UKRAINIAN MINISTRY OF HEALTH
Odessa National Medical University

Dentistry Faculty
Department of orthodontics

APPROVED
Vice-rector for scientific and pedagogical work
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GUIDELINES
For practical lesson
From the academic discipline

Dentistry Faculty, course 5
Academic discipline – Simulation dentistry: orthodontics

Discussed and approved at meetings of the
orthodontics department
Odessa National Medical University
Protocol № 1 from 31.08. 2023 y.
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Odessa – 2023

Practical Lessons
Practical Lesson №1

Topic: Causes of children's teeth and dentition defects, their prevalence. The main goal of preventive measures. Clinical and biological substantiation of children's dental
prosthesis.

Goal: To be able to identify etiological factors and pathogenesis of defects of dentition, to conduct a survey of patients with dentition defects. Be able to make impressions of dentition. Choose the treatment and prevention of this disease.

Basic concepts: Children prosthesis prevents functional, morphological and aesthetic violation of the dentition of children and adolescents. Timely and properly conducted prosthetic teeth and jaws in children saves them from cosmetic and functional defects and thus contributes to the full development of occlusion and face of a child.

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

1. Preventive examination of a 4,5-year-old child reveals an untimely missing of all the upper molars. The lower incisors contact with the mucous membrane of the palate. What is the tactics of choice?

1. Fabrication of a removable lamellar prosthesis
2. Half-yearly examination till cutting of the permanent teeth
3. Medical intervention is not required
4. Fabrication of an orthodontic appliance for deep overbite correction
5. Annual examination till cutting of the permanent teeth

2. A 10-year-old boy complains about missing teeth. Objectively: the face is symmetrical, disproportional because of shortening of the lower third. In the oral cavity: the 12, 14, 15, 17, 22, 24, 25, 27, 34, 35, 37, 44, 45, 47 teeth are missing. The X-ray picture shows partial adentia and absence of some tooth germs. Choose the most efficient prosthetic device:

1. Partial removable prosthesis for both jaws
2. Clasp dental prostheses

3. The defect should be restored by implants
4. Cantilever dental bridges
5. Bridge prostheses

3. Mother of a 3–year-old child complained about a total lack of the crown part of the 51 and 61 teeth. What tactics should the doctor choose?
1. Thin-walled cap
2. Stump tooth
3. Tooth extraction
4. Inlay
5. Metal-ceramic crown

4. An 11-year-old child complains about missing crown of the 12 tooth as a result of a trauma. The tooth root is well treated. What prosthetic construction is indicated for the removing of this defect?
1. Ilina-Marcosians pivot tooth
2. Bridge-like prosthesis supported by the 13 and 11 teeth
3. Partial removable replacing prosthesis
4. Cantilever prosthesis supported by the 11 tooth
5. Cantilever prosthesis supported by the 13 tooth

5. A 5-year-old child has missing upper molars. The lower incisors are in contact with the mucous membrane of the palate. Specify the doctor's tactics:
1. Fabricate a removable laminar denture
2. Examine the child once a year until the eruption of permanent teeth
3. Medical intervention is not needed
4. Fabricate an orthodontic appliance for the treatment of closed bite
5. Examine the child every six months until the eruption of permanent teeth

6. How to prepare the teeth for the thin-walled orthodontic crowns?
A. With the elastic
B. It is not necessary to conduct
C. Volcanic disks
D. Separation discs
E. Diamond Heads

7. What designs of prosthetics should be chosen at multiple adentia in the early primary bite period?
A. Partial removable dentures
B. Does not require prosthetics
C. Complete removable dentures
D. Bone-like prosthetics
E. –

8. Parents of a 5-year-old child complain about the absence of his lower lateral teeth and the slow chewing of food. From anamnesis: milk molars on the lower jaw were removed due to complicated caries at the age of 3. Objectively: the lower third of the face is shortened, and a deep supramental fold is determined. The lower lip is slightly twisted, thickened. All teeth are temporary, absent 85, 84, 74, 75. A distal bite is formed, complicated by the deep. Which of the following methods of treatment is a leading in the first stage?
A. Prosthetics
B. Hardware
C. Surgeon
D. Hardware and Surgeon
E. Biological

9. The parents of a 3.5-year-old girl complain about the child's difficulty of chewing. Objectively: defect of the dental arch on the lower jaw. The manufacture of partial removable prostheses is intended. Specify the term of the replacement of partial removable dentures in the primary period of the bite for Ilyin-Markosyan?
A. 6-8 months
B. Do not need to change the prosthesis to the physiological change in the teeth
C. 4 months
D. 1.5 years
E. 3 years

10. A 5-year-old child’s 54,55,64,65 teeth were removed. What causes premature removal of these teeth?
A. Shortening of dental arches
B. There is no true answer
C. Uneven growth of the jaws
D. Extension of dental arches
E. Extension of the jaws

4. Discussion of theoretical issues:

Causes of early loos of teeth:
1.Local
- Caries
- Trauma
- periodontal disease
- neoplasms

2.Systemic
- genetic defects
  *Coffin-Lowry syndrome
  *Papillon-Lefevre syndrome
  *Juvenile periodontitis and related disorders
  *Ehlers-Danlos syndrome type VIII
-neoplasms

*Najdu-Cheney syndrome (acro-osteolysis syndrome)
*Eosinofilic granuloma (laugerhans cell histocytosis)

- Immune defects
  *Diabetes mellitus
  *Inflammatory bowel disease
  *Neutropenia
  *Monocyte defects
  *Interleukin-I abnormalities
  *HIV Infection and AIDS
- Collagen defects
  *Ehlers-Danlos syndrome
- Enzyme defects
  *Acatalasia
  * Hypophosphatasia
- Acrodynia

Losing a baby tooth too early can cause dental health complications, and should be addressed as soon as possible via an evaluation by an orthodontist. Depending on the age of your child and the location of the prematurely lost tooth or teeth, interceptive orthodontic treatment may be necessary.

When baby teeth go missing too early, it can allow the other teeth around them to shift out of position. And because the permanent teeth are guided into their proper positions by the baby teeth as they erupt, misaligned baby teeth can lead to misaligned adult teeth. And misaligned adult teeth require orthodontic intervention to fix.Premature loss of teeth in children may lead to both functional and esthetic problems. Missing teeth in both anterior and posterior regions may cause malfunctions in mastication and proper pronunciation. If the missing teeth are not replaced, further complications may occur, including adjacent tooth migration, loss of alveolar bone, and irregular occlusion. Considering the sensitive nature of children, loss of teeth may cause the development of insecurities and low self esteem problems

Premature loss of deciduous teeth in the frontal area causing delay its growth, a more significant if the loss of teeth occurred in 2-3 years, and less significant if it occurred in 4-5 years. Due to a defect in the baby's dentition occurs lingual harmful habit. At rest the tongue occupies the space between the alveolar crest and lower front teeth. Constant pressure tongue promotes growth delay frontal area of the lower jaw, leading to the formation of an open bite. Tongue pressure on the crown of the lower front teeth in sagittal direction promotes progenia bite.

The loss of permanent teeth in the upper jaw in 7-9 years if untreated ends sharp growth retardation frontal area of the upper jaw, teeth shift towards the defect. Normal development of the lower jaw thus contributes overlapping top and formed progenia neutral bite.

Temporary loss of incisors in the mandible leads to displacement of canines and incisors, the remaining side of the defect, to the flattening of the frontal area of the lower jaw. The child is formed prognathic neutral bite. The space that appears between the incisors of the upper and lower jaw in the sagittal plane is filled further lower lip, there is a habit of sucking the lower lip, causing the weight of the clinical picture prognathous occlusion increases. Premature loss of lower permanent incisors (usually

due to injury) at 7-9 years of age with no orthopedic treatment also may result in the formation of a neutral prognathic bite.

Premature loss of first temporary molar can lead to tilting and moving the temporary canines and second molars temporary side defect. In a dramatic shortage of places to move there first premolar mesial second molars. Mesial temporal movement of the upper molars mesial lead to displacement of the first permanent molar, for this reason, the first permanent molars formed contact characteristic distal occlusion. With the loss of temporary lower first molar mesial displacement and subsequent second temporary molar on the first permanent molars mesial contact possible that promotes mesial bite.

Premature loss of temporary molars on one side ends teeth-alveolar extension on the opposite jaw. This dramatically deformed occlusal plane.

It should also be noted that the premature loss of temporary molars often complicated by atypical (often vestibular) provisions canines. Because mesial movement of second temporary molars and permanent molars, and hence the flattening of the dental arch in this section, the first permanent molars occupy more mesial position than they should because permanent canine that cut later finds a place in dental vestibular arc and is (usually) or palate (rarely).

Adjusted us is not an exhaustive list of possible violations of bite in the early loss of teeth suggests the importance of prevention and timely treatment.

The early loss of teeth leads not only to the development of deformation bite, but also reduces the function of chewing, promotes speech disorders and occurrence of bad habits, perhaps underdevelopment, flattening the face (with the early loss of permanent incisors), pathological changes in the temporomandibular joint (with multiple loss of molars by lowering the bite, delayed dentition).

Type defect teeth of a child is determined by the classification proposed L.M.Demnerom and V.P.Lepyhynim (1985). According to this classification of dental defects due to early removal of temporary teeth and changing bite, divided into three groups on the basis of topography, length of the defect and functional disorders.

In Group I - included included defects of the dentition, formed as a result of a premature removal of temporary tooth on one or both sides of the jaw (unilateral, bilateral).

In group II included included defects of dentition in which no two adjacent temporary teeth. The first group includes subgroup II unilateral defects, the second - bilateral.

In Group III defects attributable end, when there are two or more teeth that are located nearby. This group contains two subgroups: the first are unilateral, the second - the final bilateral defects.

This classification is advisable to resort in cases where the loss of teeth is not complicated malocclusions. If the child having significant malocclusion, he (i.e. occlusion) classified as anomalies indication of the nature of the anomaly and topography defect teeth.

Due to dynamic nature of growth in children and adolescents, prosthetic appliances must not hinder development of orofacial system, and must meet adequate esthetic and functional standards. Dental prosthetic appliances in paediatricsmust be planned with respect to the special conditions that led to tooth loss or damage. Multi-disciplinary approach is needed, under constant supervision of paediatric dentist and orthodontist, as well as regular checkups with clinical and radiographical examinations.

Prevention

Providing your child with proper dental care, including semi-yearly appointments for professional cleanings as well as the tools to brush and floss their teeth, can prevent the periodontal disease than can lead to premature tooth loss. Children who have diabetes and are at risk for decreasing bone density should undergo preventive care for osteoporosis and osteonecrosis of the jaw if needed; the child's endocrinologist or pediatrician will monitor bone density condition on a regular basis. Wearing mouthguards, helmets and other protective equipment can prevent facial trauma during sports as well.

Treatment of children with acquired defects dentition and teeth by using prosthesis (group of children who did not come irreversible changes bite) or through orthodontic correction followed by prosthetic bite.

Treating children - an important means of preserving function and preventing deformities bite. Especially large range of preventive influence prosthesis in the premature loss of teeth in the side area because it prevents abuse of the process of becoming bite height, shortening of the dental arch, the emergence teeth-alveolar elongation and bad habits, horizontal movement of teeth erupted, and intraosseous shift follicles teeth that do not erupted normalizes growth of the jaw bones.

To properly decide on what design of prosthesis indicated for children and adolescents in each case, it is necessary to know how is the growth of the dental arches and when it can be considered complete.

The development of the dental arches and alveolar processes influenced by two factors: first - growth inherent in the body as a whole; second - teething.

In pediatric practice, the following design dentures, tabs, crowns, fixed dentures, removable (partial and full), spacers between teeth and dentures with the function of stimulating growth.

5. **Topics of reports/abstracts:**

- The development of the dental arches and alveolar processes

- Prevention methods

6. **Summarizing the information received at the lesson.**
7. **List of recommended literature:**

Main:

1. Lectures on the relevant topic.
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3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
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Additional:

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. -

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Information resources

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2. Laura Mitchell,«An introduction to orthodontics», 2013 – 336 p.
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4. Національна бібліотека України імені В.І. Вернадського http://www.nbuv.gov.ua/

Practical Lesson №2

Topic: Designs of children's dentures to restore the anatomical shape of the teeth. Children's defects of dentition and their replacement with fixed dentures.

Goal: To develop the students' ability to work independently with patients to observe the rules of ethics and medical ethics. Develop the students' ability to collect medical history, examine the patient's dentition defects. Develop in students the ability to create a favorable psychological climate in dealing with children who have dental defects.

Basic concepts: Children prosthesis prevents functional, morphological and aesthetic violation of the dentition of children and adolescents. Timely and properly conducted prosthetic teeth and jaws in children saves them from cosmetic and functional defects and thus contributes to the full development of occlusion and face of a child.

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

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1. Partial removable prosthesis for both jaws
2. Clasp dental prostheses
3. The defect should be restored by implants
4. Cantilever dental bridges
5. Bridge prostheses

3. Mother of a 3–year-old child complained about a total lack of the crown part of the 51 and 61 teeth. What tactics should the doctor choose?

1. Thin-walled cap
2. Stump tooth
3. Tooth extraction
4. Inlay
5. Metal-ceramic crown

4. An 11-year-old child complains about missing crown of the 12 tooth as a result of a trauma. The tooth root is well treated. What prosthetic construction is indicated for the removing of this defect?

1. Ilina-Marcosians pivot tooth
2. Bridge-like prosthesis supported by the 13 and 11 teeth
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4. Cantilever prosthesis supported by the 11 tooth
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5. A 5-year-old child has missing upper molars. The lower incisors are in contact with the mucous membrane of the palate. Specify the doctor's tactics:

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2. Examine the child once a year until the eruption of permanent teeth
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5. Examine the child every six months until the eruption of permanent teeth

6. How to prepare the teeth for the thin-walled orthodontic crowns?
A. With the elastic
B. It is not necessary to conduct
C. Volcanic disks
D. Separation discs
E. Diamond Heads

7. What designs of prosthetics should be chosen at multiple adentia in the early primary bite period?
A. Partial removable dentures
B. Does not require prosthetics
C. Complete removable dentures
D. Bone-like prosthetics
E. –

8. Parents of a 5-year-old child complain about the absence of his lower lateral teeth and the slow chewing of food. From anamnesis: milk molars on the lower jaw were removed due to complicated caries at the age of 3. Objectively: the lower third of the face is shortened, and a deep supramental fold is determined. The lower lip is slightly twisted, thickened. All teeth are temporary, absent 85, 84, 74, 75. A distal bite is formed, complicated by the deep. Which of the following methods of treatment is a leading in the first stage?

A. **Prosthetics**
B. Hardware
C. Surgeon
D. Hardware and Surgeon
E. Biological

9. The parents of a 3.5-year-old girl complain about the child's difficulty of chewing. Objectively: defect of the dental arch on the lower jaw. The manufacture of partial removable prostheses is intended. Specify the term of the replacement of partial removable dentures in the primary period of the bite for Ilyin-Markosyan?

A. 6-8 months
B. Do not need to change the prosthesis to the physiological change in the teeth
C. 4 months
D. 1.5 years
E. 3 years

10. A 5-year-old child's 54,55,64,65 teeth were removed. What causes premature removal of these teeth?

A. Shortening of dental arches
B. There is no true answer
C. Uneven growth of the jaws
D. Extension of dental arches
E. Extension of the jaws

4. Discussion of theoretical issues:

Modern dental prosthetic appliances need to fulfill several important criteria in order to be considered as an adequate treatment options in children:

1. Rehabilitation of masticatory functions and efficiency: Prosthetic appliance needs to be able to replace missing teeth without hindering child's ability to chew. They must be designed properly to avoid or minimize wear on the opposing dentition.
2. Protection of dental pulp: Vitality of dental pulp should be preserved whenever possible. Prosthetic restoration must be made with great care not to disturb vitality of the tooth it is on (if vital), as well as adjacent or opposite teeth. Prosthetic restoration needs to be regularly checked and adjusted accounting for child's growth and development.
3. Esthetic criteria: Restoring esthetics is one of the pillars of modern dentistry. Caring about personal appearance is very important to children,

especially in adolescence1. However, there are recent studies showing that even children in preschool period (age 3-5) have a developed consciousness about their body image, and do care about how they are perceived by other children and adults alike.

4. Proper speech function: Missing teeth, especially in anterior regions, may cause improper speech. Missing incisors often lead to a child being unable to properly pronounce dental consonants such as “t”, “d”, “n” and in some languages “l”. Similar problems may develop in children with cheilo-gnato-palatoschisis. This may lead to development of improper speech patterns that need to be corrected with the aid of speech therapist after the missing teeth or defects are taken care of with adequate prosthetic appliance.

5. Prosthetic appliance must support optimal and proper development of teeth and their eruption, as well as support growth of the dental arches, and facial bones. Prosthetic appliances need to be regularly maintained, adjusted and checked in order to preventthem from inhibiting proper orofacial development. In that sense, considering the fluid and changing environment of a child’s oral cavity, all dental prosthetic appliances have a temporary function.

6. Prevention of harmful habits: missing teeth or improper teeth alignment may cause the child to develop bruxism (teeth grinding), or to repeatedly clench their jaws. These habits can also develop in some children as a response to pain, sometimes during teeth eruption. Also, kids with certain medical condition, such as cerebral palsy, are also prone to develop bruxism. The purpose of the adequate prosthetic appliance in these cases is to prevent harmful habit by stabilizing occlusion and preventing painful sensations.

7. Provision of space maintenance: If the missing teeth are not replaced with a prosthetic appliance, adjacent teeth can migrate towards the toothless alveolar ridge, leading to occlusion problems and issues with dental eruption.

8. Fixation of loosened teeth after trauma: Splints, both wire and composite or fiber, perform a crucial role in saving teeth that have been loosened by trauma. Detailed examination with x-rays must be performed before splinting the teeth, and regular dentist supervision and checkups must be maintained for the duration of the splint, to avoid ankylosis.

Stainless steel crowns first appeared as a full-tooth-coverage treatment option as early as 1950’s4. These first crowns, composed of nickel-chromium, were known tocause a variety of unwanted clinical symptoms, mostly due to allergenic potential of nickel. Since then, design of the crowns as well as metals used significantly changed5. Nowadays stainless steel crown consist of blend of metals that includes iron, chromium, carbon and 9% nickel, similar to orthodontic wires (Figure 1). Stainless steel crowns are known for their durability, as shown by Prabhakar et al in their in vitro study6. Longevity of the crown mainly relies on following proper protocols for crown placement, especially in relation to margins. If it is possible, crown margin should rest on healthy tooth substance, and if it is not, then on amalgam or glass ionomer restorative material, as studies have shown these two material demonstrate least amount of microleakage7. Possibly the greatest issue with stainless steel crowns is their poor esthetical appearance, which limits their use to restoration of

primary first and second molars. Nevertheless, these crowns may be esthetically satisfactory when veneered using composite materials in frontal teeth

Children under the edges of crowns not clear advance. In preparing the tooth crown under constant dissect just chewing or cutting surface. Separation is performed using wire to form a loop is introduced between the teeth to be prosthetics and adjacent. Crowns stamped carefully. Material for baby crowns is chromium-nickel steel and plastic. There are temporary and permanent crowns. Temporary - it orthodontic crown and prevention, which covers the teeth after trauma to preserve intact teeth pulp or to consolidate them fixed prophylactic devices. Permanent crowns cover the teeth to restore coronal tooth decay or after treatment, to fix the fixed prostheses. In order to reduce the number of visits to the doctor describe the technique of standard stainless steel crowns for restoration of deciduous molars. The selection standard crowns made by measuring the parameters of the tooth after preparation. In permanent occlusion may replace dental defects non-removable prosthetic dentures with unilateral and bilateral fixation. Children with permanent occlusion may use the three quarter crowns. Expanding and indications for use of prosthetic appliances. Defects in dentition starts in the frontal part of 15 years. With the aim to support the cosmetic use combined three quarter crowns or teeth on the pin tumbler.

Children'sdentures applied to the replacement of small defects in teeth. Prostheses with dual support for children unsuitable. Show only prosthesis with unilateral fixing or sliding. Prostheses with unilateral support in children 6 to 12 years in practice, there are few, in consequence of the need for making metal crowns abutment teeth that leads to violation cosmetic effect. ONE-SIDED bridge prostheses used in the case where the supporting teeth can be covered with combined crowns.

Retractable prosthetic appliances offered L.V.Il'yinoyu-Markosyan, applies only in the frontal area of the dentition, when the defect is the root, able to serve as support for the strengthening of pin tooth. Parts of the prosthesis fastened together using bolts. Difficult to make, besides dentition defect has to be solid.

Blocking interdental - non-removable preventive apparatus, used to prevent displacement of teeth and bite deformations that occur as a result of early loss of temporary molars. The main part of the device, locking crown, the intermediate part (round or oval bar thickness of 3-4 mm, for closing the teeth fit into the fissure intercuspal teeth-antagonists). The device is applied to the period prior to the eruption of permanent teeth bite relevant.

Resin bonded or resin retained bridges represent a minimally invasive option for replacing missing teeth. This type of restoration was first described in 1970's, and since then, they have evolved significantly in both design and materials used. First type of resin bonded bridge was known as Rochettebridge, which generated its retention through resin cement bonding through characteristic perforated metal retainer. The commonly used nickname for resin retained bridges "Maryland bridge" results from the type of electrochemical etching developed at university of Maryland, which improved and enhanced resin bonding to the metal alloy.In recent years, with development of new materials, traditional metal-resin restorations are starting to slowly be abandoned in favor of modern fiber reinforced composites. Evolution of fiber products for

dental use has transitioned from plain fibers, over pre-impregnated fibers to fully resin impregnated fibers. Most common types of fibers for use in resin bonded bridges are polyethylene, Kevlar and glass based fibers. Also, the fibers may be unidirectional, braid, mesh/network or woven. Different types of fibers and weaves create different adaptability and manageability, as well as different capabilities to distribute the force multidirectional. Majority of clinical studies of resin bonded bridges report on unidirectional fibers, and out of those, most used areglass fibers, mainly due to their strength and aesthetics17. The use of fiber reinforced composites in resin bonded restorations is advised for their favorable elastic module in comparison to metal, and better adhesion of the composite to the framework18.Main advantages of resin bonded bridges are their preservance of healthy tooth substance, needing no or minimal preparations, reduced costs and generally good patient acceptance19. Also, they tend to remove pressure from mucosae and alveolar ridge (unlike tissue supported partial denture), therefore reducing the risk of alveolar bone resorption and possible complications with future implant therapy. Careful planning is needed in order properly distribute masticatory pressure on the adjacent teeth. Resin bonded bridges are relatively easyto install, rarely require local anesthesia, and are therefore appropriate for patients who may have increased anxiety in dental chair, or are unable to devote themselves to multiple dental appointments. Patients should, however, be properly introduced and motivated of the importance of adequate oral health and hygiene, as poor maintenance of resin bonded bridge may lead to gingivitis, periodontal issues, and failure of the restoration.Most common reasons of failure of resin bonded bridge are de-bonding, and discoloration and chipping, especially in areas where fibers have been exposed to oral cavity. Majority of the studies show that the expected survival rate of resin bonded bridge to be around 72-74% after the period of 3-5 years20. Also, it is reported that anterior restorations can be expected to last longer than posterior ones, as well as that survival rate of resin bonded bridges in maxilla is higher as opposed to mandible (81% vs 56% after 2.5 years). There is however a definite lack of detailed, standardized information in the literature concerning longevity of resin bonded bridges. It is also important to note that developments of new generations of composite restoration materials and bonding agents can possibly question validity of the results of the older publications

5. **Topics of reports/abstracts:**

6. **Summarizing the information received at the lesson.**
7. **List of recommended literature:**

Main:

1. Lectures on the relevant topic.
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Practical Lesson №3

Topic: Partial removable prostheses for children. Complete removable prostheses for children. Peculiarities of orthodontic treatment of children with complicated dental defects.

Goal: To develop the students' ability to work independently with patients to observe the rules of ethics and medical ethics. Develop the students' ability to collect medical history, examine the patient's dentition defects. Develop in students the ability to create a favorable psychological climate in dealing with children who have dental defects.

Basic concepts: Children prosthesis prevents functional, morphological and aesthetic violation of the dentition of children and adolescents. Timely and properly conducted prosthetic teeth and jaws in children saves them from cosmetic and functional defects and thus contributes to the full development of occlusion and face of a child.
Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

1. Preventive examination of a 4,5-year-old child reveals an untimely missing of all the upper molars. The lower incisors contact with the mucous membrane of the palate. What is the tactics of choice?
1. Fabrication of a removable lamellar prosthesis
2. Half-yearly examination till cutting of the permanent teeth
3. Medical intervention is not required
4. Fabrication of an orthodontic appliance for deep overbite correction
5. Annual examination till cutting of the permanent teeth

2. A 10-year-old boy complains about missing teeth. Objectively: the face is symmetrical, disproportional because of shortening of the lower third. In the oral cavity: the 12, 14, 15, 17, 22, 24, 25, 27, 34, 35, 37, 44, 45, 47 teeth are missing. The X-ray picture shows partial adentia and absence of some tooth germs. Choose the most efficient prosthetic device:
1. Partial removable prosthesis for both jaws
2. Clasp dental prostheses
3. The defect should be restored by implants
4. Cantilever dental bridges

5. Bridge prostheses

3. Mother of a 3–year-old child complained about a total lack of the crown part of the 51 and 61 teeth. What tactics should the doctor choose?
1. Thin-walled cap
2. Stump tooth
3. Tooth extraction
4. Inlay
5. Metal-ceramic crown

4. An 11-year-old child complains about missing crown of the 12 tooth as a result of a trauma. The tooth root is well treated. What prosthetic construction is indicated for the removing of this defect?
1. Ilina-Marcosians pivot tooth
2. Bridge-like prosthesis supported by the 13 and 11 teeth
3. Partial removable replacing prosthesis
4. Cantilever prosthesis supported by the 11 tooth
5. Cantilever prosthesis supported by the 13 tooth

5. A 5-year-old child has missing upper molars. The lower incisors are in contact with the mucous membrane of the palate. Specify the doctor's tactics:
1. Fabricate a removable laminar denture
2. Examine the child once a year until the eruption of permanent teeth
3. Medical intervention is not needed
4. Fabricate an orthodontic appliance for the treatment of closed bite
5. Examine the child every six months until the eruption of permanent teeth

6. How to prepare the teeth for the thin-walled orthodontic crowns?
A. With the elastic
B. It is not necessary to conduct
C. Volcanic disks
D. Separation discs
E. Diamond Heads

7. What designs of prosthetics should be chosen at multiple adentia in the early primary bite period?
A. Partial removable dentures
B. Does not require prosthetics
C. Complete removable dentures
D. Bone-like prosthetics
E. –

8. Parents of a 5-year-old child complain about the absence of his lower lateral teeth and the slow chewing of food. From anamnesis: milk molars on the lower jaw were

removed due to complicated caries at the age of 3. Objectively: the lower third of the face is shortened, and a deep supramental fold is determined. The lower lip is slightly twisted, thickened. All teeth are temporary, absent 85, 84, 74, 75. A distal bite is formed, complicated by the deep. Which of the following methods of treatment is a leading in the first stage?
A. Prosthetics
B. Hardware
C. Surgeon
D. Hardware and Surgeon
E. Biological

9. The parents of a 3.5-year-old girl complain about the child's difficulty of chewing. Objectively: defect of the dental arch on the lower jaw. The manufacture of partial removable prostheses is intended. Specify the term of the replacement of partial removable dentures in the primary period of the bite for Ilyin-Markosyan?
A. 6-8 months
B. Do not need to change the prosthesis to the physiological change in the teeth
C. 4 months
D. 1.5 years
E. 3 years

10. A 5-year-old child’s 54,55,64,65 teeth were removed. What causes premature removal of these teeth?
A. Shortening of dental arches
B. There is no true answer
C. Uneven growth of the jaws
D. Extension of dental arches
E. Extension of the jaws

4. Discussion of theoretical issues:

Prosthetic restoration needs to be regularly checked and adjusted accounting for child’s growth and development.
1.Esthetic criteria: Restoring esthetics is one of the pillars of modern dentistry. Caring about personal appearance is very important to children, especially in adolescence1. However, there are recent studies showing that even children in preschool period (age 3-5) have a developed consciousness about their body image, and do care about how they are perceived by other children and adults alike2
2.Proper speech function: Missing teeth, especially in anterior regions, may cause improper speech. Missing incisors often lead to a child being unable to properly pronounce dental consonants such as “t”, “d”, “n” and in some languages “l”. Similar problems may develop in children with cheilo-gnato-palatoschisis. This may lead to development of improper speech patterns that need to be corrected with the aid of speech therapist after the missing teeth or defects are taken care of with adequate prosthetic appliance.

3.Prosthetic appliance must support optimal and proper development of teeth and their eruption, as well as support growth of the dental arches, and facial bones. Prosthetic appliances need to be regularly maintained, adjusted and checked in order to prevent them from inhibiting proper orofacial development. In that sense, considering the fluid and changing environment of a child's oral cavity, all dental prosthetic appliances have a temporary function

4. Prevention of harmful habits: missing teeth or improper teeth alignment may cause the child to develop bruxism (teeth grinding), or to repeatedly clench their jaws. These habits can also develop in some children as a response to pain, sometimes during teeth eruption. Also, kids with certain medical condition, such as cerebral palsy, are also prone to develop bruxism. The purpose of the adequate prosthetic appliance in these cases is to prevent harmful habit by stabilizing occlusion and preventing painful sensations.

5.Provision of space maintenance: If the missing teeth are not replaced with a prosthetic appliance, adjacent teeth can migrate towards the toothless alveolar ridge, leading to occlusion problems and issues with dental eruption.

6.Fixation of loosened teeth after trauma: Splints, both wire and composite or fiber, perform a crucial role in saving teeth that have been loosened by trauma. Detailed examination with x-rays must be performed before splinting the teeth, and regular dentist supervision and checkups must be maintained for the duration of the splint, to avoid ankylosis.

Partial removable dentures in children must be planned with child growth and development in mind. Design of dentures must be such that it allows for modification when teeth erupt or migrate. That said, long periods without a tooth (or tooth replacement) lead to narrowing of alveolar processes and vertical alveolar defects at sites with missing teeth, over eruption of unopposed permanent teeth, and tipping of adjacent teeth12.Tissue supported partial dentures are indicated when we expect a child to be without a tooth for a prolonged period of time, or when bone resorption and remodeling is anticipated immediately following extraction or traumatic tooth loss. They are also indicated in severe cases of hypodontia, weather hereditary (like ectodermal dysplasia) or after cyst or tumor operations. Denture fabrications in early age, especially in cases of hypodontia, may lead to significant improvements in appearance, speech and masticatory functions. Such positive changes may increase the self-confidence of the child and aid in establishing proper dietary patterns. Balla et al. showed that wearing tissue supported dentures does not inhibit maxillar or mandibular growth. Retention of tissue supported dentures in children is most often achieved by extended body of acrylic base of the denture, resting on alveolar ridge and palate (Figures 4 & 5). Clasps are only used when necessary, due to force they administer to teeth, but some orthodontic springs may be incorporated in the design of the denture to facilitate necessary tooth movement (if needed). In recent years, polyamide based dentures have started to be more frequently used in paediatric dentistry, mainly due to its higher elasticity, toxicological safety and good esthetic14. Their high adaptability and elasticity makes them especially suited for use in deciduous and mixed dentition period.

5. Topics of reports/abstracts:

6. **Summarizing the information received at the lesson.**
7. **List of recommended literature:**

Main:

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

Additional:

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.
4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.
5.Bhalajhi SI., et al. “Orthodontics: The art and science”. Sixth edition. Arya (Medi) Publication (2015)
6.William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics Elsevier Ltd (2019): 138.
7.RamyIshaq. “The Orthodontic Patient: Examination and Diagnosis”. EC DentalScience 18.5 (2019): 975-988
8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

Information resources

1. Державний Експертний Центр МОЗ України http://www.dec.gov.ua/index.php/ua/
2. Laura Mitchell,«An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України http://library.gov.ua/
4. Національна бібліотека України імені В.І. Вернадського http://www.nbuv.gov.ua/

Practical Lesson №4

Topic: Child's traumatic injuries of teeth and jaws. Clinic and treatment of tooth dislocations in childhood.

Goal: To view the current definition of clinics and treatment the most common traumatic injuries of teeth and jaws in children. Develop the ability to work independently with patients to observe the rules of ethics and medical ethics.

Basic concepts: Statistical data on the incidence of injuries in different age indicates its sequential increase in children under 14 years and adolescents aged 15-17 years. Damage to lead to various consequences, often manifested as traumatic disease that gravity may exceed the injury itself. In addition, a direct relationship between the degree of underdevelopment maxillofacial region and age of the child at the time of injury. Traumatic injuries of the face and jaws in children need special consideration, because even minor damage to the industry in early childhood may subsequently lead to a stable that is difficult to treat strains that distort the face and disrupt various functions.

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

1. A 4-year-old child got a face trauma 2 hours ago. A dentist on duty made a diagnosis: intrusive luxation of the 61 tooth. Whatisthetacticsofchoice?

A. Extractionofthe 61 tooth
B. Observation
C. Repositionofthe 61 tooth
D. Splintingofthe 61 tooth
E. Removal of pulp of the 61 tooth

4. **Discussion of theoretical issues:**

Age groups of children with traumatic injuries of front teeth (T.F.Vynohradova and Z.P. Pomarancheva-Urbanskiy):

1. Until 7 years - the root system is not yet formed;

2. From 8 to 9 years - completion of the root growth in length, but the apex remains open;

3. After 9 years - the formation of roots completely finished.

Classification of traumatic injuries of teeth proposed by N.M. Chuprinin and A.A. Anikiyenko (1974).

1. Concussion of the tooth (no injury or damage to the neurovascular bundle).

2. Luxation of the tooth.

2.1. Partial (no injury or damage to the neurovascular bundle).

2.2.Intrusive (no injury or damage neurovascular bundle).

2.3.Extrusive.

3. Fracture.

1.Crown of the tooth:

a) in the area of enamel;

b) in the area of enamel and dentine (without or with pulp exposure).

2.Cervix of the tooth:

a) above the bottom of dento-gingival pocket

b) below the bottom of dento-gingival pocket.

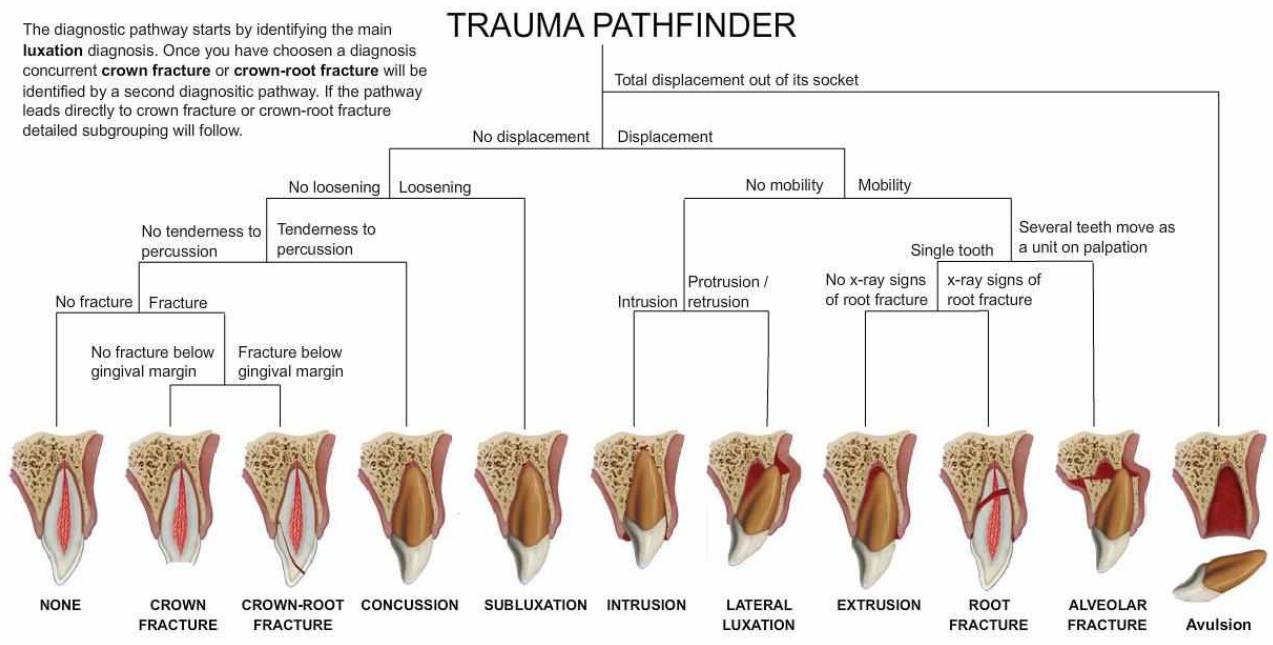
3.Root of the tooth (transverse, oblique, longitudinal, fragmented, combined):

a) in the cervical part;

b) in the middle of the root;

c) in the terminal part (without injury or damage to the neurovascular bundle, without bias or

offset).



For the diagnosis of traumatic damage to teeth need to collect a thorough history, conduct a physical examination with obligatory X-ray and electric pulp test and research in the field of dental damage.

EPT can be done only in children with roots formed, ie when the slurry reacts to slight irritation shock. When bruises and incomplete dislocations decrease tooth sensitivity to pulp of electric and thermal stimuli due to twisting or tension neurovascular bundle. Over time, these phenomena are, pulp and sensitivity is restored.

Referring rate of change radiographic characteristics of teeth in children E.A.Abakumova (1955) distinguishes between two stages: immature apex of the tooth and the closure tops. The first is characterized by the fact that in the picture are clearly visible along the channel wall of the tooth root, which thinned at the top and disperse as a bell, forming funnel-like expand the already wide openings root apex. In the second stage of the tooth root canal wall, though fully formed in its length, at the top is not closed, so in such cases clearly shows fairly wide aperture apex of the tooth.

On radiographs of temporary teeth the size of the shadow will be small, pulp chamber is relatively large and clearly visible; enamel, dentin and cement, not having such density in adults causes less intense shade than permanent teeth. If the apex of the root of temporary tooth emerging clearly visible defect filled with residue "granuloma growth", i.e. dental sac.

When temporary teeth trauma must consider the likelihood of permanent damage germs. So often have teeth removed to save permanent. In case of injury permanent tooth removal is shown in exceptional cases (repeated acute inflammation, root resorption or alveoli.

Luxation of the tooth is more common during temporary occlusion, helped reduce the length of roots during resorption and bone resorption.

When you hit the tooth having symptoms of acute traumatic pulpitis and periodontitis. Treatment is aimed at creating peace through immobilization injured tooth. (Binding ligature teeth).

