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EDITORIAL

Të nderuar kolegë

Në vijim keni numrin e rradhës të revistës Apolonia. Në mbrendësi të revistës gjeni tema interesante dhe të dobijshme për punën tonë shkencore dhe profesionale, ku aritjet e tyre i shpalosin shumë autorë nga vendi, regjioni dhe me gjërë. Interesimi për publikim në këtë revistë edhe një herë dëshmon faktin që mbetemi një revistë e mirëfillt profesionale, që me vite të tëra ndihmon kolegët tanë në dëshmimin e suksesit të tyre në fushën e stomatologjisë. Me këtë rast dua të falemnderoj të gjithë ata kolegë dhe bashpunorë të cilët shfaqën interesim për botimin e punimeve të tyre në këtë revistë.

Ju falimnderit për besimin dhe bashpunimin.

EDITORIAL

Dear colleagues,

Below you will find the next issue of Apolonia Magazine. Inside this issue, you will find interesting topics useful for our scientific and professional work, where many authors from the country, the region and beyond present their achievements. The interest in publishing proves the fact that we remain a trustworthy and professional magazine which for years has helped our colleagues in proving their success in the field of dentistry. In this regard, I want to thank all those colleagues and collaborators who showed interest in publishing their works in this journal.

Thank you for your trust and cooperation.



Prof.D-r. Lindihana Emini
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A NOVEL TEMPLATE DESIGN FOR IMMEDIATE PROVISIONALIZATION OF ONE-PIECE IMPLANT IN ESTHETIC REGION: CLINICAL ASSESSMENT.

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ABSTRACT:

The use of a cervical contouring concept utilizing a customized provisional restoration to reshape the soft tissue around implants with a main focus on the marginal soft tissue level and the facial zenith position is highly recommended and widely used nowadays. Digital dentistry has its contribution for this part, introducing a customized template "One-piece template" created by Dr. Ahmed Halim Ayoub., for fabrication of such provisional restoration.

Keywords: Provisional restoration; peri-implant soft tissue; esthetic zone; gingival emergence profile; one-piece implant; template for customization; one-piece template for compressive implants

INTRODUCTION:

An implant-supported restoration in the esthetic zone is considered to be successful when perfectly integrated with the adjacent teeth (1). The extraction may compromise this aim due to the associated changes on both hard and soft tissues that occurs affecting the ridge dimensions (2). Several surgical techniques have been introduced to maintain the volume of the ridge as much as possible or improve it if defective. Furthermore, correct implant-positioning guidelines have been documented to help produce a favorable esthetic outcome (3).

The popularity of immediate loading implants has increased considerably among patients and dentists (4). The advantages of immediate loading are to reduce the number of interventions and time of prosthetic (5). Furthermore, the success of immediate loading is related to the primary implant stability and loading control. Although two-piece implants have shown

great success for a long time, the two stages of surgical procedures, the infiltration of bacteria in the microgap between abutment and implant, and the screw fracture after loading, are considered complications that could be overcome by the use of one-piece implants (6). In addition, the one-piece compressive implant allows a minimally invasive flapless surgery which is very well accepted by patients (7).

As important as the surgical phase is the prosthetic phase. In fact, precise prosthetic work is critical to duplicate the adjacent teeth shape and shade, and the time of placement of the restoration affects the buccal ridge contour (8). Therefore, careful and appropriate management of a provisional restoration may help to create the shape of the peri-implant soft tissue so that an ideal gingival emergence profile can be mimicked. Currently, the use of a temporary restoration is a well-accepted means of predictably creating a natural-looking implant-supported restoration in clinical practice (9).

Bichacho and Landsberg (10) recommended the use of a cervical contouring concept utilizing a customized temporary restoration to reshape the soft tissue around implants with a main focus on the marginal soft tissue level and the facial zenith position. Rompen et al advocated the use of a concave transmucosal profile in order to minimize facial gingival recession (11). More recently, Su et al (12) defined two different areas within the transgingival zone based on the response of the peri-implant gingival tissues to abutment/ crown contour modifications: the critical and subcritical contours.

In the second scenario, the aim is generally to place pressure on the soft tissues and guide their remodeling so that the dental emergence profile may be optimized. Depending on the clinical dimensions of the soft tissues, the tridimensional implant position and the timing of placement, temporary restorations may require different shapes (8).

The immediate prosthetic of a one-piece system allows for better tissue healing (13), better adhesion of the gingival mucosa to form a collar which is healthy and adherent to the implant, and avoiding a second surgical procedure (14).

The prosthetic procedure of a one-piece implant enables the physiology of the natural tooth. The one-piece implant enables a borderline preparation following the contour of the gingival margin leading to a better preservation of mucous seal (15). One-piece



immediate loading implants have a survival rate similar to delayed loading implants (16).

Since immediate loading of one-piece implants has become a widely used procedure for rehabilitation of partially edentulous patients, and since there is growing interest in the ideal design characteristics of the supracrestal component of the implant restoration through provisional restorations for immediate or delayed implants, we decided to analyze the effect of immediate custom made provisional restoration to mimic and create the gingival contour required for such cases especially in esthetic zone, using special template “One piece template”, pre-designed on Blender software then modified for one piece implant on Meshmixer software by Dr.Ahmed Halim Ayoub. (Figure 1a, 1b)

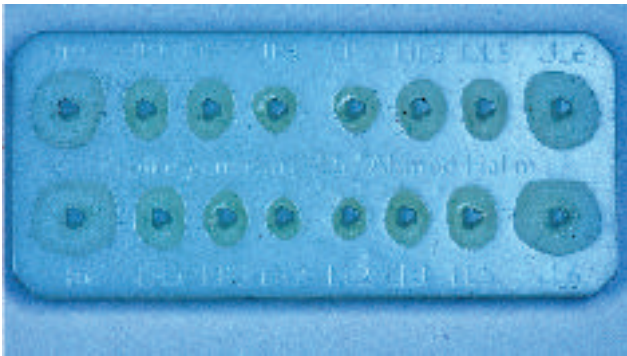


Fig 1a.



Fig 1b.

CASE DESCRIPTION: CASE 1:

A 40-year-old male patient presented with edentulous area at upper left lateral incisor region. He required an implant supported fixed restoration. Upon radiological and clinical examination (figure 2-5), the case was ready to receive implant to restore the missing tooth with immediate load.

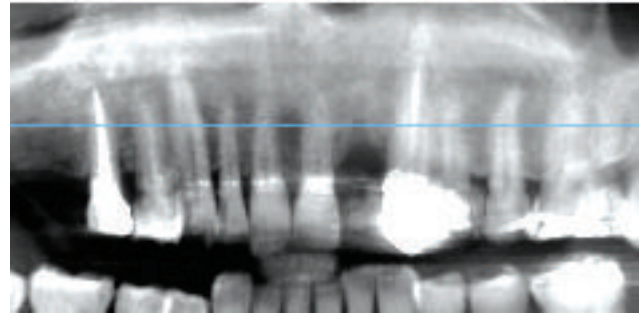


Fig.2

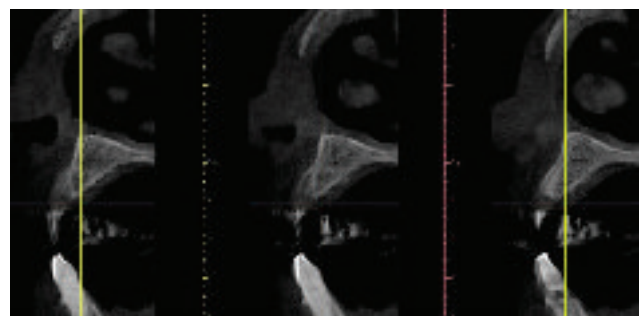


Fig.3



Fig.4



Fig.5



We decide to place a one piece implant without flap “flapless technique” in order to preserve both hard and soft tissues (Figure 6), which had been inserted with 40N, which is suitable for immediate load (Figure 7).



Fig.6

Adding flowable composite around the burning out plastic cap supplied by the implant system after creating some roughness using diamond stone (Figure 9).



Fig.9



Fig.7

A ready-made temporary crown was adopted over the plastic cap and cemented over the abutment (Figure 10).



Fig.10

A provisional restoration was fabricated to create a suitable emergence profile for the restoration, especially we are in esthetic area, using a special template made by Blender software and modified for one-piece implant on Meshmixer software (Figure 8).



Fig.8

Excess cementation was removed and an oral hygiene instruction was prescribed to the patient. After 3 month a recall for follow up and to start the steps for final restoration fabrication was carried out, a nice peri-implant soft tissue with an ideal gingival emergence profile was created around the abutment (Figure 11a,11b) and final restoration was fabricated and delivered (Figure 12a,12b).



Fig 11a.



Fig.12b



Fig.11b



Fig.12a

CASE 2:

A 33-year-old female patient presented with edentulous area at upper right first premolar region, which compromise her esthetic and present difficulties in eating. Upon radiological and clinical examination (figure 13-14), the case was ready to receive implant to restore the missing tooth.



Fig.13.

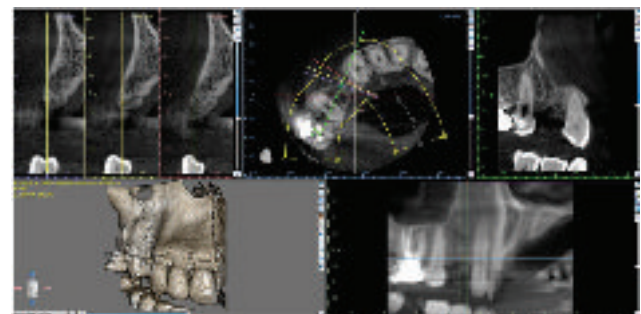


Fig.14



We decide to place a one piece implant without flap “flapless technique” in order to preserve both hard and soft tissues. A provisional restoration was fabricated using a special template made by “One piece template”, as described in the previous case. A ready-made temporary crown was adopted over the plastic cap and cemented over the abutment and oral hygiene instruction was prescribed to the patient. After 3 month a recall for follow up and to start the steps for final restoration fabrication was carried out, a CBCT was ordered to ensure the implant stability and bone integrity (Figure 15).

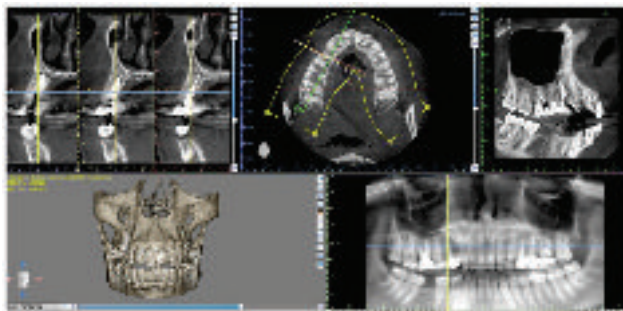


Fig.15

A nice peri-implant soft tissue with a perfect gingival emergence profile was created around the abutment (Figure 16) and final restoration was fabricated and delivered (Figure 17).



Fig.16



Fig.17

CASE 3:

A young female patient, 24 years old suffering from congenitally missing upper left lateral incisor, which compromise her esthetic, as she has an average lip line. Upon radiological and clinical examination (figure 18), the case was ready to receive implant to restore the missing tooth.



Fig.18

A one-piece implant was placed through a flapless approach, in order to preserve both hard and soft tissues (Figure 19).



Fig.19

A provisional restoration was fabricated using a “One piece template”. A temporary crown was adopted over the plastic cap and cemented over the abutment allowing for progressive loading (Figure 20).



Fig.20



Fig.22b

After 3 month a recall for follow up and to start the steps for final restoration fabrication was carried out (Figure 21).



Fig.21

A nice peri-implant soft tissue with a perfect gingival emergence profile was created around the abutment and final restoration was fabricated and delivered (Figure 22a-22b).



Fig.22a

CASE 4:

A 45-year-old male patient presented with edentulous area at upper right first premolar region, which compromise his esthetic and present difficulties in eating. Upon radiological and clinical examination (figure 23a,23b), the case was ready to receive implant to restore the missing tooth.



Fig.23a



Fig.23b



We decide to place a one piece implant without flap “flapless technique”. A provisional restoration was fabricated “One-piece template”, as described in the previous cases. A ready-made temporary crown was adopted over the plastic cap and cemented over the abutment (figure 24) and oral hygiene instruction was prescribed to the patient.



Fig.24

After 3 month a recall for follow up and to start the steps for final restoration fabrication was carried out. A nice peri-implant soft tissue with a perfect gingival emergence profile was created around the abutment (Figure 25) and final restoration was fabricated and delivered (Figure 26).



Fig.25



Fig.26

CASE 5:

A young lady, 27 years-old complaining of missing her upper right lateral incisor tooth, which compromise her smile. She is seeking for a fixed restoration without interfering with her adjacent teeth “she refused fixed bridge restoration” and she required a minimal surgical interfering to manage her problem. Upon radiological and clinical examination (figure 27a,27b), we decide to place a one piece implant without flap “flapless technique” in order to preserve both hard and soft tissues and meet the patient desire (Figure 28).



Fig.27a

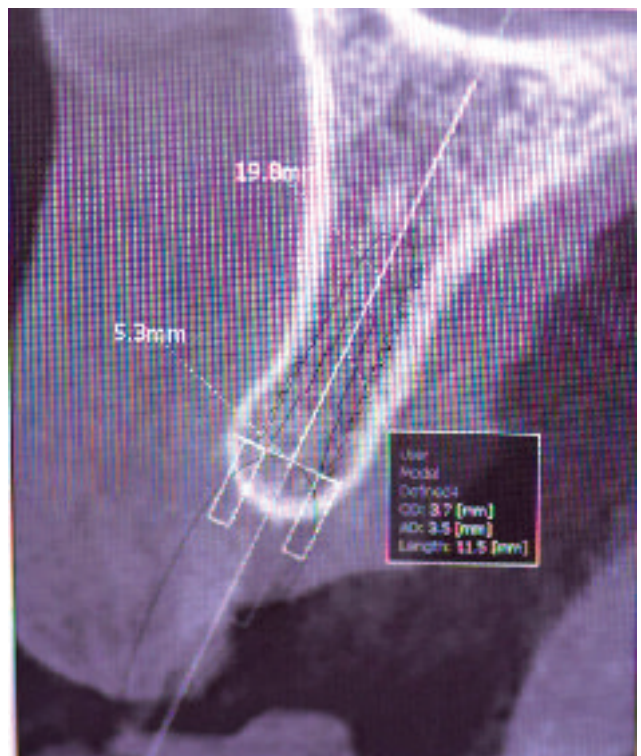


Fig.27b



Fig.28

A provisional restoration was fabricated using a special template "One-piece template". A ready-made temporary crown was adopted over the plastic cap and cemented over the abutment and oral hygiene instruction was prescribed to the patient (Figure 29).



Fig.29

After 3 month a recall for follow up and to start the steps for final restoration fabrication was carried out. A nice peri-implant soft tissue with a perfect gingival emergence profile was created around the abutment (Figure 30) and final restoration was fabricated and delivered (Figure 31a-31b).



Fig.30



Fig.31a



Fig.31b

DISCUSSION:

A one-piece implant is a type of dental implant in which the endosseous and abutment portions consist of one unit. The one-piece implant was originally designed to address the structural weakness issues that were part of the two-piece implant. The one-piece implant increases the strength and stability of the prosthesis by eliminating the weakest point of the two-piece implant, the abutment interface. In addition, the one-piece implant is an effective choice for patients or surgical sites where there is not enough bone to properly support prosthesis (17).

Single piece implants are cost-effective when compared to conventional implants, as they eliminate the need for cover screws, healing abutments, subsequent separate implant attachments or separate implant abutments. They are time effective as they eliminate the need for second stage surgery, mucosal healing period, and they also decrease patient exposure to additional unnecessary pain and discomfort (18). They provide fast, painless replacement of missed teeth. Single-piece Implants are less invasive and are either: immedia-



tely loaded in case of good bone quality, or progressively loaded in case of less than ideal bone quality (19).

Despite these advantages, one-piece dental implants do have a disadvantage in that they are less flexible than the two-piece implant due to their single-unit construction. This lack of flexibility prevents more detailed adjustments once placed. After imaging and a careful evaluation of the patient's dentition and underlying bone, the dental practitioner will determine which type of implant will best fit the patient's needs (20).

Problems in angulation could be avoided by the use of parallel pins after each drill so any deviation could be corrected with the subsequent drill, or by combining the slanted implant with angled abutment. Dentium Slim Line provides (15 and 25 degree) angled abutments which can be oriented in any direction, and are cost effective (21).

Placement of a provisional restoration at the same time as insertion of an immediate implant has been advocated to help preserve the gingival tissue height and profile (22). This is becoming increasingly popular as advances in surgical techniques and developments in implant macrogeometry facilitate the achievement of primary stability necessary for immediate implant placement and function (23).

The current rationale is based on the idea that the temporary restoration will support the soft tissue contours, thus avoiding collapses of the buccal and inter-proximal tissues.

Despite widespread clinical application, very few guidelines have been proposed in the literature regarding the ideal configuration for this type of restoration (24).

The main objectives of temporary restorations at immediate implants, besides patient comfort and esthetics during healing are: 1) maintaining the existing soft tissue architecture, 2) supporting the existing gingival margin and papilla height, 3) a smooth and polished surface that will help create a gentle transition and minimize contamination during healing (25).

A special template made by Blender software and modified for one piece implant on Meshmixer software is introduced to facilitate the fabrication of a temporary restoration, that help to produce a fast produced, well designed, easy adapted restoration that needs minor interfering for finishing and polishing. The temporization phase helped to create a peri-implant tissue with good gingival emergence profile and support the soft

tissue during primary period of healing after implant insertion, allowing for fabricating a final restoration in a previously create and stable gingival emergence profile, which guarantee stable and fixed relation between restoration and peri-implant tissue, especially if the case is not ready for immediate load and progressive load is planned.

It is the first template that is designed digitally and is printed for provisional restoration for one-piece implant and it needs further investigations for larger number of cases with long term follow up.

CONCLUSIONS:

The important purpose and practical application of provisional restorations is essential to achieve functional and esthetic success. The clinician must consider utilizing the provisional stage to improve and refine the final outcome, part of a continuum of care where the patient sees a progressive improvement from the beginning to completion of prosthodontics treatment. This continuum, in turn, can improve patient satisfaction, clinician/patient rapport and confidence leading to predictable success. Using digitally produced template "One piece template", a new innovation made by Blender software and modified for one piece implant on Meshmixer software to fabricate such provisional is considered a predictable, accurate, cost effective, chair-side and time saving method that is highly recommended to use.

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NDIKIMI I STATUSIT SOCIO-EKONOMIK NË KARIESIN E FËMIJËRISË SË HERSHME TE FEMIJËT PARASHKOLLORË NË QYTETIN E TIRANËS

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ASSOCIATION OF SOCIO-ECONOMIC STATUS WITH EARLY CHILDHOOD CARIES AMONG PRESCHOOL CHILDREN IN TIRANA CITY

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ABSTRAKT

Hyrje: Kariesi i fëmijërisë së hershme (ECC), është një formë destruktive e kariesit që prek sistemin dentar të përkohshëm dhe mund të shfaqet te fëmijët fare të vegjël menjëherë sapo dhëmbët të erruptojnë. Statusi Socio-Ekonomik (SES) tregon nivelin arsimor, nivelin e të ardhurave dhe punësimin e një individi të vetëm apo një grupi individësh. SES i ulët ndikon në rritjen e nivelit të riskut për ECC. Qëllimi i këtij studimit është të përcaktojë prevalencën dhe ashpërsinë e kariesit të fëmijërisë së hershme te fëmijët parashkollorë dhe të vlerësojë lidhjen e ECC me statusin socio-ekonomik.

Metoda: Ky studim kros-seksional është kryer në qytetin e Tiranës. 6 nga 42 kopshtet publike u selektuan rastësisht. Në këtë studim u përfshinë fëmijët 3-5 vjeç (n=904). Mbledhja e të dhënave për këtë studim u krye nëpërmjet pyetësorëve të strukturuar të plotësuar nga prindërit dhe ekzaminimit intraoral të fëmijëve. Ekzaminimi, diagnostikimi dhe rregjistrimi u krye sipas kriterëve të OBSH (1997). Format e ECC u përcaktuan në bazë të vlerave të dmft, sipas klasifikimit të AAPD (2008). Analiza statistikore u realizua në programin SPSS.18 përmes statistikes deskriptive dhe testit Hi Katror. Në të gjitha rastet, u konsiderua statistikisht sinjifikative një vlerë e $p < 0.05$.

Rezultatet: Prevalenca e ECC ishte 91% (823/904). 62.1% (561/904) e fëmijëve vuanin formën e rëndë të ECC dhe vlera mesatare e indeksit dmft ishte 6.45 (SD±4.25). Ashpërsia e kariesit të fëmijërisë së hershme ishte më e ulët në fëmijët, nënat e të cilave kishin nivel të lartë arsimor ($p < 0.001$) dhe më e lartë në fëmijët nga familje me nivel ekonomik të ulët dhe mesatar ($p < 0.001$). Niveli arsimor i nënës dhe niveli ekonomik i familjes kishte lidhje sinjifikante statistikore me indeksin dmft ($p < 0.001$).

ABSTRACT

Introduction: Early Childhood Caries (ECC) is a destructive form of caries that affects the primary teeth and may be present in children of very young age, as early as teeth erupt. Socio-Economic Status (SES) shows the level of education, level of income and employment. Low SES of parents increases the level of risk for ECC of their children. The aim of the study was to determine the prevalence and severity of early childhood caries among preschool children and to evaluate its association with socio-economic status.

Methods: This was a cross-sectional study conducted in Tirana city. 6 out of 42 public kindergartens were randomly selected. Children 3 to 5 years old (n=904) were included in this study. Information was obtained through structured questionnaires that were completed by parents and intraoral examination of children. Screening, diagnosis and recording of the subjects in this study were obtained according to WHO criteria (1997). Caries severity of ECC was assessed using dmft, according to classification of AAPD (2008). The data collected were statistically analyzed by SPSS.18 software. Descriptive statistics and the Chi square test were used and the level of significance was set as $p < 0.05$.

Results: Prevalence of ECC was 91% (823/904). 62.1% (561/904) of the children suffered severe ECC with a mean dmft = 6.45 (SD±4.25). The severity of ECC was lower in children whose mothers had higher levels of education ($p < 0.001$). The lower and medium income level was associated with higher ECC ($p < 0.001$). The educational level of the mother and family income level had a statistically significant correlation with dmft index ($p < 0.001$).



Konkluzione: Prevalenca e kariesit të fëmijërisë së hershme dhe vlera mesatare e indeksit dmft janë shumë të larta në fëmijët parashkollorë të Tiranës. Rezultatet e këtij studimi konfirmojnë lidhjen statistikisht sinjifikante midis kariesit të fëmijërisë së hershme dhe statusit socio-ekonomik. Për fëmijët e moshës parashkollorë, të cilët jetojnë në familje me nivel ekonomik të ulët duhet të ofrohen mundësi për të patur më tepër akses në shërbimin publik dentar.

Fjalët kyç: kariesi i fëmijërisë së hershme, statusi socio-ekonomik, fëmijët parashkollorë, Tiranë

HYRJE

Kariesi i fëmijërisë së hershme, i njohur në literaturë si Early Childhood Caries (ECC), është një formë destruktive e kariesit që prek sistemin dentar të përkohshëm dhe mund të shfaqet te fëmijët fare të vegjël menjëherë sapo dhëmbët të erruptojnë [1, 2]. Karakteristika dalluese e kariesit në këtë moshë është së ai prek fillimisht një numër të kufizuar dhëmbësh dhe nëse nuk trajtohet në kohë përhapet me shpejtësi në të gjithë dhëmbët e përkohshëm [3]. Sisteme të ndryshme janë përdorur për të klasifikuar kariesin e fëmijërisë së hershme [4, 5]. Sistemi më i përdorshëm i klasifikimit të ECC është ai i përcaktuar në vitin 2008 nga AAPD [6]. Sipas këtij klasifikimi kemi tre forma të kariesit të fëmijërisë së hershme:

ECC e lehtë - prania e një ose më shumë dhëmbëve të prishur, mbushur ose hequr për shkak të kariesit në fëmijët nën 6 vjeç; dmft < 4 në fëmijët 3 vjeç, dmft < 5 në fëmijët 4 vjeç ose dmft < 6 në fëmijët 5 vjeç.

ECC e rëndë - prania e lezioneve karioze si sipërfaqe të zbutura në fëmijët nën 3 vjeç; prania e një ose më shumë dhëmbëve anteriorë maksilarë të prishur, mbushur ose hequr për shkak të kariesit në fëmijët 3-5 vjeç; dmft ≥ 4 në fëmijët 3 vjeç, dmft ≥ 5 në fëmijët 4 vjeç ose dmft ≥ 6 në fëmijët 5 vjeç. *ECC maksilare* - prania e një ose më shumë dhëmbëve anteriorë maksilarë të prishur, mbushur ose hequr për shkak të kariesit në fëmijët nën 6 vjeç.

Statusi Socio-Ekonomik (SES) tregon nivelin arsimor, nivelin e të ardhurave dhe punësimin e një individi të vetëm apo një grupi individësh [7, 8]. Individët me SES të ulët kanë disavantazhe sociale dhe financiare që ulin mundësinë për t'u kujdesur për veten, për të marrë shërbimin cilësor profesional dhe për të jetuar në një ambient të shëndetshëm. Këta individë janë të prirur të neglizhojnë problemet e shëndetit oral, nevojën për përkujdesje dhe parandalim për veten dhe fëmijët e tyre. Gjithashtu niveli i ulët arsimor ndikon në rritjen e

Conclusions: The prevalence of ECC and the mean dmft are very high in preschool children of Tirana. The results show significant association between early childhood caries and socio-economic status. For preschool children who live in households with low income level, should be offered better opportunities for access to public dental service.