It should also monitor the viability of the pulp (crown discoloration, EPT). With a significant increase testimony computer (necrosis) are shown trepanation crown, dead pulp extirpation and root canal filling to prevent occurrence of radicular cysts. Clinical observation of children with tooth-slaughter 6-8 months.

Luxation of the tooth. The clinical picture depends on the severity of the dislocation, which in turn determines the therapeutic approach. Dislocation of the tooth is often accompanied by damage to the walls of the alveoli. The threat of infection and the inflammatory process in periodontal and alveolar dislocation in the tooth than on impact or fracture of the tooth. Therefore, treatment should be aimed both at preventing osteomyelitis jaw and tooth replantation.

In case of intact tooth root with clinical and X-ray tooth reponiruyut pushed by finger ahead. With the aim of using ligature binding or produce tooth-desnevuyu-early bus from plastic. Term use of such tire 3-4 weeks and then examined the child 1 every 3 months during the year. The death of the pulp with incomplete dislocation of the permanent teeth occurs in 30% of cases.

Methods of manufacturing teeth-gingival tires to immobilize the movable tooth is as follows. Elastic weight off prints on both jaws. Obtained model. Cut the dislocated tooth crown, set it in the dentition in the correct anatomical position and fix the cement. On models mark the position of central occlusion. Self-curing plastic cover the entire dentition model and establish a central parity. Produce handling tires. Term use of tire-3 weeks.

When occurs temporary tooth intrusive luxation should wait to apply treatment policy, because in some cases several days after injury intrusive tooth can independently move into the correct position. When complete dislocation of the temporary tooth shown to remove it.

The principle of therapeutic management in trauma permanent teeth is the use of organ activities. When you hit the necessary permanent tooth electrometric control (EPT) for the viability of the pulp. In the event of her death shows tooth trepanation, pulp extirpation and root-canalМожливідваваріантинеповноговивихузуба.

In the first case the tooth is not completely loses touch with the hole but moves vertically in position of supraocclusion. In the second case the tooth maintains communication with the hole but moves vertically in position infraocclusion. Thus there is a shortening of the visible part of the crown, while the root perforated bottom hole - intrusive complete dislocation. When dislocation killed one or two front teeth is necessary to reposition them. After establishing the integrity of the tooth root with X-ray and identify the formation of his apex up treatment plan.

In terms of driving front teeth distinguish five degrees of shortening crown: 1 degree - 1 mm relative to the adjacent tooth; 2 - 2 mm; 3 - 3 mm; 4 - 4 mm; 5 - 5 mm or more.

When shortening 1 and 2 degrees and preserving intact neurovascular bundle reposition of the tooth and fixed with ligatures standing next to intact teeth by the method of "eight". Fixing -2-3 weeks.

At 3.4 and 5 degrees shortening using orthopedic design. They may be removable and non-removable, single and on both jaws, plastic and metal. Permanent tooth extraction, install it in the correct position and a good record of the entire period of healing provides a kappa of plastic.

Intrusion - Diagnostic signs

Description	Displacement of the tooth into the alveolar bone. This injury is accompanied by comminution or fracture of the alveolar socket.
Visual signs	The tooth is displaced axially into the alveolar bone.
Percussion test	Usually gives a high metallic (ankylotic) sound.
Mobility test	The tooth is immobile.
Sensibility test	Sensibility test will likely give negative response. In immature, not fully developed teeth, pulpal revascularization may occur.
Radiographic findings	The periodontal ligament space may be absent from all or part of the root. The cemento-enamel junction is located more apically in the intruded tooth than in adjacent non-injured teeth, at times even apical to the marginal bone level.
Radiographs recommended	As a routine: Occlusal, periapical exposure and lateral view from the mesial or distal aspect of the tooth in question. If the tooth is totally intruded a lateral exposure is indicated to make sure the tooth has not penetrated the nasal cavity.

Extrusion - Diagnostic signs

Definition	Partial displacement of the tooth out of its alveolar socket. An injury to the tooth characterized by partial or total separation of the periodontal ligament resulting in loosening and displacement of the tooth. The alveolar socket bone is intact in an extrusion injury as opposed to a lateral luxation injury. Apart from axial displacement, the tooth will usually have an element of protusion or retrusion. In severe extrusion injuries the retrusion/protrusion element can be very pronounced. In some cases it can be more pronounced than the extrusive element.
Visual signs	Appears elongated.
Percussion test	Tender.
Mobility test	Excessively mobile.
Sensibility test	Usually lack of response except for teeth with minor displacements. The test is important in assessing risk of healing complications. A positive result to the initial test indicates a reduced risk of later pulp necrosis. In immature, not fully developed teeth, pulpal revascularization usually occurs. In mature teeth pulp revascularization sometimes occurs.
Radiographic findings	Increased periapical ligament space.
Radiographs recommended	As a routine: Occlusal, periapical exposure and view from the mesial or distal aspect of the tooth.

Typeoftrauma	Complications

Incomplete luxation of temporary tooth	Obliteration of the cavity and the tooth root. Preterm resorption of tooth root. Fusion tooth root of the hole and then abuse physiological movement of temporary tooth.
Partial intrusive luxation of temporary tooth	Changing the shape, size crowns and roots of permanent tooth. Violation of the formation and mineralization of hard tissues. Changing the timing of the eruption, abnormalities provision of permanent tooth
Complete luxation of the temporary tooth	Premature eruption of permanent teeth of the same name. Teeth-alveolar extension of the tooth-antagonist. Inclination and horizontal movement of adjacent teeth. Moving permanent teeth germs.
Concussion and partial luxation of permanent teeth with immature root	Stopping the formation of permanent tooth root. Education cysts.
Partial intrusion and luxation of the permanent tooth	Delayed tooth eruption to 2 years. Resorption damaged root of the tooth in terms of 2 to 7 years after injury.

with uncompleted root	
Subluxation	An injury to the supporting structure resulting in increased mobility, but without displacement of the tooth. Bleeding from the gingival sulcus confirms the diagnosis.

5. **Topics of reports/abstracts:**

6. **Summarizing the information received at the lesson.**
7. **List of recommended literature:**

Main:

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.

3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
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Additional:

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
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Information resources

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4. Національна бібліотека України імені В.І. Вернадського http://www.nbuv.gov.ua/

Practical Lesson №5

Topic: Clinic and treatment of tooth fractures.
Goal: To view the current definition of clinics and treatment the most common traumatic injuries of teeth and jaws in children. Develop the ability to work independently with patients to observe the rules of ethics and medical ethics.

Basic concepts: Statistical data on the incidence of injuries in different age indicates its sequential increase in children under 14 years and adolescents aged 15-17 years. Damage to lead to various consequences, often manifested as traumatic disease that gravity may exceed the injury itself. In addition, a direct relationship between the degree of underdevelopment maxillofacial region and age of the child at the time of injury. Traumatic injuries of the face and jaws in children need special consideration, because even minor damage to the industry in early childhood may subsequently lead to a stable that is difficult to treat strains that distort the face and disrupt various functions.

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

1. A 4-year-old child got a face trauma 2 hours ago. A dentist on duty made a diagnosis: intrusive luxation of the 61 tooth. Whatisthetacticsofchoice?

A. Extractionofthe 61 tooth
B. Observation
C. Repositionofthe 61 tooth
D. Splintingofthe 61 tooth
E. Removal of pulp of the 61 tooth

4. **Discussion of theoretical issues:**

For the diagnosis of traumatic damage to teeth need to collect a thorough history, conduct a physical examination with obligatory X-ray and electric pulp test and research in the field of dental damage.

EPT can be done only in children with roots formed, ie when the slurry reacts to slight irritation shock. When bruises and incomplete dislocations decrease tooth

sensitivity to pulp of electric and thermal stimuli due to twisting or tension neurovascular bundle. Over time, these phenomena are, pulp and sensitivity is restored.

Referring rate of change radiographic characteristics of teeth in children E.A.Abakumova (1955) distinguishes between two stages: immature apex of the tooth and the closure tops. The first is characterized by the fact that in the picture are clearly visible along the channel wall of the tooth root, which thinned at the top and disperse as a bell, forming funnel-like expand the already wide openings root apex. In the second stage of the tooth root canal wall, though fully formed in its length, at the top is not closed, so in such cases clearly shows fairly wide aperture apex of the tooth.

On radiographs of temporary teeth the size of the shadow will be small, pulp chamber is relatively large and clearly visible; enamel, dentin and cement, not having such density in adults causes less intense shade than permanent teeth. If the apex of the root of temporary tooth emerging clearly visible defect filled with residue "granuloma growth", i.e. dental sac.

When temporary teeth trauma must consider the likelihood of permanent damage germs. So often have teeth removed to save permanent. In case of injury permanent tooth removal is shown in exceptional cases (repeated acute inflammation, root resorption or alveolitis.

Crown fracture is most common in children 7-8 years old on the central incisors of the upper jaw. Injury can occur at different levels of disclosure or crowns without pulp exposure. Depending on distinguish the direction of fracture transverse, longitudinal and oblique fractures.

Root fracture, with a shift and no shift of fragments. Often combined with fracture dislocation of the tooth and the wall of the hole.

When choosing a treatment strategy should take into account the location of the fracture line, its length, disclosed or intact pulp of the tooth root formation degree and severity of the pathological process caused by trauma.

When timer of the enamel dentine shows polishing of the sharp edges along the line of fracture rubbing fluoride toothpastes for removing traumatic hypersensitivity. Apply a phased withdrawal method of tooth occlusion to eliminate the defect crown.

When all timer cutting edge, even without pulp exposure may develop traumatic pulpit. This case shows the pulpit biological treatment with subsequent coating of the tooth crown thin-walled metal, which is recommended to wear full root formation, narrowing the tooth cavity and the formation of a layer of dentin substitute.

Clinics and orthopedic treatment of fractures of the alveolar processes of the upper and lower jaws

Anatomical and physiological features of dentition in children of all ages (the formation of temporary occlusion formed milky bite during the "wear and tear" and the change of milk teeth during formation and during the established permanent occlusion, different resistance bone alveolar process in these times) determine the need for a differentiated approach the sample treatment strategy with traumatic injuries of the anatomical region.

Methods reposition and fixation of fractures of the jaw used in adults can not be used in children under 15-16 years. Requirements for tires and vehicles used in pediatric practice, should provide a secure fit, should not be cumbersome and inhibit the growth of the jaws, should allow to transform chewing load and use it as a factor that stimulates bone formation. And should provide maximum organ effect.

When choosing a prosthetic restoration etc. mandibular fractures in children should be possible to preserve the function of the damaged jaw. Medical device and must not tire completely and the long term limit movement in the temporomandibular joint (risk factor for arthritis, arthrosis, and subsequently ankylosis). In order to prevent complications like fractures TMJ, besides fixing equipment, recommended activating Andersen -Hoyplya, spring joint Frenkel and other devices.

A characteristic feature of the lower jaw injuries in children is subfracture, majority single and subosseus; double-fractures are not uncommon.

In pediatric practice widely used bus soldered with thin-walled metal crowns. For the manufacture of such tires during milk bite as a support using canines and second molars, and during alternating bite - teeth and first permanent molars on one or both jaws. Mandibular fracture on tooth number (angle, branch, base and neck articular process) intraoral immobilization tires must be solderedbimaxillary. It should be used in conjunction with an external bandage that has a kind of helmet, which includes

internal pockets for introduction of these chute-like inserts of elastic plastics that function as splints for the chin, jaw angles and branches. This bandage keeps debris from the landslide creates a frame pushes the lower jaw to the fixed position in the top of fissure-cusp contact pairs of posterior teeth.

At the root system formed teeth in adolescents orthopedic treatment is carried out as well as the adults.

Enamel fracture - diagnostic signs

Description	A fracture confined to the enamel with loss of tooth structure.
Visual signs	Visible loss of enamel. No visible sign of exposed dentin.
Percussion test	Not tender. If tenderness is observed evaluate the tooth for a possible luxation or root fracture injury.
Mobility test	Normal mobility.
Sensibility pulp test	Usually positive. The test may be negative initially indicating transient pulpal damage. Monitor pulpal response until a definitive pulpal diagnosis can be made. The test is important in assessing risk of future healing complications. A lack of response at the initial examination indicates an increased risk of later pulp necrosis.
Radiographic findings	The enamel loss is visible.
Radiographs recommended	Periapical, occlusal and eccentric exposures. They are recommended in order to rule out the possible presence of a root fracture or a luxation injury.

Treatment

- If a tooth fragment is available, it can be bonded to the tooth.
- Grinding or restoration with composite resin depending on the extent and location of the fracture.
- Three angulations (periapical, occlusal and eccentric exposures) should be used in the radiographic examination to rule out luxation injuries or root fractures.

Follow-up

- Clinical and radiographic control at 6-8 weeks and 1 year.

Enamel-dentin fracture - diagnostic signs

Description	A fracture confined to enamel and dentin with loss of tooth structure, but not involving the pulp.
Visual signs	Visible loss of enamel and dentin. No visible sign of exposed pulp tissue.
Percussion test	Not tender. If tenderness is observed evaluate the tooth for possible luxation or root fracture injury.
Mobility test	Normal mobility.
Sensibility pulp test	Usually positive. The test may be negative initially indicating transient pulpal damage. Monitor pulpal response until a definitive pulpal diagnosis can be made. The test is important in assessing future risk of healing complications. A lack of response at the initial examination indicates an increased risk of later pulp necrosis.
Radiographic findings	The enamel-dentin loss is visible.
Radiographs recommended	Periapical, occlusal and eccentric exposure. They are recommended in order to rule out displacement or the possible presence of a root fracture. Radiograph of lip or cheek lacerations to search for tooth fragments or foreign material.

Treatment

- If a tooth fragment is available, it can be bonded to the tooth. Otherwise perform a provisional treatment by covering the exposed dentin with glass-ionomer or a permanent restoration using a bonding agent and composite resin.
- The definitive treatment for the fractured crown is restoration with accepted dental restorative materials.
- Three angulations (periapical, occlusal and eccentric exposures) should be used in the radiographic examination to rule out displacement or fracture of the root.
- Radiograph of lip or cheek lacerations to search for tooth fragments or foreign material

Follow-up

- Clinical and radiographic control at 6-8 weeks and 1 year

Enamel-dentin-pulp fracture - diagnostic signs

Description	A fracture involving enamel and dentin with loss of tooth structure and exposure of the pulp.
Visual signs	Visible loss of enamel and dentin and exposed pulp tissue.
Percussion test	Not tender. If tenderness is observed evaluate the tooth for luxation or root fracture injury.
Mobility test	Normal mobility.
Sensibility test	Usually positive. The test is important in assessing risk of future healing complications. A lack of response at the initial examination indicates an increased risk of later pulp necrosis.
Radiographic findings	The loss of tooth substance is visible.
Radiographs recommended	Periapical, occlusal and eccentric exposure. They are recommended in order to rule out displacement or the possible presence of a luxation or a root fracture. Radiograph of lip or cheek lacerations to search for tooth fragments or foreign material.

Crown-root fracture with pulp involvement - Diagnostic signs

Definition	A fracture involving enamel, dentin, and cementum with loss of tooth structure, and exposure of the pulp.
Visual signs	Crown fracture extending below gingival margin.
Percussion test	Tender.
Mobility test	Coronal fragment mobile.
Sensibility test	Usually positive for apical fragment.
Radiographic findings	Apical extension of fracture usually not visible.
Radiographs recommended	Periapical and occlusal exposure. A cone beam exposure can reveal the whole fracture extension.

Root fracture - diagnostic signs

Description	A fracture confined to the root of the tooth involving cementum, dentin, and the pulp. Root fractures can be further classified by whether the coronal fragment is displaced (see luxation injuries).
Visual signs	The coronal segment may be mobile and in some cases displaced. Transient crown discoloration (red or grey) may occur. Bleeding from the gingival sulcus may be noted.
Percussion test	The tooth may be tender.
Mobility test	The coronal segment may be mobile.
Sensibility pulp test	Sensibility testing may give negative results initially, indicating transient or permanent neural damage. Monitoring the status of the pulp is recommended. The pulp sensibility test is usually negative for root fractures except for teeth with minor displacements. The test is important in assessing risk of healing complications. A positive sensibility test at the initial examination indicates a significantly reduced risk of later pulp necrosis.
Radiographic findings	The root fracture line is usually visible. The fracture involves the root of the tooth and is in a horizontal or diagonal plane.
Radiographs recommended	Periapical, occlusal and eccentric exposures. An occlusal exposure is optimal for locating root fractures in the apical and middle third. Bisecting angle exposure or 90^{0} degree angulation exposure is needed to locate the fractures in the cervical third of the root.

Localization of fracture line

- An occlusal exposure is optimal for locating root fractures in the apical and middle third.
- Bisecting angle exposure or 90^{0} degree angulation exposure is needed to locate fractures in the cervical third of the root.

Treatment

For root fractures where the coronal fragment have been avulsed out of the socket please use the treatment guidelines for avulsion otherwise proceed as described below.

- Rinse exposed root surface with saline before repositioning.If displaced, reposition the coronal segment of the tooth as soon as possible.
- Check that correct position has been reached radiographically.
- Stabilize the tooth with a flexible splint for 4 weeks. If the root fracture is near the cervical area of the tooth stabilization is benificial for a longer period of time (up to 4 months).
- Monitor healing for at least 1 year to determine pulpal status. If pulp necrosis develops, then root canal treatment of the coronal tooth segment to the fracture line is indicated.

Patient instructions

- Soft food for 1 week
- Good healing following an injury to the teeth and oral tissues depends, in part, on good oral hygiene. Brushing with a soft brush and rinsing with chlorhexidine 0.1 % is beneficial to prevent accumulation of plaque and debris.

Follow-up

- Splint removal and clinical and radiographic control after 4 weeks in apical third and mid-root fractures. However, if the root fracture is near the cervical area the splint should be kept on for up to 4 months.
- Clinical and radiographic control after 6-8 weeks.
- Clinical and radiographic control after 4 months. If the root fracture is near the cervical area the splint should be removed at this session.
- Clinical and radiographic control after 6 months, 1 year and yearly for 5 years.
- Follow-up may include endodontic treatment of the coronal fragment if pulp necrosis develops. The decision for endodontic treatment may be taken after three months of follow-up if the tooth still does not respond to electrometric or thermal pulp testing and if radiographs show a radiolucency next to the fracture line.

Alveolar fracture - diagnostic signs

Description	A fracture of the alveolar process; may or may not involve the alveolar socket. Teeth associated with alveolar fractures are characterized by mobility of the alveolar process; several teeth typically will move as a unit when mobility is checked. Occlusal interference is often present
Visual signs	Displacement of an alveolar segment. An occlusal change due to misalignment of the fractured alveolar segment is often noted.
Percussion test	Tender.
Mobility test	Entire segment mobile and moves as a unit.
Sensibility pulp test	Usually negative.
Radiographic findings	The vertical line of the fracture may run along the PDL or in the septum. The horizontal line may be located at any level, from the marginal bone to the basal bone. An associated root fracture may be present.
Radiographs recommended	Occlusal, periapical and eccentric exposure. A panoramic or a cone beam exposure may be useful.

Treatment

- Manual repositioning or repositioning using forceps of the displaced segment.
- Stabilize the segment with flexible splinting for 4 weeks

Patient instructions

- Soft food for 1 week
- Good healing following an injury to the teeth and oral tissues depends, in part, on good oral hygiene. Brushing with a soft brush and rinsing with chlorhexidine 0.1 % is beneficial to prevent accumulation of plaque and debris.

Follow-up

- Splint removal and clinical and radiographic control after 4 weeks.
- Clinical and radiographic control after 6-8 weeks, 4 months, 6 months, 1 year and yearly for 5 years

5. **Topics of reports/abstracts:**

6. **Summarizing the information received at the lesson.**
7. **List of recommended literature:**

Main:

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

Additional:

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.

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7.RamyIshaq. “The Orthodontic Patient: Examination and Diagnosis”. EC DentalScience 18.5 (2019): 975-988
8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

Information resources

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2. Laura Mitchell,«An introduction to orthodontics», 2013 – 336 p.
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4. Національна бібліотека України імені В.І. Вернадського http://www.nbuv.gov.ua/

Practical Lesson №6

Topic: Etiology, pathogenesis, diagnosis and prevention of congenital facial defects. Morphological and functional disorders of the maxillofacial apparatus and the body as a whole. Classification of congenital clefts of the maxillofacial area.

Goal: To learn provision of orthopedic treatment methods of congenital nonunion hard and soft palate, traumatic injuries of teeth and jaws, teeth and defects of dentition in children.

Basic concepts: : in the process of learning the student must apply their knowledge and skills and special techniques of clinical examination of patients instrumental methods, methods of orthopedic treatment of defects of teeth and dentition.

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

1. A child was born with the cleft of the alveolar process, hard and soft palate. The optimal way to feed the child before the surgery will be through:

A. Obturator
B. Enteric feeding tube
C. Baby bottle nipple
D. Spoon
E. -

2. A child was born with the cleft of the alveolar process, hard and soft palate. The orthodontist was invited to the hospital where the child was born. Why is the doctor's visit needed?

A. To make an obturator
B. Advise
C. Inspect the child
D. Give tips for breastfeeding a baby
E. -

3. An orthodontist examined a 5-year-old child after the uranoplasty. During which time, children with congenital incompatibilities of the palate are under the supervision of an orthodontist?

A. Up to 15 years
B. By forming a temporary bite
C. Up to 9 years (period of change of the anterior teeth)
D. Up to 12-13 years (the period of change in lateral teeth)
E. Up to 18 years

4. A child was born with a cleft palate. The doctor recommended an obturator. What is the optimal time for making an obturator of the palate cleft?

A. In the maternity home 3 - 4 years
B. 1 year

C. 6 to 12 months

D. 3 - 4 years

E. 5 - 6 years

5. Parents of a 3-year-old child with a defect of hard and soft palate come to an orthodontist. The doctor plans to make a floating Chasovska obturator. Which refractory material should be used

A. Thermoplastic or silicone

B. Stomaggin

C. Gypsum

D. Hydrocolonoid

E. Eugenol-oxitsink

4. Discussion of theoretical issues:

Congenital clefts of hard and soft palate.

Congenital cleft are: face (macrostoma), nose, upper and lower lip, alveolar bone, and of which the palate.Cleft lip and palate happen when a baby develops in the womb. Researchers don't know the exact cause of cleft lip and palate. It can be caused by genes passed on from parents, as well as environmental factors. Environmental factors include taking certain medicines during pregnancy, smoking or drinking alcohol during pregnancy, infections, and too little vitamin B and folic acid during pregnancy. Parents who have cleft lip, cleft palate, or both, or who have other kids with the problem are at an increased risk of having babies with the defect.

Beyond the appearance of a cleft lip, other possible complications include:

Feeding trouble. Feeding trouble happens more with cleft palate defects. Your baby may not be able to suck properly because the roof of the mouth is not formed completely.

Ear infections and hearing loss. Ear infections are often caused by problems with the tubes that connect the middle ear to the throat (eustachian tubes).

Infections that come back again and again can then lead to hearing loss.

Speech and language delay. Muscles involved with speech may not work well. This can lead to a delay in speech or odd speech. Talk with your child's healthcare provider about seeing a speech therapist.

Dental problems. The child may have problems with his or her teeth. Your child may need to see an orthodontist. This is a dentist with special training to treat teeth that are out of line and problems with the jaw.

For the diagnosis of nonunion upper lip and palate clinic using clinical and anatomical classification.

Classification of the upper lip clefts by A. A. Kolyesov.

1. Hidden congenital cleft upper lip (unilateral or bilateral).
2. Congenital incomplete cleft upper lip:

a) without deformation of skin and cartilage department nose (single or dual);

b) deformation of skin and cartilage department nose (single or dual).

3. Congenital complete cleft upper lip (single or dual).

Classification palate clefts by AA Kolesov.

1.Congenital cleft soft palate:

a) hidden; b) incomplete; c) complete.

2. Congenital cleft palate and swift:

a) hidden; b) incomplete; c) complete.

3. Congenital complete cleft Soft, hard palate and alveolar bone (single or dual).
4. Congenital cleft alveolar bone and anterior palate:

a) incomplete (single or dual); b) complete (single or dual).

But perhaps a different ratio of nonunion forms the upper lip and palate.

Anatomical and functional disorders.

In the process of formation, development and growth of the bones of the face and jaw occurs in some cases of violations of varying degrees: no the whole body or part of it, the complete absence of face (aprozopiya), no middle sections of the upper jaw bone, nose (tsyklopia), lack of mandible (agnatia). These defects are usually incompatible with human life, so children die in the first days after birth. Such severe malformations are relatively rare. But often

there is a group of congenital defects in which in the initial stage of the formation of the face, laying its individual parts is true, but later violated the development, so there are:

- Congenital cleft face (oblique, transverse, a cleft lip and palate);

Clinical examination of children with congenital disabilities face.

Clinical management of children with jaws and face clefts based on effective use of preventive and therapeutic measures during the whole development of the child. At present, both in Ukraine and abroad, well-organized network of health care centers to assist children with similar disabilities.

Clinical examination of children with disabilities should be made until 14-15 years. Tasks health center performs together a group of experts, but in a hospital, orthodontist, surgeon, internist, pediatrician, neuropsychiatrist, ENT specialist, Methodist exercise therapy, speech therapy, medical geneticist.

Cleft upper lip, upper lip and alveolar bone.

Plastic unilateral cleft lip at 2.5-3 months, bilateral - 3-5 months. After heylorynoplastyky anomalies of individual teeth by eliminating purpose hardware or massage treatment by conventional methods. Orthodontic treatment involves removal of the testimony supernumerary teeth, correct the position of the front teeth, alveolar bone defect replacement and lateral incisor by prosthetics, monitoring the formation of permanent occlusion. After surgery should send a warning to narrowing and shortening of the upper jaw. During the period of temporary occlusion and early AC mainly using removable devices with different screws and labial pelota. Since the eruption of the first permanent molars can use non-removable. At a later age bracket used equipment.

Soft palate cleft or soft and hard palate cleft.

Comprehensive and consistent assistance should be after childbirth to complete the formation of the facial bones of the skeleton. Orthodontic treatment is carried out in two stages: preoperative - the method of Mc Neil; use of floating obturator, creating favorable conditions for uranoplastyky by reducing the size of the hard palate. For this purpose, the device used for the construction of the palatine processes. The duration of use of the device from 4-6 months to 1 year, depending on the child's age, the gap width, the degree of deformation and underdevelopment palatine processes, the general

condition of the child. When surgery is necessary to address measures to prevent narrowing and shortening of the upper jaw. During the period of temporary occlusion and early AC mainly using removable devices with different screws and labial pelota. Since the eruption of the first permanent molars could be used bi- or non-removable kvadriheliks. In a later age bracket used equipment.

Unilateral of through cleft upper lip, alveolar process and palate.

Kids period: the child must assist the principle of emergency, using preforming plate, which can be made individually for each child by laboratory methods, and kits used standard preforming orthodontic devices. By uranoplastics used obturator and apparatus for the construction of the palatine processes.

By early correction forms the upper jaw can use the method of Mc Neil. The period of temporary teeth: treatment is to stimulate the growth of the upper jaw. It is necessary to direct the efforts to normalize the functions of dentition using gymnastics and orthodontic appliances. At the end of the period of temporary teeth should take steps to delay the growth of the mandible in length using hats with chin sling and pozarotovoyu rubber traction. The controller features Frenkel type III.

Period of variable bite. Radical uranoplastics. After 2 weeks are referred to a speech therapist. Shaper Built palate using protective plastic. The question of removal supernumerary teeth located in the area of nonunion should decide after evaluating radiographs of the upper jaw. Supernumerary teeth prevent further narrowing of the upper jaw. To restore functions using functional - active and functional - directing orthodontic appliances.

Standing bite: treatment of adolescents with sharply pronounced teeth abnormalities carried mainly by means of fixed orthodontic appliances, apparatus of the inclined plane, inter-jaw traction. At the close arrangement of the teeth, the presence of sagittal gap between the cutter and the normal value of language for the purpose of orthodontic treatment removed some teeth, usually the first permanent molars. Adult Treatment is most successful when pre compact-osteotomy transported in the teeth.

Two-way through-cleft upper lip, alveolar process and palate.

Treatment is complex. It should be conducted in specialized centers for clinical examination of children with congenital malformations of maxillofacial region. In assisting participating, pediatrician, surgeon, dentist, anesthesiologist, orthodontist, ENT, speech therapist, psychologist and others. experts. Optimal period beginning orthodontic treatment there. It depends on the severity of morphological, aesthetic and functional disorders.

Preoperative orthodontic treatment

Used removable orthodontic and obturator or a floating, fixed (such Ilyina-Markosyan) and reduces symptoms of disorders bite after surgery.

The use of orthodontic devices aimed at correcting the position of individual teeth.

Removing supernumerary teeth indicated.

Treatment of anomalies bite.

If necessary prosthetics.

Myogymnastic for soft palate. Massage.

Monitoring the formation of permanent occlusion.

Kids period - the removable device with screws, springs, spikes and extraoral of elastic rods.

Bite temporary teeth - after treatment in veloplastics as if of through unilateral unilateral cleft upper lip, alveolar process and palate.

Removable bite - expansion of the upper jaw using screws, springs, machine Derihsvaylera, Levkovych. In the absence of bone inter-jaw shown devices - prostheses. Devices with non-removable inter-jaw traction. Retention period lasts until the end of the change of teeth.

Prosthetic plastic using prostheses with artificial teeth and Klammer. Non-removable prosthetic appliances. Removable plastic dental prosthesis to the second row.

5. **Topics of reports/abstracts:**

6. **Summarizing the information received at the lesson.**
7. **List of recommended literature:**

Main:

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Practical Lesson №7

Topic: Orthopedic treatment of congenital clefts of the hard and soft palate. Complex staged treatment of children with upper lip, palate and alveolar bone clefts. The role of orthodontic treatment in the rehabilitation of children with congenital facial malformation.

Goal: To learn provision of orthopedic treatment methods of congenital nonunion hard and soft palate, traumatic injuries of teeth and jaws, teeth and defects of dentition in children.

Basic concepts: : in the process of learning the student must apply their knowledge and skills and special techniques of clinical examination of patients instrumental methods, methods of orthopedic treatment of defects of teeth and dentition.

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

1. A child was born with the cleft of the alveolar process, hard and soft palate. The optimal way to feed the child before the surgery will be through:

A. Obturator

B. Enteric feeding tube

C. Baby bottle nipple

D. Spoon

E. -

2. A child was born with the cleft of the alveolar process, hard and soft palate. The orthodontist was invited to the hospital where the child was born. Why is the doctor's visit needed?

A. To make an obturator

B. Advise

C. Inspect the child

D. Give tips for breastfeeding a baby

E. -

3. An orthodontist examined a 5-year-old child after the uranoplasty. During which time, children with congenital incompatibilities of the palate are under the supervision of an orthodontist?

A. Up to 15 years

B. By forming a temporary bite

C. Up to 9 years (period of change of the anterior teeth)

D. Up to 12-13 years (the period of change in lateral teeth)

E. Up to 18 years

4. A child was born with a cleft palate. The doctor recommended an obturator. What is the optimal time for making an obturator of the palate cleft?

A. In the maternity home 3 - 4 years

B. 1 year

C. 6 to 12 months

D. 3 - 4 years

E. 5 - 6 years

5. Parents of a 3-year-old child with a defect of hard and soft palate come to an orthodontist. The doctor plans to make a floating Chasovska obturator. Which refractory material should be used

A. Thermoplastic or silicone

B. Stomaggin

C. Gypsum

D. Hydrocolonoid

E. Eugenol-oxitsink

4. Discussion of theoretical issues:

Anatomical and functional disorders.

In the process of formation, development and growth of the bones of the face and jaw occurs in some cases of violations of varying degrees: no the whole body or part of it, the complete absence of face (aprozopiya), no middle sections of the upper jaw bone, nose (tsyklopia), lack of mandible (agnatia). These defects are usually incompatible with human life, so children die in the first days after birth. Such severe malformations are relatively rare. But often there is a group of congenital defects in which in the initial stage of the formation of the face, laying its individual parts is true, but later violated the development, so there are:

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Unilateral of through cleft upper lip, alveolar process and palate.

Kids period: the child must assist the principle of emergency, using preforming plate, which can be made individually for each child by laboratory methods, and kits used standard preforming orthodontic devices. By uranoplastics used obturator and apparatus for the construction of the palatine processes.

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Removing supernumerary teeth indicated.

Treatment of anomalies bite.

If necessary prosthetics.

Myogymnastic for soft palate. Massage.

Monitoring the formation of permanent occlusion.

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4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

Additional:

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3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.
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7.RamyIshaq. “The Orthodontic Patient: Examination and Diagnosis”. EC DentalScience 18.5 (2019): 975-988
8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

Information resources

1. Державний Експертний Центр МОЗ України http://www.dec.gov.ua/index.php/ua/
2. Laura Mitchell,«An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України http://library.gov.ua/
4. Національна бібліотека України імені В.І. Вернадського http://www.nbuv.gov.ua/

Practical Lesson №8

Topic: Fixed and removable orthodontic appliances

Goal: To master the basic structural elements of removable and fixed orthodontic appliances, indications for use.

Basic concepts student of the 5th year dental faculty should know the basic structural elements of removable and fixed orthodontic appliances

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

1. An 8-year-old child is found to have a convex facial profile,a forced closing of lips, and a sagittal gap of 7 mm. Eschler-Bittner's test produces some face improvement. This abnormality can be removed by means of Frankel's type I regulator. What is the mechanism of action of this device?

A. Normalization of labial, buccal and lingual pressure as well as of mandible position
B. Normalization of upper front teeth position by means of a vestibular bar
C. Maxillary expansion by means of a screw
D. Inhibition of maxilla growth in the sagittal direction
E. Normalization of mandible position and growth by means of intermandibular traction

2. The therapeutic efficacy of which strength is recommended in orthodontics?

A. 17-20 g / cm2

B. 30-45 g / cm2

C. 27-40 g / cm2

D. 65 g / c m2

E. 3-5 g / cm2

3. A 12 -year-old patient was treated by an orthodontist for a false progeny for 10 months using a permanent Engle's arch. What is the optimal duration of the retention period?

A. 20 months

B. 6 months

C. 12 months

D. 3 months

E. 10 months

4. During an examination of children at school, the orthodontist found that some of them had the tension of the colonic muscle of the mouth. Which of the following appliances can be used for gymnastics of the circular muscle?

A. Dass's appliance

B. Engle's appliance

C. Bryukl's appliance

D. Frenkel function controller

E. Andresen-Goipl's appliance

5. The orthodontist registers a 3.5- year -old child with the thumb sucking and the "infantile" type of swallowing. During the examination: the temporary teeth

bite and the direct contact of cusps are observed. Which prophylactic device is most appropriate in this case?

A. Vestibular-oral Kraus's appliance

B. Frenkel's functional appliance

C. The standard vestibular Schoncher's appliance

D. Bionator Jansen

E. Appliance with Rudolf's hinges

6. A 6-year-old child examined by an orthodontist on a dispensary account is assigned a complex of myogemnastric exercises with a lip balancer. What muscles will be effected by the prescribed treatment?

A. The circular muscle of the mouth

B. The muscles that move the lower jaw aside

C. Harsh muscle

D. Muscles that raise the lower jaw

E. Muscles that lower the lower jaw

7. A 5-year−old child has a malocclusion and is treated by using an appliance with a vestibular bumper. What effects does the vestibular bumper have?

A. Neutralizes the pressure of the circular muscle of the mouth

B. Normalizes swallowing function

C. Changes the position of the tongue

D. Changes the inclination of the upper frontal teeth

E. Stimulates the growth of the lateral areas of the jaw

8. Which elements do the functionally-guiding appliances include?

A. Sloping plane

B. Rubber pull

C. Protective shields

D. Screws and springs

E. Omega-shaped loop

9. A 4-year-old child with an oral respiration came to the orthodontist. In anamnesis, adenotomyhas been postponed. During the examination: the temporary teeth bite; upper incisors cover the lower ones correctly; the distal surfaces of the upper and lower temporary molars are located in one vertical plane. Which prophylactic device is most appropriate for the removal of the oral breathing?

A. The standard vestibular Schoncher's appliance

B. Appliance with Rudolf's loops

C. Vestibular-oral Kraus appliance

D. Frenkel's functions appliance

E. Andresen-Goipl's appliance

10. What is the function of the Coffin's spring?

A. To expand the upper dentition

B. To narrow the upper dentition

C. For the fixation of the orthodontic equipment

D. For the narrowing of the lower dentition

E. Coffin's spring is not used in orthodontics

11. A girl of 13 years old came to the orthodontist with complains about the wrong position of her teeth. It is necessary to apply the vestibular arch. What is the effect of it?

A. Mechanically active

B. Combined action

C. Preventive action

D. Functionally active

E. Functionally directing

12. The child with a bad habit - biting lower lip came to the orthodontist. Which device can you choose to treat that particular bad habit?

A. The vestibular shield

B. Katz's appliance

C. Bruckle's appliance

D. Appliance with loops of Rudolf

E. -

13. After the preventive orthodontic examination, a 9-year-old child was diagnosed with a mesial occlusion. The treatment of this pathology involves a mechanic appliance. What working element is applied to correct this pathology?

A. Screw or spring

B. Elastics and buccal shields

C. Occlusal rest seats

D. Inclined plane

E. Screw and bite plate

4. Discussion of theoretical issues:

Classification of orthodontic appliances

According to Horoshylkina the basic design of orthodontic appliances are classified as follows.

According to the principle of action there are four groups:

- functionallyacting

- functionallydirecting
- mechanicallyacting
- combinedaction.

According to the method and place of action:

- foronejaw
- for one jaw with two-jaw action
- fortwojaws
- extraoral
- combined.

According to the kind of support:

- reciprocal
- stationary.

Accordingtolocation:

- intraoral - oral (palatal, lingual), vestibular (dental);
- extraoral - the main (fronto-occipital, parietal, occipital, combined);
- neck;
- jaw (upper-labial, lower-labial, chin, submandibular, on the corners of the lower jaw, combined).

According to the way of fixation:

- unremovable
- removable
- combined.

According to the type of construction:

- arch
- tray
- plate
- modular
- skeleton
- elastic.

Functionally-active orthodontic appliances. Orthodontic devices, therapeutic action is based on guided changing dynamic equilibrium between the facial muscles that continuously operates on tooth rows in the lingual direction, and the tongue that resists this pressure in the vestibular area called functional and operating.

One of the main directions of functional and operating units was to create vestibular structures located to normalize the function of mimic muscles. Vestibular plate (Kerbitsa, Shohnera, Kraus, Myulemanna, Dass, Hintsa protect tooth rows from the pressure of the lips, cheeks, fingers and various items. They normalize the closing of the lips, breathing and swallowing function, train circular muscle mouth. Devices with grill his tongue to normalize the situation and prevent excessive pressure on the front group of teeth.

The use of functional and efficient operating devices in childhood (during the milk at the beginning of the first period of variable bite) when we can expect the growth of the jaw bones and especially apical base.