Keywords: early childhood caries, socio-economic status, preschool children, Tirana

INTRODUCTION

Early Childhood Caries, known in the literature as ECC is a destructive form of caries that affects the primary teeth and may be present in children of very young age, as early as teeth erupt [1, 2]. The distinctive characteristic of caries in this age is that it affects initially a limited number of teeth which if not treated in time spread rapidly across all deciduous teeth [3]. Different systems are used to classify early childhood caries [4, 5]. The system most commonly used to classify ECC is the system determined in 2008 by AAPD [6]. According to this classification there are three forms of ECC:

Simple ECC - the presence of one or more cavitated, filled or removed teeth due to decay in children under 6 years; dmft <4 in children 3 years old, dmft <5 in children 4 years old or dmft <6 in children 5 years old.

Severe ECC – the presence of carious lesions as tender surfaces in children under 3 years; the presence of one or more maxillary anterior teeth that are cavitated, filled or removed due to caries in children 3 to 5 years; dmft ≥ 4 in children 3 years old, dmft ≥ 5 in children 4 years or dmft ≥ 6 in children 5 years old.

Maxillary ECC - the presence of one or more of the maxillary anterior teeth that are cavitated, filled or removed due to decay, in children under 6 years old.

Socio-Economic Status (SES) shows the level of education, level of income and employment of a single individual or group of individuals [7, 8]. Individuals with low SES have social and financial disadvantages that reduce their ability to take care of themselves, get professional quality service and live in a healthy environment. These individuals are likely to neglect oral health problems, the need for care and prevention for themselves and their children. Low level of education also increases the prevalence of dental ca-



prevalencës së kariesit dentar [9,10]. SES i ulët ndikon në rritjen e nivelit të riskut për ECC [11, 12]. Kariesi i fëmijërisë së hershme është më i përhapur te fëmijët e lindur nga nëna beqare, që jetojnë në varfëri ose në kushte të këqija ekonomike apo që kanë prindër me nivel të ulët arsimor, sidomos nënat e pashkolluara dhe analfabete [13]. Kujdesi i nënës ndikon drejtpërdrejtë në shëndetin oral të fëmijës dhe në nivelin e dmft [14]. Fëmijët e kequshqyer gjatë periudhës pre, peri ose post natale dhe ata me peshë më të ulët të lindjes kanë risk më të lartë për të pasur dhëmbë me difekte të mineralizimit, të cilët preken më lehtë nga kolonizimi i streptokokut mutans dhe kariesi i fëmijërisë së hershme [15]. Rritja e urbanizimit dhe ndryshimet e shpejta në konsumin ushqimor janë ndoshta faktorët që kontribuojnë në përkeqësimin e shëndetit dentar në vendet në zhvillim [16]. Prevalenca e kariesit në vendet e zhvilluara është rreth 1-2%, ndërsa në vendet në zhvillim dhe në disa komunitete të paintegruara të vendeve të zhvilluara, prevalenca rritet deri në 70% [17]. Prevalenca e kariesit në moshën parashkollore ka pësuar një rënie në shumicën e vendeve të zhvilluara [18, 19]. Ndërsa në vendet në zhvillim dhe disa prej vendeve të zhvilluara ka një tendencë në rritje [20, 21].

QËLLIMI

Qëllimi i këtij studimit është të përcaktojë prevalencën dhe ashpërsinë e kariesit të fëmijërisë së hershme në fëmijët parashkollore dhe të vlerësojë lidhjen e ECC me statusin socio-ekonomik.

MATERIALI DHE METODA

Ky studim epidemiologjik i tipit kros-seksional është kryer në qytetin e Tiranës që është kryeqyteti i Shqipërisë. 6 nga 42 kopshtet publike u selektuan rastësisht sipas metodës së përzgjedhjes me probabilitet proporcional me madhësinë. Sipas llogarive të madhësisë së kampionit, madhësia minimale e mostrës për këtë studim ishte 734, por kampioni përfundimtar i këtij studimi kishte një madhësi më të madhe se sa minimumi i kërkuar. Në këtë studim u përfshinë fëmijët 3-5 vjeç (n=904), të cilët ishin të pranishëm në kopshtet përkatëse në ditën e ekzaminimit, nuk refuzuan të ekzaminoheshin dhe kishin dorëzuar pyetësorin e plotësuar nga prindërit. Ky studim u realizua me miratimin e marë në Drejtorinë Arsimore Rajonale të Tiranës dhe konsentit të prindërve. Mbledhja e të dhënave për këtë studim u krye nëpërmjet pyetësorëve të strukturuar të plotësuar nga prindërit dhe ekzaminimit intraoral të fëmijëve.

ries [9, 10]. Low SES increases the level of risk for ECC [11,12]. Early childhood caries is most prevalent among children born to single mothers, who live in poverty or in poor economic conditions or whose parents have low levels of education, especially among the uneducated and illiterate mothers [13]. Mother's care directly affects the child's oral health and level of dmft [14]. Malnourished children during the pre, peri or post natal period and those with lower weight birth run a higher risk of having teeth with defect of mineralization, which are more easily affected by colonization of streptococcus mutans and early childhood caries [15]. Increasing urbanization and the rapid changes in food consumption are probably the factors that contribute to the deterioration of dental health in developing countries [16]. The prevalence of caries in developed countries is around 1-2%, while in developing countries and in some communities within the developed countries, the prevalence increases up to 70% [17]. Prevalence of caries in preschool children has declined in most of developed countries [18, 19]. While developing countries and in some cases even some developed countries, show a growing tendency [20, 21].

AIM

The aim of the study was to determine the prevalence and severity of early childhood caries among the preschool children and to evaluate association of ECC with socio-economic status.

MATERIALS AND METHODS

This was a cross-sectional study conducted in Tirana city, the capital of Albania.

6 out of 42 public kindergartens were randomly selected. Kindergartens were grouped as clusters. A cluster sampling technique was used for sample selection. Sample size calculation was determined at 734 participants, but a higher number of children 3 to 5 years old (n=904) participated in this study. These children were present in kindergartens on the day of examination, did not refused examination and had submitted the questionnaire completed by parents. Permission was given by the Tirana Directorate of Education and a parental consent form. Information for this study was obtained through structured questionnaires completed by parents and intraoral examination of children. The questionnaire intended to collect information on socio-economic status of



Pyetjet e pyetësorit kërkonin informacion në lidhje me disa të dhëna të rëndësishme si statusi socio-ekonomik i nënës ose kujdestarit, mënyra e ushqyerjes, higjiena orale dhe kujdesi për shëndetin oral. Statusi socio-ekonomik i nënës ose kujdestarit ka të bëjë me arsimimin dhe nivelin ekonomik. Arsimimi lidhet me shkollimin dhe është paraqitur në 5 nivele, nga arsimimi i ulët deri tek ai pasuniversitar. Niveli ekonomik është përcaktuar në 3 nivele, në dorë të zgjedhjes së atyre që plotësojnë pyetësorin me mundësi klasifikimi të nivelit ekonomik të familjes së tyre si më të ulët, mesatar apo më të lartë në krahasim me familjet e tjera shqiptare.

Ekzaminimi, diagnostikimi dhe regjistrimi u krye sipas kriterëve të OBSH [22]. Format e ECC u përcaktuan në bazë të vlerave të dmft, sipas klasifikimit të AAPD [6]. Ekzaminimi intraoral i fëmijëve u krye nga dy ekzaminues. Trajnimi dhe kalibrimi i ekzaminuesve u krye nëpërmjet një seance provë me një numër të kufizuar fëmijësh ($n=20$). Ekzaminimi klinik u krye me instrumenta plastike njëpërdorimshme dhe si burim drite u përdor llambë dore led që u fokusua në kavitetin oral. Gjatë ekzaminimit fëmijët u ulën në karrige përballë ekzaminuesit duke përdorur metodën knee-to-knee position. Në rastet e fëmijëve më të vegjël u përdor metoda lap-to-lap position, ku fëmija qëndron në pozicion të shtrirë në prehrin e edukatores që ulet në karrige përballë ekzaminuesit.



Figura 1. Paraqitja klinike e ECC te fëmijët e studimit tonë

Për të vlerësuar besueshmërinë e ekzaminimit, një pjesë e fëmijëve ($n=96$) u riekzaminuan nga ekzaminuesi i dytë dhe të dhënat u rregjistruan për të llogaritur indeksin Kappa për krahasimin e vlerave të indeksit dmft në bazë të interpretimit sipas Landis dhe Koch [23]. Analiza statistikore u realizua në programin SPSS.18. Modeli i përgjithshëm linear u përdor për llogaritjen e vlerave mesatare të indekseve. Për të gjithë treguesit u llogaritën vlerat mesatare dhe intervalet përkatëse të besimit 95%. Të dhënat u analizuan përmes statistikes deskriptive dhe testit Hi Katror. Në të gjitha rastet, u konsiderua statistikisht sinjifikative një vlerë e $p<0.05$.

the mother or custodian, feeding habits, oral hygiene and oral health care. The socio-economic status of the mother or custodian is related to education and economic status. Education is related to the years of studies and is presented in 5 levels, starting from primary to postgraduate education. The economic status is presented in 3 levels, depending on the choice of those who complete the questionnaire with the possibility of classifying the economic status of their family as lower, average or higher compared to other albanian families.

Screening, diagnosis and recording of the subjects in this study were obtained according to WHO criteria [22]. The severity of ECC was assessed using dmft, according to classification of AAPD [6]. Intraoral examination of children was carried out by two examiners. Training and calibration was performed by two examiners through a test session with a limited number of children ($n = 20$). Clinical examination was performed with single use instruments and a LED flashlight was used as the light source, focusing on the oral cavity. During the examination children sat in a chair opposite the examiner using the method knee-to-knee position. In the case of younger children lap-to-lap position method was used, where the child is in a position lying in the lap of a teacher who sits in the chair opposite from the examiner.



Figure 1. Clinical presentation of children with ECC in our study

To assess the credibility of the examination, some of the children ($n = 96$), were re-examined by a second examiner and the data was registered to calculate the Kappa index for comparing dmft index values based on the interpretation by Landis and Koch [23]. All the data were analysed by SPSS.18 software. The general linear model was used to calculate the average values of the indexes. Average values and respective confidence interval 95% were calculated for all indicators. Descriptive statistics and the Chi square test were used and the level of significance was set as $p<0.05$.



REZULTATET

Nga 1223 fëmijë të regjistruar në kopshtet e përfshira në studim, 978 (79.9%) prindër dorëzuan pyetësozin e plotësuar dhe dhanë konsentin për ekzaminimin intraoral të fëmijëve. 923 (94.3%) fëmijë ishin të pranishëm në kopshtet ditë e ekzaminimit dhe vetëm 19 (2.05%) fëmijë refuzuan ekzaminimin. Në total 904 fëmijë (50.2% djem dhe 49.8% vajza) pranuan ekzaminimin intraoral. Indeksi Kappa (koeficienti i përputhjes përtej shansit) midis dy ekzaminuesve të përfshirë në studim ishte 0.802, që do të thotë se ekzaminimi ishte i besueshëm. Prevalenca e ECC ishte 91% (823/904). Pjesa më e madhe e fëmijëve 62.1% (561/904) vuanin formën e rëndë të ECC dhe vlera mesatare e indeksit dmft ishte 6.45 (SD±4.25).

Tabela 1 paraqet shpërndarjen e subjekteve të studimit sipas karakteristikave socio-ekonomike të tyre. Nga të dhënat rezulton se pjesa më e madhe e fëmijëve kishin nëna me arsim të lartë (40.8%), rreth 33% e fëmijëve kishin nëna me arsim të mesëm, 3% e fëmijëve kishin nëna me arsim të ulët dhe rreth 14% e fëmijëve kishin nëna me arsim pasuniversitar. Përsa i përket nivelit ekonomik përkatës të familjeve të fëmijëve që u përfshinë në studim, vihet re se pjesa më e madhe e tyre, pra rreth 80%, kishin nivel ekonomik mesatar, krahasuar me rreth 11% të cilët raportuan nivel të ulët ekonomik dhe 9.5% kishin nivel ekonomik të lartë.

Tabela 1. Shpërndarja e subjekteve të studimit sipas SES

| Variabli | Numri | Përqindja |
|-------------------------|-------|-----------|
| Arsimi i nënës: | | |
| I ulët | 28 | 3.1 |
| Tetëvjeçar | 85 | 9.4 |
| I mesëm | 298 | 33.0 |
| I lartë | 369 | 40.8 |
| Pasuniversitar | 124 | 13.7 |
| Niveli ekonomik: | | |
| I ulët | 102 | 11.3 |
| I mesëm | 716 | 79.2 |
| I lartë | 86 | 9.5 |

Tabela 2 paraqet shpërndarjen e ECC sipas nivelit arsimor të nënave të fëmijëve të përfshirë në studim, ku raportohet se ashpërsia e kariesit të fëmijërisë së hershme ishte më e ulët në fëmijët, nënat e të cilave kanë nivel të lartë arsimor ($p < 0.001$).

RESULTS

From an enrolment of 1223 children, 978 parents submitted the questionnaire and gave consent for dental examination (79.9% parental response rate). 923 (94.3%) children were present in kindergartens on the day of examination and only 19 (2.05%) children refused examination. In total 904 children (50.2% boys and 49.8% girls) completed the oral examination.

The Kappa statistic for intra-examiner reliability (caries experience) was 0.802. Prevalence of ECC was 91% (823/904). 62.1% (561/904) of the children suffered severe ECC with a mean dmft = 6.45 (SD±4.25).

Table 1 shows the distribution of study subjects according to their socio-economic characteristics. Most of the children (40.8%), had mothers with higher education, 33% of children had mothers with secondary education, only 3% of children had mothers with elementary education and about 14% of children had mothers with postgraduate education. Regarding the income level, the respective families of children who were involved in the study, most of them (80%) had an average income level, compared with 11% who reported low levels of income and 9.5% had higher income levels.

Table 1. Distribution of subjects based on SES

| Variable | Number | Percentage |
|----------------------------|--------|------------|
| Mother's education: | | |
| Elementary | 28 | 3.1 |
| Middle school | 85 | 9.4 |
| High school | 298 | 33.0 |
| College | 369 | 40.8 |
| Postgraduate | 124 | 13.7 |
| Income level: | | |
| Low | 102 | 11.3 |
| Average | 716 | 79.2 |
| High | 86 | 9.5 |

Table 2 presents the ECC distribution by education level of mothers of children involved in the study, which noted that the severity of early childhood caries was lower in children whose mothers have higher levels of education ($p < 0.001$).



Tabela 2. Shpërndarja e ECC sipas arsimit të nënës së subjekteve të studimit

| Variabli | Pa ECC | ECC e lehtë | ECC e rëndë | ECC maksimale | Vlera e p |
|---------------------|-----------|-------------|-------------|---------------|---------------|
| I ulët | 0 (0.0) | 1 (0.7) | 4 (1.0) | 1 (0.9)* | |
| Tetëvjeçar | 0 (0.0) | 1 (0.7) | 21 (5.1) | 0 (0.0) | |
| I mesëm | 7 (11.9) | 27 (18.4) | 158 (38.1) | 26 (46.6) | |
| I lartë | 40 (67.8) | 90 (61.2) | 171 (41.2) | 26 (46.6) | $p < 0.001$ § |
| Pasuni- versitar | 12 (20.3) | 28 (19.0) | 61 (14.7) | 3 (5.4) | |

§ Vlera e p-së sipas testit Hi Katror.

* Numrat absolutë dhe përqindjet në kllapa.

Në tabelën 3 raportohet se sa më i lartë niveli ekonomik i familjeve të fëmijëve të përfshirë në studim, aq më i ulët edhe niveli i ECC dhe ashpërsisë së tij ($p < 0.001$).

Tabela 3. Shpërndarja e ECC sipas nivelit ekonomik të subjekteve të studimit

| Variabli | Pa ECC | ECC e lehtë | ECC e rëndë | ECC maksimale | Vlera e p |
|----------|-----------|-------------|-------------|---------------|---------------|
| I ulët | 3 (5.2) | 8 (5.5) | 73 (17.9) | 3 (5.4)* | |
| I mesëm | 42 (72.4) | 121 (82.9) | 308 (75.7) | 48 (85.7) | |
| I lartë | 13 (22.4) | 17 (11.6) | 26 (6.4) | 5 (8.9) | $p < 0.001$ § |

§ Vlera e p-së sipas testit Hi Katror.

* Numrat absolutë dhe përqindjet në kllapa.

Tabela 4 paraqet shoqërimin e indeksit dmft me karakteristikat socio-ekonomike të familjeve të fëmijëve të përfshirë në studim. Niveli arsimor i nënës dhe niveli ekonomik i familjes kishte lidhje sinjifikante statistikore me indeksin dmft ($p < 0.001$).

Table 2. Distribution of ECC by mother's education in the study subjects

| Variable | No ECC | Simple ECC | Severe ECC | Maxillary ECC | p-value |
|---------------|-----------|------------|------------|---------------|---------------|
| Elementary | 0 (0.0) | 1 (0.7) | 4 (1.0) | 1 (0.9)* | |
| Middle school | 0 (0.0) | 1 (0.7) | 21 (5.1) | 0 (0.0) | |
| High school | 7 (11.9) | 27 (18.4) | 158 (38.1) | 26 (46.6) | |
| College | 40 (67.8) | 90 (61.2) | 171 (41.2) | 26 (46.6) | $p < 0.001$ § |
| Post-graduate | 12 (20.3) | 28 (19.0) | 61 (14.7) | 3 (5.4) | |

§ The value of p according to Chi square test.

* Absolute numbers and percentages in parentheses.

Table 3 reports that the higher the income level of the families of the children involved in the study, the lower the level of ECC and its severity ($p < 0.001$).

Table 3. Distribution of ECC based on the income level of study subjects

| Variable | No ECC | Simple ECC | Severe ECC | Maxillary ECC | p-value |
|----------|-----------|------------|------------|---------------|---------------|
| Low | 3 (5.2) | 8 (5.5) | 73 (17.9) | 3 (5.4)* | |
| Medium | 42 (72.4) | 121 (82.9) | 308 (75.7) | 48 (85.7) | |
| High | 13 (22.4) | 17 (11.6) | 26 (6.4) | 5 (8.9) | $p < 0.001$ § |

§ The value of p according to Chi square test.

* Absolute numbers and percentages in parentheses.

Table 4 represents the association of dmft index with socio-economic characteristics in the families of children involved in the study. It was noted that the educational level of the mother and family income level had a statistically significant correlation with dmft index ($p < 0.001$).



Tabela 4. Shoqërimi i indeksit dmft me karakteristikat socio-ekonomike

| Variabli | Vlera mesatare | 95% CI | Vlera e p |
|-------------------------|----------------|----------|-------------------------|
| Arsimi i nënës: | | | $p < 0.001(4) \ddagger$ |
| I ulët | 6.3 | 3.0-9.7 | $p = 0.742^*$ |
| Tetëvjeçar | 9.6 | 7.9-11.3 | $p < 0.001$ |
| I mesëm | 7.9 | 7.2-8.4 | $p < 0.001$ |
| I lartë | 5.9 | 5.1-6.0 | $p = 0.727$ |
| Pasuniversitar | 5.8 | 4.9-6.6 | referencë |
| Niveli ekonomik: | | | $p < 0.001(2)$ |
| I ulët | 9.3 | 8.5-10.2 | $p < 0.001$ |
| I mesëm | 6.2 | 5.9-6.6 | $p < 0.001$ |
| I lartë | 4.3 | 3.3-5.4 | referencë |

*Vlera e p-së sipas modelit linear të përgjithshëm.

‡Vlera e përgjithshme e p-së dhe shkallët e lirisë në kllapa.

DISKUTIME

Nga rezultatet e studimit tonë u raportua se prevalenca e kariesit të fëmijërisë së hershme në fëmijët 3-5 vjeç në kopshtet publike të qytetit të Tiranës ishte 91%, një vlerë kjo shumë e lartë duke patur parasysh se bëhet fjalë për kryeqytetin e vendit tonë. Nga të dhënat krahasuese të literaturës, vihet re se indeksi dmft=6.45 në studimin tonë është në shifra shumë më të larta se shumica e studimeve të autorëve të ndryshëm, përveç Philippines që ka një indeks në vlerë më të lartë dmft=9.8 [24] dhe Kosovës që ka një indeks gati sa dyfishi i vlerës së indeksit tonë dmft =12.5 [25].

Niveli arsimor dhe ai ekonomik janë faktorë sinjifikant pasi nga rezultatet e studimit tonë raportohet se përhapja dhe ashpërsia e kariesit të fëmijërisë së hershme është më e ulët në fëmijët nënat e të cilave kanë nivel të lartë arsimor dhe familjet e të cilëve kanë nivel ekonomik të lartë. Gjithashtu u vu re se niveli arsimor i nënës dhe niveli ekonomik i familjes rezultoi të ketë lidhje sinjifikante statistikore dhe me indeksin dmft që ishte më i ulët te fëmijët me status më të lartë socio-ekonomik. Këto të dhëna përkojnë dhe me shumë studime të literaturës që tregojnë një lidhje të ngushtë midis statusit socio-ekonomik dhe kariesit të fëmijërisë së hershme [8, 11, 26, 27, 28, 29, 71]. Niveli i ulët arsimor i nënës ndikon në mungesën e informimit dhe kujdesit për shëndetin oral të fëmijës [8, 10, 26]. Po ashtu prindërit me nivel ekonomik të ulët kanë disavantazhe sociale dhe financiare që ulin mundësinë për të jetuar në një ambient të shëndetshëm dhe për të marrë shërbimin cilësor profesional. Këta individë janë të prirur të neglizhojnë problemet e shëndetit oral, nevojën për përkujdesje dhe parandalim për veten dhe fëmijët e tyre [10, 11, 29, 30, 31].

Table 4. Association of dmft index with socio-economic characteristicse

| Variable | Average value | 95% CI | p - value |
|----------------------------|---------------|----------|-------------------------|
| Mother's education: | | | $p < 0.001(4) \ddagger$ |
| Elementary | 6.3 | 3.0-9.7 | $p = 0.742^*$ |
| Middle school | 9.6 | 7.9-11.3 | $p < 0.001$ |
| High school | 7.9 | 7.2-8.4 | $p < 0.001$ |
| College | 5.9 | 5.1-6.0 | $p = 0.727$ |
| | 5.8 | 4.9-6.6 | referencë |
| Income level: | | | $p < 0.001(2)$ |
| Low | 9.3 | 8.5-10.2 | $p < 0.001$ |
| Medium | 6.2 | 5.9-6.6 | $p < 0.001$ |
| High | 4.3 | 3.3-5.4 | referencë |

*The value of p by general linear model.

‡ The total value of p and degrees of freedom are in parentheses.

DISCUSSION

The results of our study reported that the prevalence of early childhood caries in children 3-5 years in public kindergartens in Tirana city was 91%, a value that is very high considering that Tirana is the capital city of Albania. The average value of dmft=6.45 was much higher than in the majority of studies carried out by various authors, with the exception of Philippines which had a higher dmft=9.8 [24] and Kosovo nearly double the value dmft =12.5 [25].

Educational level and economic factors were significant factors, as the results of our study reported the prevalence and severity of early childhood caries was lower in children whose mothers had a higher educational level and whose families had higher income. It was also noted that the mother's education level and family's economic status had a statistically significant correlation with the dmft index which was lower in children with higher socio-economic status. These data match the literature studies that showed a close association between socio-economic status and early childhood caries [8, 11, 26, 27, 28, 29, 71]. The low educational level of the mother affected the lack of information and oral health care for children [8, 10, 26]. Also parents with low income level had social and financial disadvantages that reduced their ability to live in a healthy environment and get professional quality service. These individuals are likely to neglect oral health problems, the need for care and prevention for themselves and their children [10, 11, 29, 30, 31].



KONKLUZIONE

Prevalenca e kariesit të fëmijërisë së hershme në fëmijët parashkollorë të Tiranës është shumë e lartë (91%) dhe pjesa më e madhe e fëmijëve (62.1%) vuajnë formën e rëndë që tregon ashpërsinë e madhe të ECC. Vlera mesatare e lartë e indeksit dmft 6.45 (SD±4.25) tregon një nivel të lartë të eksperiencës karioze. Rezultatet e këtij studimi tregojnë lidhjen statistikisht sinjifikante midis kariesit të fëmijërisë së hershme dhe statusit socio-ekonomik. Hartimi i strategjive parandaluese drejtuar komunitetit është një nevojë emergjente për përmirësimin e shëndetit oral të fëmijëve parashkollorë në vendin tonë. Për fëmijët e moshës parashkollorë, të cilët jetojnë në familje me nivel ekonomik të ulët duhet të ofrohen mundësi për të patur më tepër akses në shërbimin publik dentar.

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CONCLUSIONS

The prevalence of early childhood caries in preschool children of Tirana is very high (91%) and the majority of children (62.1%) suffer severe ECC that indicates the gravity of this condition. The average value of the dmft index of 6.45 (SD ± 25.4) shows a high level of caries experience. The results show significant association between early childhood caries and socio-economic status. To prevent ECC, some preventive strategies should be drawn up as soon as possible. For preschool children who live in households with low income level, should be offered better opportunities for access to public dental service.