Functional and structural elements operating equipment are: buccal shields lip pelota, vestibular Mantel, restrictive grid for language and others.

Functional directing orthodontic appliances. Apparatus functional steps are designed differently inclined plane (angle of 30 ^ 45 °), biting platform, occlusal overlays, which move teeth or the entire lower jaw in sagittal, transversal and vertical directions. They have not laid any of active elements. The source of power is the contractile ability of muscles during chewing osculation some teeth with an inclined plane biting platform or occlusal overlays in other areas; tooth rows while disconnected. Devices operate intermittently.

The founder functional method in orthodontics is AJ Katz. In 1933 he proposed a functional and guiding apparatus for treating abnormalities teeth-jaw apparatus. Katz believed that the power of functionally active devices regulated by periodontal receptors, that may act only to certain limits, and if it becomes excessive, there is pain and reduce muscle reflex weakens or stops. The adjustment of orthodontic force (depending on the individual

reactivity and periodontal each patient) should prevent the occurrence of pathological changes in periodontal tissues**.**

Appliances of mechanical action (active). Appliances characterized by the fact that the power of action lies in the design of the device and is independent of the contractile ability of the chewing muscles. The source of power is the active part of the device: the arc elasticity, springs, rubber elasticity and traction ligatures, force, developing screw, omega, levers and so on. The intensity of the action is governed by randomly doctor devices using their active part. The applied pressure force or thrust to be individual. To avoid complications, it is advisable to use a small force actions that are close to nature, and activate the devices controlled dosing devices, providing a period of rest.

Mechanically active non-removable orthodontic appliances. The development of scientific and practical evidence-based methods of orthodontic treatment apparatus associated with the name Engle. It is characterized by the following principles: The objective of treatment is to achieve a perfect occlusion without extractions; picture of the first permanent molar as a "key" occlusion; the patient's age; standard mechanical treatment devices. For this purpose, Engle were offered round vestibular arc (stationary, expansive, sliding). Further development of these vehicles were in vehicles arc Herbst, Mershona, Simon Korkhauza - Linda, Stanton, Kvilforda. These include winding machines, braces.

The main part is the vestibular apparatus Engle curve 0.8-1.0 mm thickness at the ends of which are carved where the wound nuts. In supporting teeth (first permanent molars) are locked crown or ring with horizontal pipes with buccal side. Doug is inserted into the tube, and nuts regulating its position: the contact with the teeth or at some distance from the teeth.

The stationary arc Engle used to move the vestibular front teeth. Doug ligatures tied to teeth that shifted and carried the nuts turning activation arc. By arc can solder hooks which recorded an additional ligature or rubber rings to move apart incorrectly spaced teeth, crowns are fixed with hooks.

Expansive arc Engle used to expand the dentition. Arc in the area where you want to expand dentition inclining and ligatures tied her teeth to be moved.

Gliding arc Engle used to tilt the front teeth in the oral direction. Arc in turn sliding nuts and removing hooks canines in the area for fixing rubber rings between the hooks and tubes on molars.

Simon device is used to extend the arc in the region of premolars and molars. In molars with vestibular side soldered vertical tubes of oral and hand soldered to the molar beams are tangentially located on the premolars and canines. U-shaped arc arch of vestibular side, the ends of which are arranged in vertical tubes on molars.

Mershona device for expanding the dental arch consists of supporting rings on molars with locks (horizontal tubes) with language-palatal side which is placed and soldered lingual arch wire elastic processes that create pressure on the teeth that will move.

The deviceAysvortais used for enlargement dentition in lateral areas and the presence of diastema diaeresis. The device consists of crowns or orthodontic rings are fixed on the first premolar are soldered to the vertical tubes which include vestibular arc. With oral side soldered to the crowns beams are tangentially located on the premolars and canines.

To expand the upper teeth used four loops byuhel, which is produced at the factory and fixed mounts with interlocking crowns by oral or rings on the molars. Nowadays, more expansive screws used (kvadroheyliks) for the accelerated expansion of the upper teeth, which are soldered to the rings on the molars and premolars. By palatal side of the rings, with curves in the form of orthodontic tooth soldered wire.

To fix the vestibular or lingual arch created original designs locking fasteners - edzhuayz, appliances, orthodontic arch wire that is fixed in the castle-device bracket that has a groove.

Edzhuayz engineering consists of locking fasteners, brackets, buccal and oral tubes, wire arches round, square and rectangular, additional elements in the form of

springs, elastic rings and chains. Castle mount - brackets are fixed on the vestibular surface of teeth with composite materials.

The design of the bracket consists of the following elements:

supporting part which is fixed to the surface of the teeth;

groove, located on the front surface of the bracket;

wings that provide a record. arc in the groove braces with metal or elastic ligatures.

The design of the brackets have the following clinical and technological characteristics:

each bracket corresponding to the respective tooth or group of teeth;

basis for each bracket has a certain thickness or height compensated;

anatomical shape provides a natural arch wire the teeth in the alveolar bone, forming the correct occlusion.

Additional supporting and fixing device.

Hooks, loops, buttons are used for fastening wire or elastic ligatures on the ring or on the tooth surface.

Guiding pins are used to prevent unwanted tilting teeth that move.

Byuheli - bearing parts that are fixed in language tubes supporting crowns or orthodontic rings

Fix non-removable orthodontic appliances using crowns or rings on non prepared permanent teeth (premolars, molars) after the so-called orthodontic separation. To do this, use elastic, spring separators, plastic wedges, ligature that are injected between the teeth and leave for a few days. If treatment is necessary to separate the tooth rows, then use the crown, if the bite is not necessary to raise - use ring. Crowns and Rings reach the necks of the teeth and fixed phosphate (visphat) -cement, but the rings have the ability lose cementation. To improve their fixation should they cement to glass ionomer cement or a special glue, adhesive, which is based on epoxy resins**.**

Removable devices of mechanical action. The desire to eliminate at least partly the above disadvantages of attached devices contributed to the development, testing and implementation in practice of existing mechanically removable orthodontic devices. This became possible after the invention of methyl methacrylate - the main component of modern plastics.

Construction removable plastic base units held by hot polymerization; by cold polymerization self-curing of plastics; by molding plastics; by stamping of plexiglass after a warm-up, so-called pneumo-vacuum formation. These include plate units combined with screws, springs, vestibular arcs. The first removable plate devices for the treatment of bite anomalies were proposed after the discovery of vulcanization of rubber (1839).

Removable plates allow vehicles moving around the tooth axis in all planes used extension (for transversely) and elongation (in saggital) dentition, anomalies in the dentition.

The base plate is the foundation of removable devices. Plastic base removable devices manufactured by hot polymerization, cold polymerization self-curing. Plastics casting, stamping of plexiglass, and so on. Basis plastic apparatus may include screws, springs and other mechanical devices.

The active element of the device can be plastic orthodontic screw. Activation screws on full rotation (360°) allows you to extend or elongate denture tooth or move to 1mm.

Instead orthodontic expansion screw for denture can use Kofina spring, but in this case it is difficult to dose the force of such a device.

Vestibular (lip) arc widely used in orthodontic treatment of protrusion of the upper front teeth. Often vestibular arc is a basic part of the orthodontic device when it only affects the teeth, without the power load on them. Vestibular arc also used for a variety of hooks for fixing rubber rings. In addition, vestibular arc may have a U-shaped or M-shaped curves that will facilitate the movement of individual teeth.

To move the teeth using a variety of spring: protrugal (single and two jaws) for labial moving teeth; Arm to distal, mesial and oral tooth movement.

To support and fixation of removable orthodontic appliances used clasps, vestibular and lingual arch, caps, pelota, springs and other devices.

Clasps consist of three parts: the shoulder, which presses the orthodontic tooth device to the body, for Klammer Oprah and process for fixing clasps in the base unit.

Often used in orthodontic practice; swept clasps Schwartz (single or multi-chain) and Adams clasps - the most effective and universal clasps.

Periodontal pelota are used to strengthen removable devices made of plastic, sometimes to the strength of the wire, which is covered with plastic.

Tray plastic used as fixing devices and cover the crowns of the teeth if necessary separation of the bite**.**

Appliances combined action. In most cases, used in the combined pathology and constitute about 75% of all removable equipment.

Functional units can be supplemented by some active elements - screws and springs used if necessary to speed up the movement of individual teeth**.**

5. **Topics of reports/abstracts:**

6. **Summarizing the information received at the lesson.**
7. **List of recommended literature:**

Main:

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

Additional:

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
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Information resources

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Practical Lesson №9

Topic: Morphological and functional age-related features of the development and formation of the child's maxillofacial apparatus and their clinical assessment. Changes in the maxillofacial apparatus in endocrine pathology.

Goal: To learn provision of orthodontic care organization childhood and adult population, methods of examination of children and adults with tooth-jaw abnormalities and deformities, to determine the risk factors of tooth-jaw abnormalities and deformities

Basic concepts in the process of learning the student must apply their knowledge of anatomy and physiology features maxillofacial child, stages and timing of temporary and permanent tooth. For mastering topics the student must use their skills and knowledge of methods of clinical and instrumental investigation of special patients.

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

1.The intraoral examination of a 5-year-old child reveals the primary occlusion, tremas and diastemas, worn tubercles and cutting surfaces of the teeth. The distal surfaces of the second lower temporary molars are anteriory to the distal surfaces of the second upper molars. This stage of primary occlusion is called:

A. Aging
B. Stable occlusion
C. Eruption
D. There is no correct answer
E. Formation

2. A visiting nurse examines a newborn child. The examination reveals that the lower face part is shorten, the chin is retrodeviated, the teeth are missing, the lower jaw is retrodisplaced. What is the name of such mandible position of a newborn?
A. Physiological infantile retrogenia
B. Mesial occlusion
C. Distal occlusion
D. Edge-to-edge occlusion
E. Physiological occlusion

3. An infant was born full-term with the body weight at a rate of 3200 g and the body length at a rate of 53 cm. It was the first physiological delivery. What position of the child's mandible is usually observed after birth?
A. Physiological retrogenia
B. Open bite
C. Direct relation
D. Physiological progenia
E. Deep overbite

4. A child was born with the body weight of 3200 g and the body length of 53 cm, 9 points on Apgar score. It was the first physiological delivery. What position of the child's mandible is usually observed after birth?
A. Physiological retrogenia
B. Central occlusion
C. Posterior occlusion
D. Direct relation
E. Physiological progenia

5. A 16-year-old boy came to see the doctor with complains of his aesthetic. Objectively: vestibular inclination of the upper and lower teeth, with minor overlapping, in the lateral sides there is a neutral teeth correlation. What kind of bite can you diagnose?
A. Biprognatic
B. Direct
C. Orthognathic
D. Opistignatychny
E. Deep

6. Parents of a one –year-old child complain of the absence of teeth. The childbirth was uncomplicated. In anamnesis: a pneumonia in the early childhood and the Rickets disease. What should the number of teeth be in this age?
A. 8
B. 12
C. 14
D. 16
E. 20

7. What form of dentition is correct in the period of temporary occlusion?
A. Semicircle
B. Parabola
C. U-like
D. Saddle-headed
E. Semiellips

8. During the examination of a newborn, the following picture is observed: the lower part of the face is shorter than the middle one, the teeth are absent, the lower jaw is displaced back. What is the number of teeth in each jaw of a newborn?
A. 18
B. 12
C. 10
D. 16
E. 14

4. **Discussion of theoretical issues:**

The proportions of the face of a newborn and adult are different. This is mainly defined by the size of the cerebral and facial skull. Chairman of the large baby and is 1/4 the length of his body. The skull of the newborn characterized by small size facial department compared to the brain, as a result of the facial department barely protruding. Another feature is the presence of a newborn skull fontanelles. They are at the intersection seams where the remains of connective tissue.

Newborn there is disparity between middle and lower regions of the face, due to the fact that the height of the bite provided only gingival rollers. The nose of the newborn is relatively small, narrow nasal passages. Subcutaneous fat layer is fairly evenly and gives the face a characteristic round child and completeness. In the thick cheeks are fat pads, called Bisha lumps. Layered fat cheeks is an independent body many parts contained in its own capsule. Both anatomical lesions contribute sucking.

The upper lip prevails over the lower forming step Province. Lips newborn soft, swollen, trunk-like, cross strip (rollers Pfaundlera-Lyushka) with sucking pad on the upper lip, thus forms a tight baby nipple covers. Deep-labial groove chin, sloping chin back.

Typical physiological retrogenia kids. The distance between the peaks alveolar

processes of jaws in the sagittal plane reaches 5.7 mm, and vertical gap is 2,5-2,7 mm, its absence causes the development of deep bite.

Vestibule and bottom of the oral cavity shallow, transitional folds poorly expressed. Tongue large.

The upper jaw consists of 2 symmetrical halves, combined longitudinal seam. During early embryonic development between the two parts is inter-jaw bone.

The upper jaw newborn wide and short, consisting mainly of alveolar bone, which is located just below the mouth. Flat palate with well-defined transverse folds.

Maxillary cavity only planned and the X-ray looks lumen elongated shape. It lies medially relative to the alveolar bone. The beginnings of teeth are almost at the same ocular fossa and separated from her thin bone plate.

The lower jaw consists of 2 halves of nonunion, which are connected by connective tissue. Alveolar bone developed better than the basal part. This is due to the presence of germs temporary and permanent tooth.

Mandibular canal is almost straight shape and is close to the edge of the mandible. The branch of the mandible is almost not developed, and articular process rises above the alveolar bone. The angle of the mandible is an average of 135 ° -140 °.

Each jaw has 18 follicles, including 10 temporary and permanent teeth 8 (6321/1236). The beginnings of deciduous teeth in both jaws located on the labial side, the beginnings of time constant lie deeper part of the language on the lower jaw and palatal - on top.

Gingival membrane is a double fold of mucous membrane crest-like shape in the frontal area of the upper and lower jaws (fold Robin - Mazhyto). It is rich in small papilla-like bumps, blood vessels, thus able to thicken. Gingival membrane also has a large number of elastic fibers. This anatomic lesion clearly seen immediately after the child stops sucking breast during feeding. Newborn sucking function well developed. Each child feeding (30 minutes from 6 to 4 times a day) promotes training of the lower jaw, chewing and facial muscles, tongue muscles every day for 3 hours. Therefore, improper feeding can lead to anomalies bite.

Avilable TMJ:

- head articular process nearly round shape, has almost the same dimensions (transverse and anteroposterior);

- well, that is a repository for the head of the lower jaw level. It has articular tubercle front and back - well expressed articular cone which limits the movement of the lower jaw to the side of the middle ear;
- mandibularfossafullyfunctioning;
- depth mandibular fossa - a little more than 2 mm;
- intraarticular disc in a newborn baby is a soft layer composed of collagen fibers;

no nap synovial membrane of the joint capsule.

Lack articular tubercle, occipital slope underdeveloped branch of the mandible, physiological retrogenia, wide flat articular fossa, unformed intra articular disc and cone create favorable conditions for the movement of the mandible in the sagittal plane.

The baby swallows and breathes during swallowing, and it is due to the peculiarities of the topography of the larynx. The high location of the entrance to the larynx (above the lower-rear edge of the soft palate) and connections only from the mouth allows the child to breathe, suck and swallow at the same time.

Type swallowing - "infantile." When the child swallowing the tongue pushes against closed lips. It stretches the facial muscles around the mouth.

During the survey is to find out the patient's passport information, namely: surname, name and patronymic; sex; age; information about the place of education or training, address; information about the parent or guardian of the child (name and surname, place of work, means of communication with parents and child - and so on. f.); information about the child's pediatrician or dentist and other professionals who have been patient.

Address or place of residence enable orthodontists to determine the medical and geographical features of the area, which is home to a patient who is examined, and their impact on the development of the child in general and on the development of tooth-maxillofacial particular.

Temporary occlusion is divided into three periods:

1 - formation period (6 months to 2-2.5 years);

2 - stable during temporary occlusion (2.5 to 4 years);

C - aging period, the temporary bite late (4 to 6 years).

In the first period of temporary occlusion of 6 months to 2.5 years is an eruption of deciduous teeth. Temporary teeth eruption characterized by the following laws: time;

order eruption; parity eruption; the sequence of eruption. Due to the growth and development of the child, changes in tooth-jaw system, new functions or the restructuring of existing

II period of temporary occlusion called "stable temporal bite" During this period somatic type formed swallowing, with growth of tubercle articular disc of temporomandibular joint double concave takes shape; increases the curvature of the articular surface of the head; enlarged articular fossa; atrophied articular cone. II period of temporary occlusion lasts for 4 years and has the following characteristics:Тимчасовийприкусмає20 зубів.

- There is no group of third premolars and molars.
- Dental arch up a semi-circle with a radius greater than the upper jaw.
- Midline face coincides with the halfway line, which runs between the central incisors. They are a continuation of each other and lying in a sagittal plane.
- Buccal tubercles of upper molars are located outside of the same name humps lower and lower buccal tubercles - inside the top of the same name humps.
- Each tooth has two antagonists, except for the lower central incisors and upper second molars.
- Tearing hump upper canines projected between the canine and the first temporary molars of the mandible.
- Distal surface of the second temporary molars located in the same vertical plane
- In the front section of the upper incisors overlap the lower 2/3 of the length of the crown.
- Cutting edges and chewing surfaces of teeth lie in the same plane as the horizontal occlusal plane
- Teeth are in the dental arch tightly, without gaps, forming aproxymal contacts.
- The teeth in the dental arch are no inclination - vertical.
- Cutting edges and chewy bumps well defined, have signs of abrasion.

For the period of temporary occlusion III, which in literature is called the period of "aging", "signs of abrasion, wear," characterized by the same features that are inherent II period. Thedifferenceisthis:

- In the frontal area established direct contact incisors.
- There are gaps between the teeth, called diastema physiological diaeresis and consequently the growth of the dental arches.
- Growing wearing cutting edge chisels and masticatory tubercles lateral teeth.
- Tearing hump upper canines projected between the lower canine and first molar (as in II period).
- Because medial displacement of the mandible distal surface of the second temporary molars form a pear-shaped platform or ledge, so-called sagittal step. This ledge (symptom Szelinski) further promotes proper establishment of the first permanent molars. The ratio of distal surfaces of second temporary molars forecast development of bite in the sagittal plane.
- Erasing teeth leads to a reduction in the height of crowns.

In the III period of temporary occlusion completed differentiation elements temporomandibular joint.

IMPACT OF ENDOCRINE DENTITION ON DEVELOPMENT OF MAXILLO-FACIAL SYSTEM. PREVENTION OF TEETH ANOMALIES WHILE ENDOCRINE DISEASES

In a number of known dental diseases, emergence and development is closely related to the function of the endocrine glands. Endocrine glands, in contrast to exocrine gland, have ducts and produce secret (hormone) in the blood or lymphatic vessels. By the endocrine glands include: thyroid gland, parathyroid gland, thymus, adrenal gland, gonads, pituitary, pancreas, and so on. D.Vidomo that endocrine gland affecting metabolism of trace elements, depending on their rate of skeletal ossification and mineralization of teeth. In various diseases of the endocrine glands is observed violating the terms of formation, development and eruption of permanent and temporary teeth. Therefore, it is important to compare the features of different formation glands

of human terms bookmarks histogenesis and differentiation of organs and tissues of the oral cavity in the embryo, fetus and child in the first years of life. These comparisons are needed to determine the effect of a cancer on the development of dental system. It is known that 6-7 weeks of embryonic development begins the formation of hard and soft palate and the primary distinction is the mouth to the mouth and nasal cavity development of vestibule mouth, and the development of language. In the same period begins to develop dental plate and is laying the rudiments and formation of deciduous teeth, and at 17-18 weeks - Bookmark teeth. Therefore, we can assume that the cortex of the adrenal glands and the thyroid gland, which during embryonic development begin to function before other glands (respectively 8 and 12 weeks) are in this period of ontogenesis leading endocrine glands, but they stimulate growth and affect not only the differentiation of tissues and organs throughout the body of the fetus, but also the development of the oral cavity. It should be noted also that the secretory activity of the hypothalamic-pituitary system appears only in the 20th week of fetal development.

Revealed that thyroid gland affects the processes of mineralization of enamel and dentin. The formation of thyroid function in humans with the same period of differentiation germs of deciduous teeth, while in the same period, other glands in a state of development and begin to function only at 20-26 weeks of pregnancy. When endocrine disease is metabolic, protein, mineral and carbohydrate, which in turn lead to violations of the formation and development of teeth. There may be a delay of resorption of roots of deciduous teeth, violation of the terms and order of eruption of permanent teeth; retention of teeth; changes in the structure of dentin, hypercementosis; carious lesions of hard tissues of teeth (hypoplasia, abnormal abrasion, necrosis, erosion and so on. p.).

Endocrine diseases are characterized by a long course, usually do not cause patients any unpleasant subjective feelings, so when you first acquaintance doctor must carefully carry out the survey. In children with endocrine disorders it is often abuse physical, mental and sexual development; change in appetite, thirst appearance; increased hair growth on the body and face; changing color

and so on. p.

PITUITARY DISEASES

The pituitary gland - the main endocrine gland of the human body. It not only produces hormones itself but also has impact on hormone production by other glands. The pituitary and hypothalamus control various aspects of metabolism in the body, there are over 22 different hormones secreted by the pituitary gland and hypothalamus. These hormones affect the development and growth of the body, regulate metabolism in tissues. It is known that pituitary dysfunction leads to various changes in the body, accompanied by the development of abnormal phenomena in the dentition.

Pituitary - odd formation, it is called lower appendage of the brain; located in the Turkish saddle. Dimensions pituitary increases with age, as evidenced by the increase in Turkish saddle, which can be investigated by means of X-ray. The average size of a newborn sella 2.5 x 3 mm; 1 year -4x5 mm; adult - 9 x 11 mm; increasing the size of sella needs to consult an endocrinologist and special studies.

Depending on the functional activity of the pituitary hormone diseases can be classified as follows:

1. Diseases arising from hyperactivity disorders (gigantism, acromegaly).

2. Diseases arising from failure gland (dwarfism and so on. D.).

3. Diseases that have no clinical manifestations endocrinopathies.

The clinic is the most common complex combination violation. Of particular importance in this case is the age of the patient, or when there are other violations of the pituitary gland. For example, if there is hyperactivity adenohypophysis a child, then the patient is a gigantism; If the disease begins in adults when the growth stops, the developing acromegaly. In the first case, when there was the closure of the epiphyseal cartilage, there is even accelerate growth, but later joined and acromegaly.

The most noticeable changes in dentition occur in disorders of the synthesis of growth hormone (GH), so-called growth hormone.

Acromegaly - a disease characterized by the growth of skeletal disproportion, tissues and internal organs caused by excessive production of growth hormone. The name "acromegaly" comes from the Greek - akros - extreme and megas - big; Rob HVO This causes an increase in final body parts: hands, feet, nose, jaws. This is the most common disease of the anterior pituitary gland, which is mostly the result of eosinophilic pituitary adenoma.

Examining the patient, pay attention to the facial characteristic changes: an increase in the bones of the nose, cheekbones and eyebrow arches; eyes are deep hypertrophied brow arches, an increase of ears. Puffy face due to the large nose, thick lips, big ears, a rough outline. This largely offset the individual contours of the face, patients with acromegaly alike. Increased brain size also part of the skull. The skin

thickened, hypertrichosis observed phenomena. Because of the uneven bone growth of facial skull especially significantly increase the size of the lower jaw is protruding, and the size of the roots of teeth relative to body like jaws seem shorter; an increase in the angle of the mandible. Moreover, such a clinic there for long disease. Tongue increased size, its possible side surfaces of the teeth imprints. Increasing the size of the tongue leads to disruption of speech due to thickening of the cartilage of the larynx and vocal cords voice becomes low, rough. Can hypertrophy of the parotid salivary glands.

Telerenthenohrafy analysis of the lateral projection of the facial skull shows that bite deformity is due to increasing the size of branches and the body of the mandible, mandibular angle increasing, and increasing the size of the foundations of the upper jaw.

Gigantism - a disease characterized by excessive compared to proportional growth of the skeleton and other organs and tissues due to excessive production of growth hormone of the anterior pituitary. The disease is considered as increased growth that does not meet the age and beyond the average age norm.

Pathologically large growth can result from over-stimulation of growth hormone or growth of unusually long duration period of growth in people with unfinished process of ossification epiphyseal cartilage, leading to epiphyseal and periosteal bone growth. Etiological factors of gigantism are the same as in acromegaly. Patients prone to gigantism acute and chronic infections from which they are dying at a young age; the average life expectancy - 21 years.

It is established that the size of crowns of teeth when the disease does not change; observed the acceleration of the timing rudiments of permanent teeth and roots of teeth formation and effects hypercementosis near the tops of the roots; Early teething and increasing the size of the dental arch. Defined as accelerated growth of facial bones, the most significant change to 12 years seen in the structure of the mandible.

Pituitary - Cushing pituitary origin arising from excessive stimulation of the adrenal adrenocorticotropic hormone. A characteristic feature of the disease is obesity. The deposition of fat leads to the so-called moon face. From the dentition disease manifests osteo-threshold jawbone.

The second group are those diseases that are accompanied by a decrease in the production of one or more hormones. If this syndrome occurs in children, it

characterized by backlog growth with further manifestation of dwarfism. At the same time determined lesions and other endocrine glands. Initially affected sex, then thyroid and adrenal cortex. These children develop myxedema with typical skin changes (dryness, mucosal edema), reduced reflexes and improve cholesterol, intolerance to cold, reducing sweating. Adrenal insufficiency manifested weakness, inability to adapt to the impact of stress.

Cerebro-popery pituitary - cerebral dwarfism - a disease in which pathogenesis important growth reduction or loss of activity in the anterior pituitary atrophic processes in it, or underdevelopment in the destruction of the tumor.

For congenital forms of dwarfism and infantilism children are born normal growth and weight gain. their growth continues for some time after birth, and from 2-4 years are noticeable stunting. The body has normal proportions and symmetry, and the development of bones and teeth, closing epiphyseal cartilage, puberty inhibited.

Clinical dwarfism determined proportionate growth retardation and weight of patients; delayed physical and sexual development of children while preserving features relative proportions of the skeleton and ossification; varying degrees the development of gonads, retarded the formation of the external genitalia, lack of secondary sexual characteristics and also the ratio of the degree of growth and differentiation of skeletal and other features. Characterized as inappropriate age-old form - progeria. Wrinkled skin and wrinkled, fat distribution disturbed.

Growth hormone or growth hormone influences the processes of protein, carbohydrate, fat and other types of metabolism in the body. These changes are reflected in the teeth, periodontal and jaw bones. Thus, in patients with pituitary dwarfism cerebro-observed delayed dentition, retained teeth, dentin microhardness abuse, abnormal bite. On the side telerenthenohramm determined by reducing the size of sella, lengthening the maxilla in sagittal direction and shortening of the average person. The skull is relatively large, and his facial part even in adulthood resembles a child's face.

In these patients, the review drew the attention senile, wrinkled facial skin, lack of elasticity; reducing the size of the oral cleft - microstomia; Radial lines around the mouth.

Bearing this in mind,it is necessary to conduct a series of symptomatic treatment and prevention, and dynamic monitoring of patients. If teeth anomalies need orthodontic treatment that will help prevent the development of periodontal disease. Treatment and extractions in these patients should be performed for strictly defined reasons and with great care, taking into account changes in the jaw bone. It should recommend treatment of major diseases in endocrinology, restorative therapy, diet and so on. N. All these measures will contribute to the development of bones, including facial and jaw; the timely development and eruption of teeth and, therefore, prevent the development of various anomalies bite.

DISEASE OF THYROID

The thyroid gland - odd, the largest of the endocrine glands of man; it produces hormones - thyroxine, triiodothyronine and thyrocaltcitonin. Thyroid gland stimulates the growth and differentiation affects body tissues, including the development of the skeletal system. It is located in the anterior neck, side and front of the larynx and trachea.

Like other endocrine glands and their functions it is subject to the pituitary gland. When the pituitary gland produces thyroid hormone, it increases the synthesis of thyroid hormones.

To determine thyroid function there is a group of tests used in clinical practice. One of them is the study of bone age. Thyroid dysfunction may manifest as increased production of hormones - hyperthyroidism and impairment - hypothyroidism.

Diffuse toxic goiter - a disease that is accompanied by diffuse hyper-plastic changes in the thyroid gland and body intoxication excessive thyroid hormones that enter the bloodstream. The disease in children and adolescents the period of puberty is very rare. Children are almost no complaints, however, symptoms increase is much faster than adults.

In patients with toxic goiter observed violations of the structure of tooth enamel in the form of erosion, depressions, grooves, especially on the labial surface of the

maxillary incisors; increasing caries prevalence, severity and duration of the process depends on the disease and to a lesser extent - from gravity. In patients with toxic goiter determined abnormal abrasion, periodontal disease.

Women suffering from toxic goiter, pregnancy should always be under the supervision of a dentist. The first review should be done at the first prenatal treatment to second - at 24-28 weeks of pregnancy, the third - 37-38 weeks, the fourth - 2-3 weeks after birth. From 8-12 weeks of pregnancy should prescribe calcium and phosphorus, and vitamins.

Children born to mothers suffering from toxic goiter, there were cases of fetal eruption of deciduous teeth; violation of the terms and order of eruption of deciduous teeth - as premature eruption (16% of cases - 3-5 months) and delayed eruption (33% of cases - in 10-11 months); violation of the terms of eruption of permanent teeth; Early mineralization crowns and roots of permanent teeth formation.

In children with toxic goiter, tooth corresponds chronological age, but usually accelerated bone.

Cephalometrics study of patients with toxic goiter determined by increasing the height of the face, more anterior facial height and slightly pronounced prognathism.

At the oral mucosa may experience changes such as those that identify with hypovitaminosis (bridou, cheilitis, glossitis).

Remember that 70% of all cases of toxic goiter in children occur in puberty, so timely begun treatment of the basic disease - the basis of prevention of caries and its complications in these patients, they need to appoint B vitamins, vitamin C. It is known that if injection of fluoride salts thyroid gland synthesizes less thyroid hormones, so you can designate 1% sodium fluoride solution and 5 drops 2 times a day, taking into account the content of fluoride in drinking water. Of great importance is food, because most cancer activity observed with an excess of animal protein in the diet, less - in the case of the use of foods rich in carbohydrates. Vegetable protein for optimal quantities in the diet, provided sufficient iodine in the body inhibits the function of the thyroid gland.

Along with treatment of the underlying disease is important hygienic oral care, therapeutic use toothpaste and remineralizing solutions after diagnosis of early forms of caries.

Hypothyroidism and myxedema. The basis of the clinical picture of hypothyroidism is reducing the functional activity of the thyroid gland, which is characterized by failure of synthesizing of thyroid hormones - thyroxine and triiodothyronine. Hypothyroidism can be caused by a violation of regulatory mechanisms that maintain normal functioning of the thyroid gland, or direct lesion of tissues - a reduction of functionally active cells. Lack of thyroid hormone also causes metabolic disorders in the body.

Found that for congenital hypothyroidism is delayed eruption of deciduous teeth for 1-2 years; by changing the temporary teeth for permanent retention observed an average of 2.3 years; numerous characteristic decay time and permanent teeth; there are atypical form of crowns of deciduous teeth, reducing their size, partial adentia, enamel hypoplasia; jawbone deformation due to an increase in the size of the tongue. In X-ray determined delay the formation of roots of permanent teeth in 2-3 years.

According cephalometrics research in the lateral projection is determined by reducing the facial angle, the shorter lower jaw and its distal location.

Cephalometric study of women with juvenile miksedema showed delayed vertical growth, especially in those who did not receive timely treatment.

In severe myxedema face adult has a distinctive appearance, determined face edema, particularly in the area of the upper eyelids, which are almost close eye slit. Protruding lips, nose thickened, cheeks hang down. The tongue increased as may be determined speech disorders. Face pale, except cheekbones that could keep a normal color. Dull facial expression changes when the patient begins to speak. Speech is slow due to violations of diction; changes in voice and speech almost pathognomonic.

Hypothyroidism - endocrine disease that is most common in adolescence. Thus there is a violation of harmony face shape, stunting facial skeleton; dental age as the bone behind the chronological. A dentist can diagnose the disease first by following symptoms: numerous cavities temporary or permanent teeth; delayed eruption of stoppage time and teeth; characteristic appearance of the face. For suspected hypothyroidism patient should be sent for consultation to the endocrinologist. Early diagnosis of hypothyroidism thyroid gland and prevent the development of rational treatment changes maxillary system, in particular malocclusions and tooth decay.

Endemic goiter and cretinism. Goiter - Thyroid hyperplastic response to a particular stimulus, because the crop should be regarded as a compensatory phenomenon - the response to endogenous or exogenous disturbances of homeostasis of the organism as a whole or the neuroendocrine system in particular. The term "crop" is defined only symptom is local reconfiguring the neck, often due to the increased thyroid gland, which reaches a significant size.

Endemic goiter - a disease that is accompanied by increased thyroid gland and occurs ceased geographical areas characterized by insufficient iodine content in nature. Endemic goiter can develop at any age, but most often occurs in the 10-12-year-olds. The difference in prevalence among girls and boys in childhood is almost determined and becomes noticeable during puberty - women suffer more than men.

The term "cretinism", or "congenital hypothyroidism" is used in cases where thyroid disease is determined at birth. If a failure is found in the thyroid gland normally developed the disease before the children, it is the acquired or juvenile hypothyroidism. Cretinism is most common in endemic goiter areas where iodine deficiency is combined with unsatisfactory social conditions of the population.

Nerd with a distinctive look: short stature with disproportionate development of individual parts of the body; they are sluggish, inactive, often suffering from deaf or speech impediment, expressed mental disability. Symptoms cretinism can be detected at birth, but most occur in the months or 2 years of life.

In the face of cretinism is not developed, so are characterized by infantile features. Bridge of nose broad and flat, underdeveloped as a newborn; widely spaced eyes, nose short and upturned. ByAccording clinical and radiological examination determined a sharp backlog of facial and cranial general and in particular the teeth and jaws.

Because the disease is associated with iodine deficiency is the primary means of prevention is the use of iodized salt and foods with iodine supplementation (bread, tea); Iodine feeding animals.

DISEASES OF PARATHYROID GLANDS

Parathyroid gland - four small glands located behind the thyroid. They play a major role in controlling the level of calcium in the body contents. Parathyroid hormone that produce parathyroid gland, in addition, participates in the regulation of phosphorus metabolism, affects the processes decalcification and bones. Evidence of functional activity of parathyroid gland in utero. They help to preserve calcium homeostasis regardless of fluctuations in mineral balance of the mother. In recent weeks fetal period and in the first days of life significantly increased activity of parathyroid gland. Not excluded parathyroid gland hormone involved in the mechanism of adaptation newborn.

Hormone parathyroid gland along with vitamin D provides calcium absorption in the intestine, its reabsorption in the renal tubule; leaching of calcium from bones and activation of osteoclast bone. Whether vitamin D PTH inhibits phosphate reabsorption of renal tubules, and promotes the excretion of phosphorus in the urine. In their physiological properties of parathyroid hormone is an antagonist of thyroid hormone - thyreocaltcitonin.

In the growth and development of bones and teeth in the body affect many external and internal factors. Hormone parathyroid gland ensures the normal relationship between the processes of bone formation and destruction, is involved in the regulation of growth and calcification bone and dental tissues.

Diseases of the parathyroid gland can cause a reduction in state functions - hypoparathyroidism and hyperparathyroidism function - increase.

Clinical signs of change in parathyroid gland activity spanning from the symptoms of neuromuscular excitability, bones, skin and its appendages.

Hypoparathyroidism - a disease accompanied by symptoms improve neuromuscular excitability (tetany), disorders of the nervous system, and lesions of ectodermal tissue. Etiological factors of the disease may remove the parathyroid gland, traumatic injury glands; degeneration due to past infections (measles, influenza, tuberculosis, syphilis, malaria). There are cases of congenital complete or partial absence of the parathyroid gland.

Clinically evident lack of parathyroid gland, depending on the timing of occurrence and severity in different ways. Long kept symptoms from the nails, hair and teeth. In congenital hypoparathyreosis essentially broken bone formation - early occurrence of osteomalacia. Increased vegetative lability and irritability (pilorospazm, diarrhea, tachycardia); signs of increased neuromuscular excitability (tetany, spazmofilii) and lesions of ectodermal origin. Some acute symptoms occur and may require emergency care. These include seizures and laryngospasm.

Tetany - a clinical syndrome in which stipulates the condition of increased excitability of the neuromuscular system. Tetany manifested predisposition to seizures. With obvious tetany daily and sometimes several times a day seizures occur, accompanied by pain. Clonic seizures have character and last from several minutes to several hours. During the attack the patient's face appears sardonic smile. In convulsions lips mouth stretched in a trunk; If the court switch to chewing muscles, there lockjaw.

Spazmofilias - chronic constitutional tetany - a form of tetany associated with insufficient calcium in the intestines soak. The main symptoms spazmofilii have a

tendency to clonic and tonic seizures. In spazmofilii possible destruction of hard tooth tissue, susceptibility to caries, and trophic changes in soft tissues and periodontal.

The most common lesions of hard tooth tissue that arises from hypothyroidism parathyroid gland is enamel hypoplasia. Hypoplasia looks stains, holes, grooves. This alveolar bone jawbone least sensitive to lack of parathyroid gland function. Depending on the severity of violations of phosphorus-calcium metabolism may develop paresthesia oral mucosa and teeth, and odontalhiyi that can cause unnecessary tooth extraction.■

ADRENAL DISEASE

The adrenal glands are located at the upper pole of the kidneys, they distinguish brain and cortical parts. The bark of adrenal steroid hormones produce different biological effects: glucocorticoids (hydrocortisone, corticosterone, etc.) That affect carbohydrate metabolism; mineralocorticoids (aldosterone) that regulate water-salt metabolism; Androgenic steroids with, estrogen and prohesteronnymy properties. The function of the adrenal cortex is regulated by adrenocorticotropic hormone (ACTH), which produces the anterior pituitary. The brain of producing catecholamines (epinephrine and norepinephrine) that affect the cardiovascular system.

The function of the adrenal glands are under constant regulatory influence of the central nervous system, brain intermediate and anterior pituitary; hormonal disorders can be expressed in insufficient or excessive production of one or more hormones.

Congenital dysfunction of the adrenal cortex - or innate adrenoheni-talnyp syndrome - a disease characterized by hyper predominant androgen psevdohermafrodytyzmu and development in girls and premature sexual development of boys and girls, and the last - in male pattern. This disease is very rare, but among adrenal pathology in children has a relatively large share. Girls and women suffer 4-5 times more often. In the etiology of the disease and there is a genetic factor.

In patients with congenital syndrome occurs Adrenogenital acceleration of development, especially bone skeleton. Terms of manifestation of secondary sexual characteristics in children ahead of age; express characteristic of differentiation skeleton in 2-8 years (reorder ossification and asymmetry). Excess androgens causes accelerated bone mineralization with changes in their structure. These changes are observed in children aged 3 to 7 years. However, despite the accelerated development of the skeleton, tooth corresponds chronological age.

The impact of hormonally active steroids on the development of teeth and navkolozubnyh tissues. Steroid hormones of the adrenal cortex are biologically active compounds that regulate the function of reproduction and development, differentiation orhanivta tissue control all types of metabolism, affecting cell membrane structure and genetic activity.

It is known that cortisone (synthetic drug) is a potent inhibitor of the growth of the jaws and teeth and at the same time stimulate the development and teething gums. The experiment is set cortisone effect on jaw bones, reducing the height of alveolar bone, osteoporosis, which is characterized by a decrease in the number of osteoblasts

and reducing the number of fibroblasts and collagen fibers in the periodontal and their degeneration.

PANCREAS

The digestive gland, which performs internal secretion (exocrine) and zovnishnose-kretornu (endocrine) function. It is located in the abdomen behind the stomach at I-II lumbar vertebrae. its external secretion is periodic allocation in the duodenum pancreatic juice, which plays an important role in digestion; internal secretion function - the hormone insulin and glucagon that regulate carbohydrate and lipid metabolism.

Diabetes - polietiological and polipathogenic disease, based on the insulin deficiency. One of the early signs of diabetes are dry mouth, loss of tongue papillae and whiskers itching mucosa, increased appetite and thirst. Changes in the mouth are manifested as diseases of the mucosa and periodontal tissues.

Diseases of the pancreas does not directly influence the formation of labial-jaw system, but the development of diabetes, particularly in children leads to metabolic disorders, exhaustion, weakening its immunological defense mechanisms, which together with other etiological factors may lead to the development of teeth anomalies.

THYMUS

Endocrine glands, which played a leading role in the development of immunity. Thymus gland is located in the upper anterior mediastinum. The largest size it reaches the baby, especially a child of 2 years in the future hardly increased. From puberty begins its involution.

Experimentally proved that thymectomy in young animals leads to slower development of the jaw bones, delayed dentition, delayed formation of dentin affects the mineralization of the skeleton. Thus, the thymus plays a role in the formation and development of dentition.

INFLUENCE OF SEX HORMONES ON TEETH SYSTEM

The endocrine function of gonads is important for the growth and development of the organism. Hyperfunction gonads in childhood leads to premature cessation of growth and hypofunction is disproportionate and excessive growth eunuchoidism. Sex hormones have a wide range of actions - organ, metabolic, proliferative.

Estrogen (female sex hormones) affect the metabolism of bone, primarily on the basis of bone protein. Under the influence of estrogen increases the concentration of calcium and phosphorus in the blood, which promotes the process of ossification. Prolonged exposure to these hormones on the body that is growing, leading to premature discontinuation due to accelerated growth calcification cartilage. Especially important is the influence of estrogen on the anterior pituitary indirectly through the hypothalamus. A well-known effect of sex hormones on the process of formation (in the tooth structure and tissue around the tooth). Sex hormones - androgens and estrogens - are important for the development of the face.

Androgens (male sex hormones) stimulate protein synthesis, reduce catabolism of amino acids - all accompanied by a delay in the body of potassium, phosphorus, calcium.

Men gonads (testes) are a complex organ in which the production of sperm and male sex hormone. their function is influenced by hormones gonadotropin anterior pituitary (follicle-stimulating hormone stimulates the process of spermatogenesis, and luteinizing - production of male sex hormone - testosterone). There are primary and secondary failure of hormonal function of male sex glands. Primary hypogonadism - a disease caused by direct lesion testicles; secondary - dysfunction due to other diseases of the endocrine system, pituitary, thyroid, and especially - the hypothalamic-pituitary system, because it stops the gonadotropic function of the anterior pituitary.

It is known that the function of the gonads influence on the formation of dentition. In youth hypogonadism kept children face contours, thin, soft skin. Determine the disproportionality of the mandible - the body compared to the rising branch. Is teething or medium term or delayed. There osteoporosis bones of the skull and facial skeleton, teeth anomalies development.

Female reproductive system consists of the ovaries, which are the sex glands and paranasal lesions. Produced in the ovaries and egg hormones that their structure is steroids. Most researchers believe that most female sexual dysfunction glands cause periodontal disease and increased activity of caries process flow.

So, finding signs of endocrine disorders, orthodontist to plan preventive and therapeutic measures must send the patient to consult endocrinologists for an advisory opinion

5. Topics of reports/abstracts:

1. Organization of orthodontic care for adults and children
2. Clinical examination methods of orthodontic patients
3. Establishing a preliminary diagnosis
4. Anthropometric survey methods of orthodontic patients
5. Biometric methods of measuring diagnostic models
6. Photometric examination methods of orthodontic patients
7. Functional examination methods of orthodontic patients
8. Panoramic x-rays analysis of orthodontic patients
9. Analysis of cephalometrics of an orthodontic patients

6. Summarizing the information received at the lesson.

7. List of recommended literature:

Main:

1. Lectures on the relevant topic.

2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

Additional:

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.
4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.
5.Bhalajhi SI., et al. “Orthodontics: The art and science”. Sixth edition. Arya (Medi) Publication (2015)
6.William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics Elsevier Ltd (2019): 138.
7.RamyIshaq. “The Orthodontic Patient: Examination and Diagnosis”. EC DentalScience 18.5 (2019): 975-988
8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

Information resources

1. Державний Експертний Центр МОЗ України http://www.dec.gov.ua/index.php/ua/
2. Laura Mitchell,«An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України http://library.gov.ua/
4. Національна бібліотека України імені В.І. Вернадського http://www.nbuv.gov.ua/

Practical Lesson №10

Topic: Methods of diagnosis of dentoalveolar anomalies.

Goal: To learn provision of diagnostic methods for children and adults with tooth-jaw abnormalities and deformities, to determine the risk factors of tooth-jaw abnormalities and deformities

Basic concepts in the process of learning the student must apply their knowledge of anatomy and physiology features maxillofacial child, stages and timing of temporary and permanent tooth. For mastering topics the student must use their skills and knowledge of methods of clinical and instrumental investigation of special patients.

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

1. What measures do you need to have in order to construct the diagram of Haulay-Gerber -Herbst?

A. The sum of the sizes of the upper central and lateral incisors and the canine
B. -
C. The length of the dental arch
D. The sum of the width of the four upper incisors
E. The width of the dental arch

2. A 9-year-old boy turned to an orthodontist complaining of absence of 12 teeth. Objectively: the face is symmetrical. The dental arches are narrowed. The place for 12 is 4 mm. What additional method of research is necessary to conduct?

A. Panoramic X-ray
B. Mastication
C. Telerentgenography
D. Myotometry
E. Diagnostic study of models

3. A girl, 14 years old, turned to the orthodontic clinic with complaints about the absence of one tooth and an aesthetic defect. During the clinical examination it was revealed: the neutral ratio of the jaws, the absence of 23 tooth with a site deficiency. The previous diagnosis: retention of 23 tooth with a place defect in the dental arch. Which of the additional research methods should be used to establish the final diagnosis?

A. Ortopantomografiya
B. Myotometry
C. Telerentgenography study
D. Rentgenography of nasal cavities
E. Measurement of diagnostic models

4. The parents of an 8-year-old child consult an orthodontist and complain about the wrong posture of the front teeth. Objectively: vestibular position of 12 and 22 teeth, insufficient space for them in the dental arch. The relation between first permanent molars is Engle's Class I. What additional testing methods should be used?

A. The Pont's index
B. Mastication

C. Clinicalfunctionaltests
D. Telerentgenography
E. Photometrictest

5. Which X-ray methods can be used to determine the bone age?
A. Rentgenography of the hand
B. Sighting X-ray
C. Cephalometric
D. Ortopantogram
E. Tomogram

6. Measuring jaw models using the Pont's method involves:
A. Determination of transversal dimensions of dentitions
B. Studying segments of dentitions
C. Determination of the sagittal sizes of dentitions
D. Diagnosis of the symmetricity of dental rows and displacement of angular teeth
E. Determination of the length of the dental arch

7. Cephalometric method is used to study:
A. Structures of the facial skeleton, its growth and prognosis of orthodontic treatment
B. Structures of temporomandibular joints
C. Determination of the condition of the teeth hard tissues, their periodontal disease, alveolar processes and jaw bones
D. Position of teeth, dental alveolar height, asymmetry of the right and left halves of the face
E. Tooth, alveolar and basal arches of the upper or lower jaw

8. Which additional method of examination should be used when the tooth arch is narrowed?
A. Pont's method
B. Korkhauz Method
C. Gerlach's method
D. Electrometry
E. Cephalometric

9. Where are the Pont's points on the upper molars?
A. Anterior transversal groove of the first molar
B. The mesial-buccal cusp of the first molar
C. Central groove of the 1-st molar
D. Contact points between the first and second molars
E. The distal-buccal cusp of the first molar

10. An 8-year-old child is examined: the upper dental arch is V - like shape, the bottom is trapezoidal (quadrangular). What diagnostic method allows you to determine the correct shape of the dental arch?
A. Hawley-Herber-Herbst
B. Linder-Hart
C. Rope
D. Tonn-Gerlach
E. -
11. A girl of 14 years old is defined to have the overcrowding of the upper and lower frontal teeth of II degree. Which method allows us to determine the size proportionality of the incisors of the upper and lower jaws at the normal depth of the overlap?
A. Tonne
B. Howes
C. Gerlach
D. Pont
E. Hawley

12. Which method is used to study the size of teeth in the period of milk bite?
A. Dolgopolova
B. Corghause
C. Tonne
D. Haulay-Herbst
E. Pont
13. What is the Pont's index equivalent for premolars and molars?
A. Premolar index 80, molar 64
B. 74 and 68
C. 82-68
D. 78-32
E. 86 and 72

4. Discussion of theoretical issues:

Clinical methods of examination of children with dental-maxillo-facial abnormalities and deformities.

During the survey is to find out the patient's passport information, namely: surname, name and patronymic; sex; age; information about the place of education or training, address; information about the parent or guardian of the child (name and surname, place of work, means of communication with parents and child

- and so on. f.); information about the child's pediatrician or dentist and other professionals who have been patient.

Address or place of residence enable orthodontists to determine the medical and geographical features of the area, which is home to a patient who is examined, and their impact on the development of the child in general and on the development of tooth-maxillofacial particular

Necessary clarification of patient complaints, anamnesis. It is necessary to analyze the following:

- from which the baby pregnancy; if not the first pregnancy, how developed and ended in the past;
- pregnancy (toxicosis, their character, period, pregnancy they occurred, hormonal, metabolic, attempts to interrupt pregnancy nutrition and treatment of pregnant women, the presence of occupational hazards, pharmaceutical, radiation and other factors during pregnancy that could cause birth defects and deformities;
- abnormalities in the fetal position;
- course delivery (Obstetrics, imposing forceps, caesarean section);
- nature of child rearing (thoracic, artificial, mixed); application nipples (nipple shape and size, hole size, duration of use);
- the timing of eruption of temporary and permanent teeth;
- diseases of the teeth and mouth
- premature loss of teeth (in age);
- carried diseases (infectious, rickets, hyperthermic conditions, and so on. p.), the age at which there were many times repeated;
- injury (nature, age);
- BadHabits;
- baby'spositionwhilesleeping;
- nature breathing during the day and at bedtime (the child breathe through the nose or mouth, sleeping with your mouth open or closed);
- diseases of the upper respiratory tract;

- surgery (adeno- and tonzylotomia or -ectomia, dental surgery) as they affected the development dentomaxillo—facial area;
- violations of the musculoskeletal system (violation physique, posture, facial fractures and jaw bone), at what age; the treatment;
- common diseases (cardiovascular, pulmonary, endocrine, nervous, diseases of the gastrointestinal tract, kidneys, etc.);
- health condition during the test;
- hygienicoralcare;
- hereditaryburdened;
- Allergicstatus;
- environmental conditions in the place of residence.

A history collected according to the patient or his parents. The survey is important to establish the cause that forced to seek orthodontic help. Often the child's parents fix attention on the lack of aesthetic and less associated local changes (violation of chewing food, no teeth, etc.) with the overall development of the child's body.

It is necessary to find out the mother in her health during pregnancy clarify that the account was this pregnancy. If this is not your first pregnancy, you need to learn how to run earlier, or were trying to miscarriage, toxemia, and his character is pregnant or the mother had metabolic or hormonal disorders, or there rhesus conflict.

It is necessary to detect the presence of the impact of pharmaceutical, chemical, radiological or other factors, and infectious and viral diseases (such as measles, kiropodibna rubella), stress, smoking, work in hazardous industries, violations of the daily routine, malnutrition, as such factors may be cause of birth defects and deformities.

It is also necessary to find out whether the deviation in the position of the fetus, the fetus or subjected to mechanical or thermal trauma as leaked birth, full-term baby is born prematurely or with which the weight.

Birth trauma (gable or vacuum Obstetrics) may adversely affect the overall development of the child and cause abnormalities in growth and development of the tooth-jaw apparatus.

Of great importance in the development of tooth-jaw anomalies is heredity. In clinical practice more common features of the so-called family development, that violations exist in one or both parents or with relatives.

A child inherits from their parents, some features of the structure of the tooth-jaw apparatus and face. This includes the size, shape, number of teeth, jaws location, sometimes sizes, features and functions of muscles and soft tissue. The child may inherit all the settings only from the father, or, for example, the size and shape of the teeth from his father, and the size and shape of the jaws of the mother that may cause undesired ratio of the teeth and jaws.

Hereditary diseases and malformations lead to significant changes in the structure of the facial skull, congenital cleft upper lip, alveolar process, hard and soft palate, syndromes Francheskетti, Robin, illness Kruzona. Inheritance can change tooth enamel (imperfect amelogenesis), dentin (imperfect dentinogenesis) and breach of enamel and dentin, known as syndrome Steyntona-Kapdepona. The legacy passed anomaly size teeth (macro and microdentia), jaws (micro- and macro-genius), their position in the skull (prognathism and progeny).

Particular attention should be given to collecting history of character-feeding (breast, bottle or mixed) and what time.

A child is born with a sucking reflex unconditional, the lower jaw distally located on the top (child retroheniya). This location mandible, firstly, facilitates the passage of the child's birth canal, and the second, along with other features of oral infant (flat palate, gingival membrane, transverse palatine folds, fatty lumps Bichat, lack of articular tubercle) promotes natural breastfeeding . As a result, the functional activity of the muscles of the maxillofacial area, defining rhythm jaw movements in sahitali, there is active growth of the lower jaw, and the end of the first year of life in children retrogenia turns ortognatia.

Breastfeeding promotes proper development of not only the tooth-jaw apparatus, but the whole body, so that the child receives mother's milk nutrition that strengthens its immunity.

When artificial feeding (especially when sostsi make a great hole) will prevail swallowing and not sucking movements. At the wrong (abandoned) position of the head muscles maxillofacial do not take active part in the act of sucking and lower jaw delayed in their development that contributes to tooth-jaw disease.

Also, a child who vyhodovuyetsya artificially, often ill infectious and allergic diseases.

Tooth-jaw anomalies may be due to breast-feeding over 3 years soft mashed food. This tooth-jaw apparatus does not receive sufficient load, which could result in lack of diaeresis and diastema between temporary teeth prior to the change and the subsequent eruption of clusters and irregular position of permanent teeth since mechanical stress is a factor of growth and development of the jaws.

Are essential terms of eruption of deciduous teeth and the number of the first year of life, diseases of the teeth and mouth, when the child began to walk and talk. These data are judged on growth and development. Find out what diseases - infectious, allergic, system - and what age the child suffered, how often they are repeated. It is important to figure out a way of breathing during the day and night (or nasal Mouth) baby sleeps with his mouth open or closed, a favorite position during sleep, or carried adenotonzylectomia or dental interventions in age, state of otolaryngology at the time of filling of history disease. It is necessary to determine the presence of bad habits that are not physiologically adaptive value (sucking fingers, lips, cheeks, tongue, different items), or have a compensatory nature (dysfunction of the tooth-jaw apparatus) that can cause tooth-jaw anomalies.

Specify the time and causes premature loss of temporary or permanent tooth. When collecting anamnesis draw attention to the violation of musculoskeletal system, diseases of the cardiovascular, pulmonary, endocrine and nervous systems, congenital anomalies of soft tissue and bone in the patient's face.

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Overview - main reception physical examination, which includes: overview, definition physique and posture, structural features of the face, examination of the mouth and clinical features determine the state of the mouth. Overview of oral conducted using mouth mirrors, tweezers and probe.

During a public viewing define physical and mental development of patient compliance with their age. Pay attention to the height and body weight, fatness, constitution, their compliance with age.

The patient was examined in the front, profile and back to determine the position of the head, shoulder blades, legs (curvature of legs, feet); shape of the chest, abdomen, back (spine curvature). Particular attention is paid to physical development and constitution of the patient. Depending on the severity curves of the spine posture distinguish the following types: normal or straightened; stooping; lordychnu, kyphotic and scoliotic. This information, in addition to the general characteristics of growth and the formation of the skeleton, can determine patohenetychyy connection with the weakening of musculoskeletal disorders and physique.

During the inspection head must determine its proportionate size of the body; proportionality facial and brain sections; face shape. The form of the face can be like a circle, square, diamond, truncated cone; take the form of a triangle, hexagon. The face may be narrow, wide, medium length, long. The form can be convex profile, straight or flattened, concave. Particular attention should be paid to children with narrow and elongated face. These children meziodystalnyh even a slight increase in the size of teeth can lead to their aggregations position. One congenital structural features and face shape or

emphasize or reduce violations caused by the presence of teeth-maxillofacial anomalies.

Bauer distinguishes four types of person:

- cerebral;
- respiratory;
- dyhestyvnyy;
- muscle.

Cerebral type is characterized by excessive development of the brain and cranial respectively. High and wide frontal face sharp division prevails over other departments - face pyramidal shape with a base directed upwards.

Respiratory preferred type is characterized by the development department average person, and therefore the facial part of the head, neck and torso acquire a number of characteristics. The face has a diamond shape, nose strongly developed in length, it is often convex back.

Dyhestyvnyy type is characterized by a predominance of lower part of face. The upper and lower jaw is too advanced. As a result of over-development of the lower face of the relative narrowness of the frontal, face sometimes takes the form of characteristic trapezoid.

The muscular type - upper and lower parts of the face are approximately equal, the limit is usually straight hair, square face.

C. J. Kryshtab face configuration for constitutional belonging divided into:

- dolihotsefalnu;
- mezotsefalnu;
- brahitsefalnu

Proportionality face. Usually the face is divided into three relatively proportional parts: the top (frontal), average (nose) and lower (jaw). The upper limits of the starts and ends of hair in the middle of the line connecting eyebrows; Average - from the middle line to eyebrow arches pidnosovoyi point that connects the lower edges of the wings of the nose; bottom - from pidnosovoyi point to the lowest point of the chin only the middle part of the face (nose) has a relatively stable vertical dimensions. The height of the lower part depends on the type

of bite in the vertical and sagittal planes (for deep bite it may be shorter, for the open and medial - extended), as amended Children height lower face more than 10% should especially examine carefully.

The symmetry of the face. There is a relative symmetry of right and left halves of the face. In congenital malformation, transversal malocclusions defined symmetry breaking of various degrees of severity. Absolutely symmetrical face does not exist. There are physiological and pathological asymmetry relative to the center of aesthetic facial asymmetry Physiological consider the difference to 2 mm

Determine the shape of the forehead, eyes, their expression of direction (straight askance). It is important to determine the racial characteristics, psychological development, etiological factors. So, after suffering early childhood rickets forehead can be high and bashtopodibnym or square with well-defined frontal hills.

Inspect the back of the nose; characterize mobility wings of the nose (in the presence of adenoid vyehetatsiy back of the nose may be wide, fixed wing nose combined with ajar mouth and dry red border of the lips indicate a violation of nasal breathing, this can lead to stunted growth medium of the face - mikrorynodysplaziyi formation of adenoid type face). Pay attention to the width and symmetry of the nostrils, narrow nose can be a sign of mouth breathing, varying their size may be due to the curvature of the nasal passages.

Variations in the structure of the ear (atresia, protruding ears and "ears satire") can be a secondary feature of the temporal bone growth disorders that affect the layout of the temporomandibular joint and mandible.

The severity of nasolabial folds (smoothed expressed or deep) may indicate the presence of sagittal bite anomalies (for prognathous occlusion are smoothed by prohenichnoho - pronounced deep), different depth or asymmetry nasolabial folds indicates the presence of changes in the transversal plane (various forms of cross-bite).

Pay attention to the nature of the closing of the lips (free, with tension, half-open mouth). If a short lip can occur tense closing of the lips of the manifestation of symptoms "thimble" or "lemon peel", which in turn can be observed and the infantile type of swallowing.

Assess the depth of lip-pidboridnoyi sulcus (deep, medium depth, zhladzhyena). Depth-labial groove pidboridnoyi vary by forming vertical or sagittal bite anomalies. A double chin may be a manifestation of improper location of the tongue (hlosoptozu)

Pay attention to the size of the mandibular angles, dimensions of branches and bodies of the lower jaw, their ratio (increasing the size of branches or the body of the mandible may indicate its excessive growth and formation prohenichnoho medial bite).

TMJ status determined by inspection and palpation. Dysfunction of the temporomandibular joint is characterized by impaired smooth jaw movements, limited or excessive mouth opening. When you open your mouth excuse symmetry and synchronicity of movements of the lower jaw; the degree of mouth opening. In adults, the distance between the cutting edges of the central incisors at the most open mouth is on average 44 mm size and is composed of 3 fingers (2, 3 and 4). Palpation of TMJ hold the skin in the area tragus ear or through the front wall of the ear canal during the closing jaws in a position of central occlusion during jaw movements.

After a review of head and face proceed to examination of the mouth, starting from the state of the mucous membrane of the lips and the corners of his mouth. At the same time pay attention to the relief of the lips, the size and nature of the moisture red border, the presence of abnormal cells.

Determine the symmetry of the corners of the mouth, their direction (raised or lowered from the bottom up); the presence of postoperative scar (after heyloplastyky held); prevalence lips. Normally upper lip should prevail over the bottom. Protruding lower lip with lip-Soft pidboridniy furrow may be a sign of the medial or open bite. Different height corners of the mouth can be a sign of formation of tooth-jaw anomalies in transversal plane.

During the oral examinationpereddver'ya determine its depth.

According to the classification Yu.L.Obraztsova (1992), the depth of vestibule can be 4 types:

Type I - 3 mm (very shallow);

Type II - 5 mm (shallow);

Type III - from 5 to 10 mm (average depth);

Type IY - 10 mm (depth).

Shallow pereddver'ya oral etiological factor may be hypoplasia anterior region of the mandible (lower front teeth crowding) or lead to the development of periodontal diseases.

Then examine bridles lips and cheek bands. Deviations from the normal location bridles lips are more common in the region of the upper lip and are changes in the level of attachment, reducing their length and natyahnutosti.

FY Horoshylkina identifies five typesfrenulums.

The first type are thin, almost transparent bridle the tongue, normally attached, but restrict its movements due to the small length.

The second type are also thin, translucent bridle, attached close to the tip of the tongue and have little long. While raising his tongue tip groove formed in the center.

The third type includes bridle, which constitute a whole, the short cord attached close to the tip of the tongue. When the tip of the tongue folded and back bulges because of tension. Licking the upper lip is difficult, and sometimes impossible. During palpation bridle determined such that the restriction of mobility of the tongue caused by fixing its tip connective tyazhem. During tyazhem that looks like a cord is a thin duplikatura mucosa.

By the fourth type are bridles, although cord which is allocated, but spliced muscles of the tongue. These bridles are often found in children with congenital cleft lip, palate and alveolar appendix.

The fifth type of bridle are hardly noticeable tyazhem, but the fibers are in the thick tongue intertwined with his muscles and restrict movement.

Anomalies of location, shape, size and strength bridles can be the cause of diastema, lead to the development of periodontal diseases.

Of great importance is the examination of the tongue because its size, shape, position and mobility affect the development of occlusion, the so-called "parafunctions tongue" lead to the formation of tooth-jaw anomalies. Thus, the presence of teeth prints on the sides of the tongue or in its front section indicates insufficient space for the tongue or increasing its size (volume loss observed in the oral cavity distal position of the mandible).

Shortened frenulum of the tongue is attached close to its tip, can cause a number of morphological and functional disorders. Exploring the mobility of the tongue, the child offered to open his mouth and the tip of the tongue to touch the mouth, licking the upper and lower lip, chin or get left and right corner of the mouth.

The next stage of examination of the oral cavity is to determine the state of periodontal tissues. Since periodontal disease is often accompanied by tooth-jaw anomalies, the orthodontist is important to determine the status of the mucous membrane of the gums. This estimate color, size, volume and shape of the gingival papillae; nature gingival margin (festonchastyy, truncated, smoothed) determine the level location of the gingival margin relative to the necks of the teeth (widening of the recession).

Examining mouth, pay attention to the mobility of the soft palate; palatine arch; palatine tonsils (their volume, color, relative location of palatal handles); pharynx; mucous membrane of the posterior pharyngeal wall, defining its status (atrophic, normal, hypertrophic).

Overview teeth and dental record formula to determine the identity of the teeth to temporary or permanent occlusion; state of dental hard tissues (caries and its complications, hypoplasia, fluorosis and so on. p.).

Determine the correct location of each tooth in the dental arch. During the period of temporary occlusion of upper and lower dental arches have the shape of a semicircle, and a constant upper dental arch is shaped like a napivelipsa and lower - parabola. Anomalies of position of individual teeth or groups affect the shape and size of dental arch and alveolar processes. For their characteristics are important clinical findings, concentrations of the teeth;

diastem availability and diaeresis; constriction and expansion; shortening and lengthening dental arches; zuboalveolyarne lengthening or shortening in some parts of the dental arches. Such violations can lead to changes in the location of the dental arches relative to each other, ie, the various forms of tooth-jaw anomalies. However, it should be remembered the presence and physiological diastemDiaeresis aged 4 to 6 years. Characterize the bite, see it in three mutually perpendicular planes: sagittal, vertical and horizontal (transversal).

Static methods for determining the chewing efficiency

Our country got static distribution system accounting chewing efficiency, developed NI Agapov. The degree of involvement of each tooth in the act of chewing defined constant (constant), expressed as a percentage. N. Agapov took the chewing efficiency of all dental device for 100%, and the unit chewing ability and endurance periodontal - small cutter, comparing it with all the other teeth. Thus, every tooth in his table chewing a constant percentage rate, and in their absence antahonistyiv count at 0%. A total of N. Agapov value of each tooth constant and does not depend on his state of periodontal disease.

IM Oksman proposed system of accounting chewing efficiency based on anatomical and physiological principles. Assessment given to each tooth, including the third molars. This takes into account the area of chewing or cutting surface, the number of tubercles, roots, features and the presence of periodontal last tooth in the dental arch. The lower and upper lateral incisors as weaker functionally taken as a unit. The upper central incisors and canines adopted two units, three premolars, first molars six, the second - five; wisdom teeth in the upper jaw - three on the bottom -on four units. \

In addition to anatomic and topographic features of each tooth, IM Oksman recommends to consider its functional value due to periodontal lesions. Therefore, the first degree of mobility should be assessed as normal teeth, the second degree with loss by 50%, while third-degree motion consider them missing. You should also evaluate cognate teeth with symptomatic acute or

chronic apical periodontitis. Carious teeth to be seal, refer to the full, and destroyed a crown - to the missing.

Calculation of chewing efficiency by dental apparatus Oksmanom better than Agapov, because it takes into account the functional value of each tooth not only according to its anatomical and topographic data, but also on functionality.

VY Kurland proposed static accounting system state reference system of teeth, called them parodontohramoyu. Parodontohrama obtained by entering data on each tooth in a special scheme.

The more severe atrophy of the alveolar bone, the more reduced periodontal endurance. Thereforeparodontohrami reduce endurance periodontal directly proportional reduction of tooth holes. In accordance with the established rates of periodontal endurance to chewing pressure at various degrees of atrophy hole. The preparation parodontohramy need to get data on wells teeth and the degree of atrophy. The degree of atrophy holes defined radiographic and clinical research.

Because atrophy hole tooth is uneven, the degree of destruction is determined by the area of most severe atrophy. The clinic is done by sensing pathological pockets conventional probe end is dull or to it napayuyut thin metal ball. This is to prevent damage to the mucous membrane of gingival pocket. On radiographs determined atrophy holes around each tooth.

Chewing sample.

The first functional test was developed Hristiansen. He proposed to determine the chewing efficiency by examining the degree of milling eating proper consistency and proper weight. Investigated were given 5 grams of chewing wood or coconut. After 50 chewing movements vyplovuvalas food supply, and vysushuvalasprosiyuvalas through a sieve to determine the degree of grinding. Chewing ability to vyrahovuvalas residue.

SE Gelman developed and simplified method of chewing test. Instead he took hazelnut almond weighing 5 grams and offered to the patient to chew for 50 seconds. By product that can be used for chewing samples were put forward specific requirements. The particles formed after chewing should not dissolve in the

saliva, decrease in volume after drying in a water bath and stick together. These requirements are largely responsible almonds, which has been proposed for this purpose, SE Gelman.

Further development of functional chewing test was performed JS Ruby. He believed that chewing 5 g almonds masticatory apparatus sets a task that goes beyond the norm. Because it offers the patient 0.8 grams hazelnut, which is approximately equal to the volume of one core almonds. A test performed as follows. Investigated give 0.8 g hazelnut and offer it to chew appearance swallowing reflex. Once investigated a desire rozzhovuvanyy nut to swallow, spit it offers content in oral nyrkovydnyy basin. Time is ticking for the nut chewing stopwatch. As a result of functional test receive two indicators: the percentage of food chewing (chewing efficiency) and chewing time. Usefulness of chewing function depends on many factors: the integrity of the dentition, the nature of bite, periodontal status, degree of formation, resorption of roots, training the neuromuscular system and the mental state of the patient.

Functional ability of individual teeth is determined depending on the shape and size of their chewing surfaces of the anatomical integrity, number and height of mounds, the number and size of the root structure cell walls, state of periodontal tissues, location of the tooth in the dental arch and reactivity child.

G**natodynamometria**

In conducting hnatodynamometriyi determine the compression strength in kilograms for each pair antahonuyuchyh teeth. The teeth of children of the same age with a physiologically individual limit of endurance. The physiological limit is variable and varies depending on the state of periodontal tissues and the whole organism.

DP Koniushkiv endurance periodontal table was about loads depending on the type of teeth. DP Koniushkiv endurance periodontal table was about loads depending on the type of teeth. In mechanical proposed following their construction hnatodynamometriv: mechanical, hydraulic (Busygin T., Miller, M. P.,

1958), e (M Perzashkevych L., 1960), e parodontodynamometr (Koniushkiv DP, 1950) universal electronic dynamometer (Courland VY, 1970)

The teeth of children of the same age with a physiologically individual limit of endurance. The physiological limit is variable and varies depending on the state of periodontal tissues and the whole organism.

TRIL ST has developed a tool that allows, unlike other endurance periodontal measure each tooth.

The study of periodontal endurance to vertical loads delivered in the hnatotenzodynamometra. SI TRIL studied endurance periodontal tissues on vertical loads of dentition defects based on age of the patient, extent and topography of the defect and its causes.

Mioartrohrafiya- simultaneous detection rate actually chewing muscles and joints head movements of the mandible in the temporomandibular joint using electronic mioartrohrafa (Courland VY, SD Fedorov, 1973). Offset joint heads and muscles leads to deformation of recording plates adjacent to the facial skin in areas that are studied, a change in strain gauge indicators. The modified electrical pulse increase and recorded on film. Mioartrohrafiya allows us to distinguish waves and waves of muscle contractions that occur during movement of the mandible.

Artrofonohrafiya- auscultation method TMJ to identify them noise, crunched and click and differential diagnosis of functional and morphological disorders

Miotonometriya take into account the tone of masticatory muscles in different states. The degree of pressure (density) is judged by the strength of the muscles, which are immersed probe device (miotonometra) at a given depth. Arrows show miotonometra dial tone the muscles in grams. In a normal tone of dormancy proper chewing muscles often reaches 40 g, and the tone of that muscle compression own dentition in the central compound ranges from 180-240 g (Fig. 4.49).

Miotonometriyi data show that muscle tone masticatory apparatus falls within their fluctuations and changes in the orthopedic treatment.

Mastykatsiodynamometriya- method of determining the physiological forces of chewing. This method is based on the following principles: determination chewing forces is by providing natural food stimuli particular strength with simultaneous graphic registration of mandibular movement. Advance with a special device - fahodynamometra - determined force in kilograms required for grinding a particular substance.

E**lectromyography** - record bioelectric potentials of muscles in order to study their physiological activity. With electromyographic studies can determine the dysfunction of the masticatory and mimic muscles at rest and under stress mandible movements characteristic of various anomalies bite.

Research bioelectrical activity of muscles surrounding the tooth rows, allows us to determine their impact on the growth of the jaw function and forming bite. It is known that chewing muscles are relatively short fibers and large mass. As a result of the reduction of the lower jaw muscles shifted upward and forward. Temporal muscles basically raise the lower jaw, while the front and rear of the beams have different direction, and designated them as bioelectric potentials are often unequal. The prevalence of function of one of these two pairs during mastication (temporal type maseterialnyy or chewing) to some extent determines the direction of growth of the mandible. If the predominant feature actually chewing muscles, the lower jaw is usually well developed. The predominance of masticatory muscles function actually observed in the medial bite temporal muscles - at the distal. Hypotonia muscles lifts the lower jaw is usually combined with a significant disconnection dentition during physiological rest (over 3 mm) and hypertonicity when it is low. Consequently, muscle tone affects the degree of separation of the teeth at physiological rest.

Graphical methods for the study of masticatory jaw movements

Various diseases of the mouth and chewing muscles break the biomechanics of the mandible. As the recovery of the patient moves the mandible can normalize. Normal movement of the mandible, the dynamics of abuse and recovery can be explored using the graphical method. Currently recording masticatory jaw

movements can be performed on different devices: kymograph, oscilloscope and others.

Mastykatsiohramaisplays all chewing movements during chewing nuts weighing 0.8 grams instead of nuts can take bread, carrots, provided that all studies of the same patient should always conduct further one product.

Character chewing wave loop closure, characteristics of individual phases depends on the size of the coil food, food texture, variety bite, occlusal relationships of teeth preserved, the nature of artificial teeth closing, fixing dentures, state masticatory muscles and temporomandibular jaw joint and others.

Studying the functions of language.

In the process of growth and formation of a child's body is becoming language. Tooth-jaw anomalies and strain often lead to incorrect articulation of the tongue. But not always broken pronunciation of sounds. Violation of languages - lisp, snuffle - observed in children with congenital nonunion palate, as well as one- and two-way cross-cutting nonunion lip, palate and alveolar appendix.

Palatohrafiya— registration point of contact with the tongue palate arch in the pronunciation sound different backgrounds. Palatohrafiya held direct and indirect methods. In the direct method, talc is placed on the tongue, and his fingerprints will be on the sky. And when the indirect method is used an artificial palate, which made the model of the upper jaw of a variety of materials: plastic, stensa, wax, celluloid. The surface of the plate facing the tongue covered with black lacquer or indifferent prypudryuyut powder (talc) injected into the mouth of the subject and pressed against the palate. The subject proposed utters a sound. This tongue touches the relevant sections of the sky, leaving prints. Then the plate is removed from the mouth and studying these prints.

Palatohramy- results of experimental phonetic. Made dark thin plate, which is flat against the palate investigated. Before the experiment, the plate is removed and prysypayetsya talc, then it prytyskuyetsya to the palate. Pronounced sound articulation is investigated; with the tongue touching the relevant sections of the sky. The plate is then carefully removed from the mouth. Brown ("zlyzani") areas on the plate indicate

the contact area of the tongue palate. Plate photographed and then discarded photos scheme articulation, called palatohramamy.

Using available data in the literature palatohram phonetic consonants by palatohrafuvannya in patients with defective language and deformities or defects dentition to identify and eliminate the cause of the violation.

Fonohrafiya- a record of words and sounds on the oscilloscope, but pronunciation of the same sound very different people, men and women, giving different images on the oscilloscope.

The study of swallowing function.

Infantile type of swallowing occurs from birth to 2-3 years. During this period, the child is not chewing and sucking because during swallowing tongue repelled by serried lips. With age, the act of swallowing improved. Somatic type of swallowing normally appears aged 2.5 to 3 years, that after the establishment of milk teeth bite. During this period the child moves from sucking to chewing because during swallowing tongue repelled by serried ranks of palate and dental arch.

If stored infantile type of swallowing, the result of an incorrect position of the tongue and lips are deformed teeth-alveolar ridges and disrupted the formation of occlusion.

Study the tongue, lips, cheeks, the hyoid bone in the different phases of swallowing. The main method of assessment is static lateral telerenthenohrafiya head, where are hypertrophied adenoids and tonsils, which contribute to the forward placement of the tongue, the tip of his wrong articulation of surrounding organs and tissues, which causes dysfunction of swallowing.

Functional swallowing test studied based on the ability to clot investigated swallow food or liquid naturally over time or on command. In normal swallowing serried lips and teeth, muscles of the face is not tight, observed peristalsis muscles hyoid region during normal swallowing 0.2-0.5 seconds (liquid food - 0.2 s hard - 0,5 s). When incorrect swallowing serried teeth, tongue contact with the lips and cheeks. This can be seen if quickly push the lips with your fingers. If there is difficulty swallowing compensatory stress facial muscles in the corners of the mouth, chin, and sometimes trembling eyelids are closed, stretched neck and head shaking. A notable

characteristic facial muscles tension - small indentation in the skin in the corners of the mouth, chin (symptom thimble) absorption lips, cheeks, often seen push the tip of the tongue protrusion and lip following.

Clinical functional test Frenkel designed to detect violations of the provisions of the back of the tongue and changes its location during orthodontic treatment and checking acquired and long-term results. Sample performed with specially curved loops of wire. they are made with vodka propalenoho over fire wire diameter of 0.8 mm. To set the back of the tongue at the front of the mouth is made smaller loop in the back part - more.

Arch wire loop and adapts to the model of the upper jaw. When making the loop smaller portion of its round base in the middle of the palate at first premolars, larger - at the first molars. The ends of the wire and twisted wire twisted position, repeating the contour slope of the alveolar bone. Then eliminate in oral vestibule between the first premolar and canine. Try on the device in the mouth, the end derive from its mouth near the angle arch handle parallel to the occlusal surface of the dentition so that its front end was doubled from shorter rear. After entering the final loop of wire in the mouth of the patient asked to sit quietly and watch to handle not touched the face to the soft tissues; register its position before and after swallowing saliva. By changing the position of the handle is judged on the level touching the back of the tongue to the palate or the lack of skills of its uplift. The success of orthodontic treatment and achieving its sustainable results largely determined normalcy back of the tongue.