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QËNDRUESHMËRIA E NGJYRËS NË PROTEZAT TOTALE TË POLIMERIZUARA ME DY TEKNIKA TË NDRYSHME

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COLOR STABILITY IN COMPLETE DENTURES POLYMERIZED WITH TWO DIFFERENT TECHNIQUES

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ABSTRAKT

Hyrje. Megjithëse dhëmbët artificialë janë në dukje më të rëndësishëm, ndryshimi i ngjyrës së bazës së protezave ka të njëjtën vlerë, bazuar në disa parametra, një prej të cilave është qëndrueshmëria e ngjyrës. Stabiliteti i ngjyrës është një parametër i rëndësishëm për pacientët e protezuar me proteza totale të lëvizshme.

Qëllimi i këtij studimi ishte vlerësimi i qëndrueshmërisë së ngjyrës midis dy llojeve të ndryshme të protezave: 1. Protezave të konstruara me teknikën e injektimit të rezinës dhe 2. Protezave të konstruara me metodën tradicionale.

Materialet dhe metoda. Protezat u ruajtën në tre solucione të ndryshme: salivë artificiale + çaj, salivë artificiale + kafe dhe salivë artificiale.

Rezultatet. Ndryshimi i ngjyrës u vlerësua duke përdorur një spektrofotometër. Grupi i protezave të konstruara nëpërmjet metodës me injeksion tregoi më pak ngjyrosje në krahasim me protezat e formuara me metodën tradicionale. Solucioni që shkaktoi më shumë ngjyrosje ishte çaji.

Konkluzione. Bazuar në këtë studim mund të konkludohet se protezat të cilat janë ndërtuar me teknikën e injektimit treguan një shkallë më të lartë të qëndrueshmërisë së ngjyrës në krahasim me protezat e ndërtuara me teknikën tradicionale.

Fjalët kyçe: Stabiliteti i ngjyrës, protezat totale, solucionet.

HYRJE:

Materiali i zgjedhjes për konstruktimin e protezave totale është polimetil-metakrilati (PMMA) që nga viti 1940¹⁻³. PMMA ka shumë përparësi, por ka edhe disa disavantazhe si tkurrja dimensionale dhe qëndrueshmëria e ngjyrës, e cila është akoma një parametër kontradiktor⁴⁻⁸. Stabiliteti i ngjyrës është

ABSTRACT

Introduction. Although the artificial teeth seem to be more important, the change of color in the denture base has the same value regarding several components, one of them is color stability. Color stability is an important parameter for the complete denture wearing patients.

The purpose of this study was to evaluate the color stability between two types of dentures: 1. Dentures constructed with injection molding technique and 2. Dentures constructed with compression molding method.

Materials and methods. The dentures were stored in three different solutions: artificial saliva+tea, artificial saliva+coffee and artificial saliva.

Results. The color change was determined using a spectrophotometer. The group of dentures made of acrylic resin with the injection molding method showed less coloration compared to the dentures with the compression molding method. The solution that caused more coloration was tea.

Conclusions. Based on this study it can be concluded that the dentures which are constructed with the injection molding technique show a higher grade of color stability compared to the dentures constructed with compression molding technique.

Key words: Color stability, complete dentures, solutions.

INTRODUCTION

The material of choice for the construction of complete dentures was polymethyl-methacrylate (PMMA) since 1940¹⁻³. PMMA has many advantages, but it has also several disadvantages such as dimensional shrinkage and color stability, which is still a contradictable parameter⁴⁻⁸. The stability of color is a quality that should all the restorative mate-



një cilësi që duhet të kenë të gjitha materialet restorative⁹⁻¹¹. Qëndrueshmëria e ngjyrës në dhëmbët artificialë në protezat totale është vlerësuar si një komponent i rëndësishëm. Megjithëse dhëmbët artificialë janë më të dukshëm, ndryshimi i ngjyrës së bazës së protezave shkakton probleme të rënda psikologjike në pacientët e protezuar dhe si pasojë domosdoshmërinë e ndryshimit të tyre¹²⁻¹⁴. Ngjyrosja e materialit tregon gjithashtu një material të vjetër dhe të dëmtuar. Disa parametra mund të shkaktojnë procesin e ngjyrosjes, të tilla si absorbimi i ujit, ndryshimi i pigmenteve ngjyrosëse etj. Qëndrueshmëria e ngjyrës së bazës së protezave dhe të dhëmbëve artificialë nga pije të ndryshme dhe ngjyruet të ushqimit është studiuar¹⁵. Agjentët pastrues janë të dobishëm për të siguruar një estetikë të mirë dhe për të shmangur ngjyrosjen e materialit. Akumulimi i materialit në dhëmbët artificialë ndjek të njëjtën rrugë si në dhëmbët natyrorë. Grumbullimet e vogla mund të eliminohen duke përdorur furça dhe shpëlarje, ndërsa njollat më të vështira siç janë ato nga çaji, kafeja etj janë më të vështira për t'u eliminuar¹⁶.

MATERIALE DHE METODA:

72 proteza u konstruktuan duke përdorur dy teknika të ndryshme polimerizuese: teknikën konvencionale dhe teknikën me injektim të rezinës. Ata u ndanë në dy grupe: Grupi 1: 36 proteza konvencionale, grupi i protezave të konstruktura nga teknika konvencionale; Grupi 2: 36 proteza, grupi eksperimental, grupi i protezave të konstruktura me teknikën e injektimit, me sistemin SR IVOCAP. Modelet Master u ndërtuan nga i njëjti model edentulozë prej silikoni. Kështu u krijuan 72 modele master prej allçie identike me njëri-tjetrin. Mbi modelet master, u vendosen dy fleta dylli, mbi të cilat u rreshtuan dhëmbët artificialë. Negativi i protezës së parë të dyllit u krijua nga një mostër silikoni. Mbi mostrën e silikonit, u vendosën modelet master, në hapësirën ndërmjet të cilave u derdh dylli i shkrirë. Pra protezat e dyllit u formuan me të njëjtën lartësi dhe trashësi të dyllit. I njëjti set dhëmbësh artificialë u përdor për konstruktimin e protezave prej dylli. Për grupin e parë, teknika konvencionale e muflimit dhe polimerizimit u ndoq, ndërsa për grupin e dytë teknika nëpërmjet sistemit SR-IVOCAP (Tab. 1). Cikli tradicional për polimerizimin e rezinës u ndoq. U përgatitën tre lloj solucionesh: salivë artificiale dhe çaj, salivë artificiale dhe kafe dhe salivë artificiale. Ndryshimi i ngjyrës u llogarit dhe u vlerësua. Secili grup u nda në tre grupe të vogla prej 12 protezash, bazuar në llojin e solucionit ku ata janë ruajtur: 12 proteza u ruajtën

materials have⁹⁻¹¹. The stability of the color in the artificial teeth in complete denture wearing has been recorded as an important component. Although artificial teeth are more evident, the change of color of the denture base causes severe psychologic problems in denture wearing patients and as a consequence the necessity of changing them¹²⁻¹⁴. The staining of the material shows also an old and damaged material. Several parameters might cause the staining process such as water absorption, the change of colorant pigments etc. The stability of the color of the denture base and of the artificial teeth by different drinks and food colorants has been studied¹⁵. Cleaning agents are useful to assure a good appearance and to avoid the material staining. The accumulation of the material in the artificial teeth follows the same path as in the natural teeth⁹. The small accumulations can be eliminated by using brushes and rinses, while more difficult stains such as those from tea, coffee etc. are more difficult to eliminate¹⁶.

MATERIALS AND METHODS

72 Dentures were constructed using two different polymerizing techniques: conventional molding and injection molding technique. They were divided in two groups: Group 1: 36 conventional dentures, the traditional group of dentures made by conventional molding technique; Group 2: 36 experimental group, the group of dentures made by impression molding technique, with the SR IVOCAP system. The Master stone casts were constructed by the same silicone mold. So 72 identical master stone casts with each other were created. Over the master stone casts, two layers of wax were applied, artificial teeth were arranged. The negative of the first wax denture was created by a silicone sample. Over the silicone sample all the other master stone casts were positioned on place, where melted wax was poured. So the wax dentures created had the same height and thickness of the wax. The same artificial teeth were used for the construction of the wax dentures. For the first group, conventional molding technique was followed, while for the second group the injection molding technique with the SR-IVOCAP system (Tab. 1). Traditional curing process was followed. Three type of solutions were prepared : artificial saliva and tea, artificial saliva and coffe and artificial saliva. The color change was calculated. Each group was divided into three small groups of 12 dentures, based on the solution where they were stored: 12 dentures were stored in artificial



në salivë artificiale dhe çaj, 12 proteza u ruajtën në salivë artificiale dhe kafe, 12 proteza vetëm në salivë artificiale (grupi i kontrollit). Ngjyra u mat menjëherë pas polimerizimit, pas 24 orësh dhe pas 1 jave. Pas 1 jave ku protezat u ruajtën në solucion, ato u vendosën në salivë artificiale për 15 sekonda për të hequr njollat sipërfaqësore, dhe më pas u analizua nëse kishte ndonjë njollë të errët. Spektrofotometri u përdor për të përcaktuar ndryshimin e ngjyrës. Vlerësimi statistikor i të dhënave u krye duke analizuar ndryshimet midis materialeve dhe pigmenteve ngjyrosëse.

saliva and tea, 12 dentures were stored in artificial saliva and coffee, 12 denture only in artificial saliva (the control group). The color was measured immediately after polymerization, after 24 hours and after 1 week. After 1 week of immersion the dentures were soaked in artificial saliva for 15 seconds to remove superficial stains, and then it was analyzed if it had any dark stains. Spectrophotometer was used to determine the color change. The statistical evaluation of the data was performed by analyzing the differences among materials and staining colors.

Tabela Nr. 1. Llojet e rezinës akrilike

| Rezina e bazës së protezës | Materiali | Prodhuesi |
|----------------------------|-----------------------|------------------|
| Metoda tradicionale | SR-Ivocap Triplex Hot | Ivoclar Vivadent |
| Metoda e injektimit | SR-Ivocap High Impact | Ivoclar Vivadent |

Table 1.Types of acrylic resin

| Denture base resin | Material | Manufacturer |
|--------------------|-----------------------|-----------------|
| Compression molded | SR-Ivocap Triplex Hot | IvoclarVivadent |
| Injection molded | SR-Ivocap High Impact | IvoclarVivadent |

Tabela Nr. 2. Ndryshimet e ngjyrës për grupet e testuara

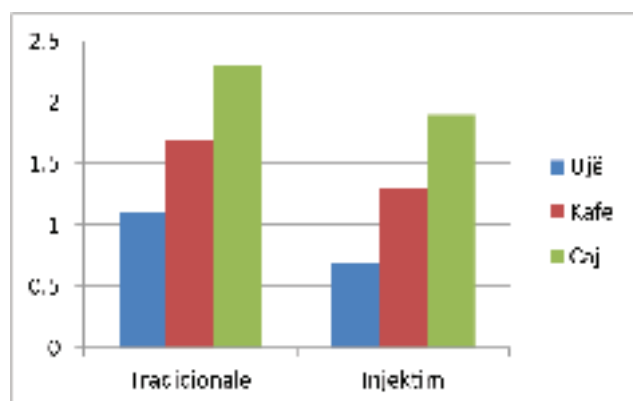
| Rezina e bazës së protezës | Solucionet | | |
|----------------------------|--------------------|------------|------------|
| | Salivë artificiale | Kafe | Çaj |
| Metoda Tradicionale | 1.1 +/- 0.2 | 1.7 +/-0.3 | 2.3 +/-0.2 |
| Metoda Injektimit | 0.7 +/- 0.1 | 1.3 +/-0.2 | 1.9 +/-0.4 |

Table 2. Color differences for the tested groups

| Denture base resin | Solutions | | |
|--------------------|-------------------|------------|------------|
| | Artificial saliva | Coffee | Tea |
| Compression | 1.1 +/- 0.2 | 1.7 +/-0.3 | 2.3 +/-0.2 |
| Injection | 0.7 +/- 0.1 | 1.3 +/-0.2 | 1.9 +/-0.4 |

Grafiku Nr. 1 : Ndryshimet e ngjyrës lidhur me solucionet e ndryshme

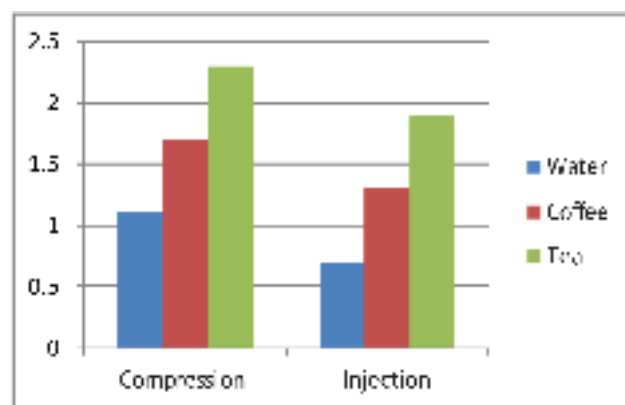
Ndryshimet e ngjyrës ΔE



Teknika e polimerizimit

Chart Nr.1 : Color change related to different solutions

Color change ΔE



Polymerization technique



REZULTATET:

Të gjitha protezat e ruajtura në kafe dhe çaj treguan një rritje në ndryshimin e ngjyrës në krahasim me ndryshimin e ngjyrës kur u ruajtën në salivë artificiale, pavarësisht nga materiali dhe teknika e përdorur. Vlera e ndryshimit të ngjyrës u përcaktua nga shkalla e ngjyrave C.I.E. L* a* b*. (Tab. Nr.2) Sasia e ndryshimit të ngjyrës është llogaritur me ΔE (Grafiku Nr.1). Ndryshimi i ngjyrës midis dy grupeve të protezave ishte statistiki i rëndësishëm. Protezat e ruajtura në çaj treguan një shkallë më të lartë ngjyrosjeje. Pas 7 ditësh protezat e konstruara me teknikën e injektimit ishin më pak të ngjyrosura nga kafeja dhe çaji në krahasim me protezat e konstruara me teknikën tradicionale (Tab.2).

DISKUTIME

Ndryshimi i dukshëm i ngjyrës në të gjitha protezat është vënë re kur ato ruhen në solucione. Sasia e ndryshimit të ngjyrës varet nga lloji i materialit i bazës së protezës dhe nga lloji i solucionit gjithashtu. Megjithatë protezat e ndërtuara nga teknika nëpërmjet injektimit treguan më pak ngjyrosje krahasuar me protezat e ndërtuara me teknikën konvencionale. Prirja e ngjyrosjes së rezinës akrilike mund të shpjegohet me vetinë e saj me absorbimin e ujit¹⁷. Kjo veti lidhet ngushtë me absorbimin e likideve me ngjyrë nga rezina akrilike. Këto likide hyjnë në përbërjen e rezinës duke zgjeruar polimerin, duke shkaktuar kështu inserimin e agjentëve ngjyruës¹⁸⁻¹⁹. Detektimi vizual i protezës së ndërtuar me teknikën e injektimit demonstroi se ato ishin më pak të ndikuara nga çngjyrosja. Protezat tradicionale pësojnë një tkurrje pas polimerizimit, e cila shkakton një hapësirë përmes të cilit pigmentet ngjyrosëse mund të kenë akses²⁰. Solucioni i çajit: Të dy llojet e protezave morën pigmentim. Kjo mendohet të ndodhë për shkak të përbërësve inorganikë të çajit²¹. Sidoqoftë, protezat e ndërtuara me teknikën e injektimit shfaqën më pak njolla krahasuar me protezat e ndërtuara me teknikën tradicionale. Solucioni i kafesë: Në të dy grupet, protezat treguan një nivel më të ulët të njollave në krahasim me solucionin e çajit.

RESULTS

All dentures stored in coffee and tea showed an increase in color change compared to the change of color when stored in artificial saliva, despite their material. The value of the color change was determined by C.I.E. L* a* b* colour scale. (Tab. Nr.2) The amount of the color difference was calculated with ΔE (Chart Nr.1). The color change between the two groups of dentures was statistically significant. Dentures stored in tea showed a higher coloration grade. After 7 days dentures constructed with the injection molding technique were less colored by coffee and tea compared to the dentures constructed with the compression molding technique (Tab. 2).

DISCUSSIONS

Significant color change in all samples were observed when they were stored in the solutions. The amount of color change depends on the type of the denture base material and on the type of the solution as well. Anyway the dentures constructed from the injection molding technique showed less staining compared to the dentures constructed with the conventional molding technique. The tendency of the staining of acrylic resin might be explained with its property to water absorption¹⁷. This property is closely related to the absorption of colored liquid by acrylic resin. These liquids enter in the resin material by expanding the polymer, by causing so the insertion of colorant agents^{18,19}. Visual detection of the denture constructed with injection molding technique showed they were less affected to discoloration. Dentures constructed with compression molding, received shrinkage after polymerization, which causes a gap through which the colorant pigments can have access.²⁰ Tea solution: Both dentures received pigmentation. This is thought to happen because of the inorganic tea components²¹. Anyway, the dentures constructed with the injection molding technique showed less staining compared to the dentures constructed with compression molding technique. Coffee solution: In both groups, the dentures showed less stainings level compared to the tea solution.



KONKLUZIONE:

Brenda limiteve të këtij studimi, mund të konkludojmë se:

1. Të gjitha protezat kishin ndryshim të ndjeshëm të ngjyrës kur u ruajtën në solucione kafe dhe çaji. Solucionet nga çaji prodhuan ngjyrosje më të lartë krahasuar me solucionin e kafesë.
2. Protezat të konstruara me injektim treguan më pak njolla krahasuar me teknikën konvencionale pas polimerizimit, pas 24 orësh dhe pas 1 jave të polimerizimit të protezave.

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CONCLUSIONS

Within the limitations of this study, we can conclude that:

1. All dentures had significant color change when stored in coffee or tea solutions. Solutions made of tea produced higher coloration compared to coffee solution.
2. Injection molding dentures showed less stains compared to the conventional molding technique after processing, after 24 hours and after 1 week of denture polymerization.

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KRAHASIMI I FORCËS PËRKULËSE NDËRMJET DY MATERIALEVE TË NDRYSHME ME BAZË PMMA

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ABSTRAKT

Hyrja. Forca perkulese eshte e rendesishme per te percaktuar forcen e punimit protetik, sidomos ne rastet kur ai eshte afat-gjate.

Qellimi. Krahasimi i forces perkulese ndermjet materialit te perkohshem me rezine vete-polimerizuese Polimetil-Metakrilatit dhe materialit restorativ te perkohshem me rezine foto-polimerizuese, Uretan-di-Metakrilatit.

Metodat. Ne studim u perfshin gjithsej 20 mostra, 10 per nga secili material. Keto mostra u ruajten ne peshtyme artificiale per 7 dite, me pas u shpelane dhe u thane. Forca perkulese u llogarit duke perdorur testin 3 pikesh ne makinën universale. Te dhenat u analizuan me t-test.

Rezultatet. Vlera mesatare e forces perkulese e mostrave te perbera nga Poli-Metilmetakrilati (134,4 MPa) ishte me e larte se sa atyre duke perdorur Uretan-diMetakrilatin (107,5 MPa).

Konkluzioni. Brenda limiteve te ketij studimi u nxor si konkluzion qe forca perkulese e Poli-Metilmetakrilatit eshte me e larte sesa e Uretil-diMetakrilatit. Polimetil-Metakrilati mund te sherbeje si nje punim restorativ i perkohshem me i mire sidomos per nje periudhe te gjate kohore ose ne rastet e parafunksioneve.

Fjalet kyce: materiale provizore, forca perkulese, mostra.

HYRJA

Nje restaurim provizor i mire duhet te plotesoje keto kushte: Te mbroje pulpen dentare, te kete pershtatje te mire marginale, te ruaje qendrushmerine e pozicionit, te kene qendrushmeri dimensionale, te realizoje funksionin okluzal, te kete force dhe retension, te jete lehtesisht i pastrueshem dhe te sigurojne estetiken.^{1,2} Gjate funksionit, punimet provizore duhet te perballojne

THE COMPARISON OF FLEXURAL STRENGTH BETWEEN TWO DIFFERENT PMMA BASED MATERIALS

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ABSTRACT

Introduction. Flexural strength is important to define the strength of prosthetic construction, especially in a long term one.

The aim: The comparison of flexural strength between two restorative provisional materials: polymethyl methacrylate and urethane dimethacrylate.

Methods: In this study were included 20 specimens, 10 for each group. These specimens were stored in artificial saliva for 7 days, then they were rinsed and dried. Flexural strength were calculated by using 3 point test in the universal machine. The data were analyzed with t-test. Results. The average value of flexural strength of specimens made of polymethyl methacrylate (134,4 MPa) was higher than the flexural strength of specimens made of urethane dimethacrylate (107,5 Mpa).

Conclusions. Inside the limits of this study we could conclude: the flexural strength of Polymethyl Methacrylate is higher than the flexural strength of urethane dimethacrylate. Polymethyl methacrylate can be used as a better provisional restorative for a long period of time, for long span prostheses or in patients with parafunctional habits.

Key words: provisional materials, flexural strength, specimens.

INTRODUCTION.

A good provisional restoration should fulfil these criteria: protect dental pulp, good marginal adaptability, to keep the position stability, realize occlusal function, force and retention, easily cleaned and good esthetic.^{1,2} During the function temporary restoration should face occlusal forces without breaking or move. This is very important in long-time provisional restorations, long span bridges, during restorative phase of reconstruc-



forcat pertypese pa u thyer ose zhvendosur. Kjo behet shume e rendesishme sidomos ne punime provizore afatgjata, ne ura me numer te madh elementesh, gjate fazes restorative te procedurave rikonstruktive te implanteve, ne rastet e nje pacienti me parafunksione.^{3,4,5} Nje nga karakteristikat e vetive mekanike te materialeve eshte forca perkulëse. Forca perkulëse eshte aftesia e materialit per ti rezistuar nje ngarkese te caktuar pa u thyer apo u deformuar. Nga ana kimike kemi dy grupe kryesore: 1. Rezinat Metakrilate ku hyjne metilmetakrilati, etilmetakrilati, vinilmetakrilati, butilmetakrilati. 2. Rezinat Kompozite : bis-GMA, bis-akriliket, uretan-dimetakrilati. Forca perkulëse e punimeve provizore varion brenda materialit, materialeve te nje klase kimik, ndermjet klasave te ndryshme kimike. Ne baze te menyres se polimerizimit i ndajme: rezine vetepolimerizuese, rezina polimerizuese me nxehtesi, rezina fotopolimerizuese, rezine duale (me drite ose me nxehtesi)^{6,7}. Klinikistet tipikisht zgjedhin nje produkt duke u nisur nga lehtesia e manipulimit, cmimi, estetika. Kur fortesia eshte primare, eshte e dobishme te njihet cili material siguron nje punim provizor me rezilient. Prandaj u realizua nje studim per te krahasuar forcen perkulëse ndermjet materialeve te perkohshem: rezines vetepolimerizuese, polimetil metakrilatit dhe rezines fotopolimerizuese, uretan dimetakrilatit.

QELLIMI

Qellimi i ketij studimi eshte krahasimi i forces perkulëse ndermjet dy materialeve te perkohshme. Pra nepermjet konkluzioneve te ketij studimi, mjeket stomatologe mund te zgjedhin cili eshte materiali me rezistent ndaj thyerjes apo deformimit, sidomos ne raste te vecanta klinike si psh. ne rastet e nje ure me numer te madh elementesh, ne rastet e nje pacienti me parafunksione si psh. ne rastet e nje bruksizmi apo ne fazat restorative te implanteve, ku kerkohet mbajtja e nje punim fiks provizor per nje kohe te gjate.

MATERIALET DHE METODA

Ne kete studim u zgjodhen dy lloje rezinash bazuar ne: menyren e polimerizimit dhe ne menyren e manipulimit. U prodhuan gjithsej 20 mostra, 10 mostra per secilin grup materialesh (fig.1). Te gjitha mostrat u formuan ne baze te intruksioneve te prodhuesit dhe procedurave standarte. Grupi 1- Rezine vetepolimerizuese e cila permban PMMA, Grupi 2- Rezine fotopolimerizuese e cila permban UDMA. Metoda me te cilen te dhenat statistikore u perpunuan eshte student "t" test.

tive procedures over implants or in patients with parafunctional habits.^{3,4,5} One of the mechanical properties of materials is flexural strength. Flexural strength is the ability of material to resist a certain load without breaking or being damaged. Regarding the chemical qualities, there are two main groups: 1. Methacrylate Resins where are included: methyl methacrylate, ethyl methacrylate, vinyl methacrylate, butyl; methacrylate. 2. Composite Resins: bis-GMA, bis-acrylics, urethane dimethacrylate. Flexural strength of provisional restorations are different in one material, inside one chemical class and between different chemical classes. Based on the way of polymerization there are different groups: auto polymerized resins, resins polymerized with heat, light-polymerized resins, dual resins.^{6,7} Clinicians typically choose a product based on the way of manipulation, cost and esthetics. When strength is the most important, it is useful to know which restorative material is the most resilient. This is the reason we conducted a study to compare flexural strength between two restorative materials: self-polymerizing resin, polymethyl methacrylate and light polymerized resin, urethane dimethacrylate.

THE AIM OF THE STUDY.

The aim of this study is to compare the flexural strength of two provisional materials. Through the conclusions of this research dentists can choose which material is the most resistant toward fracture or deformation, especially in certain clinical cases such as: in a long span bridge, in parafunctional habits patients for ex. with bruxism or in restorative phases over implants where a provisional fixed restoration is required for a long time.

MATERIAL AND METHODS

In this study two types of resin based on the way of polymerisation and the way of manipulation were chosen. 20 specimens were produced, 10 specimen for each group (fig. 1). All the specimens were made based on the instructions and standart procedures. Group 1, Auto-polymerised resin that contains PMMA, Group 2 that contains light polymerised resin. The statistical method that was used was student "t" test.



Fig.1. Mostrat e prodhuara.

Nepermjet student “t” test u krahasuan te dhenat mesatare ndermjet dy grupeve.

Prodhimi i formave metalike. Format metalike u pergatiten per te formuar mostrat. Permasat e formave metalike u bazuan ne specifkimet e Institutit te Standardeve Amerikane nr.27 me permasa: 25×2×2 mm. Format metalike jane prej alumini, ato u vendosen ndermjet dy pjatave te qelta qe te sigurojne shperndarje te njetrajtshme materialit.

Prodhimi i mostrave te Grupit 1. Rezina vetepolimerizuese, pluhur dhe likid u maten dhe u perzihen ne menyre uniforme ne raportin 2:1. Kur materiali arrin fazen e brumit, ai u mor u paketua ne format metalike dhe u mbulua me nje pjate e qelqte mbi te cilen nje presion uniform u ushtrua deri sa i gjithë polimerizimi perfundoi. Materiali u la ne format metalike per 15 min per polimerizimin e plote. Pasi perfundoi polimerizimi mostrat u terhoqen nga format metalike dhe u ekzaminuan per porozitet ose ndonje defekt tjeter. Lemimi dhe lustrimi u realizua me Strue Tegramin 25, me Disqe Magnetike (MD). Se pari u realizua ngjitja e mostrave me mbajtësen e tyre (Fig.2).



Fig.2. Mostrat e ngjitura.



Fig.1. The specimens produced.

Through student “t” test average values of the data were compared.

Metal molds were used to produce the specimens. The measures of metallic specimens were based in the specifications of American Standards Institute nr. 27 : 25×2×2 mm. Metal molds were produced by aluminum. They were placed between between two glasses plates in order to realize an equal disperse of the material.

The fabrication of the first group of specimens: auto-polymerised resin. Powder and liquid were measured in the ratio 2 : 1. When the material comes to the dough stage, it was placed in the metal molds and covered with a glass plate where a uniform pressure was performed until the whole polymerization was complete. The material was left for 15 minutes for the complete polymerization. After the polymerization was completed the specimens were examined for any porosity or defects. Grinding and polishing was made with Strue Tegramin, with Magnetic Discs. The specimens were attached with the holder. (fig.2) First grinding was made with MD Piano.



Fig.2. The specimens attached with the holder.



Lemimi fillestar (MD Piano)- Heq pjeset e demtuara dhe te deformuara te sipërfaqes se materialit, 35 mikron. Siperfaqet e te gjitha mostrave ne mbajtesin e mostrave jane te gjitha ne te njejtin nivel. Abrasivet te cilet vendosen ne disk pershpjetojne heqjen e materialit. (fig.3)

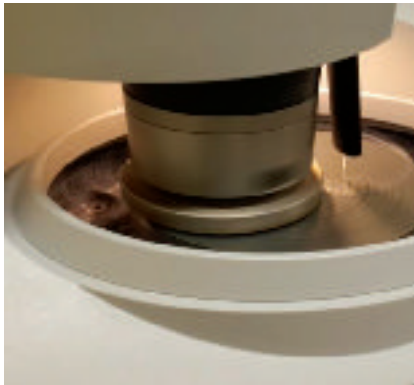


Fig. 3

It takes off the damaged and deformed parts of the material, the removal of the material was 35 micron. The surfaces of all specimens in their holder are all in the same level. Abrasives were sprayed in the disc to help to remove the damaged material. (fig.3)

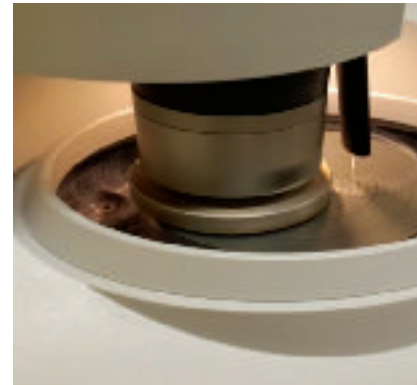


Fig. 3

Lemimi sekondar (MD Allegro): Qellimi eshte te heqin deformimet ekzistuese nga lemimi fillestar dhe pergatisin nje sipërfaqe gati per lustrim, eliminimi i materialit eshte ne sasine 15 mikron. Abrasivet qe perdoren jane Diamantet Pro, ne forme spray. (fig.4)

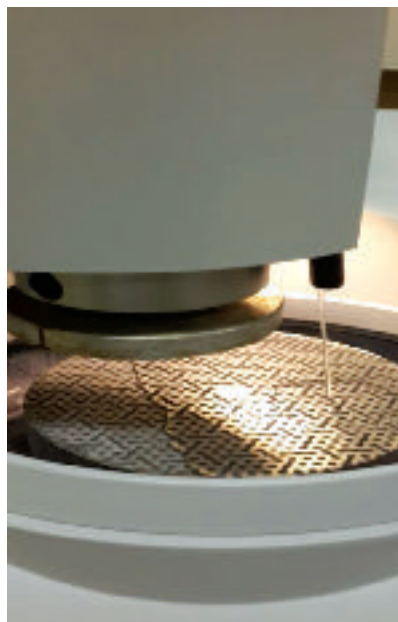


Fig. 4

Second grinding was made with MD Allegro. It helps to remove the left material from the first grinding and prepares the surface ready for polishing, the material removed was 15 micron. Abrasives that were sprayed are Diamant Pro.

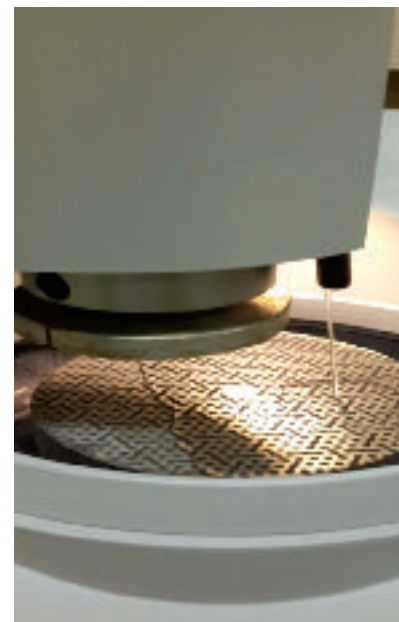


Fig. 4

Lustrimi. Lustrimi realizohet me MD Nap, me suspensione oksidi alumini.

Polishing was made with MD Nap with Oxyd Alumin suspensions. (fig.4)



Me ne fund mostrat e PMMA u maten duke perdorur Digital Caliper, Mitutoyo , per matje te sakte te ketyre permasave : 25×2×2 mm.

Pasi matjet perfunduan, mostrat u zhyten ne pesh-tyme artificiale dhe u ruajten per 7 dite, me pas u lane dhe u thane.

Prodhimi i grupeve “ 2” te mostrave: Materialet me UDMA vijne te mbrojtura nga drita, te paketuara. Ato vijne ne konsistence putty te cilat mund te paketoohen lehtesisht. Materiali u vendos ne format metalike sa me shpejt te ishte e mundur dhe u mbulua me nje pjate te qelqte mbi te cilen nje force uniforme u aplikua per dy minuta. Format metalike u ruajten ne dhoma te mbrojtura nga drita dhe mostrat ne fillim u polimerizuan per 2 minuta. Materili i tepert u hoq nga anat dhe pastaj serish u polimerizuaran per 6 minuta. Lemimi dhe lustrimi u realizua me Strue Tegramin 25, me Disqe Magnetike (MD). Mostrat UDMA, u maten duke perdorur nje Digital Caliper Mitutoyo, per matjen e permasave 25×2×2 mm. Pasi matjet perfunduan u zhyten ne pesh-tyme artificiale per 7 dite. Pas 7 diteve, mostrat u nxoren, u lane dhe u thane.

Matja e forces perkulesse. Forca perkulesse e mostrave u llogarit duke perdorur testin 3 pikesh ne makinën universale Zwick Roell, Z005. Mostrat u vendosen ne dy skajet, te cilat jane 20 mm larg njeri tjetrit. Shpejtesia e kokes e kesaj makine eshte 0,75 mm/min. Secili moster u ngarkua ne menyre graduale dhe pika ku perkulet dhe thyhet u shenua. Kjo eshte ngarkesa qe kerkohet per thyerjen e mostres dhe u perftua ne KN e cila u kthye ne N. (Fig. 5)



Fig. 5

Forca perkulesse u llogarit duke perdorur formulën standarte: Forca Perkulesse= $3 FL/2BH^2$; ku: F-Forca/ngarkesa qe nevojitet per thyerjen e mostres ; L-distanca midis skajeve-20mm; B-gjeresia e mostrave-2mm; H-lartesia e mostrave-2mm. Vlera e forces perkulesse u perftua ne N/m² e cila eshte e barabarte me 1 MPa.

At the end PMMA specimens were measured using Digital Caliper, Mitutoyo for precise measurement: 25*2*2 mm.

After the measurement of the specimens, the specimens were stored in artificial saliva for 7 days, then they were rinsed and dried.

The fabrication of second group of specimens. Materials UDMA come protected by day light, molded. They come in a putty mode, that can be easily packed. The material was packed in metal molds as soon as possible and was covered with glass plate, over which a uniform pressure was applied for 2 minutes. The excessive material was taken off by the sides and then again polymerised for 6 minutes. Grinding and polishing were realized with Strue Tegramin, with Magnetic Discs.

UDMA specimen were measured using Digital Caliper, Mitutoyo for precise measurement: 25*2*2 mm. The measurement of flexural strength. The flexural strength was calculated using 3 point test in the universal machine Zwick Roell. Specimens were placed in two edges, with a distance of 20 mm from each other. The cross head speed of the machine is 0,75 mm/min. Each specimen was loaded in a gradual way and the point that bends and broken was registered. This is the load that is required to break the specimens, in KN which were turned in N. (Fig. 5)



Fig. 5

Flexural strength was calculated using the standart formula: Flexural Strength= $3FL/2BH^2$, where F-the necessary load to break the specimen, L-the distance between 2 edges, 20 mm; B-the width of specimens, 2mm; H- hight of specimens, 2mm. The value of flexural strength was gained in N/m² which is equal with 1 MPa.



REZULTATET

Nga perpunimi statistikor i te dhenave, rezultoi qe: Vlera mesatare e forces perkulese te mostrave te perbera nga Poli-Metilmetakrilati eshte 134,4 MPa, ndersa vlera mesatare e forces perkulese se mostrave te Uretan dimetakrilatit u llogarit 107,5 MPa. Diferenca e vlerave eshte statistikisht e rendesishme.

DISKUTIM

PMMA u shfaqen per here te pare ne 1940. Keto kane avantazhe: rezistence te mire, qendrueshmeri te mire te ngjyres, lustrim te mire dhe estetike te larte^{8,9,10}. Disavantazhet e PMMA jane: clirim ne sasi te larte te monomerit te lire, reaksion ekzotermik, tkurrje nga polimerizimi. Megjithese ky material ploteson shumicen e kerkesave dhe eshte i perdorur dhe ditet e sotme, perdorimi i tij eshte ne renie per arsye te disavantazheve te tij dhe zhvillimit te materialeve te reja e te permiresuara.

Materialet Fotopolimerizuese. Permbajne uretan dimetakrilat, nje rezin polimerizimi i te ciles katalizohet nga drita e dukshme dhe kamforokinoni si iniciator^{11,12,13}. UDMA zakonisht perfshin mbushes si psh. silika mikrofin per te permiresuar vetite fizike si tkurrja nga polimerizimi. Ndryshe nga rezinat e metakrilatit nuk prodhojne mbetje te monomerit te lire pas polimerizimit, gje e cila shpjegon ulje te toksicitetit te indeve.^{14,15,16} Arsyet e zgjedhjes se UDMA jane avantazhet si: Mungese e MMA, jo ere, jo irritime, jo reaksione ekzotermike, zvogelim i tkurrjes gjate polimerizimit, kohe te gjate punimi, lehtesisht te manipulueshme, e lehte per tu vendosur dhe per ti dhene forme. Vlerat e forces perkulese te realizuara ne laborator mund te mos reflektojne kushtet e kavitetit oral, megjithate eshte e dobishme te krahasojme materialet te testuara ne kushte te kontrolluara.

IMPLIKIME KLINIKE

Eshte e rendesishme te vihet re qe forca perkulese eshte vetem nje nga vetite e materialeve provizore. Nje material i forte zoteron disa veti te tjera mekanike si: rezistenca ndaj krisjes, moduli i elasticitetit etj.

LIMITET E STUDIMIT

Se pari u perdoren mostra, dhe jo proteza fikse. Mostrat nuk imitojne saktesisht situaten klinike, por meqenese te gjitha mostrat ishin ne forme dhe madhesi unifor-

RESULTS

From the statistical results the average value of flexural strength of PMMA specimens was calculated 134,4 MPa, while the average value of flexural strength of UDMA was calculated 107,5 MPa. The difference was statistically important.

DISCUSSION

PMMA first appeared in 1940. They have these advantages: good resistance, good stability of colour, good esthetic, high polishing.^{8,9,10} The disadvantages of PMMA are: release of free monomer, exothermic reaction, shrinkage from polymerization. Although this material fulfills most of the criteria, and is used nowadays, it's use is in decrease because of its disadvantages and the development of new and improved techniques. Light polymerised Materials. They contain urethane dimethacrylate, a resin whose polymerisation is catalysed by visible light and kamforokinon as initiator.^{11,12,13} UDMA usually includes silica microfin to improve physical properties like shrinkage from polymerisation. Unlike resin of methacrylate, they do not produce free monomer after polymerisation, that explain the decrease of the toxicity of tissues.^{14,15,16}

The reason for choosing UDMA are the advantages like: absence of MMA, no irritation, no smell, no exothermic reaction, long time for manipulation, easy for manipulating and for shaping. The values of flexural strength in the laboratory may not reflect 100% the conditions of oral cavity, although it is useful to compare tested materials in controlled conditions.

CLINICAL IMPLICATIONS

It is important to clarify that flexural strength is one of the qualities of provisional materials. A strong material posses other mechanical properties like: resistance toward fracture, elastic module etc.

LIMITS OF THE STUDY

First of all, in this study were used specimens and not fixed prostheses. Specimens do not imitate exactly the clinical situation, but as all the specimens have standart sizes and shapes, the values and the comparisons are valid in this study. In the experiment the material was stored for 7 days in artificial saliva and then was



me, vlerat dhe krahasimet duhet të jenë të vlefshme në këtë studim. Në eksperiment materialin u ruajt për 7 ditë në peshtymë artificiale dhe pastaj u ushtrua forcë mbi materialin; ndërsa në situatat klinike materialin ngarkohet me forcë menjëherë pas cementimit. Bazuar në këtë studim nuk mund të thuhet që PMMA është më e mirë se UDMA. Ka shumë faktore të tjera dhe situata të ndryshme klinike, të cilat përfundimisht zgjedhin materialin provizor me të pershtatshëm për secilin pacient.

KONKLUZIONE

Brenda limiteve të këtij studimi u nxor si konkluzion që: Forca perkulëse e polimetil metakrilatit është më e lartë sesa e uretan dimetakrilatit. Vlera e forcës që mund të perballojë mostrat e perbera nga PMMA pa u deformuar apo u thyer është 134,4 MPa. Si rezultat, Polimetil metakrilati mund të shërbejë si një punim restorativ i perkohshëm më i mirë në rastet e punimeve afat-gjata, për një protezë fikse me numër të madh elementesh, në rastet e parafunksioneve si psh. në një pacient me bruksizem, ose në fazat restorative të implantëve ku kërkohet një punim provizor fiks për një periudhë afatgjatë.

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applied force over them; while in the clinical situation the material is loaded immediately after cementation. Based on this study we can not say that PMMA is better than UDMA. There are many factors and different clinical situations, that definitely choose which provisional material to use for each patient.

CONCLUSIONS

Besides the limits of this study we could conclude that the flexural strength of polymethyl methacrylate is higher than the flexural strength of urethan dimethacrylate. The value of flexural strength that PMMA can handle without breaking or deformed is 134,4 MPa. Polymethyl methacrylate can be used as a better provisional restorative for the long-term restorations, for a fixed prostheses with a large number of elements or in patients with parafunctional habits as in patients with bruxism or in restorative phases over implants where a fixed provisional bridge is required for a long time.

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 16. Mitra SB, Wu D, Holmes BN. An application of advanced nanotechnology in advanced dental materials. *J Am Dent Assoc* 2003;134:1382–90.



ANALIZE KRAHASUESE E TOMOGRAFISE SE KOMPJUTERIZUAR ME RREZE KONIKE DHE PANORAMEKSIT GJATE PLANIFIKIMIT TE TRAJTIMIT IMPLANTOLOGJIK NE MAKSILEN POSTERIORE

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COMPARATIVE ANALYSIS OF CONE BEAM COMPUTED TOMOGRAPHY AND ORTHOPANTOMOGRAM IN DENTAL IMPLANT TREATMENT PLANNING IN POSTERIOR MAXILLA

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ABSTRAKT

Hyrje: Vleresimi radiografik eshte kyç ne planifikimin e trajtimit me implante dentare. Metodot me te perdorura per plan trajtimi per implante jane metoda klasike e panorameksit, dhe metoda e koheve te fundit ajo e tomografise se kompjuterizuar me rreze konike (TKRK).

Qellimi: Analize krahasuese e te dhenave per lartesi dhe gjeresi te procesit alveolar te perfituara permes panorameksit dhe TKRK, gjate planifikimit te trajtimit me implante dentare ne maksilen posteriore.

Materiale dhe metoda: Subjektet e perfshire ne studim duhej te kishin te pakten mungese te nje dhembit ne maksilen posteriore. Tek panorameksi, tek çdo zone e planifikuar per implant, kryheshin matje per dimensionin vertikal te kockes. Kurse tek prerjet terthore te TKRK, tek çdo zone e planifikuar per implant, matej dimensionin vertikal dhe ai horizontal i kockes.

Rezultate: Ne studim u perfshine 44 subjekte (26 meshkuj dhe 18 femra). Vlera mesatare me e madhe per dimensionin vertikal te matur permes TKRK, ishte ne zonen e premolarit te pare-djathtas (15.24 mm. \pm 4.51), kurse vlera mesatare me e madhe e matur permes panorameksit, ishte ne zonen e premolarit te pare-djathtas (16.50 mm. \pm 4.15). Me ane te panorameksit u maten vlera me te medha per lartesi te kockes, krahasuar me TKRK, por ndryshimi nuk ishte statistikisht i rendesishem. Vlera mesatare me e madhe per gjeresi te procesit alveolar, ishte ne zonen e molarit te dyte-majtas (16.50 mm. \pm 4.15).

Perfundimi: Panorameksi eshte metode e sigurte per planifikim te implanteve dentare. Metoda TKRK

ABSTRACT

Background: Radiographic evaluation is crucial in dental implant treatment planning. Most used methods are the classical orthopantomogram, and the lately used method of cone beam computed tomography (CBCT).

Aim: Comparative analysis of the information about bone height and width, obtained using orthopantomogram and CBCT, during dental implant treatment planning in posterior maxilla.

Materials and methods: Patients included in the study had at least one tooth missing in posterior maxillary region. In orthopantomogram, in every region planned for dental implant placement, was measured the vertical dimension of the alveolar process. Whilst in the cross section images of CBCT, in each region planned for implant placement, was measured the vertical and horizontal dimension of bone.

Results: In the study participated 44 individuals (26 men and 18 women). The greatest mean value for vertical dimension measured using CBCT was in the region of right-first premolar (15.24 mm. \pm 4.51), while the greatest mean value measured with orthopantomogram was in the region of right-first premolar (16.50 mm. \pm 4.15). By using orthopantomogram were measured greater values for bone height compared with CBCT, but the difference was not significant. The greatest mean value for bone width resulted in the region of left- second molar (16.50 mm. \pm 4.15).

Conclusion: Orthopantomogram is a safe method for dental implant treatment planning. CBCT is the



është metode e perzgjedhur ne raste te procesi alveolar deficitar ne lartesi dhe gjeresi.

Fjalë kyçe: Implante dentare, panorameks, TKRK.

HYRJE

Trajtimi i padhembesise se pjeseshme dhe totale ka dy opsione, gjegjesisht protezat klasike dhe ato te retinuara me implante.¹ Protezat te retinuara me implante krahasuar me ato klasiket, jane trajtim me efikas, sepse implantet e vendosura brenda ne kocke, sebashku me komponentet e tyre jashte-kockore (abatmentet), sherbejne si mbeshtetes te konstruksionit protetik.² Bazuar ne njohurite shkencore dhe pervesojes klinike, keshillohet perdorimi rutine i protezave te retinuara me implante.³ Etapa me e rendesishme e trajtimit me proteza te retinuara me implante eshte plani i trajtimit, i cili perfshin anamnezen, ekzaminimin klinik dhe vleresimit radiografik.⁴ Qellimi i planit te trajtimit eshte vendosja a implanteve ne numer, dimension dhe pozicion optimal ne kocke.⁵ Implantet prodhohen nga material biokompatibel siç eshte titaniu dhe legurat e tij.⁶ Implantet prodhohen edhe ne dizajne te ndryshme qe do te thote ne dimensione dhe forma te ndryshme. Pozicione kyçe per vendosjen e implanteve jane zonat ku jane te reduktuara forcat biomekanike, gjegjesisht mbajtesit fundor te nje punumi protetik, si dhe regjioni i kaninit dhe molarit te pare.⁸ Analiza radiografike tek zonat e propozuara per venie implantesh, ka nje rol qenesor ne aspekt te identifikimit dhe analizes se strukturave anatomike fqinje te rendesishme. Kjo me qellim ruajtjen e integritetit te tyre gjate procedures se implantimit.⁹ Gjate planifikimit te implanteve dentare ne nofullen e siperme, fokusi eshte i drejtuar kah analiza e dyshemes se sinusit maxillar, dyshemes se hundes dhe kanalit nasopalatin. Gjithmone duke siguruar distance prej 1 mm. ndermjet pjeses apikale te implantit dhe strukturave anatomike fqinje.² Implantet planifikohen qe te qendrojnë ne distance 1.5 mm. me dhembet fqinje natyror dhe distance 3 mm. me implantet fqinje.⁸ Gjithashtu eshte e domosdoshme ruajtja e 1 mm. kocke nga ana bucale dhe linguale e implantit.¹¹ Analiza radiografike per planifikim implantologjik realizohet permes teknikave te ndryshme, ku deri rreth viteve 1990 si metode standarde konsiderohej panorameksi.⁵ Por panorameksi ka kufizimet e veta, siç eshte dhenia e nje pamjeje dy-dimensionale e strukturave anatomike, faktori zmadhues, mbivendosja e strukturave anatomike dhe deformimet gjeometrike.¹¹ Gjate viteve te fundit si metode e zgjedhur per planifikim implantologjik propozohet tomografia e kompjuterizuar me rreze konike (TKRK), sepse

method of choice in cases of deficient bone width and bone height.

Keywords: Dental implants, orthopantomogram, CBCT.

INTRODUCTION

There are two options for the treatment of partial and total edentulism, that is classical prosthesis and implant retained prosthesis.¹ The implant retained prosthesis compared with the classical prosthesis, are more efficient treatments, because the implants placed in the bone, together with the extra-bony components (abutments), serve as retainers for the prosthetic construction.² Based on scientific knowledge and clinical experience, it is recommended the routine usage of implant retained prosthesis.³ The most important phase of the treatment with implant retained prosthesis is the treatment planning phase, composed of anamnesis, clinical examination and radiographic evaluation.⁴ The main goal of the treatment plan, is the placement of the implants in optimal number, dimension and position in bone.⁵ Implants are produced from biocompatible materials as titanium and it's alloys.⁶ Implants are produced in different designs, which means in different dimensions and forms. The key positions for dental implants are regions with reduced biomechanical forces, namely the end retainers of a prosthetic construction, and also the canine and first molar region.⁸ The radiographic analysis at the regions planned for implant placement, plays a main role in the identification and analysis of neighbouring anatomical structures. In this way preserving their integrity during the implant placement procedure.⁹ In dental implant treatment planning in the maxillary jaw, the focus is on analysing the maxillary sinus floor, nasal floor and nasopalatine canal. In each case preserving 1 mm. distance between the apical part of the implant and the neighbouring anatomical structure.² Implants are planned in a distance of 1.5 mm. with neighbouring teeth, and 3 mm. distance with the neighbouring implants.⁸ Also it is important preserving a 1 mm. bone at the buccal and lingual side of the alveolar process.¹¹ Radiographic analysis for dental implant planning is achieved using different techniques, while in the mid-1990 as a standard method was considered orthopantomogram.⁵ But orthopantomogram has it's disadvantages such as giving two-dimensional image for anatomical structures, the magnification factor, superposition of anatomical structures and geometrical deformity.¹¹ In the latest years, as e method of choice for dental implant treatment planning is proposed the



ofron pamje tre-dimensionale te strukturave anatomike te regjionit maksilofacial, gjegjesisht mundeson matjen e volumit kockor dhe dendesise minerale kockore.¹³ Metoda TKRK mundeson percaktimin e volumit kockor permes matjes se lartesis, gjeresis, gjatesise dhe angulimit te kockes.² Lartesia e kockes e cila nenkupton distancen nga kreshta alveolare deri tek struktura anatomike fqinje, pervec permes metodet TKRK mund te matet edhe permes panorameksit. Kurse gjeresia e procesit alveolar e cila eshte e matshme vetem permes TKRK, paraqet distancen nga ana labiale deri tek ana linguale e procesit alveolar.¹⁰ Me çka percaktimi i sakte i volumit kockor eshte i nje rendesie qenesore per suksesin nga trajtimi me implante. Dhe kjo sidomos vlen per zonat me defiqite te theksuara te volumit kockor, siç eshte maksila posteriore.¹⁴ Sipas disa autoreve, panorameksi eshte metode e sigurte per planifikim te implanteve, kurse sipas te tjereve panorameksi mund te çoje deri te percaktimi jo i sakte i gjatesise se implanteve dhe dentimi i strukturave fqinje anatomike. Gjithashu permes panorameksit eshte i pamundur percaktimi i gjeresis se kockes, gjegjesisht edhe i diametrit te duhur te implanteve.¹⁵ Metoda TKRK siguron te dhena te sakta per lartesine dhe gjeresine e kockes ne zonen e maksiles posteriore, per morfologjine e dyshemese se sinusit maxillar, dhe trashesise se membranet se sinusit maxilar.¹⁶

QELLIMI

Qellimi i ketij studimi ishte analiza krahasuese e te dhe nave per lartesi dhe gjeresi e kockes, te perfituara permes perdorimit te TKRK dhe panorameksit, gjate planifikimit te implanteve dentare ne maksilen posteriore.