Experiments conducted by F. Falk (1975), confirmed the need for repeated execution of such clinical tests during treatment sharply pronounced teeth anomalies. The data indicate the state language, is a measure of time possible discontinuation of treatment with the hope of stability results.

Linguistic dynamometry - determining muscle pressure tongue inside the mouth for tooth rows using special devices. If swallowed, the pressure of the tongue on tooth rows by Winder-som variable: the front teeth - 41-709 g / cm2, the hard palate - 37-240 g / cm 2, the first molars - 264 g / cm2. Tongue pressure on surrounding tissue swallowing team 2 times greater than an arbitrary swallowing. From the pressure distribution on the tongue palate arch depends on its shape.

The study of respiratory function.

There are nasal, oral and mixed breathing. With increased physical activity may be physiological breathing through the mouth. In other cases, the presence of mouth breathing indicates a violation of this feature.

Functional respiratory test includes detecting mouth breathing. For this purpose each nostril hairs lifted cotton and watch their movement. In complicated nasal breathing excursion wool minimal or absent. In addition, it is recommended to dial in your mouth water and keep it maximum time. In stark complicated nasal breathing patient is forced to swallow the water to breathe through the mouth.

Samples for breath after maximal inspiration (sample rods) or after maximal expiratory flow (sample Ghencea). Investigated offer take a deep breath and exhale or hold your breath, clenched wings of the nose and lips. Time breath determined by stopwatch. In connection with the termination arterializatsiyi blood in the body accumulate oxidation products, including carbon dioxide. Growing excitement respiratory center, which reduces the ability to hold their breath. Normally no special training detain breath for breath 30-60 seconds, exhale - 20-30 seconds.

Spirometryдallows to study the functional ability of the pulmonary system. The proposed various devices and spirometricspirographic study of respiratory function. Methods of study depending on their varieties.

The aim - to determine the vital capacity, maximum, remaining in a state of physiological rest after dynamic loads. The results are compared with data the average rate on the basis of gender, age, height, physical development and other factors investigated.

Lack of oxygen in the body and violations of redox processes by reducing the VC can cause a delay physical and mental development dytyny5

To study the size of teeth, dentition, jaw apical bases meter should be used or special calipers, and various accessories such ortohresta, symetroskopa, ortometra.

The study models performed in three mutually perpendicular planes: sagittal, transversal and vertical. During the occlusion of permanent teeth to determine the transversal size dentition using Pona method based on the relationship between the

amount meziodystalnyh size 4 upper incisors and the distance between the first premolars and first molars on the upper and lower jaws. For this purpose, Mon proposed measurement points are for closing the teeth of the upper and lower jaws are the same. Thus, the breadth of their dentition same.

In the area of the first premolars width dentition, according to Ponom measured:

maxillary - between points in the middle intertubercular fissure;

on the lower jaw - between the distal contact points on the buccal slope hills.

At the site of the first permanent molars dentition width is measured:

maxillary - between points in the anterior longitudinal fissure cavities;

on the lower jaw - between the rear buccal tubercles

During the change of teeth instead of measuring points on the premolars taken distal dimples first milk molars in the upper jaw or cheek bumps on the back lower jaw (in Korkhauzom).

Pont brought premolyarnyy and molar indexes, which can determine the width of the indicators dentition in premolars and molars normally depending on the amount meziodystalnyh size 4 upper incisors.

Linder Hart and tested method Pona and made corrections to the index number. According to these authorspremolyarnyy index is 85, and the mole - 65. These indices can be used during the change of teeth and during permanent occlusion. In practical work recommended use offered them a table.

During the occlusion of permanent teeth in sagittal direction length of the anterior segment of the upper and lower dentition measured by Korkhauza. Korkhauz added method Pona, offering to determine the length of the anterior segment of the dentition depending on the amount meziodystalnyh size 4 upper incisors. Measurements made from the contact point on the labial surface of the cutting edges of the central incisors to the point of intersection with a line drawn through the point Pona in the area of the first premolars. Korkhauz was a table of values of the length of the anterior segment of the upper teeth with different amounts width of 4 upper incisors. These numbers reduced by 2 mm (according to the thickness of the upper incisors) could be used to determine the length of the segment lower front teeth.

he study segments dentition by Gerlach. Gerlach study suggested proportionality dentition of the upper and lower jaws allocated to it by the ratio of segments (S): front, including 4 incisors and two lateral (left and right), including canine, premolars and first permanent molar. Front upper segment (SI) and the front lower segment (Si) are determined by the amount of Moesia-distal sizes of the upper and lower incisors. Side segments as upper (Lor and Lol), and bottom (Lur and Lul) jaw left and right chord measured magnitude - the line connecting the mesial surface of canines at the point of contact with the side cutter with distal surface of the first molars at the point of contact of the second molar.

The formula for Gerlach approach of the dentition segments:Lor> SI < Lol

Lr = LI (±3 %),

where L - lateral segment: the sum canine, both premolars and first molar (r-right, 1 - left).

SI = L - 0.1 (±3 %) (straightbite);

SI = L (±3 %) (normal bite);

whereI- upper incisors, L - lateral segment.

Measuring the apical base method NG Snahinoyi.

Apical basis - a notional line passing at the level of the tops of the roots of teeth on the upper and lower jaws. In the vestibule of the oral cavity is projected on a transitional fold. Dimensions apical base study in transverzalnomu (width) and sagittal (length) directions for modification by House in N. Snahinoyi

The width of the apical base of the upper jaw is determined on a plaster model of a straight line between the deepest point in the region of fossa sapipa (in deepening between the tops of canines and first pre-molars), and the model of the lower jaw measurement is performed between the same teeth, receding from the level of the gingival margin 8 mm.

The length of the apical base of the upper jaw measured from point A (intersection of the median palatal suture line that connects the central incisors in the neck of the palatal surfaces) the median palatine suture to the line connecting the distal

surface of the first permanent molars. The lower jaw - from point B (the front surface of the cutting edges of the central incisors) on perpendicular to the intersection with a line connecting the distal surface of the first permanent molars.

Normally, the width of apical base of the upper jaw is 44% lower - 40% of the mesio-distal size 12 permanent teeth of each jaw. With the same width parameter associated dentition in the region of premolars (39.2%) and molars (50.4%).

Chart Hauleya - Gerber - Herbst. To build a chart to determine the amount they mesio-distal-size three upper teeth (central, lateral incisors and canines) - radius AB, which is described in terms of the range. Then the circle of radius AB from point A lay segments AC and AD. Doug CAD is the location of the curve six frontal teeth. To locate the lateral teeth describe another circle. To this point of the range E BE conduct direct through points C and D to the intersection with the tangent point A, resulting in receiving an equilateral triangle EFG. Radius equal to the side of the triangle from point A to point continuing diameter AE point O, which describe a circle of radius EF.

In terms of additional circle diameter M AM postpone radius AO points J and N. connecting point N with point C and point J of point D, the curve obtained HCADJ, which is the whole curve of the upper dental arch by Hawley. At intervals of emergency and DJ must be placed side teeth. Herbst replaced the side straight lines and arcs CN DP. The centers of these arcs is L and K, which are on the diameter (KL), perpendicular diameters AM. CN describing arcs and arc radius LC DP - radius KD. Thus, the arc Hawley - Herber - Herbst NCADP is curve-formed upper teeth. For the right curve of the lower denture with drawing diagrams initial radius, according to Hawley, should be 2 mm less. In addition, the curve of CAD are not only incisors and canines, but first premolars.

To determine the shape of the dentition model put on the drawing so that its middle line that passes through the palate seam, coincided with diameter AM, a side of an equilateral triangle FEG held between canines and premolars. Then sharpened

pencil lead round contour of the dentition and compare the existing form of the curve diagram.

To characterize the size of the head and face of the patient determine the following parameters: the width, height, length and depth. Point bone bases marked in capital letters, and point the soft tissues - string. The width of the head study in upper, middle and lower parts of it

• width of the head (ey - ey) - between laterally protruding points (ey) on the side of the head left and right;

morphological face width (zy - zy) - protruding outside points (zy) zygomatic arcs left and right;

the width of the face (go - go) - the lower and backward between spaced points (go) corners of the lower jaw to the right and to the left (lower jaw width is measured similarly).

The length of the head (gl - op) measured between the most protruding point on the forehead to the bottom of the mid-sagittal plane above the root of the nose between the eyebrows and the most protruding backward point (OP) on the back of mid-sagittal plane (Fig. 4.20).

Head height (t - v) define the point (t), located on the tragus ear perpendicular to the line gl - op the most salient point (v) in head circumference.

In the height of the head, face height study: morphological (upper, lower and full) and physiognomic.

• Upper morphological height of the face (n - WG) measured between point (n), which is located at the intersection of the median (middle) plane of the nasal-frontal suture and the most forward point (WP) alveolar crest of the maxilla in the median intersection with the orientation of the skull in Frankfurt plane.

Lower morphological face height (WG - gn) defined between the point (WP) and point (gn) connection contour of the lower edge of the outer contour of the mandible symphysis.

The full morphological face height (n - gn) measured between the point and the point n gn.

Physiognomic facial height (tr - gn) defined between the point (tr), located on the sagittal plane on the border between the forehead and scalp, and point gn.

The depth of facial assessed on four dimensions that define the point t to point n, skin, the most backward point is located on the site go lower contour of the nose to the upper lip (sn), the most anterior point chin speech (pg) in the median intersection when targeting the head on Frankfurt plane point gn to characterize the shape of the head and face applied indexes, which represent a percentage of the size of the head and one person to another.

Head shape is determined by the cross-longitudinal, circumferential high altitude and high altitude cross-indexes. The most important and most frequently used in practical work transverse to the longitudinal (cranial, main) index - the percentage of the width of the head to its length. If this value is less than 75.9, then the form dolihotsefalic head 76,0-80,9 - mezotsefalic, 81,0-85,4 - brahitsefalic, 85.5 or more - hiperbrahitsefalic.

The form of the face can be determined using facial indices proposed by Kollman, Uzhumetskene 1.1., Garson, Izard G. Garson Face Index is determined by the percentage of morphological facial height (n - gn) to the width of the face in the zygomatic arch (zy - zy). The magnitude of the index face the following types: a wide, wide, medium, narrow, very narrow.

Izard proposed morphological facial index (IFM), which is equal to a percentage of the distance from the point (oph) crossing the midline of the face and eyebrow arches tangent to the point gn the width of the face in the zygomatic arch (zy

- zy). The value index of 104 and more characterized by narrow face, 97 to 103 - the average, from 96 and less - broad face.

Faces patient study in face and profile. In the FAS is estimated symmetrical left and right halves of the face and proportionality of the upper, middle and lower thirds of the face.

Profile face judged by its type, it is concave, straight and curved. In assessing facial profile into account the position of the lips to the aesthetic plane proposed by Ricketts; it passes through the point (EN) at the tip of the nose and point (DT), which corresponds to the point pg.

Profile face is determined by assessing the position of the upper lip (UL) and lower lip (LL) regarding aesthetic plane. Protrusion of the lower lip meets the curved profile of the face. Concave face profile is determined by a deviation lower lip back from the aesthetic plane by more than 2.0 mm.

Between face shape and width, length dentition, their apical base established stable relationship. Therefore, when determining the average size of individual rules dentition into account the shape of the face.

X-ray studies

Radiographic studies are needed to clarify the diagnosis, determining prognosis and treatment plan, study the changes occurring in the growth of a child under the influence of treatment. It is important depending on the purpose, to choose the most effective method of X-ray examination. These methods are divided into internal and extraoral.

Intraoral radiography performed dental devices of various designs. Intraoral radiography allows us to study the state of hard tissue of teeth, their steam, alveolar processes and jaw bones to identify destructive changes, cysts, tumors, congenital and acquired defects, as well as clarifying anomalies D rudiments of teeth, the degree of forming their crowns and roots retention teeth abnormalities of their shape, the ratio of milk roots and crowns of the permanent teeth.

Intraoral radiographs median palatal suture is necessary to study its structure, the degree of ossification, changes that occur at slow or fast discovering the seam during expansion of the upper jaw, clarify the indications for plastic surgery frenulum of the upper lip if its fibers are woven into the median palatine suture and contribute to the emergence diastema.

Extraoral radiography methods

Extraoral methods include a panoramic X-ray radiography, orthopantomography, TMJ imaging and cephalometric analysis.

Panoramic radiography of the jaws

In panoramic radiograph of the upper jaw are pictures of dental, alveolar and basal arches, blade, nasal cavities, upper maxillary sinus, zygomatic bone on radiographs of the mandible - a reflection of its dental, alveolar and basal arches edge of the lower jaw angles and branches. Compared with intraoral radiographs in obtaining panoramic radiographic image increases the distance object - film. This due to the large areas of inspection and zoom in 1,8-2 times you can get valuable diagnostic information.

Orthopantomography

Orthopantomography or panoramic imaging, image gives a flat curved surfaces of bulk lots. This method of receiving Panoramic x-rays, which can examine the degree of mineralization of roots and crowns of teeth, the degree of resorption of roots of milk teeth and their relationship with the rudiments of permanent teeth, bending teeth erupted, and retained teeth relative to adjacent teeth and the median plane zuboalveolyarnu height front and side parts of jaws incisive overlap, the asymmetry of the left and right halves of the face, middle and lower part of the facial skeleton.

Tomography of TMJ

Tomography TMJ - autotomography at which improves sharpness and clarity anatomical structures layer that stands out. Tomogram is able to present the most

important indicators form the joint cavity, its width, and depth-ness to express articular tubercle, shape and size of the head articular joint space between the head and the cavity in its front, middle and rear sections. At physiological occlusion joint heads are usually in the middle of the joint

cavity. When occlusion anomalies observed three main position of joint head: they can be in the middle of the articular pits, shifted back and forth or up and down.

There are several methods for calculating the TMJ tomograms particular method of decoding tomograms NA Rabuhinoyi modification IE Androsov AA Anikiyenko, LI Kamyshev.

Top articular tubercle is connected to the lower edge of the opening of the ear canal. On top of the glenoid cavity (L) falls perpendicular to this line (indicated by the point of intersection K). From the point K at 45 ° left and right carried straight line to the intersection of the joint cavity, thus getting distance but also with; spending in terms of K perpendicular, to get the distance. With the lowest point of the lower jaw drops notch perpendicular to the extension lines LN. To scan measure:

head height of the mandible,

the width of the head of the mandible,

the width of the joint space: in front of the anterior, posterior in front of the department at 45 ° in the anterior, 45 ° in the posterior part, in the upper.

Telerenthenohramm - X-ray of the skull, made at a distance, reflecting traumatic facial skeleton and soft tissue contours of the face. With telerenthenohramy can define the features of growth and development of the facial skeleton, changed the location of its growth; have a complete picture of the relationship between bone structure and foundations of the soft tissues of the face; choose the most efficient method of treatment.

Currently, more than 200 known methods of analysis telerenthenohram side of the head and many addons. Various methods differ from one type of measurement

points for linear and angular measurements, reference planes that little change in the growth and development of the facial skeleton.

Key terms used to study the side telerenthenohram:

A (ss) - subspinale - subspinalna point Downs, most posterialno placed in the front loop apical base of the upper jaw;

In (sm) - submentale - submentalna point Downs, most posterialno placed in the front loop apical base of mandible;

Va - basion - the lowest point of the front edge of the great occipital hole in the mid-sagittal plane;

Ah - articulare - the intersection of the front surface of the Ba-zylyarnoyi occipital bone back of the neck;

C - condylen - a point atop the contour of the articular heads;

N - nasion - connect the frontal and nasal bones in the mid-sagittal plane position of the point can be different depending on the degree of frontal sinus;

Se - selliaturcica - point in the middle of the entrance to the Turkish saddle;

S - sella - a point at the center of the Turkish saddle;

O (A-1) - the point is formed perpendicular to SpP from point A;

Or - orbital - posted the lowest point of the lower edge of orbit; located on the edge of the eye zygomatic bone;

Sna (ANS) - spinanazalis anterior - apex anterior nasal spine; located in the plane of the upper jaw bases;

Snp (PNS) - spinanazalis posterior - posterior nasal beard; posterior border of the maxilla foundations;

sp - the highest point on the lower contour of the mouth;

Pt (FPM) - pterygomaxillare - upper distal point alar-maxillary fissure at the intersection foramen rotunda of the rear wall alar-maxillary fossa; forms a loop behind and above the Snp (PNS), its lowest point corresponds to the point Snp (PNS);

Gn - gnation - the place of the lower edge of the mandibular symphysis and external circuit; front point on the lower contour of the body of the mandible;

Go - gonion - on the outer edge of the lower jaw while crossing it with the bisector of the angle formed by the tangent to the lower edge of the body and the rear edge of branch of jaw; posterior point on the lower contour of the body of the mandible;

Pg - pogonion - the most forward point podboridtion performance;

Me - menton - the lowest point on the mandibular symphysis;

Ro - rohiop - located on the upper contour of the ear canal, touches the Frankfurt horizontal;

Osri - anterior occlusal point - the middle vertical incisal overlap between cutting surfaces of central incisors; mid sagittal and vertical gaps between the central incisors;

Osr2 - posterior occlusal point - the middle surface of the closing of the first upper and lower molars;

AOC - the projection of point A on the SRF;

BOC - projection point B on the SRF;

Pr - prostnion - the lowest and most forward point of the alveolar bone of the upper jaw;

is - incision superius - the middle point of the most cutting edge speaker of the upper central incisor;

aps - apex superius - the middle point of the top most cutting edge speaker of the upper central incisor;

ms - molarsuperius - distal-buccal tubercle of the first molars of the upper jaw;

id - infradentale - the highest and most forward point on the surface of the alveolar bone of the lower jaw;

ii - incision inferius - the middle point of the most cutting edge speaker of the lower central incisor;

ari - apex inferius - the middle point of the top most speaker of the lower central incisor;

mi - molar inferius - distal-buccal tubercle of the first mandibular molar;

g - glabella - the most protruding point soft tissue frontal;

n - cutaneousnasion (point of intersection N - Se contoured skin);

sn - subnasale - cutaneal point, most post-cal posted on the site go lower contour of the nose to the upper lip;

pr (EN) - pronasale - most point jutting nose;

tr - trichion - point anterior border of the scalp to the median sagittal plane;

11 - most serving point outline red border of the lower lip;

ul - most serving point outline red border of the upper lip;

st - stomion - the middle point between the upper and lower lip;

pg (DT) - skin pogonion - most protruding point on the profile chin;

Main lines used for research telerenthenohram side:

N - Se (SL) - cranial plane (Schwarz), the plane of the front of the base of the skull; connecting nasion and selliaturcica;

H (FH) - Frankfurt horizontal (Simon), Wu-hoochnychna plane; and connecting the orbital condylen;

SpP (NL) - spinal plane nasal line, plane bases upper jaw; connecting spinanazalis anterior and spinanazalis posterior;

OcP - occlusal plane; is made so that it dotorkalos least three tubercles molars; shares incisive middle floors and ceilings hills last teeth that are in contact; during temporary occlusion incisive pass through the middle temporal overlap the central incisors and molars second temporary bumps in the period of variable bite - through the middle of the permanent central incisors and hills first or second permanent molars that are in occlusal contact;

MP (ML) - mandibular plane, the plane of the foundations of the mandible, mandibular plane of the body; connecting gnation and posted the highest point of the contour of the lower body of the mandible;

MT1 - tangent to the contour of the lower mandible; passes through the lower contour of the foundations of the mandible, from the point formation

Renault perpendicular to MR with pogonion, to the point of intersection of the vertical tangent A; actual length \ Ist \ body of the mandible;

OK - the actual length \ Ist \ body upper jaw; defined between points A-1 (perpendicular from point A to SpP) and Snp;

Pn - vertical bow (Dreyfus); perpendicular, dropped to N - Se skin at the point nasion;

Ro - orbital vertical (Dreyfus); conducted in terms orbital; perpendicular N - Se, parallel Pn; The space between the RP and Roh called jaw

Dreyfus specialized field.

N - A - vertical facial (Downs); connecting nasion and subspinale;

A- B - connecting subspinale and submentale;

A Pg - connecting subspinale and pogonion;

A - tangent vertical, vertical rear contour branches of the mandible;

MT 2 - tangent to the posterior mandible branch circuit; from the point of intersection of H and A, and the point of intersection of MR and A; actual length \ Ist \ branches of the mandible;

T -dotychna to the points sn - subnasale and pg (DT) - skin pogonion;

OI - the longitudinal axis of the upper central incisor, and is connecting aps;

ui - the longitudinal axis of the lower central incisor, II and connecting API (axis other one root tooth conducted similar);

CS - longitudinal axis of the upper first molar is carried out through the middle of the distance between the medial and distal roots and fissures;

shpi - longitudinal axis of the lower first molar, conducted by bifurcation of the roots of teeth and fissures intertubercular (axis other bilateral or multi-root teeth held similar).

The main angles used to study telerenthenohramm side.

Facial angle (angle F) - formed by the intersection of NOSe and N-A. The average value of the angle dorvnyuye 85 ± 5 °. Its value characterizes the location of the upper jaw against the skull base, shift forward from "average face" - antepozytsiya; shift back compared to the "average person" - retro-position (by Schwartz).

Inclination corner angle or the angle of spinal plane (angle I) - formed by the intersection Pn and SpP. The average value of the angle is 85 ± 5 °. If the angle larger average size, the jaw tilted forward more than the "average person" - anteinklinatsiya; If the angle is less than the average, the more inclined jaw back - retroinklinatsiya.

Angle SeNB - formed by the intersection of N-Se and N-B. The average value of the angle is 83 ± 5 °. Its value characterizes the location of the apical base of mandible in the sagittal direction relative to the plane of the skull base.

Angle ANB - formed by the intersection of A and N-N-B. Determine the relationship of the apical bases jaws. The average value of the angle is 3 °. In the sagittal malocclusions the angle is different from the norm. At the distal occlusion limits changes the angle from + 1 ° to + 11 °, pry mesial - from + 5 ° to -11 °, emphasizing the discrepancy in the location of the apical bases jaws.

Frankfurt horizontal angle (angle D) formed by the intersection of H and Pn. The average value of the angle is 90 °. Its value characterizes the location of the joint heads of the lower jaw relative to the base of the skull that affects the shape of the profile of the face.

Analysis telerenthenohramm A. Schwarz.

The most common method of decoding side telerenthenohram head in Ukraine is a method proposed by Schwartz with additions of other authors (Downs, Jrobak, Ricketts). When analyzing telerenthenohram A. Schwarz shares angular and linear measurements on:kraniometrychni, hnatometrychni, profilometrychni.

Kraniometrychnyh purpose of research is to determine the position of the jaws relative to the plane of the front of the skull base - determine the type face and identify deviations from the average size, typical for a normal bite with the same type. The goal - to get a profile which nature has endowed a patient without a pathology. The difference between "right" and the actual profile caused by disease.

Hnatometrychnyh purpose of research is to determine the morphological characteristics of different types of abnormalities and deformities bite. This measure affecting zuboschelepnoho complex located between SpP - spinal plane or the plane of the bases of the upper jaw, and MR - mandibular plane or the plane of the foundations of the mandible. Based hnatometriyi defined anomaly that has arisen due to the size of the jaws discrepancies, anomalies of the teeth, alveolar bone

abnormalities forms; revealed the influence of the size and position of the jaws, and abnormalities of the teeth to form the profile face; the degree of inclination SRF - occlusal plane to N - Se, which is important for the prediction of treatment from an aesthetic point of view.

Profilometrychnyh purpose of research is to study the shape of the face and profile specification kraniometrychnyh impact on relations shape profile. A. Schwarz recommends to assess the shape of the jaw profile for the position of the lips, mouth in relation to the tangent T Pn and Po, the proportionality of parts of the face and the profile angle T.

Analysis of Downs. B. Douns described his method in three works - in 1948, 1952 and 1956, respectively.

The first part (in 1948) dedicated to the study of the skeleton and dentition dentition with normal occlusion and teeth ratio of the facial skeleton normal. The method of calculating the averages and standard deviations and range of fluctuations of some parameters defined performance standards and deviations from them for the development of the jaws and facial skeleton. In 1952 he presented the results of studies Douns parameter changes traumatic facial area associated with growth and treatment. The work, presented in 1956, simplified the two previous studies and added a series of observations and assessments that may have clinical application.

Douns uses horizontal plane Frankfurt, which, in his opinion, is a natural line and reference line face to determine the position of the lower jaw and the Sella-Nasion line and plane Nasion-Basion most relevant to the study of traumatic facial ratios. To analyze the growth and determination of treatment outcomes Douns prefers "Bolton plane" that is the area from point to point nasion Bolton (the deepest point on the curve of the outer surface of the skull, located behind the articular surfaces of the occipital fishery mandible). This choice is made because the base of the skull (N-S-Ba) may be distorted; Bjork is shown in 1955. Growth and development of cranial-facial structures vary according to Dounsom, from the development of the upper and

lower jaws and tooth development and alveolar processes relative to fundamentals jaws. In this regard, Douns divides its analysis into two parts:

Skeleton type, face shape is described, an important consideration given the relative position of the mandible.

Type dentition: dentition is described in relation to skeletal face.

Analysis of Rikketsa. Name Robert Murray Rykettsa was one of the most famous in modern orthodontics since its first appearance in 1950 of the year. In analyzing telerenhenohramm used Rikketsa point and plane are not found in other types of analysis and implemented with the aim to link telerenthenohrafiyu theories of growth and development. We know that the site where nerves penetrate the bone, in the development of early osyfikuyutsya because Rikkets believed that these areas are relatively stable. Thus, these points are important in 11 points analysis.

Nasion - the most anterior point on fronto-nasal seam.

Orbitale - the lowest point on the rear edge of the eye bone cavity.

The item is on the line, crossing the lower edge of the foramen rotundum bottom and back of the pterygoid fossa. This point is determined only telerenthenohramah in lateral projection.

Rohiop - the highest point of the ear hole.

Basion - the lowest and most backward point located at the occipital bone.

Pogonion - most point located anteriorly surface chin tangent point to the plane of the face (NA).

The point on the leading edge of the chin, between points B and RO where bone basics curve changes from concave to convex.

The top bow front axle.

The deepest point in the curvature of the upper jaw, nose ossyu between the front and tooth alveolar shoot.

The point is determined on a branch of the mandible.

5. **Topics of reports/abstracts:**

Organization of orthodontic care for adults and children

Clinical examination methods of orthodontic patients

Establishing a preliminarydiagnosis

Anthropometric survey methods of orthodontic patients

Biometric methods of measuring diagnostic models

Photometric examination methods of orthodontic patients

Functional examination methods of orthodontic patients

Panoramic x-rays analysis of orthodontic patients

Analysis of cephalometrics of an orthodontic patients

6. **Summarizing the information received at the lesson.**
7. **List of recommended literature:**

Main:

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

Additional:

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.

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8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

Information resources

1. Державний Експертний Центр МОЗ України http://www.dec.gov.ua/index.php/ua/
2. Laura Mitchell,«An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України http://library.gov.ua/
4. Національна бібліотека України імені В.І. Вернадського http://www.nbuv.gov.ua/

Practical Lesson №11

Topic: Physiological and biomorphological changes of the maxillofacial apparatus under the influence of orthodontic equipment.

Goal: To master the theory restructuring periodontal tissues under the influence of orthodontic appliances (Flyuorensa, Valkhofa-Kinhsleya, Openheyma) provision of orthodontic equipment impact on periodontal tissue

Basic concepts: in the process of learning the student must apply their knowledge of the physiological and pathological species bite, etiology and pathogenesis, classification ZSCHS abnormalities and deformities, orthodontic treatment patients kinds, mechanism of action and classification of orthodontic equipment.

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

1. What measures do you need to have in order to construct the diagram of Haulay-Gerber -Herbst?

A. The sum of the sizes of the upper central and lateral incisors and the canine
B. -
C. The length of the dental arch
D. The sum of the width of the four upper incisors

E. The width of the dental arch

2. A 9-year-old boy turned to an orthodontist complaining of absence of 12 teeth. Objectively: the face is symmetrical. The dental arches are narrowed. The place for 12 is 4 mm. What additional method of research is necessary to conduct?
A. Panoramic X-ray
B. Mastication
C. Telerentgenography
D. Myotometry
E. Diagnostic study of models

3. A girl, 14 years old, turned to the orthodontic clinic with complaints about the absence of one tooth and an aesthetic defect. During the clinical examination it was revealed: the neutral ratio of the jaws, the absence of 23 tooth with a site deficiency. The previous diagnosis: retention of 23 tooth with a place defect in the dental arch. Which of the additional research methods should be used to establish the final diagnosis?

A. Ortopantomografiya
B. Myotometry
C. Telerentgenography study
D. Rentgenography of nasal cavities
E. Measurement of diagnostic models

4. The parents of an 8-year-old child consult an orthodontist and complain about the wrong posture of the front teeth. Objectively: vestibular position of 12 and 22 teeth, insufficient space for them in the dental arch. The relation between first permanent molars is Engle's Class I. What additional testing methods should be used?
A. The Pont's index
B. Mastication
C. Clinicalfunctionaltests
D. Telerentgenography
E. Photometrictest

5. Which X-ray methods can be used to determine the bone age?
A. Rentgenography of the hand
B. Sighting X-ray
C. Cephalometric
D. Ortopantogram
E. Tomogram

6. Measuring jaw models using the Pont's method involves:
A. Determination of transversal dimensions of dentitions
B. Studying segments of dentitions
C. Determination of the sagittal sizes of dentitions
D. Diagnosis of the symmetricity of dental rows and displacement of angular teeth

E. Determination of the length of the dental arch

7. Cephalometric method is used to study:
A. Structures of the facial skeleton, its growth and prognosis of orthodontic treatment
B. Structures of temporomandibular joints
C. Determination of the condition of the teeth hard tissues, their periodontal disease, alveolar processes and jaw bones
D. Position of teeth, dental alveolar height, asymmetry of the right and left halves of the face
E. Tooth, alveolar and basal arches of the upper or lower jaw

8. Which additional method of examination should be used when the tooth arch is narrowed?
A. Pont's method
B. Korkhauz Method
C. Gerlach's method
D. Electrometry
E. Cephalometric

9. Where are the Pont's points on the upper molars?
A. Anterior transversal groove of the first molar
B. The mesial-buccal cusp of the first molar
C. Central groove of the 1-st molar
D. Contact points between the first and second molars
E. The distal-buccal cusp of the first molar

10. An 8-year-old child is examined: the upper dental arch is V - like shape, the bottom is trapezoidal (quadrangular). What diagnostic method allows you to determine the correct shape of the dental arch?
A. Hawley-Herber-Herbst
B. Linder-Hart
C. Rope
D. Tonn-Gerlach
E. -

11. A girl of 14 years old is defined to have the overcrowding of the upper and lower frontal teeth of II degree. Which method allows us to determine the size proportionality of the incisors of the upper and lower jaws at the normal depth of the overlap?
A. Tonne
B. Howes
C. Gerlach
D. Pont
E. Hawley

12. Which method is used to study the size of teeth in the period of milk bite?

A. Dolgopolova
B. Corghause
C. Tonne
D. Haulay-Herbst
E. Pont
13. What is the Pont's index equivalent for premolars and molars?
A. Premolar index 80, molar 64
B. 74 and 68
C. 82-68
D. 78-32
E. 86 and 72

4. Discussion of theoretical issues:

The impact of orthodontic equipment for periodontal tissue.

One of the main components of orthodontic treatment is to move teeth in three mutually perpendicular directions. When you move the tooth to it has active power and reactive power opposes. Under the influence of these forces in one direction may reciprocating motion of the tooth and rotary - when the directions of the forces do not match. The center of rotation of the tooth is about the boundary between the middle and apical third of the root. The magnitude of the moment of rotation is proportional to the active force and the length of the perpendicular lowered from the center of rotation of the tooth to the line of action of the active force. Orthodontic devices and is a source of strength, and therefore Orthodontist use it to correct the anomaly or anomalies bite position of individual teeth. There is a corresponding alteration in all elements of periodontal - alveoli, periodontal, dental cement and gums. The nature of restructuring varies depending on parties, parties or party pressure thrust.

Theories restructuring bone

Theory of Flyurens. Its essence is that, depending on the pressure or traction acting on the tooth, there are structural changes in the alveoli, appozytsiya and bone resorption. When you move the tooth, such as oral vestibular alveolar area can be divided into two parts: the vestibular and oral. In the vestibular alveoli

of the side adjacent to the tooth, in connection with the formation of the gap between the tooth and the alveoli, through the process appozytsiyi traction, and on the other side, that is on the side of the oral alveoli, which affects the roots, because pressure from tooth to bone is bone resorption.

This theory does not explain the following phenomena: according to her, is a thickening of the alveoli vestibular and lingual thinning in areas of contact with the tooth, but the outer side of the alveolar process both oral and vestibular side of unchanged. In orthodontic practice there is always movement of the entire area of the alveolar bone in or out by about the same distance that move teeth. Float not only the tooth, but also changing the position of the alveolar process and, therefore, the theory resorption and appozytsiyitulmachenni representatives in this view unsatisfactory.

Theory of Kinhsley and Valkhof. The compact part of the bone and the more spongy part of different elasticity and stretching, especially at a young age, as you know, spongy bone consists of bone balochok woven in loops which are bone marrow. In the application of traction or pressure brute force loop change their configuration is updated a tense intra-bone.

There is a difference of tension in various parts of the bone tissue. This is caused by the movement of teeth with alveoli. If the action of the forces that deform the bone, lasts a long time, the difference intramolecular tension gradually smoothed and modified forms all the bones become stable.

Thus, the example of the displaced tooth in the oral direction can be seen, according to this theory, on the side of the pressure bone because of its elasticity shrinks and moves in the oral direction, and the vestibular portion is released from pressure and thrust transmitted through the alveolar membrane whole moves dental orally.

This theory, unlike the previous one, explains the move anomaliynoyi area jaw bone in one direction or another. But this theory ignores the well-known major factor genesis of bone tissue, which depends on two processes: appozytsiyi and resorption.

After 45 years of experiments, the Swedish scientist Sanstedt first conducted research on a young dog, changing arc type Engle, mounted on its canines. Within three weeks he moved the upper front teeth 3 mm palatynalno.

On the side thrust both at low and at high power is bone growths on the wall of the alveoli. Bone tumors are sending gully bent periodontal fibers. On the side pressure, the resorption of the alveolar walls, the nature of which depends on the degree of periodontal compression.

At low power resorbed alveoli wall and the surface of the tooth intact. Under the influence of large forces periodont compressed, so that the process goes resorption of periodontal tissue at the site of compression periodontal alveoli walls resorption occurs. The process of resorption occurs from viable periodontal until resorb all his cramped islands. This resolves the root of the tooth.

Oppenheim theory. In 1911 Oppenheim published their research performed on the milk teeth of apes, during which he peremischuvav teeth in various directions via labial arch. Based on research he described typical histological picture of changes in periodontal displaced teeth. Oppenheim great merit is put forward his position on the use of large negative forces, because it is associated with damage to periodontal tissues. Oppenheim was the representative of this view, as a result of changes in the tissues, ie bone restructuring, moves not only position the tooth with abnormal to normal, but the alveoli. According to this theory, at moving teeth orthodontic apparatus is not moving along alveolar bone with a tooth due to the elasticity of bones and rebuilding it through the process of bone resorption and appozytsiyi.

But there appozytsiya resorption and not as representatives of their first interpreted theory. Consider the example of a tooth, displaced in the oral direction, as mentioned above, the alveoli can be divided into two parts: the vestibular and oral. In each of them is both resorption and appozytsiya.

On the side of the vestibular alveoli touch the tooth because of tooth displacement of the alveoli is appozytsiya on the outer side; concerning the oral part of the alveoli, in the place of contact with tooth resorption occurs, and with external

- appozytsiya. Thus there is a thickening of the vestibular and oral flat out no, and there is almost uniform change in the structure of tissues of both jaws moving in the tooth in oral and vestibular directions.

As a result of these processes of bone are moved from abnormal to normal position not only teeth, but also all the alveoli and the surrounding tissue.

Kalvelis theory suggests that the presence of thrust areas of osteoclasts and osteoblasts in the areas of pressure occurs in the retention phase, when there is alignment periodontal gap. On the surface of newly formed bone (traction zone) resolves osteofitne establishment and smooth wall is formed alveoli. On the side pressure (under retention) occurs layers of bone on rezorbovanu-hole wall surface, thus aligned alveolar wall and fixed periodontal fibers.

Kalvelis DA based on experimental data and collaborate clarified a number of major changes for orthodontic loading. General provisions stemming from understanding the author biomorfozu tissue surgery. The severity of these rearrangements author conditionally divided into 4 stages:

characterized by balance of resorption and new formation processes of alveolar bone.

transitional morphological violations, but they are reversible.

establishment of functional ability of the tooth, but with morphological defects.

completed the process of tissue changes the appearance of morphological defects dysfunction.

Schwartz studied the mechanism of orthodontic tooth movement - clarification of the center tilt teeth. He also wrote a lot about tissue changes - both from own research and from considering the works of other authors.

Rayzman Theory (1951) upholds faithfulness and provision Kinhsleya Oppenheim and compares the parallel processes of bone resorption on the side of the pressure and bone appozytsiyi on the side thrust. Based on experiments, the author managed to prove that these processes are unevenly in different terms and with varying intensity. From studies in rabbits set Rayzman made conclusions: •restructuring of a fabric is the corresponding sequence;

- Destructive process first developed in the areas of direct action regulating device, then together with the process navkolozubnyh resorption in tissue regeneration processes occur;
- The processes of tissue repair, stabilization of the shape and position of teeth occur in periods when the device is not activated condition;
- Abnormal stress on the upper jaw incisors affects the jaw, but the process of resorption her come later occur less rapidly and on a smaller area.

Theory A. I. Pozdnyakov. A. I. Pozdnyakov spend experimental study on dogs, to study changes in the periodontal orthodontic intervention. It found that the move tooth using orthodontic device causes reaction from the hole periodontal bone cement and root, resulting in a stratification of resorption and bone, cement and change direction periodontal fibers. Resorption of bone occurs on the side of the pressure in the cervical part of the inner wall of the hole. On the other side, ie the side thrust, is layering young bones.

Theory A. D. Mukhinoy (1953). A. D. Mukhina conducted research on dogs to test tissue changes in the median palatal suture carts and teeth. The results of the study confirm the general pattern of orthodontic tooth movement, namely on the side thrust periodont growing tumors and found the bone on the inner wall of the alveoli, and the pressure side periodontium narrowed and there is resorption of the inner wall of the hole. In the palatal suture perestroika processes are also stratification by new bone at the edges of the joint.

Clinical studies MM Khotyn allowed it to establish that the alteration of bone alveolar bone during orthodontic treatment of children occurs in the teeth like those seen increased chewing pressure and excluded from the act of chewing.

Theory Z. F. Wasilewski. These 3F. Wasilewska obtained in experiments on puppies aged 1.5-2 months, showed that:

processes and root resorption hole milk tooth chewing side with high pressure occurring more rapidly than in the same teeth;

baby tooth resorption cement flows by type of lacunar hypertrophy;

circular fiber connections under increased pressure chewing change their direction - placed obliquely from the wall down the middle of the hole and the neck of the tooth, forming a trough;

periodontal gap in his teeth examined broader than in control;

bony septum between the root and milk rudiments of permanent teeth in most researched resorbed side.

Data from these experimental studies have shown that the use of orthodontic appliances that increase the bite on milk molars safe for the formation of permanent teeth germs.

Morphological changes of temporomandibular joint

TMJ is an area of active growth of the lower jaw. Restructuring in these joints is similar to the process of building sites in bones epiphyseal cartilage plates. With orthodontic appliances can move the lower jaw sideways, up, down, forward or back. This gives rise to morphological changes in the temporomandibular joint. Often put forward the lower jaw; while its joint heads move along the slope of the articular tubercle. In the initial period of orthodontic treatment is no noticeable change because the compressed plate cartilage lining the joint holes and covered with articular head.

At the end of the first week of orthodontic treatment in bone articular tubercles begin the process of rebuilding. Expanding blood vessels, the number of cellular elements within the bone and brain cavities are noticeable increased in size osteocytes, later appearing osteoblasts and bone resorbed. Rebuilding bone is not only in the area of compression of the articular tubercles, but also on the surface of the articular heads. Significant changes occur in the articular disc. In areas where the disk does not feel pressure, it increases 2-3 times. This cartilage cells become bigger and okruhlyayuchys lose star-shaped. Often they are 3-4 in the series as a short chain. Expanding, disc fills the space that occurs in the distal movement of the joints due to articular head forward and down into the areas of disk compression decreases the number of collagen fibers and cell elements of synovial membrane responds to increased functional activity of cells. The number of synovial fluid. Where

intra drive connected to the capsule, synovial membrane buds grow, sometimes it is smooth. In the shell appear clearly pronounced blood vessels. Normally this happens. Observed changes in the muscles that are directly related to the joint. The process involved the restructuring of the branches of the lower jaw area located below the neck joint head. After the active movement of the mandible in the joint restructuring processes, which have been gradually normalized. In bone, which is the basis of the articular fossa, between rows of collagen fibers are large cells and osteoblasts, a new bone framework.

The results summarized experimental observations suggest that the orthodontic movement of the mandible in the mesial direction to the extent appropriate to the functional movement on the front surface of the joint head is resorption, while the remaining part of growing up and heads distally by enhondralnoyi build bone.

Active bone growth noted in the joint construction of pits, ie areas where construction is usually bone. The lowest growth is observed on the surface of the articular pits and at their outer edges, where the bone is by building appozytsiyi. Articular disc fastest reacting to the movement of the mandible. Hyaline cartilage covering the joint head, provides an increase in the size of the mandible (growth) and change the direction of growth under the conditions of functional load. Plates of cartilage that lines the joint fossa are less morphological reconstruction. Perhaps it is because the joint holes located at the base of the skull in the vital centers.

As a result of orthodontic treatment can be achieved by appropriate adjustment elements TMJ treatment and sustainable results which ensure normal function in their new environment. The nature of morphological reorganization is directly dependent on the degree of displacement of the mandible.

Force in Orthodontics

The action on the crown of the tooth pressure force or thrust tooth leans toward the active forces on the side slope periodont subjected to enhanced

compression (a zone pressure) on the opposite side of the tooth is removed from the walls of the alveoli, periodontal fissure extends, stretch periodontal fibers (a zone of tension) . In the area of pressure, the resorption of the alveoli walls, and a tooth can move in the direction of the applied force. As tension on the wall of the alveoli is neoplasms of bone and tooth movement as bone tumors step by step backwards. Thus, roaming tooth can be stopped at any stage of treatment. The walls of the alveoli will be in approximately the normal width. The tooth is stable, and the retention occurring only under certain leveling conversion alveoli walls.

Orthodontic treatment is based on the excitement and stimulation of bone restructuring jaws caused strength of orthodontic devices. The nature of this force depends on the structure and actions of the state apparatus. The creation of the current force should be given great importance, because this depends largely on the progress and success of orthodontic treatment.

In orthodontics There are several types of forces action.

- The nature of force - mechanical and functional.
- The magnitude of the current strength - large, moderate and weak potency.
- The nature of - permanent and intermittent power.

Mechanically active devices are those that are included in a source of strength. This type of apparatus called active devices because the devices themselves develop strength. The source of power may be elasticity curves and springs, elastic rubber traction force developed screw ligatures and others. The force is developing these sources is regulated or dosed orthodontist, and the patient has to take this action so that developing designated device.

The force develops functionally operating apparatus differs from the mechanical force. The source of this type of contractile force is the force of chewing muscles of the patient. Most devices do not contain any source of power and therefore called passive. Since all body processes are controlled regulatory body adaptations, dosage strength should be the body of the patient. Consequently, the value of the current strength should be within

tolerance of the patient, and overdose is harmful consequence and should not be tolerated.

In periodontal receptors is rich grid that come in agitation by mechanical irritation, especially at elevated mechanical and masticatory pressure. With an increased load of teeth in the initial period there is sensitivity, even pain, as a defensive reaction to the damaging effects of external stimuli. As a result of prolonged high pressure sensitivity is a change - adapting mechanoreceptors periodontal regarding the strength and duration of pressure. Every pain has a physiological stimulus characteristic - it has a damaging effect, resulting in the perception of irritation is reduced or disappears altogether. This may explain the occurrence of severe tissue changes under load teeth functional and operating devices.

In orthodontics are two different kinds of force - continuous and intermittent forces.

Intermittent power characterized by the fact that the device is activated with great force action at regular intervals - periodically. The nature of the active force - as aftershocks; After activating the machine develops a great power, but soon calms down. The source of power unit are screw arches, ligatures, springs, elastic, reinforced on a stable footing.

Continuously agent characterized by a uniform effect. The source of this type of force is the elasticity curves and springs and, to some extent, the effect of traction rubber until rubber in the mouth does not swell. From the elasticity of the metal depends "tireless" device, that device performance is more or less evenly long.

Continuously operating force we must not understand the meaning of one period of the force from one machine to the next activation, but in the sense of the entire period of orthodontic treatment, consisting of a number of periods a permanent force. Continuous power is characterized by a small but uniform effect.

The decisive factor in orthodontic movement of teeth is adequate agent that stimulates the resorption of the alveoli walls in the area of pressure, and in the area of thrust - bone tumors. The minimum limit is too low, optimum

power is 20-26 g / cm2, ie slightly less capillary blood pressure (A. Schwartz).

If you use a large force, then squeezed periodont and side walls of the alveoli pressure resorption occurs. In these cases resorptive tissue transformation occurring from places of viable periodontal tissue and bone and brain cavities resolves impaired periodontal alveoli wall and sometimes a tooth, and only then can move the tooth. Thus, by applying large forces can not accelerate tooth movement and vice versa.

Small forces promote stimulation of osteoreparation - a set of measures aimed at alveolar bone resorption and bone formation of new layers of bone in areas that are not subject to pressure.

The first phase of orthodontic processes stimulate action to overcome the barrier defenses and processes of destruction of bone resorption should prevail over the processes of formation of new bone.

The second step in the process of formation and destruction of tissue must be balanced as possible.

In the third and final stage of the process of stimulation should aim to accelerate the transformation of a new mechanism of bone basis for a complete bone tissue regeneration that should prevail over the processes of resorption. What is stronger bone after orthodontic treatment, the less relapses, relapses occur because of insufficient retention period of incomplete treatment.

Moyyers GE and 3. T. Bauer noted that the application of large forces of the shape of blood vessels and blood flow velocity in the center move, leading to malnutrition tissues. Under long-term large forces can occur necrosis. The authors point out that even a small force causing stagnation in the vessels and can lead to the emergence of pathological processes. Therefore, they recommend to apply in practice ortodon-Atlantic power levels capillary pressure.

Schwarz (1932) wrote that the old tooth moving the pressure on him shall not exceed 20 g / cm2, while the cabinet strength should move closer to 40-50 g / cm2.

5. **Topics of reports/abstracts:**

- The underlying theory building Flyurensa?
- Theory Kinhsleya - Valkhofa. The underlying theory building Kinhsleya - Valkhofa?
- Oppenheim theory and its shortcomings.
- What forces affect the periodontal tissues under the influence of orthodontic equipment?
- Where is the center of rotation of the tooth?

6. **Summarizing the information received at the lesson.**
7. **List of recommended literature:**

Main:

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

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4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.
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6.William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics Elsevier Ltd (2019): 138.
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Information resources

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2. Laura Mitchell,«An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України http://library.gov.ua/
4. Національна бібліотека України імені В.І. Вернадського http://www.nbuv.gov.ua/

Practical Lesson №12

Topic: Peculiarities of local and general disorders of the state of the body with dento-jaw anomalies.

Goal: To master the position of relationship disorders emotional state, condition of the gastrointestinal tract, musculoskeletal, respiratory, cardiovascular systems, the teeth anomalies. Prophylaxis incurred.

Basic concepts in the process of learning the student must apply their knowledge of the physiological and pathological species bite, etiology and pathogenesis,

classification maxillo-facial abnormalities and deformities, orthodontic treatment patients kinds, mechanism of action and classification of orthodontic equipment.

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

1. Embryonic development of the face and jaws
2. Anatomical and physiological features of oral newborn
3. Height and age-related changes jaws
4. Features type of swallowing their characteristics.
5. Methods studying the state language functions.

4. **Discussion of theoretical issues:**

Swallowing role in the development tooth-jaw apparatus. Diagnosis swallowing disorders. The influence of breathing on the formation tooth-jaw system and body as a whole. Methods of studying the state language functions.

Content of topic

Tooth-jaw system is considered as a functional system in conjunction with its morphological development that occurs in the postnatal period before and after the eruption of teeth and forming dentition.

Function of closing of the lips. When closed without tension lips defined myodinamic balance tongue muscles from the inside, facial and masticatory muscles -

out. Violation of the closing of the lips can be a symptom of dysfunction breathing or self-change (short upper lip, etc). Incompetent lips lead to a breach myodinamic balance jaw muscle-facial area that may cause a change in the inclination of the front teeth lip side, and conversely lower - in the oral direction.

The function of the respiratory system. There are nasal, oral and mixed breathing. Considered normal nasal breathing, if necessary, increased physical activity or temporary inability to breath through his nose, air can pass through the mouth.

When habitual mouth breathing changing the position of the tongue and lower jaw, forming high gothic palate narrows and extends the upper jaw, lower jaw distally located. In some cases, to facilitate breathing baby down the lower jaw down and forward to contributing to the development of the lower jaw and upper delay growth.

The function of chewing. The full chewing of food of various consistency promotes the growth of the dental arches. The change of teeth is active on the side habitual chewing.

Schwartz described two types of chewing: masseter and temporal and S. Y. Kryshtab proposed a third type - mixed.

In masseter type of chewing observed strong chewing muscles, chewing movements slow, but strong chewing muscles actually crossed the line molars, while lifting the lower jaw pushed forward, well masticated food.

In temporal type chewing chewing muscles less strong, fast choppy chewing movements, proper chewing muscles attached to some distant line of molars, mandibular movements faster and choppy, chewing interrupted, food swallowing badly crushed.

Preferential feeding the child soft, mashed food leads to "laziness of mastication", which can cause in the third period of milk teeth and bite close contact between the teeth (no physiological diaeresis and diastema).

Swallowing function. Swallowing is a sequential process, among which are three phases: oral, pharyngeal and esophageal. During normal swallowing closed lips and teeth, facial muscles are not tense the muscles sublingual area. In cases wrong (infantile) closed swallowing teeth, tongue contact with the lips and cheeks, there is a compensatory stress facial muscles in the area of the corners of the mouth, chin

(symptom thimble), sometimes trembling and closed eyelids, neck stretched and tilted head. Most infantile swallowing formed with open bite and protrusion of the front teeth.

Functions speech. In medical practice violations of speech called dyslalia. Dyslalia depending on the location to share palate, lingual, dental and labial.

Palate - associated with the pathology of hard and soft palate (tumors, paresis, nonunion, etc.).

Lingual - with abnormalities of the tongue and bite.

Dental - with violation shape of teeth and their position in the alveolar arcs, the lack of teeth (adentia).

For the normal physical development of children need good nutrition and digestion is largely dependent on the masticatory apparatus, including teeth that provide good performance of the chewing muscles, periodontal stability, adequacy of the structure alveolar processes and jaw cysts. All these elements articulation chain in need of training, which is provided during chewing solid food.

The presence of a complete set of teeth correctly placed in the tooth row, ensure harmonious development of the facial skull and the correct formation of sounds and purity of language. Traumatic injuries of teeth and jaws in children can occur as a dairy (temporary) and permanent teeth in children, in isolation or in conjunction with fracture. This occurs at the same time how difficult complication or necrosis of the dental follicle rostkovoyi zone, and thus a violation of the tooth root formation or even periodontal tissue inflammation and bone. Loss of teeth in children accompanied by deformation of the dental arches in both vertical and horizontal directions. Injury occurs when teeth fall during children's games, sports, and more.

Often there is damage and abuse layer ameloblasts hard tissue histogenesis; teeth, through inferiority which further creates favorable conditions for the occurrence of cavities.

Premature loss of temporary molars leads to disruption of the formation of bite height and reduce existing height emergence teeth deformations, displacement of the mandible distally, changing relationships between elements of temporomandibular joint dysfunction chewing. purity of sound and language, the appearance of bad habits. Over the life of a human dentition undergoing complex processes associated with growth, development and involution. Temporary teeth in the growing body belong to

the few organs that undergo reduction. However, at some stage they ensure harmonious development of the entire system and oro-facial are more important than regular teeth

5. **Topics of reports/abstracts:**

1. Connection of tooth-jaw anomalies and irregularities and emotional state.
2. Connection of tooth-jaw anomalies and conditions and gastrointestinal tract.
3. Connection of tooth-jaw anomalies and musculoskeletal system.
4. Connection of tooth-jaw anomalies and respiratory system.
5. Prevention of occurrence of disorders due to anomalies of the teeth-jaw.

6. **Summarizing the information received at the lesson.**
7. **List of recommended literature:**

Main:

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

Additional:

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.
4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.
5.Bhalajhi SI., et al. “Orthodontics: The art and science”. Sixth edition. Arya (Medi) Publication (2015)
6.William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics Elsevier Ltd (2019): 138.
7.RamyIshaq. “The Orthodontic Patient: Examination and Diagnosis”. EC DentalScience 18.5 (2019): 975-988
8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

Information resources

1. Державний Експертний Центр МОЗ України http://www.dec.gov.ua/index.php/ua/
2. Laura Mitchell,«An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України http://library.gov.ua/
4. Національна бібліотека України імені В.І. Вернадського http://www.nbuv.gov.ua/

Practical Lesson №13

Topic: Clinical examination of an orthodontic patient.

Goal: must master the clinical methods of examining children with PAA. The student should clearly understand the importance of studying anamnestic data when examining children with PAH. The student must be able to collect the patient's complaints, anamnestic data, fill out the medical history of the orthodontic patient.

Basic concepts: In the process of mastering the material, the student must apply his knowledge about the peculiarities of the anatomy and physiology of the child's MFO, the stages and timing of the development of temporary and permanent teeth, the morpho-functional characteristics of the temporary, removable and permanent bite, physiological and pathological types of bite.

Equipment: cephalometric analys, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test,**
   frontal survey on basic terminology, etc.)
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

1. What is the mechanism of occurrence of pathology of the dentoalveolar system in case of improper artificial feeding?
2. How is the TMJ state diagnosed?

3. What factors can cause the diagnosis of anomalies and deformities of the maxillofacial region during prenatal development?

4. Discussion of theoretical issues:

Clinical examination of patients with dentoalveolar anomalies and malocclusion is the main one in determining the orthodontic diagnosis and includes subjective and objective research.

Subjective research is finding out the patient's passport data, complaints, life history and disease. It is carried out by interviewing the patient or his parents.

The passport part reflects the last name, first name and patronymic of the patient, his gender, age, information about the place of education or training, address. You must register the child's parent or guardian information. The gender of the patient is important in planning orthodontic treatment, since girls are ahead of boys in biological development.

Distinguish between passport, biological, dental and bone age.

Passport (chronological, or calendar) age is the period from the moment of birth to a certain moment in life.

Biological , or anatomical and physiological age is determined by the totality of metabolic, structural, functional, regulatory features and adaptive capabilities of the body and is an obligatory function of time, but in contrast to the passport, it is characterized by less distinct time intervals
during which irreversible age-related biological changes occur in the body. The biological age can correspond to the chronological age or be ahead of or lagging behind it.

Assessment of the level of age-related development for "dental age" (Table 1) is carried out during the change of teeth according to the formula:

4n-20 where n is the patient's age in years, 20 is the number of temporary teeth.

If the number of permanent teeth erupted is age appropriate, then development is considered normal. If the number of permanent teeth is less than necessary, the development is delayed; with a larger number of permanent teeth, the development of the child is considered accelerated. Bone age is the age of a person, which is determined by the state of the skeletal system. X-rays of the hands are often used to determine bone age.

Table 1.

Assessment of the level of age development according to "dental age "

age	flo or	Number of permanent teeth		
		Delayed development	Normal development	Accelerated development
5.5 years	M D	0 0	0-3 0-4	more than 3 more than 4
6 years	M D	0 0	1-5 1-6	more than 5 more than 6
6.5 years	M D	0-2 0-2	3-8 3-9	more than 8 more than 9
7 years	M D	less than 5 less than 6	5-10 6-11	more than 10 more than 11
7.5 years	M D	less than 8 less than 8	8-12 8-13	more than 12 more than 13

The address or place of residence enables the orthodontist to determine the medico-geographical features of the area in which the patient lives, and their influence on the development of the child's body

in general and on the development of the dentition of the maxillofacial region in particular.

The methodology for collecting complaints varies. You can ask questions, but it is better to give the patient or the parents an opportunity to talk about what is bothering them at the moment.

Complaints of orthodontic patients are most often associated with aesthetic imperfections of the face and dentition, less often - with impaired functions: speech, chewing, swallowing, breathing, lips closing; pain and crunching in the ears during opening of the mouth with disorders in the temporomandibular joints.

When determining the history of a child's life, pay attention to the following:

• determining the age of the parents at the time of the child's birth;

• from which pregnancy the child was born, if the pregnancy is not the first, then what was the course and end of the previous one; the course of pregnancy (toxicosis, their nature, during pregnancy they were observed; hormonal disorders, metabolic disorders, attempts to terminate pregnancy; the nature of the diet and regime of an avagitnoi woman; the presence of occupational hazards; pharmacological, radiation and other factors during pregnancy that could lead to congenital malformations development and deformities;

• deviations in the position of the fetus;

• the course of labor (term of birth, obstetrics: forceps, cesarean section)

• the nature of the child's feeding (breastfeeding, artificial, mixed);

• use of the nipple (shape and size of the nipple, hole size, space of use);

• timing of eruption of temporary and permanent teeth; • diseases of the teeth and oral cavity; premature tooth loss (at what age)

• past illnesses (infectious, rickets, hyperthermic states, etc.), At what age were observed, how many times were repeated;

• trauma (character, at what age)

• bad habits;

• position of the child during sleep;

• the nature of breathing during the day and during sleep (the child breathes through his nose or through his mouth; sleeps with his mouth closed or open)

• diseases of the upper respiratory tract; operative interventions (adeno- and tonsilotomy or -ectomy, dental operations), how they affected the development of the dento-maxillofacial region;

• violations of the musculoskeletal system (violation of the physique, posture • fractures of the jaw and facial bones), at what age; ongoing treatment;

• general diseases (cardiovascular, pulmonary, endocrine, nervous, diseases of the gastrointestinal tract, kidneys, etc.);

• state of health during examination;

• hygienic care of the oral cavity;

• hereditary burden;

• allergic status;

• environmental conditions in the place of residence. Anamnesis of the disease allows you to determine the onset of the disease (the formation of a dentoalveolar anomaly or deformity of the bite), which preceded it, the duration and dynamics of the disease; applied methods of treatment and

their effectiveness; the possibility of inherited transmission of certain signs of the structure of the face, jaws, bite, teeth. Due to the fact that individual changes in the oral cavity arise as a result of past or concomitant diseases, and also at one time affect the course of somatic diseases, it is necessary to determine how the patient feels at the moment.

Objective research.

Review - assumes general overview, determination of physique and features of the structure of the face, examination of the oral cavity.

During the general review, the somatic and mental development of the patient is determined, their compliance with age. Pay attention to height and body weight, fatness, constitution. The patient is examined in front, in profile, from the back and the position of the head, shoulders, shoulder blades, legs (curvature of the legs, feet), the shape of the chest, abdomen, back (curvature of the spine) is determined. Particular attention is paid to the physical development and physique of the patient. Depending on the severity of the curvature of the spine, the following types of posture are distinguished: normal, or straightened; stooped; lordic, kyphotic and scoliotic.

This information, in addition to the general characteristics of the growth and formation of the skeleton, makes it possible to determine the pathogenetic relationship with the weakening of the musculoskeletal system and constitutional disorders.

When examining the head, it is necessary to determine its proportionality to the size of the body; the proportionality of the facial and brain regions; face shape.

The shape of the face can be similar to the shape of a circle, square, rhombus, truncated cone; have the form of a triangle, hexagon. The face can be narrow, wide, medium length, elongated. The shape of the profile can be convex, straight, flattened, concave. Features of the shape and structure of the face are important in determining the aesthetic prognosis of orthodontic treatment. Individual congenital features of the structure and shape of the face show us disorders caused by the presence of a dentoalveolar anomaly.

In addition to the general characteristics of the shape of the face and head, their components are described.

The proportionality of the face. Usually the face is subdivided into three relatively proportional parts: upper, middle and lower.

Facial symmetry. There is a relative symmetry of the right and left halves of the face. Distinguish between physiological and pathological asymmetry of the face. Physiological asymmetry is considered a difference of up to 2 mm. Determine the shape of the forehead, eyes, their expression, direction of vision (straight line, sullenly). This is important for determining racial characteristics, psychological development, etiological factors. So, with rickets transferred in early childhood, the forehead can be high and tower-like or square with well-defined frontal tubercles.

Examine the nasal dorsum, characterizing the mobility of the nasal wings (in the presence of adenoid vegetations, the nasal dorsum can be wide, the fixed nasal wings in combination with a half-open mouth and a dry red border of the lips indicate a violation of nasal breathing, this can lead to a growth retardation of the middle part of the face - microrhinodysplasia, to the formation of an adenoid type of face). A deviation in the structure of the auricles (atresia, protruding ears and “satyr” ears) may be a secondary sign of disorders in the growth of the temporal bone, which affects the location of the TMJ elements and the lower jaw.

Characterizes the severity of nasolabial folds (smoothed, deep or medium depth), which can be a manifestation of sagittal malocclusion.

Pay attention to the nature of lips closing (free, with tension, half-open mouth). The thickness and length of the upper and lower lips are determined. These factors influence the aesthetic prognosis of the treatment. Symptom may occur due to tight closing of lips and infantile type of swallowing.

"Thimble" or "lemon peel" (pinpoint indentations on the skin of the chin). Undesirable medial movement of the lower jaw or expansion of the jaws along the short upper lip, therefore, an increase in the volume of the

bite will lead to tense closing of the lips and a change in facial expression (formed

"Surprised face"), a "gummy smile" may form.

The depth of the labio-chin sulcus is assessed (deep, medium depth, smoothed). The depth of the labio-mental sulcus depends on the presence of vertical or sagittal malocclusion. The shape of the chin can be of great importance in the aesthetic prognosis of treatment. The chin can be straight, sloping back, or protruding. These manifestations can be a sign of an individual face structure or a symptom of sagittal malocclusion. A straight square chin gives the face a masculine look. A double chin can be a manifestation of an incorrect tongue position.

Determine the size of the mandibular angles, the size of the branch and the body of the lower jaw.

Diagnostics of the temporomandibular joint condition

With various types of TMJ dysfunction, the following symptoms may occur: flapping, clicking, crunching, crepitus, limited opening of the mouth, displacement of the lower jaw to the side when opening the mouth, S-shaped movements when lowering the lower jaw, signs of tooth wear.

Palpation of the joints: the index fingers are placed in front of the ear tragus on both sides and ask the patient to open his mouth wide. With an excessive excursion of the condyles (dislocation, subluxation), the fingers fall into the empty articular cavities behind the maximum open mouth. On palpation, you can determine the crunch, flapping, and sometimes palpate the deformed process.

Further, the attachment points of the masseter and temporal muscles are palpated. Muscle pain indicates hypertonicity.

Attention is drawn to the nature of the movements of the lower jaw when opening and closing the mouth. Movement should be smooth, can be tilt, zigzag, circular.

At the time of closing the mouth, attention is drawn to the presence and degree of displacement of the lower jaw, the cause of the displacement (arthrogenic or myogenic) is determined. Arthrogenic displacement is characteristic of habitual unilateral dislocations, subluxations, deforming arthrosis, etc. Myogenic - develops as a result of a sharp unilateral hypertonicity of the masticatory muscles (especially the lateral pterygoid).

The distance between the cutting edges of the central incisors is measured (in adults, according to D.E. Kalantorovim, it averages 44 mm).

After examining the head and face, they begin to examine the oral cavity, first the mucous membrane of the lips and corners of the mouth.

At the same time, the relief of the lips, the size and nature of the moisture content of the red border, the presence of pathological elements are determined. Then the symmetry of the corners of the mouth is determined, their direction (raised up or lowered down), the presence of postoperative scars , the prevalence of lips. Normally, the upper lip should prevail over the lower lip. A protruding lower lip along a smoothed labiochin sulcus can be a sign of a medial or open bite.

When examining the vestibule of the oral cavity, its depth is determined. Depth of the vestibule - the distance in millimeters from the middle of the gingival margin to the actual bottom of the vestibule of the oral cavity).

According to Yu.L. Obraztsov (1992), the depth of the vestibule can be:

• very small - up to 3 mm,

• small - up to 5 mm,

• medium depth - from 5 to 10 mm,

• deep - more than 10 mm.

A shallow vestibule can be an etiological factor in the underdevelopment of the frontal area of the lower jaw (crowding of the lower frontal teeth) or the development of periodontal diseases .

• Then they move on to examining the frenulum of the lips and cheek cords in order to determine the anomalies of their location (high attachment, low, normal), shape and size.

• The normal frenulum is a thin triangular fold of the mucous membrane, has a wide base on the lip and ends in the midline of the alveolar ridge at about 5 mm from the gingival margin. Anomalies of the frenum are characterized by attachment site, shape, and size.

• G.Yu. Pakalns (1969) distinguishes: strong bridles with an attachment point at the apex of the interdental papilla, when stretching the lip along such a bridle the interdental papilla is also fed;

• • middle - attached at a distance of 1 to 5 mm from the top of the interdental papilla;

• • weak, which are attached in the area of the transition fold.

• Deviations from the normal location of the lip frenulum are more common in the upper lip area and turn out to be changes in the level of attachment, a decrease in their length and tension.

• Depending on this, there are three types of abnormal upper lip bridles.

• The frenum and the species are characterized by the fact that they have a normal length, but are located close to the gingival margin (at a distance of 1-2 mm) or are woven into it.

• Type II bridles are characterized by a normal level of attachment to the alveolar process, however, in the lip area, they are attached more closely to its free edge. The mobility of the lip in such cases is limited; when it is removed, the bridle stretches and acquires a triangular shape with a base at the red border of the lip.

•

• Type III includes bridles, which begin with a wide base at the free edge of the lip,

• are attached along the entire length to the alveolar process and end in the form of a mucosal duplication between the central incisors. The middle part of the lip is more often shortened, nasal closure of the lips.

• Anomalies in the location, shape, size and strength of the frenulum can be the cause of diastema, the development of periodontal disease.

• An examination of the tongue is important, since its size, shape, location and mobility directly affect the development of the bite and the formation of dentoalveolar anomalies. So, the presence of dental prints on the lateral surfaces of the tongue or in the frontal area indicates insufficient space for the tongue or an increase in its size. The shortened frenum of the tongue, attached close to its tip, can cause disturbances in the dentition. Restriction of the mobility of the tongue makes it difficult for a newborn baby to suck, can lead to swallowing disorders, incorrect pronunciation of certain sounds.

• F.Ya. Khoroshilkina (1972) identifies 5 types of frenum of the tongue, restricting its movement.

• The first type includes thin, almost transparent bridles, normally attached, but limiting its movement due to its small length.

• The second type also includes thin, translucent bridles, attached close to the tip of the tongue and are of short length. During the raising of the tongue, a groove forms at its tip in the center. The third type is the frenulum, which is a tight, short cord attached close to the tip of the tongue. During the extension of the tongue, the tip is tucked, and the back explodes as a result of tension. Licking the upper lip is difficult and sometimes impossible. On palpation of such a frenum, it is determined that the limitation of the mobility of the tongue is due to the fixation of its tip with a connective tissue cord. In the cord, which looks like a cord, there is a thin duplication of the mucous membrane.

• The fourth type includes bridles, the cord of which, although it stands out, is fused with the muscles of the tongue.

• Such bridles are often found in children with congenital clefts of the lip, alveolar ridge, and palate.

• Frenulum of the fifth type is characterized by the fact that the cord is hardly noticeable, its fibers are located in the thickness of the tongue, woven from its muscles and limit movement .

• The next step in the examination of the oral cavity is to determine the state of the periodontal tissues. Since periodontal disease is often accompanied by dental anomalies, it is important for the orthodontist to determine the condition of the gingival mucosa. In this case, the color, size, volume and shape of the gingival papillae are assessed; the nature of the gingival margin; determine the level of location of the gingival margin relative to the necks of the teeth (growth, recession).

• Changes in the color of the gums indicate the presence of a pathological process. Normally, ash-trees of a pale pink color are pale - with anemia; bright red

• - in acute inflammation, cyanosis is inherent in chronic inflammation, leukemia and diabetes. Changes in the color of the gums can be determined in the area of individual and groups of teeth or have a generalized character; manifest only in the gingival papillae or spread to the mucous membrane of the alveolar process.

• Using palpation, the consistency of the gums is determined. Normally, of course, elastic, if pathological changes appear, then they are loose pasty or dense. Changes in the consistency of the gums are accompanied by changes in its contours.

• Normally, the interdental gingival papillae are sharp; in chronic inflammatory processes, of course, roller-like thickened; the gingival margin becomes scalloped . When determining the location of the gingival margin relative to the necks of the teeth, the recession of the gingival margin can be determined; the edge of the gum is located below the enamel-dentin border.

• Examining the palate, pay attention to the mobility of the soft palate; palatine arches; palatine tonsils (their volume, color, location relative to the palatine arches) pharynx; the mucous membrane of the posterior pharyngeal wall, determining its condition (atrophic, normal, hypertrophic).

• Examination of the teeth and writing down the dental formula allows you to determine whether the teeth belong to a temporary or permanent bite; the condition of the hard tissues of the teeth (lesion and acceleration, hypoplasia, fluorosis, etc.). Zoubi postiynogo bite for Zigmondy (1861) poznachayut Arabic numerals, i preformed postiynogo dentition bite Got Taqiy viglyad:

87654321: 12345678

87654321: 12345678

The teeth of a temporary bite are determined by Roman numerals and the dental formula of the formed temporary bite is as follows:

V IV III II I: I II III IV

V V IV III II I: I II III IV

V

1

To unify the recording of the dental formula, the International Organization of Dentists FDI-ISO (1970) proposed an ambiguous system for naming teeth, which consists in the digital designation of their location on the corresponding side of the upper or lower jaw. The dental formula of the formed permanent bite with this method of designation is as follows: **18 17 16 15 14 13 12 11: 21 22 23 24 25 26 27 28**

48 47 46 45 44 43 42 41: 31 32 33 34 35 36 37 38

In the bite of deciduous teeth, the right upper jaw is conventionally designated by the number 5, the left - 6, the left part of the lower jaw - 7, the right - 8. The dental formula of the temporary bite with this designation method is as follows:

55 54 53 52 51: 61 62 63 64 65

85 84 83 82 81: 71 72 73 74 75

A review of individual teeth allows you to determine anomalies in their number, eruption, location, size, color, structure of hard tissues.

Anomalies in the location of individual or groups of teeth are reflected in the shape and size of the dental arches and alveolar processes. For their characteristics, such clinical symptoms as: crowded positions of the teeth; the presence of diastemas and three; narrowing and expanding; shortening and lengthening of dental arches; dentoalveolar lengthening or shortening in certain areas of the dental arches. Such violations can lead

to changes in the location of the dental arches relative to each other, that is, to various forms of dentoalveolar anomalies.

According to D.A. Kalvelis (1961), distinguish between a narrowed dentition, saddle-shaped compressed, V-shaped, quadrangular (trapezoidal) and asymmetric.

F.Ya. Khoroshilkina, G.H. Granchuk, I.I. Postolaks distinguish the following forms of the dentition of the upper jaw: normal, narrowed, elongated, shortened, stepped, symmetrical and asymmetrical. On the lower jaw: normal, narrowed, elongated, widened. Describing the bite, describe it in three planes: mid-sagittal, vertical and horizontal.

Closure of the dentition is an important clinical symptom that determines the indications for orthodontic treatment.

5. **Topics of reports/abstracts:**

Instrumental method
Biological method
Surgical method

6. **Summarizing the information received at the lesson.**
7. **List of recommended literature:** Main:

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

Additional:

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.

3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.
4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.
5.Bhalajhi SI., et al. “Orthodontics: The art and science”. Sixth edition. Arya (Medi) Publication (2015)
6.William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics Elsevier Ltd (2019): 138.
7.RamyIshaq. “The Orthodontic Patient: Examination and Diagnosis”. EC DentalScience 18.5 (2019): 975-988
8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

Information resources

1. Державний Експертний Центр МОЗ України http://www.dec.gov.ua/index.php/ua/
2. Laura Mitchell,«An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України http://library.gov.ua/
4. Національна бібліотека України імені В.І. Вернадського http://www.nbuv.gov.ua/

Practical Lesson №14

Topic: Anthropometric investigating methods

Goal: To learn the position of clinical methods of examination of children with dental maxillo facial abnormalities develop the skills determine the configuration of the face, a clinical survey of the soft tissues of the oral mucosa, determine the status of teeth, occlusal relationships between the study of the dentition, filling medical history and establishment according to the preliminary diagnosis by clinical examination.

Basic concepts: in the process learning the student must apply their knowledge of the features of the anatomy and physiology of maxillo facial

area child, stages and timing of temporary and permanent teeth, morphological and functional characteristics temporary, alternating and permanent occlusion, physiological and pathological types of bite . Clinical methods of examination of children with dentalmaxillo-facial abnormalities and deformities. During the survey is to find out the patient's passport information, namely: surname, name and patronymic; sex; age; information about the place of education or training, address; information about the parent or guardian of the child (name and surname, place of work, means of communication with parents and child - and so on. f.); information about the child's pediatrician or dentist and other professionals who have been patient.

Equipment: cephalometric analys, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test,**
   frontal survey on basic terminology, etc.)
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

What measures do I need to have in order to construct the diagram of Haulay Gerber Herbst?

A. Sum of the sizes of the crowns of the upper iliac, central and lateral cavity
B. Dimensions of lateral segments of dental series
C. Length of dental arc
D. The sum of the width of the crowns of the four cuttings
E. Width of dental arc

A 9-year-old boy turned to an orthodontist doctor in connection with not having 12 teeth. Objectively: the face is symmetrical. Narrowing of dental rows. A place for 12 - 4 mm. What additional method of research is necessary to conduct?

A. Panoramic X-ray

B. Mastication
C. Helerentgenography
D. Myotometry
E. Diagnostic study of models

To the orthodontic clinic, the girl turned 14 years old with complaints about the absence of one tooth and an aesthetic defect. During clinical examination it was revealed: the ratio of the jaws is neutral, the absence of 23 tooth with a site deficiency. Previous diagnosis: a retention of 23 tooth with a placebo defect in the tooth row. Which of the additional research methods should be used to establish the final diagnosis? A. Ortopantomografiya
B. Myotometry
C. Telerentgenography
D. Roentgenography of adnexal nasal cavities
E. Measurement of diagnostic models

The parents of the child appealed to the clinic at the age of 8 years with complaints about the wrong posture of the front teeth. Objectively: vestibular position of 12 and 22 teeth, insufficient space for them in the dentine. The first permanent molars are merged into Class I Englia. What additional testing methods should I use?
A. Definition of the Pona index
B. Mastication
C. Clinical functional tests
D. Telerentgenography
E. Photometric research

With which X-ray method can you determine the bone age?
A. Tomogramma
B. Sighting X-ray
C. Telerentgenography
D. Ortopantogram
E. Roentgenography of the hand
Measuring gypsum jaw models using the Pona method involves:
A. Determination of length length of dental rows
B. Studying segments of dentitions
C. Determination of sagittal sizes of dentitions
D. Diagnosis of semetricity of dental rows and displacement of angular teeth
E. Determination of transversal dimensions of dentitions

Telerentgenographic head scan is used to study:

A. Tooth, alveolar and basal arches of the upper or lower jaw
B. Structures of temporomandibular joints
C. Determination of the condition of hard tissues of teeth, their periodontal disease, alveolar processes and jaw bones
D. Posture of teeth, dental alveolar height, asymmetry of the right and left half of the face
E. Structures of the facial skeleton, its growth and prognosis of orthodontic treatment Which additional method of examination should be used when narrowing the tooth row?
A. Electrometry
B. Korkhauz Method
C. Method Gerlach
D. Method Pon
E. Telerentgenography

Where are the Pont points on the upper jaw molars?
A. Top of the mesial-thymus bug of the first molar
B. Rear deepening of intergranular fissure
C. Anterior deepening of the intergranular fissure of the first molar
D. Contact points between the first and second molars
E. Top of the distal-bilgeous bulge of the first molar

A child has 8 years defined: the upper dental arch V - like shape, the bottom - trapezoidal (quadrangular). What diagnostic method allows you to determine the correct shape of the dental arc A. Linder-Hart
B. Hawley-Herber-Herbst
C. Rope
D. Tonn-Gerlach
E. Hoves
A girl of 14 years defined the overcrowding of the upper and lower frontal teeth II degree. Which method allows us to determine the proportionality of the size of the incisors of the upper and lower jaw at the normal depth of the cutter overlap:
A. Howes
B. Tonne
C. Gerlach
D. Pont
E. Hawley
To study the size of teeth in the period of milk bite method is used:
A. Dolgopolova
B. Corghause
C. Snowboard
D. Haulay-Herbst
E. Pona

Why is the Pona index equivalent for premolars and molars
A. Premolar index 80, molar 64
B. 74 and 68
C. 82-68
D. 78-32
E. 86 and 72

What measurements do I need to have in order to construct a Chaule-Gerber-Herbst chart?
A. The width of the tooth arch
B. Sum of the size of the crowns of the upper canine, central and lateral incisor
C. Length of dental arc
D. Dimensions of lateral segments of dentition
E. The sum of the width of the crowns of the four incisors

4. Discussion of theoretical issues:

Anthropometry allows you to study the size and shape of the face and its individual parts, the relationship between the size and shape of the facial region of the skull and tooth-mirk arches.