MATERIALE DHE METODA

Ne studim ishin te perfshire 44 paciente, te gjinise mashkullore dhe femerore, te moshes mbi 18 vjet. Secili pacient duhej te kishte mungese te te pakten nje dhemb ne zonen e maksiles posteriore, si dhe mungese te kunderindikacioneve absolute per venie te implanteve. Çdo subjekt iu nenshtrua nje inçizimi me metoden e panorameksit dhe nje inçizim me TKRK. Per realizimin e inçizimeve radiografike u perdor aparati Rotograph Prime 3D, tek ordianca stomatologjike private Nova Dental Grup- Shkup. Aparati perdorte rryme elektrike prej 2 mA-12 mA, dhe tension prej 60 kV-86kV. Permes metodet me panorameks perfitohej nje pamje e vetme e regjionit maksifacial, kurse permes metodet TKRK perfitoheshin gjithsej 532 pamje, gjegjesisht prerje ter-

cone beam computed tomography (CBCT), because it offers a three-dimensional image of the anatomical structures of the maxillofacial region, that is it allows measuring the bone volume and bone mineral density.¹³ CBCT allows measuring the bone volume, by measuring the bone height, bone width and bone angulation.² Bone height, that is the distance from the crestal part of the alveolar process to the neighbouring anatomical structure, can be measured not only by using CBCT but also by using orthopantomogram. Whilst the bone width is measurable only by using CBCT, and it presents the distance from the labial to the lingual side of the alveolar process.¹⁰ So the precise determination of the bone volume is of a crucial importance for the success from the treatment with dental implants. And this is especially important for the regions with accentuated deficiencies of bone volume, as the case of posterior maxilla.¹⁴ According to some authors orthopantomogram is a safe method for implant planning, but according to other authors, orthopantomogram can lead to a wrong determined length of the implants, and thus damaging the neighbouring anatomical structures. Also, using orthopantomogram it is impossible the determination of bone width, which means the adequate diameter of the implants.¹⁵ CBCT method gives precise informations for bone height and bone width in the posterior maxillary region, the maxillary sinus morphology and the maxillary sinus membrane thickness.¹⁶

AIM

The aim of this study was the analysis of the information for bone height and width, given with the use of CBCT and orthopantomogram, during dental implant treatment planning in posterior maxilla.

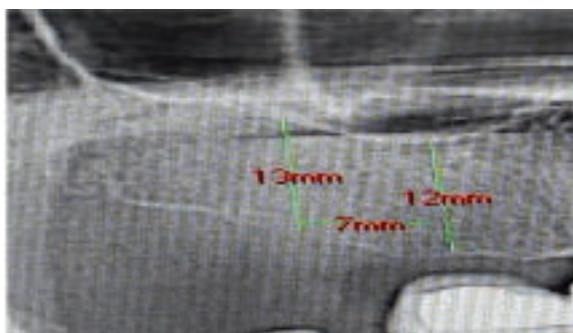
MATERIALS AND METHODS

In the study were included 44 patients, men and women, over 18 years of age. Every patient had to have at least one missing tooth in the posterior maxilla, and absence of absolute contraindications for implant placement. Every patient was scanned with orthopantomogram scanning and CBCT method. For the performing of the scans was used the devise Rotograph Prime 3D, in the private dental clinic Nova Dental Group in Skopje. The devise was using electricity of 2 mA-12 mA, and tension of 60 kV-86 kV. Using the orthopantomogram was obtained a single image of the maxillofacial region, while using CBCT were obtained 532 images (cross sections) in horizontal, vertical and

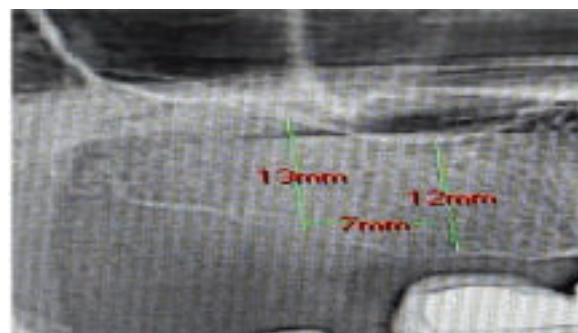


thore ne planin horizontal, vertikal dhe antero-posterior te regjionit maksilofacial. Madhesia e çdo pikseli tek panorameksi dhe prerjeve terthore te TKRK ishte 120 μm ., kurse madhesia e vokselave tek TKRK ishte 175 μm .. Trashesia e prerjeve terthore te TKRK ishte 0.175 mm.. Kurse numri i shkalleve te ngjyres gri, permes se cileve paraqiteshin strukturat anatomike tek panorameksi dhe te TKRK ishte 65536. Per planifikim implantesh tek panorameksi perdorej softveri "Villa Quickvision", kurse per analize tek prerjet terthore te TKRK perdorej softveri 3D Planner. Implantet e planifikuar kishin diameter prej 3-7 mm. dhe gjatesi prej 6-18 mm.. Gjegjesisht tek panorameksi permes perdorimit te vegles "vizore" masnim dimensionin vertikal prej tek kreshta alveolare deri tek dyshemeja e sinusit maxilar, te shprehur ne njesi milimetrike. Kurse per te matur dimensionin vertikal (lartesine e kockes) si dhe dimensionin horizontal (gjeresine e kockes) tek TKRK perdornim veglen "matje nga pika ne pike". Ku gjeresi e kockes paraqiste distanca nga ana bukale tek ana lingual e procesit alveolar. Keto matje per gjeresi te kockes beheshin ne nivel te kreshtes, te mesit dhe ne nivel apikal te procesit alveolar, ku si vlere per gjeresi, konsiderohej mesatarja e dale nga matjet ne te trija nivelet.

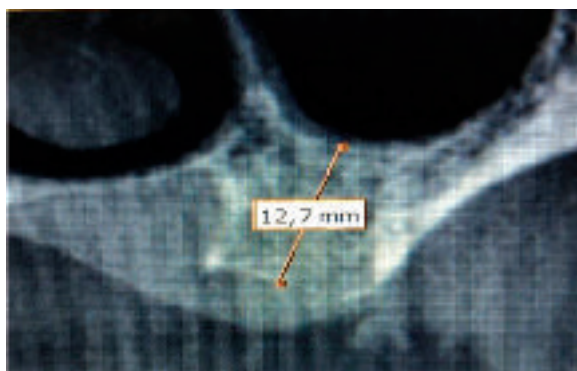
antero-posterior plane of the maxillofacial region. The dimension of each pixel in orthopantomogram was 120 μm ., and the dimension of voxels was 175 μm .. The thickness of cross sections in CBCT method was 0.175 mm.. The number of gray values, by which the anatomical structures were presented in the image was 65536. For implant planning in the orthopantomogram images, was used the software "Villa Quickvision", and for implant planning in CBCT images was used the software 3D Planner. The planned implants had diameter of 3-7 mm., and length of 6-18 mm.. Respectively in the orthopantomogram image using the tool "ruler" we measured the vertical dimension from the crest of the alveolar process to the maxillary sinus floor, expressed in millimeters. And for measuring the vertical dimension (height) and horizontal dimension (width) in CBCT images we used the tool, "point to point measurement". Where the bone width presented the distance from the buccal side to the lingual side of the alveolar process. The measurements for bone width were made in the crestal, middle and apical part of the alveolar process, and the value for bone width dimension, was considered the mean value obtained from the measurements on the three levels.



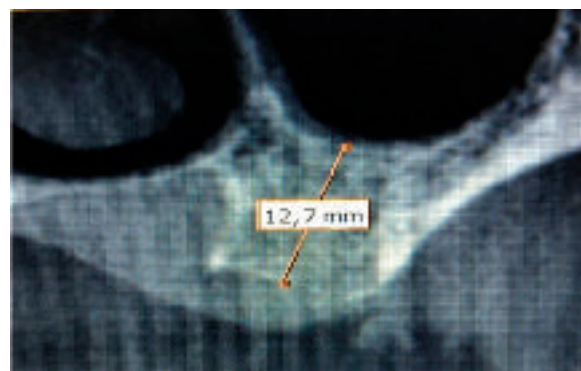
Fotografia 1. Dimenzioni vertikal i procesit alveolar, ne zonen e maksiles posteriore (panorameks).



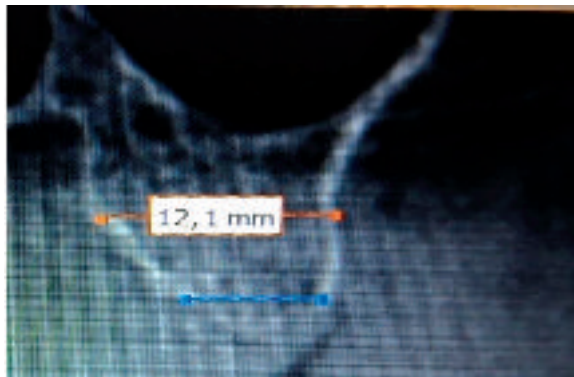
Picture 1. Vertical dimension of the alveolar process, in posterior maxillary region (orthopantomogram).



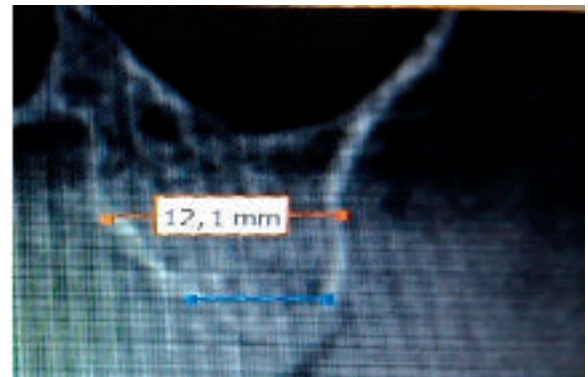
Fotografia 2. Dimenzioni vertikal i procesit alveolar, ne zonen e maksiles posteriore (TKRK).



Picture 2. Vertical dimension of the alveolar process, in posterior maxillary region (CBCT).



Fotografia 3. Dimenzioni horizontal i procesit alveolar, ne zonen e maksiles posteriore (TKRK).



Picture 3. Horizontal dimension of the alveolar process, in posterior maxillary region (CBCT).

REZULTATE

Ne studim ishin te perfshire 44 paciente, prej te cileve 26 meshkuj dhe 18 femra. Mosha mesatare e subjekteve varionte nga 27-75 vjet (mesat. 55.75).

Ne tabelen 1. jane paraqitur vlera mesatare, vlera minimale, vlera maksimale dhe deviacioni standard, per dimensionin vertikal te kockes, te matur nga kresh-ta e procesit alveolar deri tek dyshemeja e sinusit maxilar, te maksiles posteriore djathtas dhe majtas, duke perdorur metoden TKRK.

Gjegjesisht vlera mesatare me e madhe rezultoi ne regjionin e premolarit te pare- djathtas (1.4): 15.24 mm. \pm 4.51, kurse vlera mesatare me e vogel ne regjionin e molarit te dyte-majtas (2.7): 9.74 mm. \pm 1.67.

Tabela 1.

| Variabel | N | Mesat. | Min. | Maks. | D.S |
|----------|----|--------|------|-------|------|
| 1.1.4 | 20 | 15,24 | 8,60 | 20,60 | 4,51 |
| 1.1.5 | 19 | 12,02 | 7,30 | 19,60 | 4,40 |
| 1.1.6 | 17 | 9,83 | 7,00 | 18,00 | 3,17 |
| 1.1.7 | 12 | 10,27 | 7,00 | 16,00 | 3,19 |
| 1.2.4 | 24 | 14,48 | 8,00 | 20,00 | 3,72 |
| 1.2.5 | 12 | 12,39 | 7,30 | 18,80 | 3,90 |
| 1.2.6 | 10 | 11,19 | 7,00 | 16,00 | 2,70 |
| 1.2.7 | 16 | 9,74 | 7,50 | 12,50 | 1,67 |

Ne tabelen 2. jane paraqitur vlera mesatare, vlera minimale, vlera maksimale dhe deviacioni standard per dimensionin vertikal te procesit alveolar te matur tek panorameksi.

Gjegjesisht vlera mesatare me e madhe rezultoi ne regjionin e premolarit te pare-djathtas (1.4): 16.50 mm. \pm 4.15, kurse vlera mesatare me e vogel ne regjionin e molarit te dyte-majtas (2.7): 9.79 mm. \pm 1.89.

RESULTS

In the study were included 44 patients, from which 26 were men and 18 women. Age of the subjects varied from 27-75 years (mean 55.75).

In the table 1. Are presented the mean value, minimum value, maximum value and standard deviation, for the vertical dimension of bone, measured from the crestal part of alveolar process to the maxillary sinus floor, in the right and left posterior maxillary region, using CBCT method.

Respectively the greatest mean value was shown in the right-first premolar region (1.4): 15.24 mm. \pm 4.51, while the smallest mean value in the left-second molar region (2.7): 9.74 mm. \pm 1.67.

Table 1.

| Variable | N | Mean | Min. | Max. | S.D |
|----------|----|-------|------|-------|------|
| 1.1.4 | 20 | 15,24 | 8,60 | 20,60 | 4,51 |
| 1.1.5 | 19 | 12,02 | 7,30 | 19,60 | 4,40 |
| 1.1.6 | 17 | 9,83 | 7,00 | 18,00 | 3,17 |
| 1.1.7 | 12 | 10,27 | 7,00 | 16,00 | 3,19 |
| 1.2.4 | 24 | 14,48 | 8,00 | 20,00 | 3,72 |
| 1.2.5 | 12 | 12,39 | 7,30 | 18,80 | 3,90 |
| 1.2.6 | 10 | 11,19 | 7,00 | 16,00 | 2,70 |
| 1.2.7 | 16 | 9,74 | 7,50 | 12,50 | 1,67 |

In the table 2. Are presented the mean value, minimal value, maximum value and standard deviation, for vertical dimension of the alveolar process, measured in orthopantomogram.

Respectively the greatest mean value resulted in the right-first premolar region (1.4): 16.50 mm. \pm 4.15, while the smallest mean value in the left- second molar region (2.7): 9.79 mm. \pm 1.89.



Tabela 2.

| Variabel | N | Mesat. | Min. | Maks. | D.S |
|----------|----|--------|-------|-------|------|
| 1.1.4 | 20 | 16,50 | 8,00 | 24,00 | 4,15 |
| 1.1.5 | 19 | 12,16 | 7,00 | 19,00 | 3,72 |
| 1.1.6 | 17 | 10,00 | 7,00 | 18,00 | 2,98 |
| 1.1.7 | 13 | 10,33 | 7,00 | 13,00 | 2,27 |
| 1.2.4 | 24 | 13,89 | 8,00 | 20,00 | 3,35 |
| 1.2.5 | 13 | 12,69 | 8,00 | 20,00 | 3,77 |
| 1.2.6 | 9 | 11,44 | 10,00 | 14,00 | 1,67 |
| 1.2.7 | 14 | 9,79 | 7,00 | 12,00 | 1,89 |

Ne tabelen 3. jane paraqitur analizat per ndryshime ne aspekt te vlerave (dimensioni vertikal kockor), te matura permes metodes se panorameksit dhe TKRK. Me çka vlerat e perfituara permes panorameksit, rezultuan me te medhaja se ato te perfituara permes TKRK (perjashtim regjioni i premolarit te pare-majtas).

Por per te gjitha regjionet, per $p > 0.05$, ndryshimet nuk ishin stistikisht te rendesishme.

Tabela 3.

| Variabel | Rank Sum TKRK | Rank Sum Orto. | U | Z / t | p-lev. |
|----------|---------------|----------------|--------|--------|--------|
| 1.1.4 | 380,00 | 440,00 | 170,00 | -0,81 | 0,42 |
| 1.1.5 | 359,00 | 382,00 | 169,00 | -0,34 | 0,74 |
| 1.1.6 | 287,00 | 308,00 | 134,00 | -0,36 | 0,72 |
| 1.1.7 | 10,27* | 10,33* | | -0,06* | 0,95 |
| 1.2.4 | 616,00 | 560,0 | 260,00 | 0,58 | 0,56 |
| 1.2.5 | 150,00 | 175,0 | 72,00 | -0,33 | 0,74 |
| 1.2.6 | 92,00 | 98,00 | 37,00 | -0,65 | 0,51 |
| 1.2.7 | 9,74* | 9,79* | | -0,07* | 0,94 |

Ne tabelen 4, jane paraqitur vlera mesatare, vlera minimale, vlera maksimale dhe deviacioni standard, per dimensionin horizontal te procesit alveolar, te regjioni i maksiles posteriore majtas dhe djathtas, duke perdorur metoden TKRK. Gjegjesisht vlera mesatare me e madhe rezultoi ne regjionin e molarit te dyte-majtas (2.7): 10.05 mm. \pm 2.06, kurse vlera mesatare me e vogel ne regjionin e premolarit te pare-majtas (2.4): 7.38 mm. \pm 1.13.

Table 2.

| Variable | N | Mean | Min. | Max. | S.D |
|----------|----|-------|-------|-------|------|
| 1.1.4 | 20 | 16,50 | 8,00 | 24,00 | 4,15 |
| 1.1.5 | 19 | 12,16 | 7,00 | 19,00 | 3,72 |
| 1.1.6 | 17 | 10,00 | 7,00 | 18,00 | 2,98 |
| 1.1.7 | 13 | 10,33 | 7,00 | 13,00 | 2,27 |
| 1.2.4 | 24 | 13,89 | 8,00 | 20,00 | 3,35 |
| 1.2.5 | 13 | 12,69 | 8,00 | 20,00 | 3,77 |
| 1.2.6 | 9 | 11,44 | 10,00 | 14,00 | 1,67 |
| 1.2.7 | 14 | 9,79 | 7,00 | 12,00 | 1,89 |

In the table 3. It is presented the analysis for differences in values (vertical dimension of bone) measured using orthopantomogram and CBCT. Whereby, the values acquired using orthopantomogram were greater than those acquired using CBCT (except for the left-first premolar region).

But for all the regions, for $p > 0.05$, the differences were not statistically significant.

Table 3.

| Variable | Rank | Rank Sum Orto. | U | Z / t | p-lev. |
|----------|--------|----------------|--------|--------|--------|
| Sum | 380,00 | 440,00 | 170,00 | -0,81 | 0,42 |
| CBCT | Rank | 382,00 | 169,00 | -0,34 | 0,74 |
| Sum | 287,00 | 308,00 | 134,00 | -0,36 | 0,72 |
| Ortho | U | Z / | | -0,06* | 0,95 |
| t | p- | 560,0 | 260,00 | 0,58 | 0,56 |
| lev. | 150,00 | 175,0 | 72,00 | -0,33 | 0,74 |
| 1.2.6 | 92,00 | 98,00 | 37,00 | -0,65 | 0,51 |
| 1.2.7 | 9,74* | 9,79* | | -0,07* | 0,94 |

In the table 4, are presented the mean value, minimal value, maximal value and standard deviation, for the horizontal dimension of the alveolar process, in the right and left posterior maxilla, using CBCT method. Respectively, the greatest mean value resulted in the left-second molar region (2.7): 10.05 mm. \pm 2.06, while the smallest mean value in the left-first premolar region (2.4): 7.38 mm. \pm 1.13.



Tabela 4.

| Variabel | N | Mesat. | Min. | Maks. | D.S |
|----------|----|--------|------|-------|------|
| 2.1.4 | 20 | 8,00 | 5,00 | 9,90 | 1,18 |
| 2.1.5 | 19 | 7,89 | 5,00 | 10,30 | 1,37 |
| 2.1.6 | 17 | 8,81 | 5,70 | 12,00 | 1,63 |
| 2.1.7 | 12 | 10,03 | 7,50 | 12,40 | 1,88 |
| 2.2.4 | 24 | 7,38 | 5,30 | 10,00 | 1,13 |
| 2.2.5 | 12 | 8,31 | 5,80 | 14,20 | 2,43 |
| 2.2.6 | 10 | 9,77 | 6,60 | 13,80 | 2,19 |
| 2.2.7 | 16 | 10,05 | 6,70 | 13,70 | 2,06 |

Table 4.

| Variabel | N | Mesat. | Min. | Maks. | D.S |
|----------|----|--------|------|-------|------|
| 2.1.4 | 20 | 8,00 | 5,00 | 9,90 | 1,18 |
| 2.1.5 | 19 | 7,89 | 5,00 | 10,30 | 1,37 |
| 2.1.6 | 17 | 8,81 | 5,70 | 12,00 | 1,63 |
| 2.1.7 | 12 | 10,03 | 7,50 | 12,40 | 1,88 |
| 2.2.4 | 24 | 7,38 | 5,30 | 10,00 | 1,13 |
| 2.2.5 | 12 | 8,31 | 5,80 | 14,20 | 2,43 |
| 2.2.6 | 10 | 9,77 | 6,60 | 13,80 | 2,19 |
| 2.2.7 | 16 | 10,05 | 6,70 | 13,70 | 2,06 |

DISKUTIMI

Ne studimin tone, permes panorameksit planifikonim implante tek zonat me prani te pakten 7 mm. lartesi kocke. Kurse permes metodes TKRK planifikonim implante ne zonat me te pakten 7 mm. lartesi kocke dhe 5 mm. gjeresi kocke. Permes metodes TKRK planifikuam gjithsej 130 implante, kurse permes panorameksit 128 implante. Nga studimi i autorit Patel et al.¹⁷ rezultoi qe vlerat per gjatesi te implanteve te planifikuara permes TKRK, krahasuar me ato te panorameksit, ishin me te peraferta me gjatesine e implanteve te vendosura gjate fazes se implantimit. Ne studimin e autorit Correa et al.¹⁸ duke perdorur metoden TKRK u planifikuan implante me te shkurtera krahasuar me ato te planifikuara duke perdorur panorameksin, ku ndryshimi ishte statistikisht i rendesishem. Autori Nunes¹⁶, konstatoi se lartesia e procesit alveolar e percaktuar permes TKRK ka tendence zvogelimi duke shkuar nga premolaret tek zonat e molareve, kurse gjeresia e procesit alveolar ka tendence rritjeje duke shkuar nga premolaret tek zonat molare. Rezultatet e autorit Nunes perputhen me rezultatet tona, gjegjesisht nga studimi jone rezultoi qe edhe permes panorameksit edhe TKRK, regjioni premolar kishte tendence per lartesi me te madhe te procesit alveolar, krahasuar me regjionin e molareve. Gjithashtu tek zonat e molarit te dyte procesi alveolar tregonte gjeresi me te madhe, krahasuar me zonat premolare. Nga studimi i autorit Ozalp¹⁵ rezultoi qe permes panorameksit u maten vlera me te vogla per lartesi te kockes, krahasuar me ato te matura permes TKRK, ku ndryshimet ishin statistikisht te rendesishme. Por rezultatet tona ishin ne kundërshtim me ato te Ozalp, pasi qe dimensionin vertikal i kockes i matur permes panorameksit na rezultoi me i madh krahasuar me ate te matur permes TKRK, por gjithashtu ndryshimi tek studimi jone nuk ishte statistikisht i rendesishem. Autori Mello et al.¹⁹ konstatoi se diametri (gjeresia) i implanteve i planifikuar me ane te panorameksit dhe TKRK kishte perputhshmeri 69% gjegjesisht 73% me

DISCUSSION

In our study using orthopantomogram we planned implants in the regions with presence of at least 7 mm. of bone height. Whilst using CBCT, we planned implants in the regions with at least 7 mm. of bone height and 5 mm. of bone width. Using the CBCT method we planned 130 implants in total, while using orthopantomogram we planned 128 implants. From the study of the author Patel et al.¹⁷ resulted that the values for the length of the implants obtained using CBCT, compared with the values obtained using orthopantomogram, were closer to the length of the implants placed in the bone during the implantation phase. In the study of the author Correa et al.¹⁸ using the CBCT method, were planned shorter implants, compared with those planned using orthopantomogram, and the difference was statistically significant. The author Nunes et al.¹⁶ found out that the bone height measured using CBCT, had a decreasing tendency going from the premolar region to the molar region, while the bone width had an increasing tendency going from the premolar region to the molar region. The results of the author Nunes are in agreement with our results, that is from our study resulted that by using both orthopantomogram and CBCT, the premolar region had a tendency for greater bone height of the alveolar process, compared with the molar region. Also, in the second molar region the alveolar process showed greater width, compared with the premolar region. From the study of the author Ozalp¹⁵ resulted that using orthopantomogram were measured smaller values for bone height, compared with those measured using CBCT, while the differences were statistically significant. But our results were contradictory to those of the author Ozalp, respectively in our study, the bone vertical dimension measured using orthopantomogram resulted greater than that measured using CBCT, but also the difference in our study was not statistically significant. The author Mello et al.¹⁹ found out that the diameter (width) of the implants



diametrin e implanteve te vendosura ne kocke gjate fazes se implantimit. Kurse Autori Sahota²⁰, nga studimi i tij erdhi ne perfundim se planifikimi i gjerise dhe gjatesise se implanteve permes panorameksit dhe metodes TKRK, mbeti i pandryshuar me diametrin e implanteve te implantuara, tek 85% respektivisht 90% te rasteve. Nga studimi i autorit Deeb²¹, rezultoi korelacion (lidhshmeri) 0.77 dhe 0.99 i planifikimit te gjerise se implanteve permes panorameksit dhe TKRK, dhe gjeresine e implanteve te vendosura ne kocke.

PERFUNDIMI

Metoda e panorameksit eshte metode e sigurte per planifikim para-operator te implantimit. Metoda e tomografise se kompjuterizuar me rreze konike (TKRK), ofron te dhena precise per karakteristikat anatomo-morfologjike te procesit alveolar residual, dhe strukturave fqinje. TKRK eshte metoda e duhur ne raste lartesis kockore deficitare. Metoda TKRK mundeson planifikim te sakte te diametrit te implanteve. Metoda TKRK eshte metode e perzgjedhur, per formulim te planit te trajtimit me implante dentare.

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planned using orthopantomogram and CBCT had an agreement of 69% respectively 73%, with the diameter of the placed implants in bone during the implantation phase. The author Sahota²⁰ from his study concluded that the planning of implants width and length using orthopantomogram and CBCT method, remained unchanged in 85% respectively 90% of the cases. From the study of author Deeb²¹ resulted a correlation of 0.77 and 0.99 of the planning of the implant's width using orthopantomogram and CBCT, and implant's width placed in the bone.

CONCLUSION

Orthopantomogram method is a safe method for pre-operative planning of implantation. The cone beam computed tomography (CBCT) gives precise information for anatomical-morphological characteristics of the residual alveolar process and the neighbouring structures. CBCT is the appropriate method in cases with bone height deficiencies. The CBCT method allows precise planning of the implants diameter. The CBCT is the method of choice in formulating the dental implant treatment planning.

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ПАРОДОНТАЛНИ СЛУЧУВАЊА ПРИ ОРТОДОНТСКИ ДВИЖЕЊА НА ЗАБИТЕ РЕВИЈАЛЕН ПРИКАЗ

Цана Амела.

АПСТРАКТ

Цел. Да се посочат биолошките случувања во пародонталните ткива како одговор на ортодонтските сили аплицирани при решавање на одредени малоклузии.

Материјал и метод. Спроведено е електронско пребарување на трудови од базата на податоци PubMed со клучни зборови: periodontitis, orthodontics forces, soft tissue changes, bone changes, објавени на англиски јазик. Предвид беа земени ревијални прегледи, оригинални клинички испитувања и компаративни студии. Индиректно користени се библиографски материјали цитирани во трудовите од авторите: Feller L, Yu Gyung Kim, Angelina Gorbunkova и Nan Jiang.

Резултати. Пародонциумот во целост, а најмногу периодонциумот и алвеоларната коска се ткивата во кои се случуваат мноштво патогенетски механизми при ортодонтско движење на забите. Тековната литература изобилува со податоци кои укажуваат на промени во меките и тврдите ткивни структури на пародонтот. Опишани се причините и последиците од примена на ортодонтска сила врз гингивата (зголемување, инвагинација и рецесија) како можни состојби. Дискутирани се биолошките промени во периодонциумот и алвеоларната коска, активноста на остеобластите и остеокластите. Потврдено е дека клучните ефекти во движење на забите се потпираат на активноста и диференцијацијата на фибробластите, остеобластите и остеокластите кои дефинитивно учествуваат во ремоделирање на коската и корекција на отстапувањето во посакуваната позиција.

Заклучок. Ортодонтски сили својат активност ја реализираат преку бројни посредници кои се ослободуваат од клеточните структури (ензими, MMP-2) и други проинфламаторни или остеогени фактори, кои ги поттикнуваат процесите на ремоделирање главно врз периодонталниот лигамент и алвеоларната коска.

Клучни зборови: periodontitis, orthodontics forces, soft tissue changes, bone changes,

PERIODONTAL DEVELOPMENTS DURING ORTHODONTIC TOOTH MOVEMENTS- REVIEW

Cana Amella

ABSTRACT

Aim: To point out the biological developments in the periodontal tissues in response to the orthodontic forces applied in solving certain malocclusions.

Material and method: An electronic search of papers from the PubMed database was conducted with keywords: periodontitis, orthodontics forces, soft tissue changes, bone changes, published in English. Reviews, original clinical trials, and comparative studies are considered. Indirectly are used bibliographic materials quoted in the articles of the authors: Feller L, Yu Gyung Kim, Angelina Gorbunkova and Nan Jiang.

Results: The periodontium as a whole, and especially the periodontal ligament(PDL) and the alveolar bone remain the tissues in which a numerous of pathogenetic mechanisms occur during orthodontic tooth movement. The current literature abounds with data indicating changes in the soft and hard tissue structures of the periodontium. The causes and consequences of the use of orthodontic force on the gingiva (enlargement, invagination and recession) are described as possible conditions for orthodontic tooth movement. Biological changes in the periodontal ligament and alveolar bone are discussed, the activity of osteoblasts and osteoclasts and all responsible mechanisms that participate in each tissue separately are pointed out as well. It has been confirmed that the key effects in the movement of the teeth rely on the activity and differentiation of fibroblasts, osteoblasts and osteoclasts that definitely remodel the bone and correct the present deviations to the desired condition.

Conclusion: Thanks to a number of mediators released from cellular structures (enzymes, MMP-2) and other proinflammatory or osteogenic factors, orthodontic forces stimulate remodeling processes mainly on the periodontal ligament and alveolar bone.

Keywords: periodontitis, orthodontics forces, soft tissue changes, bone changes



ВОВЕД

Во текот на целиот живот кај секоја индивидуа во физиолошки услови забите прават минимални невидливи движења во нивната позиција со кои го обезбедуваат своето место во забниот лак. Овие движења се резултат на многу промени на пародонциумот од биохемиски, хистолошки, морфолошки, цитолошки и други причини на кои се должи состојбата во устата. Сепак, најголемите случувања се одигруваат во периодонциумот, особено во алвеоларната коска кои се одвиваат благодарение на процесите на апозиција и ресорпција. Првите случувања се продукт на остеобластите, а вторите се резултат на остеокластичната активност. Но, овие процеси се строго избалансирани и во нормални околности не предизвикуваат никакви оштетувања, напротив тие се надополнуваат, одржувајќи го забот во алвеоларната чашка во постојана кондиција. Апострофираните процеси ја ремоделираат коската која заедно со постојаната депозиција на цементот успеваат да одржуваат соодветен однос на коренската површина и алвеоларната чашка, без да се случат поголеми нарушувања во стабилноста и позицијата на забот кога забите имаат задоволителен распоред во забниот лак.¹

Во услови на ортодонтски отстапувања, состојбата се менува и се појавува потреба од ортодонтска интервенција. Третманот на малоклузиите опфаќа примена на постапки кои треба да се превземат за корекција на состојбата, а кои се потпираат токму на овие овие вообичаени и секојдневни физиолошки процеси. Имено, со дозирање строго контролирани сили настанува корекција на присутното отстапување т.е. третирање и контролирање на разни отстапувања во орофацијалниот раст и корекција во формата, развојот на вилицата и поставеност на забите.²

Како одговор на применетите ортодонтски сили, настанува механичка стимулација врз потпорниот апарат на забот, предизвикувајќи повеќекратни промени на меките и цврстите ткива околу забот. Промените се случуваат на морфолошко и хистолошко ниво т.е. во екстрацелуларниот матрикс и клетките предизвикувајќи клеточна пролиферација и диференцијација кои влијаат врз моделирањето на алвеоларната коска.³

Во овие процеси на придвижување, бенефитот од ортодонтскиот третман е очекуван и во најголем број од случаите се евидентира клинички позитивен прогрес. Но ортодонскиот третман има двонасочен ефект, затоа покрај позитивниот, понекогаш

INTRODUCTION

Throughout the life of each individual in physiological conditions the teeth make minimal invisible movements in their position that secure their place in the dental array. These movements in the periodontium are the result of many biochemical, histological, morphological, cytological and other changes at molecular level. However, the greatest developments take place in the periodontium, especially in the alveolar bone, which are based on the processes: “compression and tension”, “apposition and resorption”. The first events in the alveolar bone are the product of osteoblasts, and the second are the result of osteoclastic activity. However, these processes are strictly balanced and under physiological circumstances do not cause any damage, on the contrary, they complement each other, keeping the tooth in the tooth sockets in constant condition. The processes remodel the bone which together with the permanent deposition of cement manage to maintain a proper ratio of the root surface and the dental alveoli, without major disturbances in the stability and position of the tooth, when the teeth have the correct arrangement in the arch, and no other dento-facial disorders. 1

In conditions of orthodontic deviations, the circumstances changes and there is a need for orthodontic intervention. The treatment of malocclusions and aberrations in the orofacial region includes the application of procedures that correct the condition, and which rely on these common and everyday physiological processes. Namely, by dosing strictly controlled forces, a correction of the present disorder occurs, i.e. treatment and control of various deviations in orofacial growth and correction of shape, jaw development and tooth placement. 2

In response to the applied orthodontic forces, mechanical stimulation occurs on the tooth supporting apparatus, causing multiple changes in the soft and hard tissues around it. The changes occur on a morphological and histological level, i.e. in the extracellular matrix and cells causing cell proliferation and differentiation that affect alveolar bone modeling. 3

In these mobility processes, the benefit of orthodontic treatment is expected and in most cases clinically positive progress is recorded. However, orthodontic treatment has a two-way effect, so in addition to the positive, sometimes there are negative effects, i.e. certain risks are possible, in addition to visible improvements. The success of orthodontic treatment is influenced by many factors, including



следат негативни ефекти, т.е. можни се одредени ризици, покрај видливите подобрувања. Ризиците најмногу се однесуваат на алвеоларната коска, но и на пародонциумот во целост. Сепак познато е дека врз успехот од ортодонтскиот третман влијаат многу фактори, меѓу кои пародонталниот статус, оралната хигиена и правилната примена на силите (јачина, насока, времетраење) врз крајната цел придвижување и правилно позиционирање на забите.⁴

Глобално, земено движење на забите под дејство на ортодонтските сили се реализира преку два процеси: инфламаторен кој се случува во пародонталниот лигамент и ремоделација на коската која се одвива во алвеоларната коска.⁵

Овие две структури заедно со цементот се интимно поврзани, го формираат пародонтот што е одбитно значење за движење на забот во посакуваната позиција, но и од клучно значење за пародонталниот статус, евентуални оштетувања или поедини несакани механички индуцирани состојби.⁶

Пародонталниот лигамент (PDL) и алвеоларната коска се двете најважни ткива кои се вклучени во ортодонтското движење на забот, заради тоа и биолошките случувања се примарни токму на овие две ткива во пародонциумот.⁷ Покрај нив пародонциумот го сочинува гингивата и цементот. Сите заедно се главната потпора на забот во алвеоларната чашка, и имаат повеќекратна улога. Го штитат забот од стрес при мастикацијата, го оневозможува продорот на оралната микрофлора во екстрацелуларниот матрикс и ја превенира повредата на крвните и нервни садови.^{8,9} Оттука, при ортодонтско движење на забите покрај пародонциумот и алвеоларната коска, процесите делумно ги опфаќаат и преостатнатите ткива кои го сочинуваат пародонтот.

Целта на оваа статија е да се посочат биолошки случувања во пародонталните ткива како одговор на ортодонтските сили аплицирани при решавање на одредени малоклузии. За реализација на оваа цел спроведено е електронско пребарување на базата на податоци на PubMed со клучни зборови: periodontitis, orthodontics forces, soft tissue changes, bone changes, објавени на англиски јазик. Предвид беа земени ревијални прегледи, оригинални клинички испитувања и компаративни студии. Индиректно беше користен библиографскиот материјал цитиран во трудовите од авторите: Feller L, Yu Gyung Kim, Angelina Gorbunkova и Nan Jiang.

periodontal status, oral hygiene and the proper use of force (strength, direction, duration) on the ultimate goal of moving and correct positioning of the teeth. 4

Globally, the movement of the teeth under the action of orthodontic forces is realized through two processes: inflammatory which occurs in the periodontal ligament and remodeling of the bone that takes place in the alveolar bone. 5

These two structures together with the cementum are intimately connected and together with the gingiva they form the periodontium. The first three tissues are important for the movement of the tooth in the desired position, having an essential role on the periodontal status, and responsibility for possible damage or certain unwanted mechanically induced conditions. 6

The periodontal ligament (PDL) and the alveolar bone are the two most important tissues involved in orthodontic tooth movement, and therefore biological events are primary to these two tissues in the periodontium. 7 In addition, the periodontium consists of the gingiva and the cementum as well. Together they are the support of the tooth in the dental alveoli, and play a multiple role. They protect the tooth from stress during chewing, prevent the infiltration of the oral microflora in the extracellular matrix and prevent the injury of blood and nerve vessels. 8,9 Hence, in orthodontic tooth movement, in addition to the periodontal ligament and alveolar bone, the processes partially involve the remaining tissues.

The purpose of this article is to point out biological developments in periodontal tissues in response to orthodontic forces applied to resolve certain malocclusions. For the realization of this goal has been implemented electronic search of PubMed database with keywords: periodontitis, orthodontics forces, soft tissue changes, bone changes, published in English. Reviews, original clinical trials and comparative studies were considered. The bibliographic material quoted in the works of the authors Feller L, Yu Gyung Kim, Angelina Gorbunkova and Nan Jiang was used indirectly.



СЛУЧУВАЊА ВО ГИНГИВАТА

Гингивата е најповршниот дел на пародонциумот, кој хистолошки се состои од богат клеточен дел-епител и сврзно ткиво во кои доминираат колагени влакна, малку клетки меѓу кои имуни кои се потопени во екстрацелуларен матрикс.¹⁰ Битна улога во одржување на хомеостазата на гингивата има припојниот епител. Преку секреторниот инхибитор на леукоцитната протеаза и S100A9 се реализираат бројните микробни ефекти. Во припојниот епител се детектирани цитокини, хемокини, воспалителен протеини-2 од макрофагите. Сите овие клеточни структури обезбедуваат одржување на физиолошката хемостаза и активно учествуваат во одбраната на ткивото.¹¹⁻¹³

За разлика од епителот на гингивата, сврзното ткиво кој е главната структура на lamina propria и во кој главна улога имаат фибробластите учествува во процесите на хомеостазата и репарација на ткивото. Оваа своја активност ја реализира со помош на колагенот, еластинот, гликопротеините или факторите на раст. Епителните клетки имаат моќ да мигрираат во оштетените сегменти од гингивата и да посредуваат во регенерација на ткивата.¹⁴⁻¹⁵

Фибробластите покажуваат капацитет на клеточна пролиферација и миграција, миофибробластична диференцијација и ремоделирање на колагенот, заради што имаат позитвен ефект врз гингивата во физиолошки услови или состојби на оштетување. Сепак, неговиот капацитет не е неограничен, напротив тој е прилично варијабилен и зависи од многу фактори, меѓу кои возраста е посочена како една од важните компоненти кои влијаат врз заздравување на оштетените сегменти од пародонтот.¹⁶⁻¹⁹ Овие факти се експериментално потврдени.²⁰

Вон физиолошките услови, за време на ортодонтско движење на забите можни се одредени негативни ефекти врз гингивата. Гингивата може да реагира со прекумерен раст (гингивално зголемување), рецесии на гингивата и гингивални инвагинации, кои најчесто се јавуваат во случаи на ортодонтска екстракција.²

Во клиничката пракса кај пациенти кои се ортодонтски третирани се појавуваат и одредени несакани ефекти. Кај најголем дел од пациентите се регистрираат гингивални зголемувања (хиперплазија), причина за создавање лажни гингивални џепови каде епителниот припој сеуште е на емајлово-цементното споиште, или пак лажни пародонтални џепови. И едните и другите се одлична подлога за

DEVELOPMENTS IN THE GINGIVA

The gingiva is the superficial part of the periodontium, which histologically consists of a rich cellular epithelium and connective tissue dominated by collagen fibers, a few cells of which are supportive and immune immersed in an extracellular matrix.¹⁰ An important role in maintaining homeostasis has the junctional epithelium. Numerous microbial effects are realized through the secretory leukocyte protease inhibitor and S100A9. Cytokines, chemokines, inflammatory proteins-2 from macrophages were detected in the junctional epithelium. All of these cellular structures ensure the maintenance of physiological haemostasis and actively participate in tissue integrity.¹¹⁻¹³

Unlike gingival epithelium, the connective tissue which is the main structure of lamina propria and in which fibroblasts play a major role participates in the processes of homeostasis and tissue repair. It carries out this activity with the help of collagen, elastin, glycoproteins or growth factors. Epithelial cells have the power to migrate to damaged segments of the gingiva and mediate tissue regeneration.¹⁴⁻¹⁵

Fibroblasts show the capacity for cell proliferation and migration, myofibroblastic differentiation, and collagen remodeling, thereby showing a positive effect on the gingiva under physiological or degenerative conditions. However, its capacity is not unlimited, on the contrary it is quite variable and depends on many factors, including age as one of the important factors that affect the healing of damaged segments of the periodontium.¹⁶⁻¹⁹ These data are experimentally confirmed.²⁰

Outside of physiological conditions, certain negative effects on the gingiva are possible during orthodontic tooth movement. The gingiva may respond with overgrowth (gingival enlargement), gingival recessions and gingival invagination, most commonly in cases of orthodontic extraction.²

In clinical practice in patients who are orthodontically treated, certain side effects occur. In most of them, gingival enlargements (hyperplasia) are registered, the reason for creating false gingival pockets where the epithelial attachment is still on the cemento enamel junction, or false periodontal pockets. Both are excellent substrates for plaque accumulation and cause initiation or progression of periodontal damage under orthodontic care.²¹⁻²²



акумулација на плак, и причина за иницијација или прогресија на оштетување на пародонтот во услови на ортодонтско оптеретување.²¹⁻²²

Од тие причини одржување на оралната хигиена е прва препорачлива мерка, но, литературата посочува дека кај поединци евидентирана е одлична орална хигиена, а сепак е присутна гингивална хиперплазија²³. Во овие услови како можни причинители се апострофираат применетите материјали (никел, челик) од кои се направени сајлите или брекетите. Во првиот случај приоритетот и припаѓа каде механичката траума последица на нивната примена²⁴ или пак се посочува алергична компонента²⁵. Претпоставката дека механичниот стрес може да има клучна улога во гингивалното зголемување е потврдена со високи вредности на матриксметалопротеиназите (ММР), поточно ММР-8, ММР-9 кои се детектирани во гингивалниот цевикларен флуид (GCF), кај пациенти без клинички знаци на гингивит.²⁶

За време на ортодонтскиот третман можна е појава на гингивални инвагинации. Регистрирано е дека тие се почести при доцно по вадење на забот со варијабилност на клиничките знаци (GIs).²⁷

Многу често наидуваме на гингивална рецесија²⁸, која е истовремено и естетски и функционален проблем кај ортодонтски третирани пациенти.

Покрај чувствителност на коренот на забот, зголемена е можноста за појава на кариес, абразија на забите или проблематично одржување оралната хигиена.

Гингивалната рецесија (GR) може да биде последица на ортодонтскиот третман (ORT), бидејќи е регистрирана кај 10-12%, но не е апсолутно присутна.²⁹ Таа може да биде последица на несоодветна техника на четкање³⁰⁻³¹, анатомски и морфолошки отстапувања на алвеоларната коска, тенка кортикална ламина и многу други причини.³² Од овој аспект гледано, како причини за појава на рецесиите вреди да бидат споменати намалена ширина на прикрепена гингива³³, или тенок биотип на гингивата³⁴. Пронајдена е силна корелација помеѓу тенкиот биотип на гингива, проинклинално ортодонтско движење и ширината на кератинизираната гингива.³³

СЛУЧУВАЊА ВО ПЕРИОДОНЦИУМОТ

Главната маса на периодонталниот лигамент (PRL) е сврзно ткиво. Во него доминираат колагени влакна продукт на фибробластите, но и клетки од формативен (цементобласти, остеобласти, фибро-

Therefore, maintaining oral hygiene is the first recommended measure, although the literature indicates that individuals have excellent oral hygiene, and still gingival hyperplasia is present.²³ In these conditions, the possible causes are the applied materials (nickel, steel) of which are made wires or brackets. In the first case, the consequences are due to mechanical trauma²⁴ or an allergic component²⁵ is suggested, detected in gingival cervical fluid (GCF), in patients without clinical signs of gingivitis.²⁶

Gingival invagination is possible during orthodontic treatment. They have been reported to be more common after late tooth extraction with variable clinical symptomatology (GIs).²⁷

Very often we encounter gingival recession²⁸, which is both an aesthetic and functional problem in orthodontically treated patients.

In addition to the sensitivity of the tooth root, the possibility of caries, tooth abrasion or problematic oral hygiene is increased.

Gingival recession (GR) can be a consequence of orthodontic treatment (ORT) - registered in 10-12%, but not the absolute cause of the condition.²⁹ It can be a consequence of improper brushing technique³⁰⁻³¹, anatomical and morphological deviations of the alveolar bone, thin cortical lamina and many other reasons. From this point of view, the reasons for the occurrence of recessions are worth mentioning the reduced width of the attached gingiva³³, or a thin biotype of the gingiva³⁴. A strong correlation was found between thin gingival biotype, proinclinal orthodontic movement, and the width of the keratinized gingiva³³, although orthodontic tooth movement is a well-established factor in many studies.

DEVELOPMENTS IN THE PERIODONTIUM

The main mass of the periodontal ligament (PRL) is connective tissue. It is dominated by collagen fibers, a product of fibroblasts, but also cells of formative (cementoblasts, osteoblasts, fibroblasts) and defense character, progenitor cells, blood, nerve and lymph vessels immersed in extracellular matrix.³⁵⁻³⁶

Fibroblasts predominate in the periodontium, accounting for approximately 25-30% of the volume space and 50-60% of the total cellularity in the periodontium.³⁷ They play a major role in remodeling



бласти) и одбрамбен карактер, прогениторни клетки, крвни, нервни и лимфни садови потопени во екстрацелуларен матрикс.³⁵⁻³⁶

Во периодонциумот преовладуваат фибробласти кои сочинуваат приближно 25-30% од волуменскиот простор и 50-60% од вкупната целуларност во периодонциумот.³⁷ Тие имаат главна улога во ремоделирање на PRL. Тие имаат можност брзо да се размножуваат и динамично да мигрираат. Се верува дека фибробластите се изложени на физички или биохемиски стимули, можат да се диференцираат во остеоласти или цементобласти со индукција на mRNA на c-fos или активирање на патот ERK / JNK.³⁸⁻³⁹

Благодарение на колагените влакна и Шарпеовите влакна кои инсерираат во цементот на коренот на забот и алвеоларната коска периодонциумот ја обезбедува неговата основна потпорната улога.⁴⁰

За разлика од формативните, одбрамбените клетки (макрофаги, мастоцити, лимфоцити, плазма клетки) имаат повеќекратна улога главно заштитна, но истовремено тие имаат улога на посредници при размножување на фибробластите и ендотелните клетки. Оваа своја улога ја реализираат благодарение на факторите на раст и цитокините.⁴¹

Во почетната фаза на ортодонтското движење на забите периодонциумот станува хиперемичен, едематозен и инфилтриран со воспалителни клетки.⁴²

Зголемениот клеточен инфилтрат во периодонталниот простор влијае врз еластичноста на лигаментот и алвеоларната коска. Во овој случај постои прогресивно намалување на можноста за истегнување на колагените влакна како последица на матрикс металопротеиназите и другите катаболни агенси.⁴³

Во раната фаза на ортодонтското придвижување се јавува типичен акутен инфламаторен одговор, кој се карактеризира со васкуларни промени т.е. вазодилатација на крвните капилари во периодонталниот лигамент, кој истовремено предизвикува миграција на леукоцитите надвор од нив.⁴⁴ Леукоцитите ослободуваат цитокини-локални биохемиски сигнални молекули, кои дејствуваат директно или индиректно на таргет клетките. Овие промени се причина за синтеза и ослободување на супстанции како невротрансмитери, цитокини, фактори на раст, колоно-стимулирачки фактори, ензими и пропација на сигнални каскадни реакции. Тие хемиски супстанции ги индуцираат клет-

the PRL. They also have the ability to multiply rapidly and migrate dynamically. Fibroblasts are believed to be exposed to physical or biochemical stimuli, and can be differentiated into osteoblasts or cementoblasts by induction of c-fos mRNA or activation of the ERK / JNK pathway.³⁸⁻³⁹

Thanks to the collagen fibers and Sharpey's fibres that insert into the cementum of the tooth root and alveolar bone, the periodontal ligament provides its basic supporting role.⁴⁰

Unlike formative, defense cells (macrophages, mast cells, lymphocytes, plasma cells) have multiple roles mainly protective, but are also mediators in the proliferation of fibroblasts and endothelial cells. They fulfill this role thanks to growth factors and cytokines.⁴¹

In the initial stage of orthodontic tooth movement, the periodontal ligament becomes hyperemic, oedematous, and infiltrated with inflammatory cells.⁴²

Increased cell infiltrate in the periodontal space affects the elasticity of the ligament and alveolar bone. In this case there is a progressive reduction in the possibility of stretching of the collagen fibers, causing stiffness of the fibrous part. At this stage there is an overproduction of the matrix metalloproteinases and other catabolic agents that complement the pathogenic developments in the periodontal ligament.⁴³

In the early stage of orthodontic movement there is a typical acute inflammatory response, which is characterized by vascular changes, vasodilation of blood capillaries and leukocyte migration into the periodontal ligament.⁴⁴ Leukocytes release cytokine-local biochemical signaling molecules that act directly or indirectly on target cells. These changes cause the synthesis and release of substances such as neurotransmitters, cytokines, growth factors, column-stimulating factors, enzymes, and the propagation of signal cascading reactions. These chemicals induce cells (osteoblasts and osteoclasts) to activate, and at the same time stimulate precursor cells in the periodontal ligament to transform into appropriate ones to perform their biological function.⁴⁵⁻⁴⁷

With the application of orthodontic forces, the fibers begin to change morphologically and histologically. Some of them stretch, and some of them loosen depending on the direction of the force. In parallel with these processes, the blood flow in the periodontal space changes, which affects the changes in the configuration of the proteins and the extracellular matrix.