Biometric method for the study of diagnostic models of the jaws

Diagnostic models are those jaw models that are used by an orthodontist to conduct biometric studies and compare the results obtained during orthodontic treatment **.** For the production of diagnostic models of the jaws, it is necessary to completely and clearly remove the dentition, alveolar processes, the transitional fold of the mucous membrane with the display of the frenulum of the lips and tongue and cords, palate, hyoid region and maxillary tubercles.

Better to work with diagnostic models cast from super plaster. The bases of the models are made out with the help of special devices - rubber molds - or the corners of the base are cut in accordance with the canine line. The bases of the models of the upper and lower jaws should be parallel to the chewing surfaces of the posterior teeth. Models are marked with the patient's last name, first name, age and date of prints.

To determine the size of the teeth, dentition, apical bases of the jaws, a modified caliper or special meters are used, as well as various devices such as an orthochrest, simethroscope, and optometer.

The study of diagnostic models of the jaws is carried out in three mutually perpendicular planes: mid-sagittal, vertical and horizontal

(transversal) and in three directions corresponding to them: sagittal, vertical and horizontal. Determining the size and shape of teeth

In orthodontic practice, three sizes of teeth are usually measured: width, height and thickness.

The width is measured in all teeth at the level of the most convex part of the tooth crown (equator), in the lower incisors - at the level of the incisal edge.

Comparison of the measured width of the crowns of temporary and permanent teeth with their average value, shown in the tables, allows you to determine the changes in their size (macro- and microdentia). By the vestibular or oral arrangement of the central incisors, the location for these teeth is determined by measuring the distance between the contact points of adjacent teeth. Comparison of the width of the crowns of abnormally located teeth and the presence of space, which is for them in the dentition, makes it possible to determine the presence or lack of space. The lack of space by 1/2 or more of the width of the crown of an abnormally located tooth for choosing a treatment method is an absolute indication for the extraction of individual teeth.

The height of the coronal part of the frontal teeth is measured from the cutting edge of the tooth to its cervical border in the middle of the vestibular surface, and in the lateral teeth - from the middle of the buccal tubercle to the cervical border.

Crown thickness is measured for anterior and posterior teeth as their vestibulo-oral dimension.

Determination of proportionality of the sizes of the incisors of the upper and lower jaws

Tonn determined a directly proportional relationship between the sum of the crown widths of the upper and lower incisors with a constant orthognathic bite. The Tonn index is 1.33.

Z.I. Dolgopolova determined, according to the technique developed by Tonn, the ratio of the sum of the width of the crowns of the temporary upper and lower incisors and confirmed their relationship with the temporary orthognathic occlusion. The Dolgopolovaya index is 1.30. **Gerlah** found that the ratio of the sizes of the upper and lower incisors depends on the depth of the incisor overlap. With a straight permanent (orthogenic) bite, the Gerlah index is 1.23.

Yu.M. Malygin determined the ratio of the sizes of the upper and lower incisors with a constant deep bite. Index Yu.M. Malygin is 1.42.

Determination of the longitudinal length of the dentition

Determination of the length of the dentition is carried out according to the Nase method. For this, the ligature wire is placed from the distal surface of the first permanent molar of one of the sides of the

dentition through the middle of the chewing surfaces of the lateral teeth and the cutting edges of the opposite side frontal to the distal surface of the first permanent molar, providing the wires of the dentition shape. The length of the dentition should be equal to the sum of the mesio-distal dimensions of 12 permanent or 10 deciduous teeth.

Determination of transversal dimensions of dentition (width)

In children during the period of temporary occlusion Z.I. Dolgopolova (1973) proposed to determine the transversal dimensions (width) of the dentition on the upper and lower jaws between the central and lateral incisors, canines, first and second temporary molars.

The measuring points in the central and lateral incisors and canines are located at the tops of the dental cusps (on the oral side), in the first and second molars - on the chewing surfaces in the anterior recess at the intersection of the longitudinal and transverse grooves.

During the period of permanent occlusion, the Pont technique (1907) is used to determine the transversal dimensions of the dentition, which is based on a directly proportional relationship between the sum of the mesio-distal dimensions of the 4 upper incisors and the width between the first premolars and the first molars on the upper and lower jaws.

For this, Pont proposed measuring points on the upper and lower jaws, which coincide during the closing of the dentition of a permanent orthognathic bite, and, accordingly, the width of the dentition at these points is the same. On the first premolars, the width of the upper jaw is measured between points located in the center of the intertubercular fissure, and on the lower jaw, the distal point of the first premolar, which is tangent to the second premolar (contact point between premolars).

On the first molars, the width of the upper jaw is measured between points in the anterior depressions of the longitudinal fissure, and on the lower jaw, between the distal buccal cusps of the first molars.

Pont has defined indices by which it is possible to determine the indices of the width of the dentition in the area of premolars and molars, depending on the sum of the mesio-distal dimensions of the 4 upper incisors.

The sum of the transverse dimensions of 4 incisors x 100%

Premolar s first index = ---------- ------ -------- = 80

Distance between premolars

Molar index = The sum of the transverse dimensions of 4 incisors x 100% ---- ---------- ------- ---------- = 64

Distance between molars

According to Korkhaus, in a changeable bite, instead of measuring points on the premolars, the distal dimples of the first temporary molars on the upper jaw or their distal buccal tubercles on the lower jaw are taken.

Linder, Hart (1939) amended the index numbers. According to these authors, the premolar index is 85, and the molar index is 65. In practical work, it is recommended to use the table they proposed.

In addition to studying the width of the dentition in the premolar region, it is important to measure the width between the canines, which is determined between the tops of their tearing tubercles.

A.B. Slabkovskaya (1995) proposed to determine the width between the canines depending on the sum of the mesio-distal sizes of the 4 lower incisors, since their sizes are less variable.

Determination of the sagittal dimensions of the dentition

The sagittal dimensions of the dentition of children during the period of temporary occlusion are measured by the method of **Z.I. Dolgopolov oh** . In this case, the length of the anterior segment and the total sagittal length of the dentition are determined. The length of the anterior segment of the dentition is measured from the middle of the distance between the mesial angles of the central incisors from the vestibular side in the sagittal direction to the point of intersection with the line connecting the distal surfaces of the crowns of the temporary canines. The total sagittal length is from the middle of the distance between the mesial angles of the central incisors from their vestibular

side to the point of intersection with the line connecting the distal surfaces of the second temporary molars.

Korkhaus established a definite relationship between the sum of the mesiodistal dimensions of the 4 upper incisors and the length of the anterior segment of the dental arch. he compiled a table of measurements. Table indicators are reduced by 2-3 mm

(Thickness of the upper incisors) can be used to determine the length of the anterior segment of the lower dental arch. The indicators of the length of the anterior segment of the upper and lower dental arch can be the same with a straight (orthogenic) bite. The ratio of the sizes of the segments of the dental arches (frontal and lateral)

Gerlach (1966) proposed to divide the dental arches into three segments: frontal and two lateral. The dimensions of the frontal segment are determined by the sum of the mesio-distal dimensions of the 4 incisors, and the lateral ones are measured from the mesial surface of the canine to the distal contact points of the first permanent molars. The author has proved that there is a symmetry of the lateral areas of the dental arches and a certain ratio of the sizes of the anterior and lateral areas. The ideal ratio for an incisal depth of 3 mm is determined when the size of the anterior segment corresponds to that of the lateral segment. With a straight bite, a shortened frontal part of the dental arch, since there was an adaptation to a certain ratio of teeth

Determination of the parameters of the apical basis

H.G. Snagina confirmed the method of **A. Howes** (1957), determined the directly proportional relationship between the sizes of

dental arches and their apical basis. In the transversal direction, the width of the apical base is measured on the upper jaw between the deepest points of the canine fossa on the lower jaw - stepping back 8 mm from the intersection of the horizontal line connecting the necks of the lower canines and the first premolars, and the vertical line passing through the crown of their interdental papilla ... Normally, the width of the apical base of the upper jaw is 44%, and in the lower - 43% of the sum of the mesio-distal

dimensions of the 12 permanent teeth of each jaw.

The narrowing of the dentition is usually accompanied by a narrowing of the apical base. According to H.G. Snagina, it can be 2 steps:

1. ste stump - width apical basis is 42-39% in the maxilla and 41-38% - in the lower jaw.

Grade 2 - the width of the apical base is 39-32% in the upper and 38-34% in the lower jaw.

Narrowing of the I degree there is a hope that after the expansion of the dentition there will be no recurrence of the anomaly. Narrowing of the II degree is indications for a decrease in the size of the dental arch due to the removal of individual teeth to eliminate the discrepancy between the dimensions of the dental arch and the apical base. Snagino minutes , measuring the length of the apical basis in the maxilla is performed from a point between the central incisors in the necks of the teeth on the palatal surface, the lower - from the front surface of the cutting edges of cutters to a line connecting the distal surface of the first permanent molars.

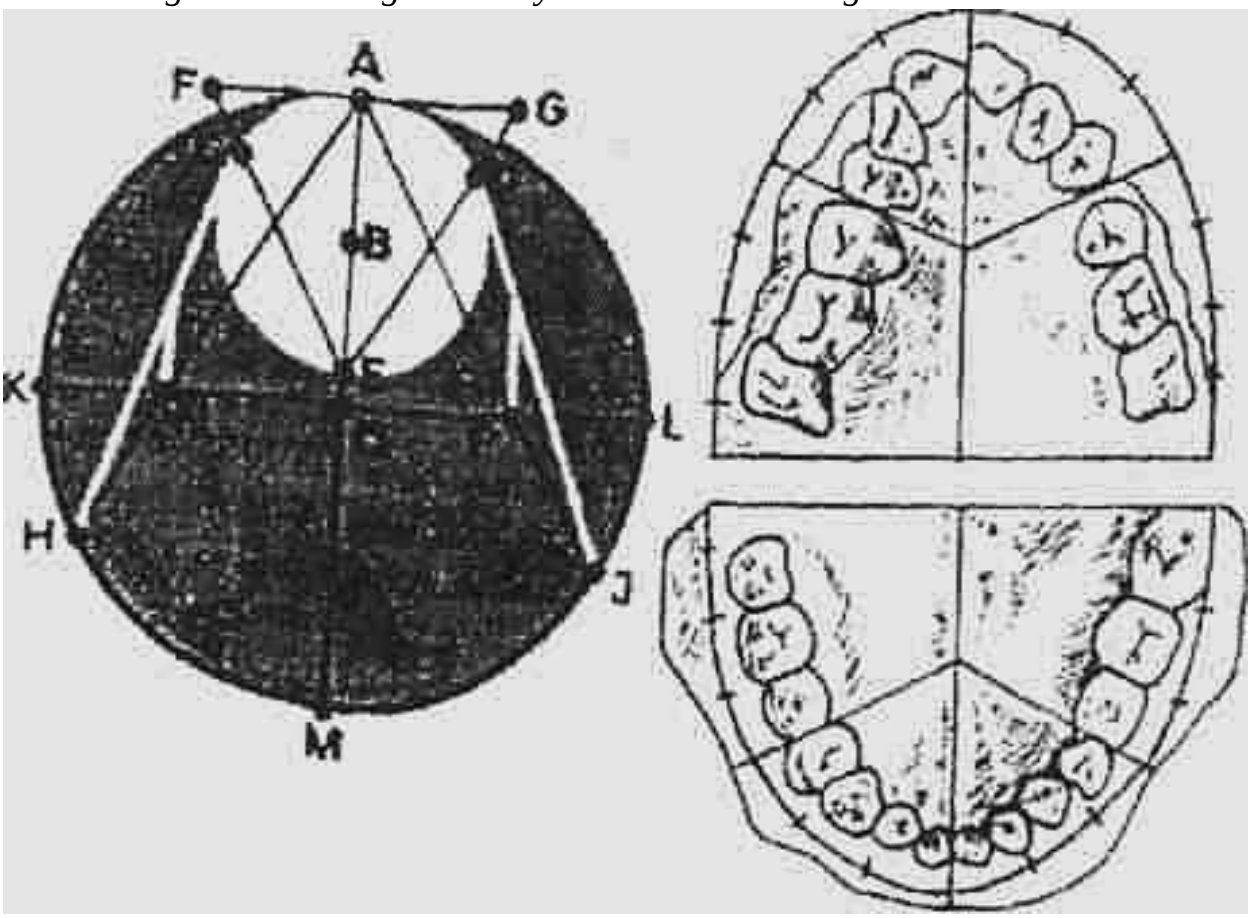
In children with temporary occlusion, the width of the apical base is 55.7% in the upper and 50.0% in the lower jaws of the sum of the mesio-distal dimensions of 10 deciduous teeth. In the period of temporary occlusion, the width of the apical basis is determined between the apex of the canine roots and the first temporary molars. The measuring points are

located in the recesses corresponding to the projection of the apex of the interdental papilla between the above teeth.

Graphic method for studying the shape and size of the dental arch

The Hawley-Herber-Herbst diagram plays an important role in determining the normal shape of the dental arch.

Figure 1. Plotting a Hawley-Herber-Herbst diagram.



To plot the diagram, the mesio-distal dimensions of the 3 frontal teeth (central and lateral incisors and canine) are measured and they are sad. This is the magnitude of the radius AB. From point B, describe a circle with radius AB. With a radius AB from point A, segments AC and AD are laid on both sides. The CA arch is the curve of the 6 anterior teeth. To determine the location of the lateral teeth, another circle is described. From point E, straight lines are drawn through points C and D and a triangle EFG is obtained. With a radius equal to the size of the side of the triangle EFG, from point A, point O is marked on the extension of the diameter AE, from which a circle with radius FE is described. From point M to an additional circle is plotted according to the value of AO points J and H. By connecting point H with point C and point J with point

D, the HCADJ curve is obtained, which reflects the curve of the location of the posterior teeth with Hawley. On the HC and DJ segments

1

the posterior teeth should be located. Herbst combined the Herber (ellipse) and Hawley principle, replacing the lateral straight lines with CN and DP arcs. The centers for these arcs are points L and K, which are located on a diameter perpendicular to the diameter AM. The arc CN is described with the radius LC, and the arc DP with the radius KD. Thus, the NCADP arch has rounded lateral areas and is a curve corresponding to the ellipsoidal shape of the normal upper dentition.

Depending on the width of the 3 anterior teeth on a transparent celluloid film, several different diagrams are determined, which make it possible to choose the one necessary for comparison with the diagnostic model. In order to determine the shape of the dentition, the diagnostic model is imposed on the diagram so that the midline that runs along the palate of the suture coincides with the diameter of the AM, and the sides of the PEC triangle pass between the canines and premolars. Then the contour of the dentition of the diagnostic model is drawn with a pencil and compared with the plotted curve on the diagram.

The study of the ratio of segments of the dentition according to Gerlach allows

• to determine the individual differences of the segments of the dentition, selected taking into account their functional unity; • to establish the proportionality of the ratio of the segments of the dentition, which is characteristic of a properly formed bite;

Differentiation of crowding of teeth caused by the discrepancy between their size, from crowding, which developed as a result of narrowing or shortening of the dentition.

5. Topics of reports/abstracts:

1. How to estimate the proportion and symmetry face?
2. Classification of types of bridles for FY Horoshylkinoyi?
3. How many types of oral vestibule depth defined Yu.L.Obraztsova?

4. What are the features characterizing cerebral type faces by B. Bauer? 5. What are the signs of study when examining the state of the temporomandibular joint?

6. What kind of functional disorders symptom indicates "thimble"?

6. Summarizing the information received at the lesson.

7. List of recommended literature:

Main:

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

Additional:

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.
4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.
5. Bhalajhi SI., et al. “Orthodontics: The art and science”. Sixth edition. Arya (Medi) Publication (2015)
6. William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics Elsevier Ltd (2019): 138.
7. RamyIshaq. “The Orthodontic Patient: Examination and Diagnosis”. EC DentalScience 18.5 (2019): 975-988
8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

Information resources

1. Державний Експертний Центр МОЗ України http://www.dec.gov.ua/index.php/ua/
2. Laura Mitchell,«An introduction to orthodontics», 2013 – 336 p.

3. Національна наукова медична бібліотека України http://library.gov.ua/
4. Національна бібліотека України імені В.І. Вернадського http://www.nbuv.gov.ua/

Practical Lesson №15

Topic: X-ray examination methods

Goal: the student must master the techniques of photometry of the head, be able to take photographs profile and face, know the basic anthropometric points and measurement parameters, be able to analyze the face and profile of an orthodontic patient, be able to study the proportions of the face.

Basic concepts: Know the anatomical formations on the face, point-like landmarks, be able to examine the patient's face, know how the face and profile are determined.

Equipment: cephalometric analys, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test,**

frontal survey on basic terminology, etc.)

3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

How to determine the width, depth, length of the face.

What indexes are used to characterize the shape of the head

How is the PT point determined according to the analysis of the teleroentgenogram for, Rickets?

What are the parts of Downs teleroentgenogram analysis?

What line is the reference line of the face in the analysis of the Downs teleradiograph?

What lines form the corner of the SeNB **?**

What angle determines the position of the upper jaw relative to the plane of the base of the skull **?**

What measurements are taken during craniometric examinations?

How is the nasion point determined when analyzing teleroentgenograms?

4. Discussion of theoretical issues:

Photometry is based on the regularities of the structure of the facial and cerebral parts of the skull, the proportionality of the ratio of different parts of the chairman and their relationship to certain planes.

The study is carried out on the patient's face, facial photographs and teleradiograms.

Photos are taken in the following projections:

- frontal, the lips are relaxed (if at rest there is no closing of the lips, it should be preserved)
- in the lateral projection, two pictures on the right and left **;** the frontal teeth are in maximum contact, the lips are closed. At the same time, lip tension is observed, such photos will clearly record its effect on the aesthetics of the face. Especially recommended for patients who do not close the lips at rest;
- frontal dynamic (with a smile) - while the patients purse their lips not as pronounced as those who laugh;
- magnified smile image for detailed smile analysis.

To characterize the size of the head and face, the following parameters are determined: width, height, length and depth. Bone support points are designated in capital letters, and soft tissue points - in lower case.

- The width of the chair is studied in its upper, middle and lower parts:

head width (eu-eu) - between laterally protruding points on the lateral surface to the left and right;

morphological width of the face (zy-zy) - between the most prominent points of the zygomatic arch on the left and right;

width of the face (go-go) - between the lower points of the corners of the lower jaw on the left and right.

Head length (gl-op) - measured between the most prominent point on the lower part of the forehead along the mid-sagittal plane between the eyebrows and the most posteriorly protruding point of the occiput on the mid-sagittal plane.

The height of the head (tv) - is determined from the point on the tragus of the ears, perpendicular to the gl-op line to the most protruding point on the circumference of the head. Height of the face: morphological visota of the face (upper, lower , povna):

- upper (n-pr) - measured between point n, located at the intersection of the median plane with the nasal-frontal suture and the most anterior point of the alveolar ridge of the upper jaw;
- lower (pr-gn) - between the most anterior point of the alveolar ridge of the upper jaw and the junction point of the contour of the lower edge of the lower jaw and the outer contour of the symphysis; - full (n-gn) - between point n and point gn. physiognomic height of the face (tr-gn) - is determined between the point located on the sagittal plane on the border between the forehead and the scalp and the point gn.

The depth of the face is estimated from the point located on the tragus of the ear to points n of the skin, sn is the most posteriorly located point at the place of transition of the lower contour of the nose to the upper lip, pg is the most anterior point of the chin protrusion, gn is the junction point of the contour of the lower edge of the lower jaw and the outer contour symphysis.

To characterize the shape of the head and face, indices are used, which represent the percentage of some head and face sizes to others.

The shape of the head is determined by the transverse-longitudinal, height-longitudinal and height-transverse indices.

The transverse longitudinal index is the percentage ratio of the width of the head to its length. If the index value is less than 75.9 - dolichocephalic head shape, 76.0-80.9 - mesocephalic, 81.0 - 85.4 - brachycephalic, 85.5 and more hyperbrachycephalic.

Garson facial index - is determined by the percentage of the morphological height of the face to the width of the face in the area of the zygomatic arches. The following face types are

determined by the index value: very wide, wide, medium, narrow, very narrow .

The morphological facies index Izard is equal to the percentage of the distance from the point of intersection of the midline of the face and the tangent to the superciliary arches to the point and tangent to the superciliary arches to the point gn of the point of the width of the face in the area of the zygomatic arches.

Size from 104 or more - narrow face, from 97 to 103 - medium, from 96 and less - wide face.

The face is examined from the front and the profile.

X-ray is a method of X-ray examination, in which a fixed image of the object under study is obtained using X-rays on a material sensitive to it (X-ray film).

X-ray examinations are needed to clarify the diagnosis, determine the plan and prognosis of treatment, study the changes that occur in the process of the child's growth under the influence of therapeutic measures.

X-ray methods:

- intraoral;
- extraoral. **intraoral radiography is** indicated in the presence of diastemas, anomalies in the position of individual or groups of teeth, the presence of supernumerary or impacted teeth, to determine the degree of resorption of temporary roots and the stage of formation of the roots of permanent teeth.

An intraoral telephone X-ray can determine the following:

Intraoral phone radiography allows you to determine the following: Teeth adherence to the hourly chi post- bite.

- The degree of resorption of the roots of the temporary teeth .
- Presence, location, degree of formirova n and I foul lkula village toyannyh teeth

- The ratio of the follicle of the permanent tooth and the roots of the temporary .

A common way to study is to intraoral **radiography bite** or approx klyuzionnaya radiography , with the help of which you can get :

1. A section of greater length.
2. The presence and location of impacted teeth.
3. Condition of the palatine suture.

4. Presence of calculi of the submandibular and sublingual salivary

5. The presence of a fracture line in case of injury.
6. The presence of a fracture of the crown or root of the tooth during trauma.

Bite photography is done for examining children and adolescents with a violation of the opening of the mouth, as well as with increased sensitivity of

the mucous membranes of the oral cavity, which leads to an increased vomiting reflex. **Radiograph of the palatine suture.** In cases when a narrowing of the upper jaw or its dental arch is diagnosed and expansion is planned, as well

as for the treatment of diastemas, radiography of the palatine suture is shown.

A more pronounced palatine suture is determined with a diastema . Its width and density often correspond to the size of the diastema. With a Diastema of small size, the palatine suture is of medium width and density, and with a diastema of 45 mm, it is wide and dense **.**

As follows the rapid expansion of the upper jaw by means of fixed orthodontic appliances sometimes there is an opening (gap) palatal suture. In such cases, a dark strip is visible on the radiograph in the region of the palatine suture, with moderate expansion of the gap is not observed. Sometimes only a slight depression of bone tissue or expansion of the gap between the roots of the central incisors is noted closer to the apex of the alveolar process.

In some cases, it becomes necessary to assess the sections of the upper and lower jaws of the temporomandibular joint, facial bones, the images of which do not appear on intraoral photographs or they are only partially visible. Extraoral images of teeth and surrounding tissues are less structural. Therefore, such pictures are used only in cases where it is impossible to obtain intraoral radiographs (increased gag reflex, trismus, etc.).

Extraoral methods of radiography include panoramic radiography, orthopantomography, tomography of the TMJ, and teleradiography.

Radiography of the lateral projection of the body and ramus of the lower jaw . On extraoral radiographs of the body and branches of the lower jaw, it is possible to study the ratio of their sizes, measure the angle the lower jaw and the nature of the "wisdom" teeth eruption.

Panoramic X-ray of the jaws. On a panoramic radiograph of the upper jaw, an image is obtained of its dental, alveolar and basal arches, a ploughshare, nasal cavities, maxillary sinuses, zygomatic bones, on an radiograph of the lower jaw - a reflection of its dental, alveolar and basal arches, the edges of the lower jaw, angles and branches.

Compared to intraoral radiographs, the object-to-film distance is increased when obtaining a panoramic radiographic image. Thanks to this, valuable diagnostic information can be obtained due to the large area of view and the magnification of the image by 1.8-2 times. **Orthopantomography,** or panoramic tomography, provides a planar image of curved surfaces and capacious areas. Using this method, orthopantomograms are obtained, which can be used to study the degree of mineralization of the roots and crowns of the teeth, the degree of resorption of the roots of deciduous teeth and their relationship with the rudiments of permanent teeth, the inclination of the teeth erupted, and impacted teeth relative to the adjacent teeth and the median plane, the tooth-alveolar height in the anterior and lateral areas of the jaws, incisal overlap, asymmetry of the right and left halves of the face, middle and lower parts of the facial skeleton. **Radiography I TMJ.** An indication for the use of this method is the presence of complaints or symptoms from the TMJ in patients or the presence of a dentoalveolar anomaly associated with a displacement of the lower jaw (distal, mesial, cross bite).

Plain radiography of the temporomandibular joint is performed using the Schuller, Parma method.

The Parma method is a close-up contact survey that can be performed with a dental X-ray machine after the tube has been removed. Functional radiographs of the TMJ can be obtained using the Parma technique. For this, two images are taken with the mouth open and closed (for the closed teeth in the central occlusion

position). Such radiographs determine:

1. The position of the articular heads in the articular fossa.
2. The ratio of the articular heads and other elements make up the joint.
3. The width of the joint space.

Schuller method. To obtain an image of joints according to the Schuller method, the survey is carried out with a special tube 50 cm long.

tilting it at 30 °, the central ray is directed to the part of the skull of the healthy side (a palm width above the external auditory canal), at the same time it passes through the auditory opening of the examined side, that is, almost axially through the articular head. On radiographs obtained using this technique, you can find:

1. The contours of the joint elements.
2. The relationship of the elements of the joint.
3. Gross pathological changes.

However, this conclusion is unsuitable for studying the TMJ function. In addition, various distortions are possible, especially the width of the joint space. The picture also shows minor changes in the joint.

Tomography - a layer-by-layer image of an object under study on an X-ray film - an additional method that allows you to obtain an image of a separate layer. Tomography is used mainly to clarify the pathology of the upper jaw and to study the TMJ. A tomogram makes it possible to obtain indicators of the shape of the articular cavity, its width, depth, the severity of the articular tubercle, the shape of the articular head, the size of the articular space. In physiological occlusion, the articular heads are located in the middle of the articular cavity. In case of anomalies, there are three main positions of the articular heads: they can be located in the middle of the articular fossa, displaced back and up or forward and down.

A layer-by-layer study with a small angle of inclination (8-10 °), or zonography, is a combination of an X-ray image and a tomogram. In this case, the image of the object under study is clearer and more contrasting.

Research on bone age first appeared in pediatrics. One of the first orthodontists who drew attention to the relationship between the onset of

mineralization of the sesamoid bone, located in the area of the interphalangeal articulation of 1 toe with a period of intensive skeletal growth, was **TW Todd** (1937).

The bone age is determined by the radiograph of the hand.

Stage 1 - pineal gland and diaphysis of the proximal phalanx of the 2nd toe of the same size. The chronological age of girls and boys is 9 years.

Stage 2 I - the epiphysis and diaphysis of the medial phalanx of the 3rd finger are of the same size. The apogee of growth will come in 2 years, but the growth of the upper jaw ends, and the lower one continues. Chronological age of girls - 9 years 7 months, boys - 11 years 2 months.

Stage 3 - the pisiform bone is mineralized, the mineralization of the hookshaped bone begins. Chronological age of girls - 10 years 5 months, boys - 11 years 9 months.

Stage 4 - the sesamoid bone appears, the mineralization of the hook-shaped bone ends. The chronological age of the girls is 11 years 3 months. boys - 12 years 5 months According Kominek, for the treatment of sagittal malocclusions is an urgent need to move the lower jaw, as it is possible to miss a window of opportunity, especially in Class II of Angle th

... Stage 5 I - the peak of pubertal growth begins, coincides with the beginning of the menstrual cycle in girls. In the medial phalanx of the 3rd finger, the pineal gland is wider than the diaphysis. Chronological age of girls - 12 years 4 months, boys - 14 years

Stage 6 - there is a decline in pubertal growth. The distal phalanx of the 3rd toe is formed: the lumen strip between the pineal gland and the diaphysis disappears. Chronological age of girls - 13 years 1 month, boys - 15 years 4 months.

Stage 7 I observe the connection of the pineal gland and the diaphysis of the proximal phalanx of the 3rd finger. The peak of growth has already passed. The chronological age of girls is 14 years 1 month, boys - 16 years.

Stage 8 - there is a connection between the pineal gland and the diaphysis of the medial phalanx of the 3rd finger. Chronological age of girls 14 years 3 months, boys -

16 years. At this stage, the child is still growing, but growth is slowing down, and this must be taken into account. Kaminek recommends only tilting or moving the teeth, moving the lower jaw is no longer possible **.**

Stage 9 - the connection of the pineal gland and the diaphysis of the radius. This stage indicates the end of the formation of the child's skeleton. Chronological age of girls - 16 years 5 months, boys - 17 years

3 months. At this stage, Kaminek recommends planning complex maxillofacial surgeries to be performed after the end of the skeleton.

Teleroentgenogram - X-ray of the skull, taken from a distance, reflects the craniofacial skeleton and the contours of the soft tissues of the face. With the help of a teleroentgenogram, it is possible to determine the features of the growth and development of the facial skeleton, the localization of its altered growth; have a complete understanding of the structure and relationship of the bone base with the soft tissues of the face; choose the most rational method of treatment.

De Coster , Korkhause , Tweed , Bjork , Downs , Sassouni , Maj , Bimle r , Ricketts , Schwarz , A.A. have studied the anatomical variants of the structure of the facial skeleton . El-Nofeli, Frankel , **A.P. Kolotkov, Steinhauser , Legan , Burstone , Harvold , Steiner** et al .

• At present, there are more than 200 methods for the analysis of lateral telerentgenograms of the head and many additions to them. Different methods differ from each other in the types of measurements, points for linear and angular measurements, reference planes, which change little during the growth and development of the facial skeleton.

• The methods for analyzing lateral teleroentgenograms by type of measurement are as follows:

• determination of linear dimensions between certain points and their relationship (methods of **De Coster, Korkhause, Moorrees, Wylie**);

• measurement of angles (methods **Bjork, Downs, Graber**);

• determination of the proportionality of the size of the bones of the facial skeleton (methods **Maj, Luzy**);

• combined - determination of linear and angular dimensions and proportionality of the structure of the facial skeleton (methods of **Sassouni, Schwarz, A.A. El-Nofeli, Frankel, A.P. Kolotkova** , etc.).

The most common method for decoding lateral telerentgenograms of the head in Ukraine is the technique proposed by Schwartz and other authors (**Downs, Jrobak, Ricketts**).

When analyzing the TRG **A.M. Schwarz** divides angular and linear measurements into: craniometric, gnatometric, profilometric.

The purpose of craniometric studies is to determine the position of the jaws in relation to the plane of the anterior part of the base of the skull - to determine the type of face and to identify deviations from the average size characteristic of a normal bite with the same type. The goal is to get a profile that

nature has endowed the patient with no pathology. The difference between the “correct” and the actual profile is due to pathology. The purpose of gnatometric studies is to determine the morphological features of various types of malocclusion anomalies and deformities. In this case, the measurements relate to the dentoalveolar complex located between the SpP - the spinal plane, or the plane of the base of the upper jaw and MP - the mandibular plane, or the plane of the base of the lower jaw. On the basis of gnatometry, an anomaly is determined that has arisen due to the invisibility of the size of the jaws, anomalies in the position of the teeth, anomalies in the shape of the alveolar process; the size and position of the jaws, as well as anomalies in the position of the teeth, influence the shape of the face profile; the degree of inclination of the OCP - the occlusal plane to N - Se is determined, which is important for the prognosis of treatment from an aesthetic point of view.

The purpose of profilometric studies is to study the shape of the profile of the face and clarify the effect of craniometric relationships on the shape of the profile. A.M. Schwarz recommends evaluating the shape of the jaw profile by the position of the lips, in relation to the oral tangent T to Pn and Po, by the proportionality of the parts of the face and beyond the profile angle T. The main points used for the study of lateral teleradiograms:

A(ss) - subspinale - subspinal point Downs, most posteriorly located on the anterior contour of the apical base of the upper jaw;

B(sm) - submentale - submental point Downs, most posteriorly located on the anterior contour of the apical base of the lower jaw;

Ba - basion - the lowest point of the anterior margin of the foramen magnum in the mid-sagittal plane;

Ar - articulare - the intersection of the anterior surface of the basilar part of the occipital bone with the posterior surface of the neck;

C- condylen - point at the apex of the contour of the articular heads;

N - nasion - the connection of the frontal and nasal bones in the mid-sagittal plane, the position of the point may be different depending on the degree of development of the frontal sinus;

Se - sellia turcica - a point in the middle of the entrance to the Turkish saddle;

S - sella - point in the center of the Turkish saddle;

B (A-1) - the point formed by the perpendicular to SpP from point A;

Or - orbital - low placed point of the lower edge of the orbit; located on the eye edge of the zygomatic bone

Sna (ANS) - spina nazalis anterior - the top of the anterior nasal spine; located on the plane of the base of the upper jaw;

Snp (PNS) - spina nazalis posterior - posterior nasal spine; posterior border of the base of the upper jaw; **sp** - highest point on the lower sky contour;

Pt (FPM) - pterygomaxillare - the upper distal point of the crilopodimaxillary fissure, at the intersection of the foramen rotunda with the posterior wall of the pterygoid-maxillary fossa; forms a loop behind and above the
Snp point (PNS), its lowest point corresponds to the Snp point (PNS)

Gn - gnation - the junction of the lower edge of the lower jaw and the outer contour of the symphysis; anterior point on the lower contour of the lower jaw body;

Go - gonion - on the outer edge of the lower jaw when it intersects with the bisector of the angle formed by the tangent to the lower edge of the body and the posterior edge of the jaw branch; posterior point on the lower contour of the body of the lower jaw;

Pg - pogonion - the most forward point of the sub-side performance;

Me - menton - the lowest point on the symphysis of the lower jaw;

Ro - rorion - located on the upper contour of the external auditory canal, touches the Frankfurt horizontal;

Osp1 - anterior occlusal point - the middle of the vertical line of the incisal overlap between the cutting surfaces of the central incisors; the middle of the vertical and sagittal clefts between the central incisors;

Osr2 - posterior occlusal point - the middle of the surface of the first upper and lower molars;

AOC is the projection of point A onto the OCP;

Vos is the projection of point B onto the OCP;

Pr - prostnion - the lowest and most anterior point of the alveolar process of the upper jaw;

is - incision superius - midpoint of the incisal edge of the most protruding central upper incisor;

aps - apex superius - the midpoint of the apex of the incisal edge of the most protruding central upper incisor; **ms** - molar superius - distal-buccal tubercle of the first molar of the upper jaw; **id -**

infradentale - the highest and most anterior point on the surface of the alveolar process of the lower jaw;

ii - incision inferius - the middle point of the incisal edge of the most protruding central lower incisor; ***ari - apex inferius - the*** middle point of the apex of the most protruding central lower incisor; ***mi - molar inferius*** - distal-buccal tubercle of the first molar of the lower jaw; ***g - glabella - the*** most prominent point of the soft tissues of the frontal part; ***n - skin*** nasion (point of intersection of N - Se with the skin contour) ***sn - subnasale -*** cutaneous point, most posteriorly located at the transition point of the lower contour of the nose to the upper lip; ***pr (EN) - pronasale - the*** most protruding point of the tip of the nose, ***tr - trichion - the*** point of the anterior border of the scalp on the median sagittal plane ***;*** l - the most prominent point of the contour of the red border of the lower lip; ul - the most prominent point of the contour of the red border of the upper lip; st - stomion - midpoint between the upper and lower lip; ***pg (DT) -*** cutaneous pogonion - the most prominent point on the chin profile.

The main lines used to study lateral teleradiographs:

N - Se (NSL) - cranial plane (Schwarz), the plane of the anterior part of the skull base; connects nasion and sellia turcica; H (FH) - Frankfurt horizontal (Simon), vukhochnichna plane; connects orbital and condylen ***;***

SpP (NL) spinal plane, nasal line, plane of the base of the upper jaw; connects spina nazal is anterior i spina nazalis posterior;

OcP - occlusal plane; carried out so that at least three cusps of molars touch to it; separates the middle of the incisal overlap and the overlap of the hillocks of the last teeth that are in contact; during the temporary bite, it passes through the middle of the incisal overlap of the temporary central incisors and mounds of the second temporary molars, during the changeover bite - through the middle of the permanent central incisors and mounds of the first or second permanent molars, which are in occlusal contact;

MP (ML) - mandibular plane, plane of the base of the lower jaw, plane of the body of the lower jaw; connects the gnation and the above-placed point of the lower contour of the lower jaw body;

MT1 - tangent to the lower contour of the lower jaw; runs along the lower contour of the base of the lower jaw, starting from the point formed by the perpendicular on the MP with the pogonion, to the point of intersection of the tangent vertical line A; actual length \ Ist \ of the body of the lower jaw;

OK - actual length \ Ist \ of the upper jaw body; defined between points A-1 (perpendicular from point A to SpP) and Snp;

Pn - nasal vertical (Dreyfus) perpendicular lowered to N - Se at the point of cutaneous nasion;

Po - orbital vertical (Dreyfus) is drawn from the orbital point; perpendicular to N - Se, parallel to Pn.

The space between Pn and Po is called the Dreyfus jaw profile field.

N - A - front vertical (Downs) connects nasion and subspinale;

A - B - connects subspinale and submentale;

A - Pg - connects subspinale and pogonion;

A - tangent vertical, vertical of the posterior contour of the lower jaw branch;

MT2 - tangent to the posterior contour of the lower jaw branch; from the point of intersection of H and A, and the point of intersection of MP and A; actual length \ Ist \ of the branch of the lower jaw;

T - tangent to points sn - subnasale and pg (DT) - cutaneous pogonion; **oe - the** longitudinal axis of the upper central incisor, connects is and aps; ***ui*** - the longitudinal axis of the lower central incisor, connects the ui and the are

(the axes of other single-rooted teeth are carried out similarly) **oml** - the longitudinal axis of the upper first molar, drawn through the middle of the distance between the medial and distal roots and the intertubercular fissure; **uml** - the longitudinal axis of the lower first molar, is passed through the bifurcation of the roots of the teeth and the intertubercular fissure (the axes of other two- or multi-rooted teeth are carried out similarly).

The main angles and lines used for the study of lateral teleradiograms:

Face angle (angle F) - formed at the intersection of N-Se and NA. The average value of this angle is 85 ± 5 °. Its value characterizes the

location of the upper jaw in relation to the base of the skull: forward displacement in comparison with the "middle face" - anteposition; displacement back in comparison with the "middle face" - retroposition (according to Schwartz).