ките (остеобластите и остеокластите) да се активираат, а истовремено и ги стимулираат клетките прекурсори во пародонталниот лигамент да се трансформираат во соодветни за да ја реализираат својата биолошка функција.⁴⁵⁻⁴⁷

Со текот на примена на ортодонтските сили влакната почнуваат морфолошки и хистолошки да се менуваат. Некои од нив, се истегнуваат, а некои се олабавуваат зависно од правецот на дејство на силата. Паралелно со овие процеси се менува протокот на крв во пародонталниот простор, со што се менува конфигурацијата на протеините и екстрацелуларниот матрикс.

Одредени протеини кои се активирани под дејство на ортодонтските сили, како и одредени механички индуцирани сигнали ги стимулираат гените кои кодираат неколку протеини и ензими кои имаат суштинско значење во процесот на ремоделирање на екстрацелуларниот матрикс во пародонталниот лигамент.⁴⁸ Клетките различно реагираат под дејство на ортодонтските сили во PDL. Така, во зоните на компресија, доминираат катаболички процеси, а во зоните на притисок претежно се присутни анаболните активности. Благодарение на сите биохемиски, хистолошки и молекуларни процеси настануваат промени кои резултираат во координирано ремоделирање на PDL кој е од суштинско значење за ортодонтското движење на забите.⁴⁹

Ортодонтското придвижување на забите во одредена мера се разликува од нормалното физиолошко придвижување, бидејќи се формираат јасно дефинирани зони на тензија и компресија во пародонталниот лигамент. Физиолошкото придвижување е подолготраен процес, кој обично е движење во мезијална насока или насока на движење кон помал отпор. Во спротивно, ортодонтското индуцирано придвижување може да биде диригирано брзо и побавно (зависно од физичките карактеристики на зададената сила) во било која зададена насока.⁵⁰ Сите овие ефекти се последица на два неразделни процеси: инфламаторен кој се случува во пародонталниот лигамент и коскена ремоделација (ресорпција и апозиција) кој се случува во алвеоларната коска.

СЛУЧУВАЊА ВО АЛВЕОЛАРНАТА КОСКА

Како и сите други ткива во пародонциумот и алвеоларната коска претрпува промени при дозирање сили за ортодонтско поместување на забите. Правилното позиционирање на забите кое е долготраен процес,

Certain proteins that are activated by orthodontic forces, as well as certain mechanically induced signals, stimulate genes that encode several proteins and enzymes that are essential in the process of remodeling the extracellular matrix in the periodontal ligament.⁴⁸ Cells react differently under the action of orthodontic forces in the PDL. Thus, in the compression zones, catabolic processes dominate, and in the pressure zones, anabolic activities are predominantly present. Thanks to all biochemical, histological and molecular processes, changes result in coordinated remodeling of the PDL during orthodontic tooth movement.⁴⁹

Although there are great similarities between the physiological and orthodontic movement of the teeth, the orthodontic movement of the teeth differs from the physiological one to a certain extent because clearly defined zones of tension and compression are formed in the periodontal ligament. Physiological movement is a longer process, which is usually a movement in the mesial direction or a direction of movement towards a lower resistance. In contrast, orthodontic induced movement can be directed faster and slower (depending on the physical characteristics of the given force) in any given direction, depending on the condition of the individual. However, regardless of all these effects are a consequence of two inseparable processes: inflammatory which occurs in the periodontal ligament and bone remodeling (resorption and apposition) which occurs in the alveolar bone.

OCCURRENCES IN THE ALVEOLAR BONE

Like all other tissues in the periodontium alveolar bone undergoes changes in the dosing force for orthodontic tooth movement. Proper positioning of the teeth, which is a long process, is based on biochemical, histological and morphological changes of the alveolar bone, which differ significantly from each other, developments on the side of compression and tension.

The biological mechanisms responsible for bone remodeling can be described by “compression-tension” theory.

On the compression side, the periodontal ligament is compressed, vascularization is reduced, osteoblast cells die, and osteoclasts are activated that begin resorption of the alveolar bone. On the other side of the tooth side of tension, osteoblasts that create bone tis-



се базира на биохемиски, хистолошки и морфолошки промени на алвеоларната коска, кои битно се разликуваат на страната на компресија и тензија.

Биолошките механизми, кои се одговорни за remodelација на коската можат да бидат опишани со теоријата на “компресија-тензија“.

На страната на компресија, периодонталниот лигамент е притиснат, васкуларизацијата се намалува, клетките-оosteобласти изумираат, а се активираат остеокластите кои ја започнуваат ресорпцијата на коската. Од другата страна на забот-страната на тензија, се активираат остеобластите кои создаваат коскено ткиво.⁵¹⁻⁵⁵

Всушност на страната на компресија доминираат процесите на ресорпција на алвеоларна коска. Доминантната остеокластична активност, предизвикува неправилни шуплини во коскениот субстрат кој подоцна ќе се пополни со новоформирана коска поради активноста на остеобластите.

Генерално во целиот овој процес доминираат две последователни постапки: првата - ресорпција на коската (разложување на минералите) и втората - деградација на органскиот матрикс.⁵⁶ Овие процеси се остваруваат со посредство на ензими, матрикс металопротеиназа (ММП) и лизозом цистеин протеинази. ММП се неопходни фактори кои учествуваат во ремоделирање на алвеоларната коска. Во овој контекст вредностите на ММП-2 протеинот се зголемуваат на страната на компресија пропорционално со времето на апликација, достигнувајќи врв по осум часа од дозирање на ортодонтската сила. На страната на тензија, ММП-2 значително се зголемува по еден час апликација на сила, но постепено се враќа на почетната состојба во рок од осум часа.⁵⁷

Во коскената remodelација, на двете страни (компресија и апозиција) вклучени се и испреплетени биохемиски и хистолошки случувања чиј краен ефект е ресорптивни и апозициони сегменти на ѕидот на алвеоларната чашка.

На страната на компресијата настанува нарушување на протоколот на циркулација, клеточна смрт, ресорпција на хиализираното ткиво од страна на макрофагите и поткопување на коскената ресорпција од страна на остеокластите.

На страната на тензија, алвеоларната коска, PDL и цементот се ремоделираат благодарение на остеобластната активност, кои создаваат најнапред остеоид или колаген тип I, по што следи минерализација на коската.⁵⁸ Ортодонтското оптеретување

sue are activated, stimulating the processes of bone apposition. 51-55

In fact, on the compression side, resorption processes dominate with dominant osteoclastic activity. The result of this activity is the creation of irregular cavities in the bone substrate which will later be filled with newly formed bone due to the activity of osteoblasts.

Generally, this whole process is dominated by two consecutive procedures: the first - bone resorption (decomposition of minerals) and the second - degradation of the organic matrix.⁵⁶ These processes are mediated by enzymes, matrix metalloproteinase (MMP) and lysosome cysteine proteinases. MMPs are essential factors involved in alveolar bone remodeling. In this context, the values of MMP-2 protein increase on the compression side in proportion to the time of application, reaching a peak eight hours after dosing orthodontic force. On the tension side, MMP-2 increases significantly after one hour of force application, but gradually returns to baseline within eight hours.⁵⁷

In bone remodeling, on both sides (compression and bone apposition) are involved intertwined biochemical and histological events resulting in resorptive and bone apposition segments of the alveoli wall.

On the compression side, there is a disturbance of circulation flow, cell death, resorption of hyaline tissue by macrophages, and undermining of bone resorption by osteoclasts.

On the tension side, the alveolar bone, PDL, and cementum are remodeled by osteoblast activity, which first produces osteoid or type I collagen, followed by bone mineralization. Orthodontic strain can cause micro bone damage and associated fluid changes, while flow in the lacuno-canalicular network (LCN) can also cause apoptosis, where signals from osteocytes in the apoptotic process have the capacity to recruit osteoclasts in the zone of micro damage. These processes are necessary because they participate in bone remodeling.⁵⁹

Local release of inflammatory mediators, cytokines and growth factors, endothelins, prostaglandin E2, vascular endothelial growth factor (VEGF) and TGF- β , has a strong influence on these processes complementing bone remodeling processes by facilitating orthodontic tooth movement.⁶⁰



може да предизвика микро оштетување на коската и придружни промени во течноста, додека пак протокот во лакуноканакуларната мрежа исто така може да предизвика нивна апоптоза, каде сигналите од остеоцитите во процесот на апоптоза имаат капацитет да регрутираат остеокласти во зоната на микрооштетување. Овие процеси се неопходни бидејќи, тие учествуваат во коскената ремоделација.⁵⁹

Во овие процеси силно влијание има локалното ослободување на воспалителни медијатори, цитокини и фактори на раст, ендотелини, простагландин E2, васкуларен ендотелен фактор на раст (VEGF) и TGF- β кои ги дополнителнуваат процесите на коскеноото ремоделирање олеснувајќи го ортодонтското движење на забот.⁶⁰

Сепак сеуште останува отворено прашањето дали може еден вид ортодонтска сила со специфична големина и фреквенција по можност да ги активираат остеобластите, додека друга сила со други карактеристики да ги активира остеокластите?

ЗАКЛУЧОК

Ортодонтски сили кои се применуваат со цел корекција на одредени отстапувања се пренесуваат главно врз пародонталниот лигамент и алвеоларна коска. Оваа активност ја реализираат преку бројни посредници кои се ослободуваат од клеточните структури (ензими, MMP-2) и други проинфламаторни или остеогени фактори. Сите овие ги поттикнуваат процесите на ремоделација.

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However, still remains the question whether one type of orthodontic force with a specific size and frequency can possibly activate osteoblasts, while another force with other characteristics can activate osteoclasts?

CONCLUSION

Orthodontic forces applied to correct certain deviations are transmitted mainly to the periodontal ligament and alveolar bone. This activity is realized through numerous mediators that are released from cell structures (enzymes, MMP-2) and other proinflammatory or osteogenic factors. All of these stimulate bone remodeling processes, which correct the diagnosed deviation.

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GRAFTIMI I DEFEKTEVE KOCKORE ME "ADG" NË PJESËN DISTALE TË DHËMBALLËS SË DYTË, I SHKAKTUAR NGA EKSTRAKSIONI I DHËMBALLËS SË TRETË MAKSILARE

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AUTOGENOUS DENTIN GRAFTING OF OSSEOUS DEFECTS DISTAL TO MAXILAR SECOND MOLARS AFTER EXTRACTION OF IMPACTED THIRD MOLARS

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ABSTRAKTI

Resorbimi i ashtit në pjesën distale të mollarit të dytë ndodhë shpesh pas ekstraksionit të mollarëve të tretë të impaktuar. Në këtë studim u ekzaminua shërimi i ashtit duke ndjekur metodën e GBR (Guided Bone Regeneration) në trajtimin e defekteve kockore në pjesën distale të mollarit të dytë, që shkaktohen nga ekstraksioni i mollarit të tretë të impaktuar, të inklinuar horizontalisht ose mezialisht. Si material për graftim u përdor mollari i tretë i përpunuar pas ekstraksionit.

-Pas nxjerrjes kirurgjikale të mollarëve të tretë, dhëmbët e nxjerrë u pastruan nga çdo ind i butë, duke përfshirë ligamentin parodontal, pastaj u bluan dhe dezinfektuan duke përdorur një protokoll bluarje për të prodhuar një graft autolog të dentinës (ADG). Me materijalin graftues më pas u mbushim alveolën dhe e mbuluam më sfungjer hemostatik-Gelatamp para qepjes së plagës. Ana e kontrollit (djathtas) iu nënshtrua të njëjtave procedura si në anën e studimit (majtas) me çrast asnjë materijal augmentus nuk u vendos në alveolë.

-Niveli kockor alveolar në pjesën distale të mollarit të dytë matet me anë të thellësisë të sondimit dhe në menyrë radiografike të cilat krahasohen në mes të dy anëve.

Janë kryer ekzaminime klinike dhe radiologjike, duke përfshirë radiografi panoramike dhe thellësi të sondimit para dhe 3 muaj pas intervenimit kirurgjik.

HYRJA:

Nxjerrja kirurgjikale e mollarëve të tretë shkakton traumë dhe gdhendje të ashtit përreth varësisht nga pozicioni i dhëmbit, angulimi dhe anatomomorfologjia

ABSTRACT

Bone loss at the distal aspect of mandibular or maxillary second molars frequently is reported after extraction of impacted third molars. This study examined osseous healing following guided bone regeneration treatment of osseous defects distal to maxillary second molars after surgical removal of impacted mesioangular or horizontally inclined third molars using the processed third molar as the graft material.

-After surgical extraction of the third molars, the extracted teeth were stripped of any soft tissue, including the periodontal ligament, then grinded and disinfected using a dentin grinding protocol to produce an autogenous dentin graft (ADG). This graft was then placed into the extraction socket and covered with a hemostatic sponge prior to site closure. On the control (right) site underwent the same procedure as those in the left (study) site except that no ADG was placed into the socket.

-The alveolar bone level distal to the second molar was established by both probing depths and radiographic evaluation, which were compared between the two sites.

Clinical and radiological examinations were performed, including panoramic radiographs and probing depths before and 3 months postoperatively.

INTRODUCTION :

-Surgical extraction of impacted maxillary third molars causes trauma, with the level of necessary bone removal dependent on the tooth's position and angulation as well as the anatomy of the patient. The ex-



e nfullës së pacientit. Nxjerrja mund të çojë në resorbimin e pjesës distale të alveolës së molarit të dytë dhe në eksponimin e rrënjës distale(1,2). Trajtimi kirurgjikal i mollarëve të tretë kërkon ngritjen e një lemboje të plotë mukoperiostale, osteotomi për të arritur deri tek dhëmbi dhe separim të dhëmbit për të lehtësuar nxjerrjen.

Heqja kirurgjike e mollarëve të tretë maksilarë mund të rezultojë në defekte intraoseale në pjesën distale të molarit të dytë(3-5). Këto ndërlikime mund të jenë më të mëdha tek pacientët e moshuar për shkak të zvogëlimit të vëllimit të kockave, shërimit të ngadaltë ose sëmundjeve të tjera të pranishme siç janë parodontiti ose osteoporozë(6).

Në studimin nga Kugelberg, shërimi periodontal u krahasua në 2 dhe 4 vjet pas ekstraktimit të mollarit të tretë mandibular të impaktuar. Në 2 vjet pas intervenimit kirurgjik, 16.7% e rasteve të pacientëve të moshës ≤ 25 vjeç kishin defekte intraoseale më shumë se 4 mm krahasuar me 40.7% në grupmoshën > 25 vjeç, dhe në ri-ekzaminimin 4-vjeçar shifrat përkatëse ishin 4.2% dhe 44.4%, përkatësisht. Bazuar në këto rezultate mund të konkludohet se nxjerrja standarde kirurgjike e molarit të tretë të impaktuar mund të çojë në një status paradontal të kompromituar të molarit të dytë, i cili mund të kërkojë trajtim shtesë kirurgjik në të ardhmen.

Grafti autolog i dentinës(ADG) i përgatitur dhe i përpunuar mund të përdoret për rigjenerim kockor të drejtuar(GBR) sepse ka veti dhe përbërje të ngjajshme biokimike me kockën e njeriut.

QËLLIMI:

Në materialin tonë klinik të provojmë dhe të studiojmë efikasitetin e graftit autolog të dentinës në augmentimin e defekteve kockore që shkaktohen pas nxjerrjes së molarit të tretë maksilar dhe përveç asaj të:

1. Tregojmë procedurën e re të përgatitjes dhe fitimit të graftit autolog të dentinës me procedurë imediatë të graftimit në regjionin e duhur.
2. Të bëjmë evaluimin klinik dhe radiologjik të kapacitetit rigjenerues të indeve kockore dhe të buta dhe krahasimin e tyre me regjionin e kundërt i cili nuk i është nënshtruar asnjë procedure graftimi.

traction may lead to distal root surface resorption of the second molar and residual osseous defects(1,2).

Surgical treatment of impacted third molars often requires use of a full-thickness mucoperiosteal flap, bone removal by means of osteotomy to access the impacted tooth, and sectioning of the tooth to allow removal.

Surgical removal of impacted maxillary third molars may result in infrabony defects (IBDs) at the distal aspect of the second molar (3-5). These complications might be greater in older patients due to reduced bone volume, slow healing, or other diseases present such as periodontitis or osteoporosis(6).

The study by Kugelberg, periodontal healing was compared at 2 and 4 years after impacted mandibular third molar extraction. At 2 years postoperative, 16.7% of the cases of patients aged ≤25 years had IBD of more than 4 mm compared to 40.7% in the age group >25 years, and at the 4-year re-examination the corresponding figures were 4.2% and 44.4%, respectively.

Based on these results it may be concluded that standard surgical impacted third molar extraction could lead to a compromised periodontal status of the adjacent second molar, which might necessitate additional future surgical treatment. Autogenous dentin graft (ADG) prepared chairside may be used for guided bone regeneration (GBR) because it has similar biochemical contents and characteristics to human bone. Possessing osteoconductive, osteoinductive and osteogenic properties(7,8). Both alveolar bone in maxillofacial region and teeth embryologically are derived from the same neural crest cells.

MATERIALS AND METHODS :

1. Clinical parameters :

-Using special Questionnaires, following the healing potential of this graft in osseous defects distal to second molars placed at the time of third molar extraction surgery, compared to another site that underwent a standard impacted third molar extraction surgery without any additional GBR procedure.

Patients were evaluated at 7,15 days and 3 months, postoperatively to assess wound healing. At these appointments, patients were given a questionnaire to evaluate postoperative pain, swelling, use of NSAID.

It is also important to describe possible postoperative complications (infection-swelling, paraesthesia, hematoma, dehiscence, etc.)



MATERIALE DHE METODA:

1. Parametrat klinike:

Përdorimi i **Pyetësorit** të veçantë, për të ndjekur potencialin shërues të këtij grafiti në defektet kockore të mollarëve të dytë, përdorur në mënyrë imediate pas ekstraktimit të mollarit të tretë, krahasuar me anën tjetër (18) që iu nënshtrua një operacioni standard të ekstraktimit të mollarit të tretë të impaktuar, pa ndonjë procedurë shtesë augmentuese - GBR.

Pacientët u kontrollua 7,15 ditë dhe 3 muaj, pas operacionit për të ndjekur procesin e shërimit të plagës. Në këto takime, pacientëve iu nënshtruan një Pyetësori për të vlerësuar dhimbjen postoperative, ënjtjen, përdorimin e NSAID etj.

Gjithashtu me rëndësi është që të përshkruhen edhe komplikimet e mundshme postoperative (infeksioni, ënjtja, parestezija, hematoma, dehiscenca, etj.)

2. Ekzaminimi paraklinik-radiografik:

Radiografa panoramike është kryer 3 muaj pas operacionit për të vlerësuar rigjenerimin e indit kockor si dhe për të përjashtuar patologjitë që mund të kenë ndodhur nga operacioni.

Radiografitë panoramike janë kryer para operacionit dhe 3 muaj pas operacionit në të cilat është bërë matja e dendësisë së ashtit me anë të softuerit IMAGE J (versioni 1,36 i aprovuar nga Instituti Nacional Amerikan i Shëndetësisë) i cili përdoret për të analizuar (zonat e interesit-ROI me vlera numerike nga 0-250 grey në 1 piksel të imazhit).

Me ndihmën e këtij softueri bëhet matja e dendësisë dhe mineralizimit të ashtit të sapoformuar në regjionin e augmentuar në krahasim me regjionin e kundërt ku nuk është kryer augmentim.

Gjithashtu me anë të RTG panoramës bëjmë matjen e defekteve kockore vertikale distalisht nga molari i dytë.

RAPORTIM I RASTIT:

Pacienti në gjendje të mirë shëndetësore, pa sëmundje periodontale, dhe ka të paktën një molarë maksillar të impaktuar, i cili në raport me molarin e dytë maksillar ishte horizontalisht ose mezialisht i inklinuar. Para fillimit të intervenimit pacienti nënshkroi Pëlqim (Consent Form) për pjesmarrje në studim dhe për përdorimin e grafitit autogjen të dentinës për mbushjen e defektit oseal në pozicion të dhëmbit 28.

2. Paraclinical-Radiographic Examination :

- Panoramic radiographs were performed at 3 months postoperatively to evaluate bone preservation/regeneration and to exclude pathologies that might have occurred from surgery.

An orthopantomogram was performed preoperatively and 3 months postoperatively to measure bone density with Software Image J (version 1.36b issued by the American National Institutes of Health) used to analyze ROI (numerical area of interest). values from 0-250 in 1 pixel of the image).

-This can show the degree of mineralization and density of the newly formed bone tissue in the appropriate augmented region, compared to the opposite region where augmentation has not been performed. (10)

Also, with the help of digital panoramix, vertical measurements of vertical bone defects are performed distally from the second molar.

CASE REPORT:

Patient was willing to participate in the study, is in good general health, without periodontal disease, and have at least one IMMT (impacted maxillary molar teeth) that was horizontally inclined in relation to the second molar. After that patient receipt and signed the informed consent for using ADG in osseous defect in position 28.

Presurgical Procedures

Prior to IMMT surgery, patient medical history was recorded, including medicine usage and background diseases, and a panoramic radiograph was performed to establish the angle of impaction, the relation of the IMMT to the distal aspect of the second molar, and also whether any infectious lesions were present in the oral cavity.

The autogenous dentin was created following extraction of the IMMT utilizing the Smart Dentin Grinder (fig.3) with the protocol for Mineralized Dentin Graft.

-The extracted tooth fragments were cleaned to remove caries if present as well as periodontal ligament (PDL) remnants. The tooth was grinded into particles using the dentin grinder machine. Fig... The particles were then saturated for 10 minutes in a dentin cleanser solution (sodium hydroxide solution mixed in 20% ethanol) this was followed by a phosphate buffered saline wash, resulting in a bacteria free, autogenous graft material ready for implantation (fig.2).



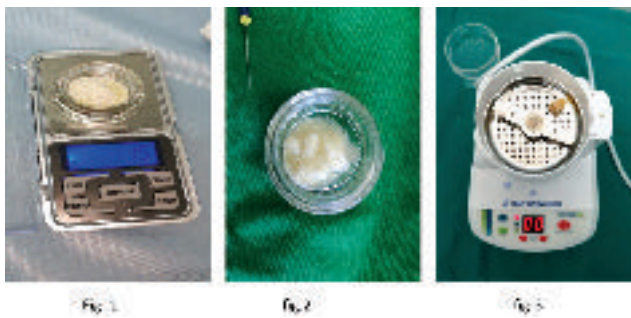
Para operacionit është regjistruar historia mjeksore e pacientit, duke përfshirë medikamentet që ai përdor dhe sëmundjet shoqëruese.

Grafti autogjen nga dentina u formua nga mollari i tretë maksilar i impaktuar duke përdorur Smart Dentin Grinder (fig.3) bazuar në protokollin për përfitimin e Graftit të Dentinës së Mineralizuar.

Dhëmbi(28) i nxjerrë u pastrua nga mbetjet e ligamentit paradontal, u blua në grimca të vogla prej 300-1200 mikron duke përdorur aparatën për bluarjen e dhëmbëve(SDG).