With distal occlusion, the average angle can be either more or less than the average; analysis of other parameters allows us to determine the types of distal occlusion, caused not only by the anterior position of the upper jaw (prognathia), but also by the underdevelopment of the body of the lower jaw, its branches, and a decrease in the angles of the lower jaw. In mesial occlusion, the average angle is less than the average, which indicates a retroposition of the base of the upper jaw.

The inclination angle, or the angle of inclination of the spinal plane (angle I) - is formed at the intersection of Pn and SpP. The average value of this angle is 85 ± 5 °.

If the angle is greater than the average, then the jaws are tilted forward more than in the “middle face” —anteinclination; if the angle is less than the average, then the jaws are tilted more backward - retroinclination. With anterior or posterior inclination, the direction of the occlusal and mandibular planes, the direction of the incisor axes changes.

Various combinations of the magnitude of the facial and inclination angles characterize the type of face, due to the genetic conditions of development. Depending on the size of the facial and inclination angles and the combination of their values, 9 types of faces with Schwartz are distinguished. The profile is determined by three angles: F, I, T.

Angle SeNB - formed at the intersection of N-Se and NB. The average value of this angle is 83 ± 5 °. Its value characterizes the location of the apical base of the lower jaw in the sagittal direction in relation to the plane of the skull base.

The distal bite is more often due to the retroposition of the apical base of the lower jaw, and the angle is less than normal. The mesial bite is more often due to the antelopes of the apical base of the lower jaw, and the angle is more than normal.

Angle ANB - formed at the intersection of NA and NB. Determined by the relationship of the apical bases of the jaws. The average value of this angle is 3 °. With sagittal malocclusion, the angle is

different from the norm. With distal occlusion, the boundaries of changes in the value of the angle from + 1 ° to + 11 °, with mesial - from + 5 ° to - 11 °, which emphasizes the discrepancy in the location of the apical bases of the jaws.

The angle of the Frankfurt horizontal (angle H) is formed at the intersection H and P n. The average value of this angle is 90 °. Its value characterizes the location of the articular heads of the lower jaw in relation to the base of the skull, and affects the shape of the face profile. Characterizes the vertical arrangement of the temporomandibular joints. According to Schwartz, there is a relationship between the depth of the middle cranial fossa and the location of the temporomandibular joints. The flat this fossa, the higher the joints are, and vice versa.

If the angle is less than the average, then the articular heads are in the supraposition position, that is, closer to the base of the skull than in

"Middle person"; if the angle is greater than the average, then the articular heads are in the infraposition position, that is, lower than the base of the skull than

in the “middle face”. Every 2 mm of depth or height corresponds to a 3 ° angle and vice versa. With the supraposition of the articular heads or the normal position of the lower jaw, the chin is displaced backward, with infraposition - forward. In this regard, the supraposition of the articular heads affects the shape of the jaw profile as retroinclination, and infraposition as anteinclination. The location of the chin can be aligned with the growth of the branches of the lower jaw in length,

lengthening of the base of the lower jaw, an increase in the mandibular angles.

Determination of the profile type of the facial skeleton according to Khazund

Hazund modified the analysis of the position of the jaws in the sagittal and vertical directions depending on the magnitude of the basal angle and compiled a metric table of the profile type of the lower part of the face: retrognathic, orthognathic, prognathic. For this purpose, the following parameters are studied:
angles F (SeNA), SeNB, SeNPg, N-Se-SpP, N-Se-MP.

The bolts box is divided into 3 parts. If all the values lie in the same plane, namely, close to one vertical line, this indicates a harmonious structure of the face, which, as a rule, does not require orthodontic correction of the jaw bodies, but only indicates the implementation of dentoalveolar compensation (dentoalveolar form of anomalies). The deviation of the values of one or more angles of the mean values indicates a tendency to disharmony as a result of the incorrect position and inclination of the jaws in the skull, namely, in relation to the base of the skull (the gnatic form of the anomaly).

Assessment of the jaw growth type (Jrobak, Ricketts) of "growing" patients

The type of jaw growth is assessed. The degree of formation of the bone and dentoalveolar system can be detected by the X-ray of the hand during the period of pubertal growth of the patient and by the anthropometric values of the TRG of the head in the lateral projection: by assessing the ratio of the posterior and anterior height of the facial region of the skull (Se-Go N-Me), the angle of inclination of the body plane of the lower jaw to the plane of the anterior skull (angle N-Se

(NSL) -MP (ML)), the angle of the sum of three angles (angle NSeAr + angle SeArGo + angle ArGoMe), lower genius angle (angle NGoMe), facial angle according to Ricketts (angle N-Ba-Se-Gn), intermaxillary angle (formed at the intersection of SpP and MP). There are the following types of growth: neutral, vertical, horizontal.

Analysis of meaningful values obtained as a result of measurements and analysis of teleroentgenograms shows a tendency towards vertical or horizontal type of growth. This tendency is the more pronounced, the further the fields are seen from the middle (normal-facies) plot.

With the vertical type of growth, there is a favorable prognosis for the treatment of medial and deep occlusion, deep incisal disocclusion, at the same time, the prognosis for the treatment of distal occlusion and vertical incisal disocclusion is unfavorable. With the horizontal type of growth, the prognosis for the treatment of deep incisal occlusion and medial occlusion is unfavorable, but

favorable - with distal occlusion and vertical incisal disocclusion.

The angle of inclination of the occlusal plane (angle Pn OCP) is formed at the intersection of Pn and OCP. Reflects the position of incisors and molars in the vertical direction. The average value of this angle is 75-80 °.

If the angle is less than the mean, then the occlusal plane is more inclined upward in relation to the base of the skull than in the "mean

face ", and this affects the aesthetic prognosis of the treatment of sagittal malocclusion. If the angle is greater than the mean, an improvement in the face profile can be expected after treatment of sagittal malocclusion.

When targeting the position of the 1st and 6th teeth (variable bite), the average value of the angle is greater than when targeting the position of the 1st and 7th teeth (permanent bite).

The angle SpP OCP is formed at the intersection of SpP and OCP. The average value of this angle is 8-10 °. Reflects the vertical placement of the anterior and posterior teeth.

The angle OCP MP is formed at the intersection of OCP and MP.

The average value of this angle is 10-12 °. The angle of the

mandibular plane (angle Pn

MP) is formed when crossing
Pn and MP. The average value of this angle is 60-65 °.
The magnitude of the angle changes as a result of the ante and retroinclination of the jaws, infra- and supra-occlusion of the articular heads of the lower jaw, with anomalies in the position and development of the lower jaw.

The basal angle (angle B) is formed at the intersection of SpP and

MP. The average value of this angle is 20 ± 5 °. Characterizes the

vertical position of the jaws. Its size depends on the height of the

lateral teeth, the size of the mandibular angles, the length of the

branches of the lower jaw, the height of the temporomandibular

joint, the inclination of the plane of the base of the upper jaw to the

plane of the base of the skull. The mandibular (genius) angle (go

angle) is measured between MT1 and MT2. The average value of

this angle is 123 ± 10 °. Decreasing or increasing the angle increases

the severity of dentoalveolar deformities.

The Ricketts face angle (N-Ba-Se-Gn angle) is formed when the line connecting the N points to Ba and the lines connecting the Se points to Gn intersects the lower posterior angle. With a neutral type of jaw growth, this angle is 90 ± 2 °. Jaw length ratios
When decoding teleroentgenograms, the terms are used: the true (Ist) length of the jaws, that is, the one that the patient has, and the desired (Sol), that is, which should be. The desired length is calculated in comparison with the length of the anterior cranial base, i.e. the N-Se distance. According to Schmuth-Tigelkamp, the ratio

of mandibular body length to anterior cranial base length should be 20:21 or 60:63.

Length of the body of the lower jaw
The length of the body of the lower jaw in its normal development is compared with the length of the base of the anterior cranial fossa. Up to 11 years old: MT1 = N - Se + 7 mm. After 11 years: MT1 = N - Se + 3 mm.

The ratio of the length of the body of the lower jaw to the length of its branches
The length of the mandible is measured from the intersection of the perpendicular drawn from the Pg point to the MT1 plane to the Go point. The height of the branches of the lower jaw is measured from the point of intersection of MT1 and

MT2 to the point of intersection of MT2 and H. Normally, the ratio MT1 /

MT2 = 7/5. The ratio of the body length of the upper jaw to the

length of the body of the lower jaw

Normally, the ratio OK / MT1 = 2/3 The size of the upper jaw does NOT depend on the type of face. The value of the sagittal ratio of the apical bases and the size of the jaws behind the bit (Weet) Assessment of the size, position and proportionality of the apical bases of the jaws is carried out by determining the relationship between the apical bases and the size of the jaws, as well as the vertical-basal ratio. The inter-view of the apical bases of the jaws is determined by the angle ANB.

The ratio of the height of the teeth in

Measuring the height of the teeth makes it possible to judge the characteristics of the growth of the jaws in the vertical plane. It is recommended to measure the height of the teeth perpendicular from the occlusal planes of the teeth to their basal planes. **The angle of inclination of the axes of the teeth in relation to the planes of the base of the jaws**

Angles are measured vestibularly. If the axial inclination of the upper incisors is 65 °, then they are in the protrusion position, more than 75 ° - in the retrusion position.

The interriceal angle (angle ii) is formed when the axes of the incisors intersect. The average value of this angle is 140 ± 5 °.

The ratio of the apical bases of the upper and lower jaws in the sagittal direction

Defined by angle AB-SpP. When the lines A-Pg and SpP intersect, the angle MM (maxil-Mandibular) is formed. The average of these angles is 90 °. With the correct relationship between the dentition in a person with a middle face, points A, Pg, b are on the same line, which, intersecting with SpP, forms an angle of 90 °. These points often deviate from each other, more often the Pg point. In this case, not one, but two angles are formed: AB-SpP and A-Pg-SpP.

The human face is divided into several parts

Legan and Burstone rate two parts of the face: G - Sn / Sn - Me. The ratio of the top of the face to the bottom is 1.

Schwartz evaluates three parts of the face: frontal - from point Tr to point N; nasal - from point N to point Sn; jaw - from point Sn to point Gn.

The shape of the profile depends on the thickness of the soft tissue. Soft tissues can both compensate for an irregular profile and further exacerbate it. Therefore, the thickness of the soft tissue must always be taken into account. This is especially important when choosing a treatment method **. Lip position** determined by their relation to line T. If line T divides the red border of the
upper lip in half and touches the outer surface of the red border of the lower lip - the position of the lips is average. If the lips (one or both) are in front of the T line, the position of the lips is positive, if behind it is negative.

The position of the lips (according to Ricketts) is assessed for aesthetic bulge. Based on this, a distinction is made between concave, convex and straight facial profiles.

The face profile is determined by evaluating the position of the upper lip (UL) and lower lip (*LL*) with respect to the plane (E-plane) drawn through the points pr (EN) and pg (DT). The ul point is on the plane, and the ll point is 2 mm behind it - a straight face profile. Protrusion of the lower lip from the aesthetic plane by 1-2 mm - convex profile of the face. The lag of the lower lip from the aesthetic plane by more than 2 mm is the concave profile of the face.

P ryamaya teleroentgenography .

In addition to teleradiological examination of the skull in the lateral projection, it is also studied in direct and axial projections. Such a study is used to study the growth of the facial skull in the transverse direction and to identify asymmetry in the presence of pathology in the transversal plane. This method is especially valuable for cross bite, lateral

displacement of the lower jaw and uneven growth of the right and left half of the face.

In the orthodontic treatment of patients with a significant narrowing of the upper dentition and its apical base, curvature of the nasal septum and a decrease in the volume of the nasal cavity using the method of accelerated opening of the palatal suture according to **Derichsweiler** , the analysis of direct teleradiograms of the skull makes it possible to assess changes in the location of not only the maxillary bones, but also other bones of the facial skeleton. Direct projection is also used to determine the indications for reconstructive surgery in the maxillofacial region. The main goal of the study is the recognition of asymmetry, which is due to the uneven development of both halves of the facial skeleton or its individual parts.

5. **Topics of reports/abstracts:**

1.Photometry - what is this method and for what purpose it is used.

2. What parameters are determined from the photograph to characterize the size of the patient's head and face.

3. How to determine the morphological facies index of Izard and what information it provides.

6. **Summarizing the information received at the lesson.**
7. **List of recommended literature:**

Main:

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

Additional:

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.
4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.
5.Bhalajhi SI., et al. “Orthodontics: The art and science”. Sixth edition. Arya (Medi) Publication (2015)
6.William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics Elsevier Ltd (2019): 138.
7.RamyIshaq. “The Orthodontic Patient: Examination and Diagnosis”. EC DentalScience 18.5 (2019): 975-988
8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

Information resources

1. Державний Експертний Центр МОЗ України http://www.dec.gov.ua/index.php/ua/
2. Laura Mitchell,«An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України http://library.gov.ua/
4. Національна бібліотека України імені В.І. Вернадського http://www.nbuv.gov.ua/

Practical Lesson №16

Topic: Planning orthodontic treatment

Goal: To master planning provision of orthodontic care children and adults, methods of examination of children and adults with tooth-jaw abnormalities and deformities, identify factors vestments in the treatment of tooth-jaw abnormalities and deformities

Basic concepts: in the process learning the student must apply their knowledge of anatomy and physiology features maxillofacial child, stages and timing of temporary and permanent tooth. For mastering topics the student must use their skills and knowledge of methods of clinical and instrumental investigation of special patients.

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**

A 14 –year-old patient consulted an orthodontist. The objective examination revealed that on the site of the second incisor a canine tooth had cut out, and on the site of the canine the second incisor appeared. The same pathology had also the patient's father. Make a diagnosis:

A. Transposition of the lateral incisor and the canine
B. Palatine position of the lateral incisor
C. Distal position of the lateral incisor
D. Mesial position
E. Superocclusion of the incisor and infraocclusion of the canine

2. Preventive examination of a 6-year-old child revealed the temporary teeth bite. The upper and the lower dental arches are trapeziformed. The upper incisors overlap the lower incisors more than by ⅔. The incisors and the second molars are in the same relation. There is no space between the frontal teeth. The upper dental arch is bigger than the lower dental arch by the buckle cusp size. Bite abnormality is observed in the following planes:

A. Sagittal and vertical
B. Sagittal and nasal
C. Sagittal and frankfurt
D. Sagittal and lateral
E. Sagittal and occlusal

3. A 12-year-old patient complains about an aesthetic defect. Objectively: the lower third of the face is shortened, the upper frontal teeth overbite the lower teeth by 3/3 of height, an oral inclination is observed, the lateral parts all along exhibit cusp-to-cusp relationship between the antagonists; Engle's class II malocclusion is also present. Malocclusion is observed in the following planes:

A. Insagittalandvertical
B. Insagittal
C. Intransversalandvertical
D. Intransversal
E. Invertical

4. An 11- year- old girl has adentia of the 35 tooth; it was proved by an X-ray examination. Between the 34 and 33 teeth as well as between the 34 and 36 teeth there are trems, the 34 tooth is turned by 30 degree relative to its glosso-buccal direction. Whatabnormalpositiondoesthe 34 toothhave?

A. Tortoocclusion (rotation of teeth) and distal
B. Oral
C. Mesial
D. Distal
E. Vestibular

5. A boy of 10 years- old comes to see the doctor. His face is symmetric and proportional, mouth breathing is observed. The examination of the oral cavity reveals a saddle-like form of the dental arches and deep palate. The upper first molar relationship (Engle's key to occlusion) remains intact. What is the most likely diagnosis?

A. Narrowing of dental arches
B. Elongation of dental arches
C. Mesial occlusion
D. Distal occlusion
E. Widening of dental arches

6. An 8-year-old boy complains of improper arrangement of the teeth. The examination at an orthodontic clinic reveals a broad, tight, low-attached upper lip frenulum. Thebroadfrenulumanditslowattachmentmaycause:

A. Diastema
B. Protrusion of the upper front teeth
C. Elongationoftheupperdentition
D. Shorteningoftheupperdentition
E. Narrowingoftheupperdentition

7. Preventive examination of a 5-year-old child revealed a half-open mouth, the difficult closing of the lips, primary occlusion, a 4 mm sagittal gap, the homonymous contact between the canines and the second molars. The upper dental arch is V-shaped, the lower one is trapezoid. Both dental arches in primary occlusion should have the following shape:
A. Semicircle
B. Parabola
C. Semiellipse
D. Quadrangle
E. Triangle

8. Preventive examination of a 5-year-old child reveals the infant swallowing. The bad habit of thrusting the tongue between the teeth may cause the following complication:
A. Incomplete eruption of the front teeth
B. Broadening of the upper dental arch
C. Narrowing of the lower dental arch
D. Narrowing of the upper dental arch
E. Broadening of the lower dental arch

4. Discussion of theoretical issues:

Without doubt, treatment planning is the most difficult, but also the most important, element of orthodontics. A knowledge of dental development, facial growth, psychology, and appliance mechanics are all prerequisites for success. Treatment planning is an interactive process. No longer can the doctor decide, in a paternalistic way, what is best for a patient. Both

ethically and practically, patients must be involved in the decision-making process. Ethically, patients have the right to control what happens to them in treatment. It is something done for them, not to them.

It can also be the case that the patient has no concern regarding their dentition, and it is the parent or dentist who has requested the

consultation. In this case, acceptance of orthodontic treatment more difficult to obtain.

Four factors are considered important for the success or failure of orthodontic

treatment:

(1) Motivation: The patient must be interested to correct the malocclusion and aware of the problem related to their appearance.

(2) Mobility: Teeth may have progressive mobility and continuous migrations.

(3) Limitations: Health of the oral tissues must be good and at least three quarters of the teeth's roots should be surrounded by

alveolar bone, and no evident root resorption.

(4) Cooperation: The patient should follow the guidelines for appliance care and oral hygiene with removable and fixed appliances.

It is important to consider the type of complaint of the patient and whether its correction falls within the scope of orthodontic treatment. For example, a patient with a gummy smile might seek orthodontic care to enhance aesthetics. It must here be noted that the correction of the problem might require the interaction of orthodontic treatment with other disciplines that include orthognathic surgery.

Treatment aims

The following list is not comprehensive and has to be tailored to the individual case. Some of the problems that may need to be addressed during treatment are:

- Improvedentalhealth
- Relievecrowding
- Correctthebuccalocclusion
- Reducetheoverbite
- Reducetheoverjet
- Alignttheteeth

As emphasised previously, it is essential that the oral health is of a high standard before treatment starts. Carious teeth should be restored and the periodontal condition and oral hygiene should be excellent before treatment starts.

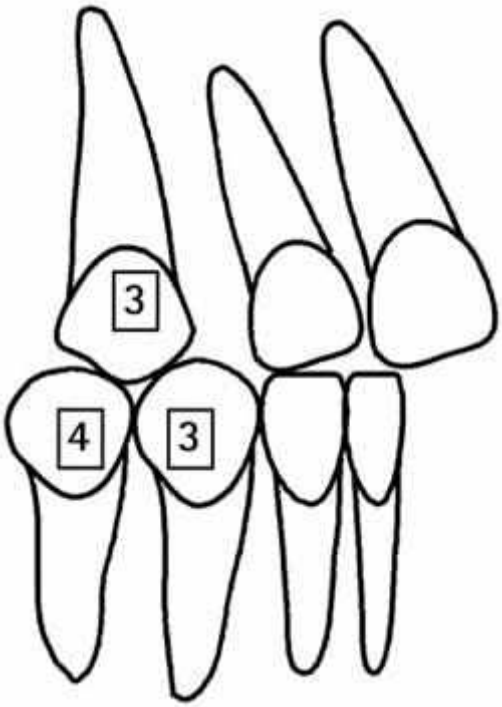
Relieve crowding

The decision to extract teeth needs to be carefully considered and depends on the degree of crowding, the difficulty of the case and the degree of overbite correction.

Correct the buccal occlusion

The key to upper arch alignment is to get the canines into a Class I relationship (Fig. 1). Providing the lower incisors are well aligned, achieving this will generally produce sufficient space to align the upper incisors.

Figure 1



It is important to achieve a Class I canine position in order to fully correct the overjet and the buccal segment relations

Full size image

In order to get the canines Class I there are, in general two choices for the molar relationship at the end of treatment; either Class I or a full unit Class II. This will be covered in more detail later in the section on treatment plan.

Overbite and overjet reduction

The overbite should always be reduced before overjet reduction is attempted. A deep overbite will physically prevent the overjet from being reduced because of contact between the upper and lower incisors.

Retention

Once the overjet has been reduced and or upper incisors have been aligned a retainer should be fitted. These are designed to reduce the risk of relapse post treatment by allowing remodelling and consolidation of the alveolar bone around the teeth and reorganisation and maturation of the periodontal fibres. There are many different types of retainers but they are generally removable or fixed. There are no hard and fast rules regarding the length of time retention should continue. The authors recommend for removable appliance treatment that retention should continue for 3 months full time and 3 months at night-time only. For fixed appliance cases this should be 3 months full time and a minimum of 9 months at night-time only. At the end of this minimum year's worth of retention, discretionary wear should be advised. This means that the patient is given the option of discarding the retainer if they are fed up with wearing it, or continuing on a part-time regime to give the teeth the best possible chance of staying straight. If they decide to stop wearing the retainer they

should be warned there is no guarantee that the teeth will remain straight throughout life and the only way to improve this prospect is by indefinite (ie life-long) wearing of the retainer.

Some cases, especially those that were spaced or where rotations were present prior to treatment, should be retained indefinitely, usually with bonded retainers.

Treatment plan

The treatment plan should be considered as follows:

- Oralhealth
- Lowerarch
- Upperarch
- Buccalocclusion
- Choosetheappliance

Oralhealth

Tooth brushing and diet advice must be given and written in the notes. Daily fluoride rinses are also recommended. Caries must be treated and periodontal problems appropriately addressed.

Lower arch

Plan the lower arch first. The size and form of the lower arch should generally be accepted. Excessive expansion in the buccal regions or proclination of the lower incisors is contra-indicated in most cases because the soft tissues will generally return the teeth to their original position.

The need for extractions depends on the degree of crowding. In some cases, slight proclination of the lower incisors and expansion in the lower premolar region is acceptable, although this should be kept to a minimum in carefully planned cases. Generally this type of treatment is confined to the correction of mild crowding (less than 5 mm), cases where incisors have been retroclined by a digit habit or trapped in the vault of the palate, or during development of Class II Division 2 malocclusions especially where there is a deep bite. Any case where the overbite is excessive must be very carefully assessed before extraction decisions are made.

As the degree of crowding increases from 5–10 mm the need for extractions increases and with more than 10 mm of crowding extractions are nearly always required. If spontaneous alignment or removable appliances are to be used, first premolars are usually the extraction of choice because they are near to the site of crowding, allow the canines to upright and produce the best contact point relationship. If other teeth are to be extracted then generally fixed appliances will be required. Crowding tends to worsen with age and is thought to be related to facial growth which continues at least until the fifth decade.

Upper arch

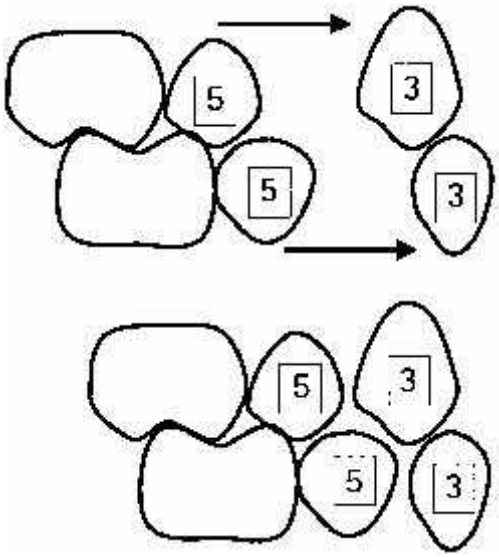
Plan the upper arch around the lower. If extractions are undertaken in the lower arch these should generally be matched by extractions in the upper. If no extractions are carried out in the lower arch the space for upper arch alignment may come from either distal movement of the upper buccal segments or extraction of upper premolars. The choice depends on the space requirements and the buccal occlusion. As the degree of crowding and overjet increase, then the space requirements will also increase and it is more likely that extractions as opposed to distal movement will be indicated.

Determine whether the teeth are favourably positioned for spontaneous alignment. If appliances are needed can removable or fixed appliances accomplish the tooth movements?

Plan the buccal occlusion

Consider whether this needs to be corrected and if so how. If headgear is to be used, should it be used in conjunction with a removable or a fixed appliance? If the lower arch is crowded, space may be created by the removal of two lower premolars. This is then matched by upper premolar extractions and the molar relationship must be Class I at the end of treatment to allow the arches to fit together (Fig. 2).

Figure 2: The importance of keeping extraction patterns symmetrical is demonstrated.

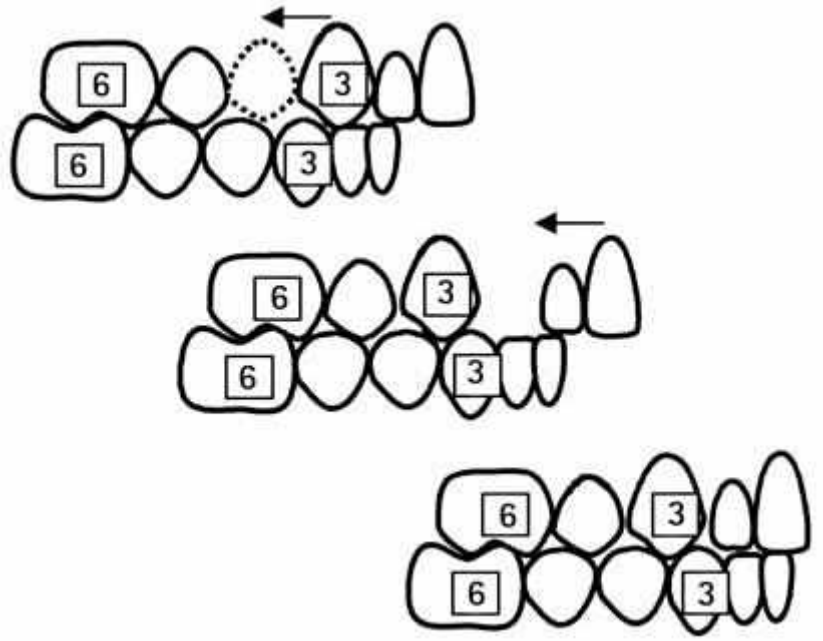


The lower arch crowding has been dealt with by removal of two lower premolars. The loss of the corresponding upper premolars means the molar relationship at the end of treatment should be Class I

Full size image

However if the lower arch is well aligned, space to align the upper arch can be created by either upper premolar extractions or by distal movement of the upper buccal segments. The choice depends on how much space is required and what the molar relationship is at the start of treatment. Generally the more Class II the molars are the more likely one will opt for premolar extraction rather than distal movement. Moving molars more than 3–4 mm distally is possible but becomes increasingly demanding on patient co-operation. In circumstances where the space requirements are large, upper premolar extraction reduces the treatment time and increases patient compliance. Figure 3 shows the sequence of events when upper premolar extraction alone is undertaken as an aid to overjet reduction.

Figure 3

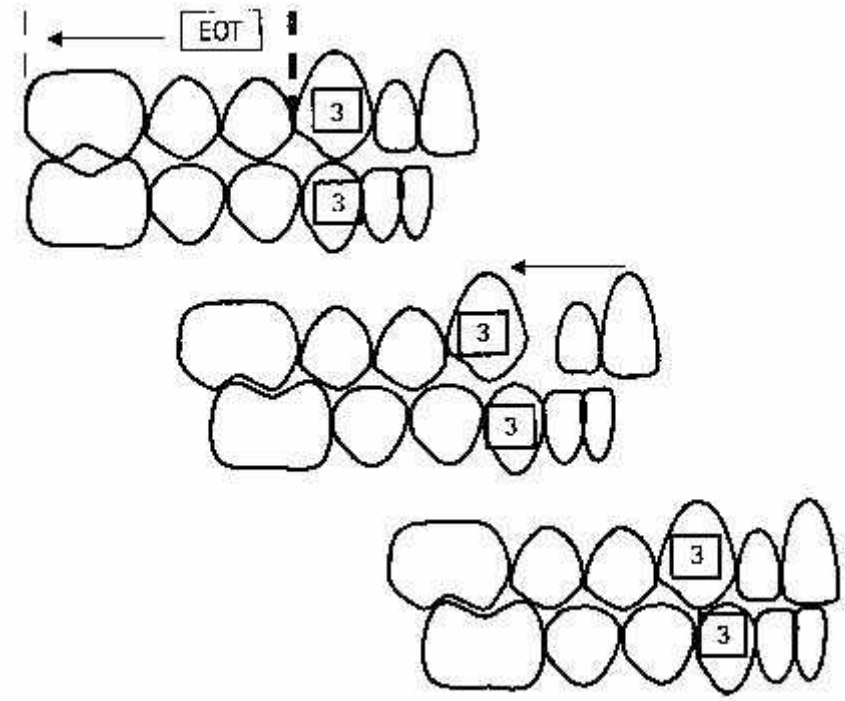


Where upper premolars alone are extracted (assuming no crowding in the lower arch), reduction of the overjet and space closure means the molar relationship must be a full unit Class II

Full size image

The nearer to Class I the initial buccal occlusion is, the more likely it will be that distal movement is appropriate. Therefore, space requirements that involve less than half a unit Class II correction can be accomplished by distal movement of the molars in a relatively short time with more chance of good patient co-operation (Fig. 4). Extracting upper premolars in these cases produces an excess of space and may increase the treatment time.

Figure 4: Where a relatively small Class II correction is required – this can be achieved through distal movement of the molars.



The loss of upper premolars in this case would produce an excess of space

Choose the appliance

Once the need for extractions has been considered the appropriate appliance should be selected. This can involve allowing some spontaneous alignment to occur, using removable, fixed or

functional appliances with the addition of extra-oral traction or anchorage. Appliance choices are covered in the next section.

5. **Topics of reports/abstracts:**
   1. Organization of orthodontic care for adults and children
   2. Clinical examination methods of orthodontic patients
   3. Establishing a preliminary diagnosis
   4. Anthropometric survey methods of orthodontic patients
   5. Biometric methods of measuring diagnostic models
   6. Photometric examination methods of orthodontic patients
   7. Functional examination methods of orthodontic patients
   8. Panoramic x-rays analysis of orthodontic patients
   9. Analysis of cephalometrics orthodontic patients

6. **Summarizing the information received at the lesson.**
7. **List of recommended literature:**

Main:

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

Additional:

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.
4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.
5.Bhalajhi SI., et al. “Orthodontics: The art and science”. Sixth edition. Arya (Medi) Publication (2015)
6.William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics Elsevier Ltd (2019): 138.
7.RamyIshaq. “The Orthodontic Patient: Examination and Diagnosis”. EC DentalScience 18.5 (2019): 975-988

8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

Information resources

1. Державний Експертний Центр МОЗ України http://www.dec.gov.ua/index.php/ua/
2. Laura Mitchell,«An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України http://library.gov.ua/
4. Національна бібліотека України імені В.І. Вернадського http://www.nbuv.gov.ua/

Practical Lesson №17

Topic: Fixation and activation of orthodontic devices

Goal: To master planning provision of orthodontic care children and adults, methods of examination of children and adults with tooth-jaw abnormalities and deformities, identify factors vestments in the treatment of tooth-jaw abnormalities and deformities

Basic concepts: in the process learning the student must apply their knowledge of anatomy and physiology features maxillofacial child, stages and timing of temporary and permanent tooth. For mastering topics the student must use their skills and knowledge of methods of clinical and instrumental investigation of special patients.

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**
4. **Discussion of theoretical issues:**

"Orthodontic's button fixation"

1. Say hello to the patient
2. Explain the steps and purpose of the procedure (to fix the orthodontic's button, it is
necessary to prepare the necessary tooth and fix the button)
3. Wear a mask
4. Treat hands

5. Wear gloves
6. Take a sterile tray from Panmed and select the necessary instrument:
• tray
• reverse action tweezers
• spatula
• probe
7. Take a tooth cleaning and polishing tool from the Petri dish
• Low speed handpiece brush
8. Clean the surface of the tooth
9. Rinse with water from the water gun
10. Isolate the tooth from saliva with a cotton roll
11. Apply etching gel
12. Rinse the tooth with water from the water gun
13. Dry the tooth with the air gun
14. Apply the required amount of bond to the tooth using the applicator
15. Blow off the bond with an air gun
16. Apply fixing material to button base
17. Spread the material evenly over the base of the button
18. Place the button on the tooth and press down for a firm fit to release of excess
material
19. Remove excess material with a probe
20. Curing the material with a photopolymer lamp

Bracket Fixation"
1. Say hello to the patient
2. Explain the steps and purpose of the procedure (to fix the bracket, it is necessary to
prepare the necessary tooth and fix the bracket)
3. Wear a mask
4. Sterilize your hands
5. Wear gloves
6. Take a sterile tray from Panmed and select the necessary instrument:
• tray
• reverse active tweezers
• spatula
• Bracket height gauge
• probe

7. Choose from the set the appropriate bracket for the tooth
8. Take a tool for cleaning and polishing the tooth from the Petri dish
• Low speed handpiece brush
9. Clean the surface of the tooth
10. Rinse the tooth with water from the water gun
11. Isolate the tooth from saliva with a cotton roll
12. Apply etching gel to the tooth
13. Rinse the tooth with water from the water gun
14. Dry the tooth
15. Apply the required amount of bond to the tooth using the applicator
16. Blow off excess bond with the air gun
17. Apply fixing material to the base of the bracket
18. Evenly distribute the material on the base of the bracket
19. Place the bracket on the tooth, checking the correct position
- vertically with a bracket height gauge
- by mesio-distal location: parallel to the line connecting the contact points
- by angulation: along the axis of the tooth
20. Remove excess material around the bracket with a probe
21. Use a photopolymer lamp to cure the material from
the mesial and distal sides.

8. Topics of reports/abstracts:

1. Organization of orthodontic care for adults and children
2. Clinical examination methods of orthodontic patients
3. Establishing a preliminary diagnosis
4. Anthropometric survey methods of orthodontic patients
5. Biometric methods of measuring diagnostic models
6. Photometric examination methods of orthodontic patients
7. Functional examination methods of orthodontic patients
8. Panoramic x-rays analysis of orthodontic patients
9. Analysis of cephalometrics orthodontic patients

9. Summarizing the information received at the lesson.

10. List of recommended literature:

Main:

1. Lectures on the relevant topic.
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3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.

4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

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1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
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Practical Lesson №18

Topic: Fixation of orthodontic rings, thin-walled crowns, crowns with a spacer

Goal: To master planning provision of orthodontic care children and adults, methods of examination of children and adults with tooth-jaw abnormalities and deformities, identify factors vestments in the treatment of tooth-jaw abnormalities and deformities

Basic concepts: in the process learning the student must apply their knowledge of anatomy and physiology features maxillofacial child, stages and timing of temporary and permanent tooth. For mastering topics the student must use their skills and knowledge of methods of clinical and instrumental investigation of special patients.

Equipment: cephalometric analis, plaster models, typodonts, panoramic x-rays.

Plan

1. **Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
2. **Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
3. **Questions (test tasks) to check basic knowledge on the topic of the seminar:**
4. **Discussion of theoretical issues:**

Algorithm of actions of a student with a practical skill:
"Fixation of an orthodontic space maintainers"

1. Say hello to the patient
2. Explain the steps and purpose of the procedure (to fix an orthodontic space maintainers, it is necessary to prepare a tooth and fix the structure)
3. Wear a mask
4. Sterilize your hands
5. Wear gloves
6. Take a sterile tray from Panmed and select the necessary instrument:
• tray
• round tapered pliers
• tweezers
• spatula
• mixing surface for glass ionomer cement
• probe
7. Using tweezers and a cotton ball pre-moistened in ethyl alcohol, treat the orthodontic
construction
8. Blow off the remaining ethyl alcohol with the air gun

9. Fit the space maintainers in the oral cavity (the crown should reach the gingival
margin, but not enter the gingival sulcus)
10. Take a tool for cleaning and polishing the tooth from the Petri dish
• Low speed handpiece brush
11. Clean the surface of the tooth
12. Isolate the tooth from saliva with a cotton roll
13. Using tweezers, take a cotton ball soaked in ethyl alcohol and treat the tooth surface
and orthodontic structure
14. Blow off the remaining ethyl alcohol from the structure with the air gun .
15. Apply the required amount of fixing material to the mixing glass according to the
instructions.
16. Mix the fixing material
17. Using a spatula, apply a layer of cement of sufficient thickness to the inner surface of
the space maintainers
18. Fix the structure on the tooth
19. Using a probe, remove the remaining cement (begin to remove excess cement when
the material becomes like rubber in its consistency)

Fixation of an orthodontic thin-walled crown"
1. Say hello to the patient
2. Explain the course and purpose of the procedure (to fix the orthodontics' crown, it is
necessary to prepare the necessary tooth and fit the factory crown)
3. put on a mask
4. sterilize hands
5. Put on gloves
6. Take a sterile tray from Panmed and select the necessary instrument:
• tray
• round tapered pliers
• tweezers
• spatula
• mixing surface for glass ionomer cement
• probe

7. Pick up an orthodontic crown from the factory set
8. Using tweezers and a cotton ball pre-moistened in ethyl alcohol, treat the orthodontic crown
9. Blow off the remaining ethyl alcohol with an air jet
10. Use pliers with round tapered to fit the crown in the oral cavity (the crown should reach the
gingival margin, but not enter the gingival sulcus)
11. Take a tooth cleaning and polishing tool from the Petri dish
• Low speed handpiece brush
• low speed handpiece elastic
12. Clean the surface of the tooth
13. Isolate the tooth from saliva with a cotton roll
14. Using tweezers, take a cotton ball soaked in ethyl alcohol and treat the surface of the tooth
and orthodontic crown
15. Blow off the remaining ethyl alcohol from the orthodontic crown and tooth with the air gun
16. Apply the required amount of fixing material to the mixing glass according to the instructions.
17. Mix the fixation material
18. Using a spatula, apply a layer of cement of sufficient thickness to the inner surface of the
orthodontic crown.
19. Fix the crown on the tooth (during the entire curing time, the pressure should be moderate)
Using a probe, remove the excessive cement (begin to remove excess cement when the material
becomes like rubber in its consistency)

5. **Topics of reports/abstracts:**

1. Organization of orthodontic care for adults and children
2. Clinical examination methods of orthodontic patients
3. Establishing a preliminary diagnosis
4. Anthropometric survey methods of orthodontic patients
5. Biometric methods of measuring diagnostic models
6. Photometric examination methods of orthodontic patients
7. Functional examination methods of orthodontic patients
8. Panoramic x-rays analysis of orthodontic patients
9. Analysis of cephalometrics orthodontic patients

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