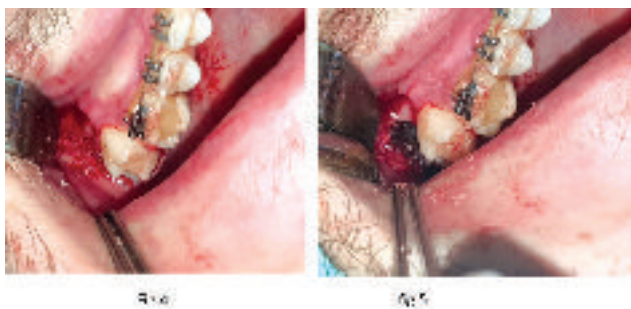
Grimcat më pas u nënshtruan për 10 minuta në një tretësirë për pastrimin e dentinës (tretësirë hidrokسيد natriumi e përzier në 20% etanol) kjo u pasua nga një larje me tretje fiziologjike të puferizuar(PBS) duke rezultuar në një material graftimi pa baktere, autogjene të gatshme për implantim.

Në këtë rast pas bluarjes së dhëmbit u fitua 1.5 gram graft material i gatshëm për graftim imediat. (Fig 1)



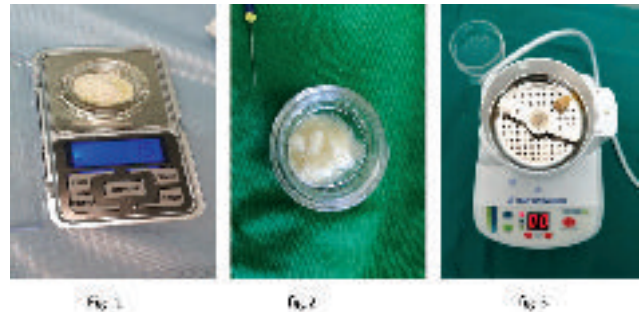
-Pas intervenimit kirurgjik pacienti filloi me antibiotike (Amoksicilin+Clavunic Acid 1000 mg S.2X1) për qëllime profilaktike dhe analgetik sipas nevojës.

Pacienti u udhëzua që të shpërlante gojën me solution Klorheksidine 2 herë në ditë për 14 ditë. Sururat u hoqën 10 ditë pas operacionit.



Grafti autolog i dentinës u aplikua në alveolën e dhëmbit të nxjerrë dhe u la që të njomet me gjakun e pacientit (fig .4) Grafti pastaj u mbulua me një sfungjer hemostatik zhelatinoz të absorbueshëm-Gelatamp(fig 5.) ,më pas lemboja u mbyll per primam me qepje vikrile 4-0.

In our specific case, a quantity of 1.5 gr (fig.1) autologous dentin graft material was obtained, ready for immediate grafting.



Postoperatively was ordained prophylactic antibiotics, amoxicillin 1000 mg twice per day, and non-steroidal anti-inflammatory drugs (NSAIDs) that were prescribed according to individual needs. The patients were instructed to rinse with 0.12% CHX-based solution twice daily for 14 days. Sutures were removed 10 days postoperatively.



The ADG was packed into the osseous defect related to the extracted tooth and allowed to moisten with the patient's blood in the site(fig 4).The ADG was then overlaid with an absorbable hemostatic gelatin sponge(fig.5), and the flap was closed by primary intent with 4-0 vicryl sutures.

AIM :

-On our own clinical trial is to examine and prove the effectiveness of ADG in filling bone defects in the jaw bones created after extraction of impacted maxillary molar and to:

1. Present the new procedure for preparation and obtaining ADG with immediate grafting procedure in the desired region.
2. To make a clinical and radiological evaluation of the healing capacity of the bone and soft tissue structures and its comparison with the opposite region where augmentation was not performed with any graft material.

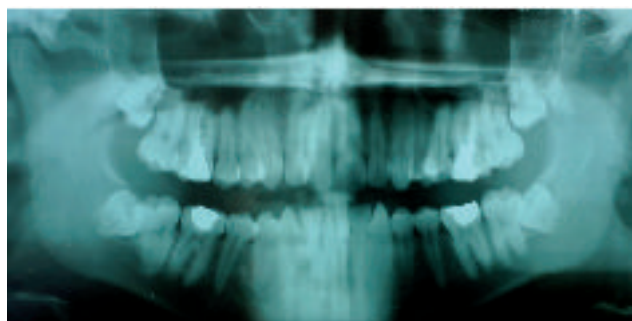


REZULTATI:

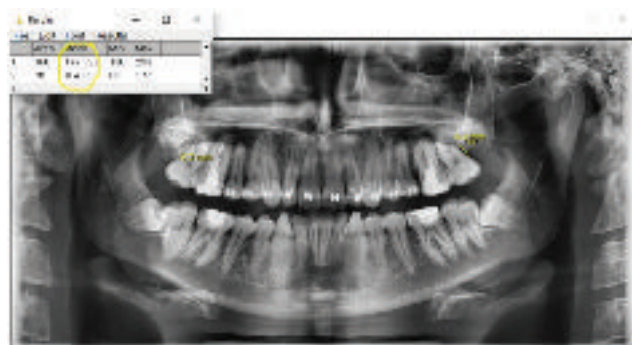
Defekti kockor vertikal distalisht nga molari i dytë maksilar (17,27) i tregon vlerat e mëposhtme numerike:

| | Matje vertikale para operacionit (Xhepi parodontal-PS) | Matje vertikale 3 muaj pas operacionit (PS) |
|-----------------------|--|---|
| Pozicioni 28 (me ADG) | 6 mm | 1 mm |
| Pozicioni 18 (pa ADG) | 6 mm | 5 mm |

Me anët të këtyre matjeve vërehet se në regjionin 28 kemi mbushje të mëdha të defektit kockor intraoseal me zvoglim të PS = 1 mm, kemi prezervim të pjesës distale të dhëmbit 27 ndërsa në regjionin që nuk është augmentuar 18 edhe pas tre muajsh kemi perzistim të defektit oseal me vlerë të xhepit parodontal PS = 5 mm.



Rtg Panoramik -para intervenimit kirurgjik



Rtg Panoramik – 3 muaj pas intervenimit kirurgjik

Rezultatet e matjeve të dendësisë së ashtit me anët të softuerit IMAGE J në regjionin e augmentuar dhe në atë jo të augmentuar janë të përshkruara në vijim:

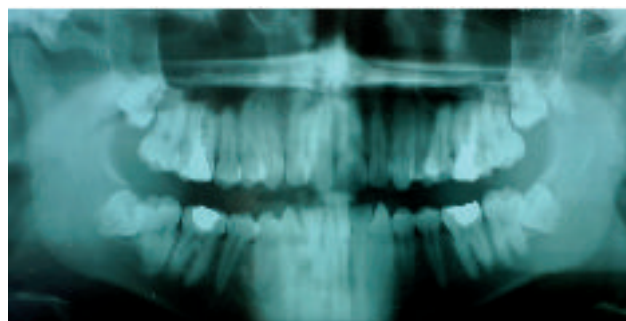
- A. Në regjionin e augmentuar 28 vlerat e dimenzionit fraktal (FD) janë 177 grey.
- B. Ndërsa në regjionin 18 i cili nuk i është nënshtruar asnjë procedure augmentimi vlerat e dimenzionit fraktal janë me vlerë mesatare 104 grey.

RESULTS :

The vertical bone defect distal to the second molar (17,27) shows the following numerical variations shown in the table:

| | Vertical measurements preoperatively (periodontal pocket) | Vertical measurements 3 months postoperatively (PD) |
|---------------------------|---|---|
| Position 28 (with ADG) | 6 mm | 1 mm |
| Position 18 (without ADG) | 6 mm | 5 mm |

With this it can be seen that in the augmented area 28 there is excellent filling of the osseous defect with reduction of PD = 1 the distal surface of the distal root of tooth 27 is preserved, while in the non-augmented region 18 and after 3 months there is persistence of the osseous defect with periodontal pocket value of PD = 5.



Results of bone density measurement using Software Image J of the augmented bone region (ROI) and the non-augmented bone region

- A) in the augmented region 28 the values of the fractal dimension FD are with an average value of 177.
- B) while in position 18 where no augmentation is performed, FD is 104.

In the augmented region, faster formation of young bone tissue with newly formed bone trabec-



Në regjionin e augmentuar vërehet formim më i shpejtë i ashtit ,me trabekula kockore të formuara rishtazi dhe me tendencë për zmadhim të mëtutjeshëm të dendësisë të ashtit.

Në rastin e mëposhtëm mund të vërehet rreziku nga humbja e mëtutjeshme e dhëmbit 37 për shkak të krijimit të një defekti të madh kockor-resorbimi i shkaktuar nga ekstraksioni i molarit të tretë të thellëimpaktuar dhe ekspozimi i rrënjës distale të dhëmbit 37.



DISKUTIMI:

Si opsion trajtimi për reduktimin e rrezikut nga paraqitja e komplikimeve paradontale mezialisht nga zona e operimit është përdorimi i materialeve kockorë për graftim , për të ruajtur aspektin distal të molarit të dytë. Përdorimi i materialeve graftuese komerciale megjithatë e rritë koston e trajtimit për pacientin, e cila mund të çojë pacientin të refuzojë një procedurë të tillë të kushtueshme.

Grafti autolog i dentinës është vërtetuar si burim efikas dhe i sigurt për prezervim alveole dhe për aplikime në procedura tjera si material graftimi. Është vërejtur se sasi të mëdha të matriksit kockor krijohen pas 60 ditëve, ndërsa pas 90 ditëve fillon krijimi i ashtit lamelar.

Për shkak se materiali për graftim është autogjen ai përmban sasi të mëdha të proteinave morfogenetike kockore të cilat i tërheqin qelizat progjenitore dhe shërbejnë si skelet për formimin e ashtit të ri. Që nga viti 1967 Youmans dhe Urist identifikuan që qelizat që vijnë në kontakt me BMP (Proteinat morfogenetike kockore) ndryshojnë rrugën e diferencimit dhe zhvillimit të indeve duke rezultuar në formimin e ashtit (11). Dentina është një burim i BMP që mund të ka të njëjtat efekte në formimin e kockave kur shfrytëzohet si material për graftim.

Resorbimi i grimcave ADG është i ngadaltë, për këtë arsye, ndihmon në formimin e lamelave kockore

ulae and a tendency to further increase bone density is observed.

In the following case, the risk of consequent tooth loss 37 due to the creation of a large bone defect after extraction of a deeply impacted molar and complete exposure of the distal root while not using it to obtain ADG and its immediate augmentation can be observed.



DISCUSSION :

A treatment option to reduce the risk of future periodontal pathology mesial to the IMMT surgical site is the use of osseous grafting to preserve the distal aspect of the second mandibular molar. Use of commercially available osseous grafting products, however, increases the cost of treatment for the patient, which may lead to refusal for that additional procedure.

An ADG has been documented as a reliable graft source when socket preservation is being performed and for other osseous grafting applications, as it has been noted that large amounts of new woven bone formation were generated after 60 days of healing, and small amounts of lamellar bone were seen after 90 days.

Because the graft material is autogenous, it provides an abundance of BMPs attracting progenitor cells and acting as a scaffold for new bone growth. Dating back to 1967 Youmans and Urist et al identified that cells that come in contact with BMP change the pathway of differentiation and tissue development resulting in bone formation(11).

Dentin was a source of BMP that could have the same effects on bone formation when utilized as a graft material.

Resorption of the ADG particles is slow, which, therefore, assists in lamellar bone formation with stability of the resulting bone over time. Studies have



të qëndrueshme të cilat me kalimin e kohës shndërrohen në asht.

KONKLUZIONI:

-Përdorimi i grafitit pas nxjerrjes kirurgjikale të molarëve të tretë të impaktuar mund të ndihmojë në parandalimin e resorbimit të alveolës gjatë shërimit dhe është dokumentuar që rezulton në përshpejtimin e formimit të indeve kockore në aspektin distal të molarit të dytë.

Është qasje me kosto të kapshme për pacientin dhe lejon kirurgun të përdorë material autolog të grafitimit, i cili shpesh është i preferueshëm për augmentim.

Procesi klinik i shërimit të indeve kockore dhe atyre të buta u përshpejtua pa përkeqësim të pasqyrës klinike, ënjtje dhe dhimbje si dhe ruajtje relative të dimensioneve horizontale dhe vertikale.

Radiologjikisht pas operacionit vërehet formim i hershëm i trabekulave kockore dhe osteointegrim i shkëlqyer i grafitit të dentinës në defektin maksillar.

Dhëmbët e nxjerrë nuk mund ti quajmë më mbetje biologjike pasi që me procedurë të shpejtë prej tyre mund të fitohet material grafitimi i sigurt dhe me efikasitet biologjik shumë të lartë.

Me përdorimin e matriksit të mineralizuar të dentinës fitojmë përdorim maksimal të potencialit biologjik, pa përdorim të materialeve tjera për grafitim.

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supported that cortico-cancellous bone that formed was maintained successfully with an implant after an average follow-up of 5 year.

CONCLUSION :

The use of grafting at the time of surgical extraction of impacted third molars can aid in the prevention of site resorption during healing and has been documented to result in formation of osseous tissues on the distal aspect of the adjacent second molar.

It is a cost-efficient approach for the patient and allows the surgeon to employ autologous bone grafting material, which is often preferable, for GBR.

-Clinical process of bone and soft tissue healing is accelerated and with a calm clinical flow without more pronounced edema and pain with relatively preserved vertical and horizontal dimensions

Postoperative X-ray shows early formation of new bone with excellent osteointegration of the dentinal graft in the osseous maxillary defect.

- Extracted teeth can no longer be considered as medical waste material due to the fact that in a short period of time can be obtained graft material with great safety and significant biological importance.

-With the use of mineralized dentin matrix we get maximum utilization of our own biological potential without the use of other artificial graft materials.

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 13. Autogenous Dentin Graft in Bone Defects after Lower Third Molar Extraction: A Split-Mouth Clinical Trial Luis Sánchez-Labrador, María Martínez-Ares, Ricardo Ortega-Aranegui, Juan López-Quiles and José María Martínez-González * Department of Dental Clinical Specialities, Faculty of Dentistry, Complutense University of Madrid (UCM), Plaza Ramon y Cajal S/N, 28040 Madrid, Spain; luis-sanc@ucm.es (L.S.-L.); mmartinares@gmail.com (M.M.-A.); riortega@ucm.es (R.O.-A.); jlopezquiles@odon.ucm.es (J.L.-Q.) * Correspondence: jmargo@ucm.es; Tel.: +34-913-941-968
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NJË VËSHTRIM RETROSPEKTIV MBI DIAGNOSTIKIMIN E HERSHËM KISTAVE ODONTOGENE

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ABSTRAKT

Kistet odontogjene përbëjnë pjesën më të madhe të lezioneve në tërësinë e kistave në regionin maksillo-facial. Në praktikën tonë të përditshme ndoshta mund të jetë patologjia më e shpeshtë me të cilën përballemi. Në shumë raste, diagnostikimi i këtyre lezioneve bëhet rastësisht gjatë kontrolleve rutinë, ose si pasojë e inflamacioneve sekondare të mbivendosura në këto patologji. Shpesh herë, kur këto leziona evidentohen me vonesë paraqesin përmasa të zmadhuara me një shpërhapje të gjere ne inde, madje duke zëvendësuar indin kockor dhe përkeqësuar prognozën e tyre e cila mbetet pozitive por me tendencë recidivimi sidomos kur këto patologji kanë përmasa të mëdha.

QËLLIMI

Synimi i këtij punimi është vështrimi edhe një herë në mënyrë të përmblodhur të asaj çka përfaqëson periodonti, funksioneve të tij nëse ekziston mundësia e zëvendësimit të tij apo jo, po kështu do të hedhim dritë mbi faktorët etilogjikë të patologjisë e jo vetëm por do të paraqisim edhe komplikacionet që rrjedhin nga diagnostikimi i vonshëm i këtyre lezioneve.

Një problem tjetër që vlen të diskutohet në studimin tonë është përcaktimi i kufirit egzakt midis lezionit periapikal, granulomës kistike apo kistës radikulare. Për të qenë korrekt në definimin e tyre. Për këtë problem kemi shfrytëzuar imazherinë dhe diametrin e lezionit periapikal.

Shfrytëzimi i grafeve kockore, aplikimi i elementëve të përfutur nga përpunimi i gjakut të vetë pacientit duke përfutur plazëm me elementë të pasuruar apo faktorë të përqëndruar të rritjes mbetet pa dyshim një ndër qëllimet primare të këtij punimi, ndaj rastet klinike që do të paraqesim do të jenë pasqyrim i këtyre aplikimeve.

CLINICAL CONSEQUENCES OF LATE DIAGNOSIS OF THE ODONTOGENE CYST OF THE JAWS

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ABSTRACT

Odontogenic cysts comprise most of the cystic lesions of the maxillofacial region. In our daily practice it may be the most common pathology we face. In many cases, the diagnosis of these lesions occurs randomly during routine checks or as a result of secondary inflammation overlapping in these pathologies. Sometimes, when diagnosed late these lesions appear with enlarged proportions with a wide spread of tissue, even replacing bone tissue and exacerbating their prognosis, which however remains positive but with a tendency of recurrence especially when these pathologies are of a great magnitude.

PURPOSE

The aim of this paper is to look at the sum of the periodontium, its functions, the possibility of its substitution or not, and we won't only shed light on the etiologic factors of this pathology but we will also present complications stemming from late diagnosis of these lesions.

Another problem worth of discussing in our study is the definition of the exact boundary between periapical lesion, cystic granuloma and radicular cyst, in order to be correct when defining them. For this problem we have used the imaging and diameter of the periapical lesion.

Using bone grafts, the application of the elements gained by the patient's own blood processing by gaining plasma with enriched elements or growth-centered factors remains undoubtedly one of the primary goals of this paper, and as such the clinical cases that we will present will reflect these applications.

The etiology of this pathology remains theoretically correct. Their description remains an obligation not



Etiologjia e kësaj patologjie mbetet teorikisht e saktësuar. Përshkrimi i tyre mbetet si detyrim jo vetëm sepse është pjesë e rëndësishme e anamnezës, por në disa raste klinike ndonëse pa simptoma të dukshme në momente të caktuara mund të bëhen shkak për infeksione të ndryshme të cilat në disa raste edhe të rrezikshme për jetën e pacientit

a) Shkaqet traumatike: Si pasojë e traumës shkaktohet shkëputje e tufës neuro-vaskulare dhe si pasojë e çrregullimit të qarkullimit të gjakut në pulpë. Në terma afatgjatë kjo goditje i bashkohet traumës së lehtë e të vazhdueshme të cilat japin periodontite kronike aseptike për momentin që më vonë i bashkohet edhe flora bakteriale. Periodontiti traumatik mund të shfaqet si ndërlikim gjatë trajtimit terapeutik të kanaleve radikularë nga instrumentat e zgjerimit të kanaleve apo kalimi i konit të gutaperkës apo materialeve të mbushjes tej apeksit në hapësirën periodontale.

b) Shkaqet infektive: Ndonëse periodonti nuk komunikohet me mjedisin në gojë flora bakteriale mund të depërtojë në të (per continuitatum) d.m.th nga indet fqinjë, megjithatë hapësira periodontale mundet të komunikojë me mjedisin e gojës nëpërmjet kanalit të rrënjës ose me anë të gingivës në qafën e dhëmbit në rastet me paradontopati.

c) Shkaqet kimike: Medikamentet që përdoren gjatë etapave të ndryshme terapeutike mund të jenë faktor i periodontitit si për shembull arseniku sidomos në rastet kur pacienti nuk paraqitet brenda 48 orësh, por periodontit medikamentoz mund të shfaqet edhe nga materialet e mbushjes me bazë silikatesh dhe kompozitet kur nuk bëhet izolimi i mirë i dhomës pulpore. Mund të përmendim përdorimin e cementit në karieset e thella. Acidi ortofosforik i lirë nëpërmjet kanaleve dentinarë jep nekrozë të pulpës e cila pas mbivendosjes së florës bakteriale me kalimin e kohës jep periodontit.

d) Shkaqet ose faktori human: Është pjesë e jetës sonë mos mjekimi i dhëmbëve ose lënia në mes e mjekimit të tyre, për arsye sociale, ekonomike dhe neglizhencë e pacientit.

Diagnostikimi i saktë kërkon edhe ekzaminimet ndihmëse veçanërisht ato radiologjike. Në ditët e sotme koha apo epoka dixhitale të drejton në mënyrë të pagabueshme drejt grafive panoramike si shkallë të parë dhe të lejon të ngjitesh hap pas hapi drejt grafive tomografike. Në këtë kuadër nuk mundet të lëmë pa përmendur si një ndihmesë edhe telemedicinën, megjithëse mendoj kjo është ende në hapat e parë të zbatimit.

only because it is an important part of the anamnesis, but in some clinical cases, although without obvious symptoms at certain times, it may be the cause of various infections that can be dangerous for the patient's life.

a) Traumatic Causes: As a consequence of trauma, disruption of the neurovascular bundle and of the pulmonary circulation occurs. In the long term, this adds to the small and persistent trauma, which for the moment causes chronic aseptic periodontitis that is later joined by bacterial flora. Traumatic periodontitis can appear as a complication of the therapeutic treatment of radical canals by canal expansion instruments, or the passage of gutta-percha cones or filling materials beyond the apex to the periodontal space.

b) Infectious causes: Although the periodontium does not communicate with the oral environment, bacterial flora can penetrate (for continuitatum) from neighboring tissues, however the periodontal space may communicate with the mouth environment via root canal or gingiva on the tooth in the cases with paradontopathy.

c) Chemical causes: Medicines such as arsenic, used during various therapeutic stages may be a causing factor of periodontitis, especially in the cases where the patient does not appear within 48 hours, but the periodontitis caused by medications may also appear from silicate-based filling materials and when there is no good isolation of the pulp chamber. We can mention the use of the cement in the cases of deep caries. The ortho-phosphoric acid free through the dentinal channels gives pulp necrosis which, after the overlap of the bacterial flora over time, gives periodontitis.

d) Human Causes or Factors: Sometimes for a variety of reasons, ranging from social and economic ones, to the negligence of the patient, we don't pay dental care enough attention.

Accurate diagnosis also requires auxiliary examinations especially the radiological ones. Nowadays, as we're living in the digital era, intuition guides you infallibly to the panoramic graphs as a first step and allows you to go step step-by-step to the tomographic graphs. In this context we cannot leave without mentioning telemedicine, although I think that it is still in the first steps of implementation.

Based on imaging when the lesion was over 1 cm we thought of a radical cyst and under this limit we thought of cystic granuloma or periapical lesion. We think it has a relative value for the treatment of these



Në bazë të imazherisë kur lezioni ka qenë mbi 1 cm kemi menduar për kist radikular dhe nën këtë kufi kemi menduar për granulomë kistike apo lezion peri-apikal. Kjo mendojmë se ka vlerë relative për mënyrën e trajtimit të këtyre lezioneve me rrugë konservative apo kirurgjikale. Ne jemi të mendimit se lezionet nën 1 cm kur mjekimi terapeutik ka dështuar disa herë të ritrajtohen me trajtim endodontik korrekt të kanalit dhe të kryhet rezeksion apikal, ndërsa në lezionet mbi 1 cm të trajtohen endodontikisht dhëmbët e përfshirë në kist dhe të realizohet cistektomia.

Formimi i periodonciomit përfundon afërsisht një vit pas formimit të apeksit të rrënjës. Në pacientët me denticion të përzier krahas dukurisë të përthithjes së dhëmbëve të qumështit zvogëlohet edhe hapësira periodontale. Periodonti zëvendësohet me granulacione. Kështu gjatë këtyre zhvillimeve periodonti nuk ka strukturë e trashësi të qëndrueshme. Trashësia e tij lëviz nga 0.2 -0.25 mm. Nga funksioni i dhëmbit, mosha ose procese patologjike kjo trashësi mund të ndryshojë. Periodonti përbëhet nga fije kolageni, mendohet edhe nga fibra elastike, ind lidhor i shkriqit, nga elementë qelizor dhe shumë enë gjaku, limfatike dhe nerva.

Furnizimi me gjak i periodontit sigurohet pjesërisht nga degëzimet e arterieve përpara se ato të futen në kanalet e rrënjëve. Me degët e arterieve intradentare ato formojnë anastomoza për dhëmballët. Përveç këtyre ka edhe anastomoza të tjera midis arteriolave ose kapilarëve të periodontit dhe atyre të gingivës. Enët e gjakut sigurojnë, sidomos në periudhën e osteogenezës ose osteolizës nevojat e indeve të mineralizuara për cementin e kockës. Këto enë gjaku shërbejnë njëkohësisht si amortizues të dhëmbëve gjatë presionit që ushtrohet mbi ta në përtpje. Enët limfatike të periostit e të indeve të buta së bashku me enët limfatike të anës së jashtme e të brendshme të trupit të nollës përfundojnë në nyjet limfatike regionale kjo shpjegon më së shumti angazhimin e tyre gjatë proceseve inflamatore. **Periodonti është i pasur me elementë qelizorë ndaj këto lejojnë që ai të kryejë një sërë funksionesh të rëndësishme.**

a) Të formimit: Kjo realizohet kryesisht me anë të cementoblasteve dhe osteoblasteve. Funksion ky i rëndësishëm në rastet e mjekimit të periodontiteve.

b) Mbajtës e mbështetës: Ky kufizon lëvizjet e dhëmbit, kur ai nuk është në funksion bën që fibrat e tij zhduken e zëvendësohen me ind konjektiv.

c) Sensitiv: Ky shërben si sistem paralajmërues në rastet e mbingarkesës apo të traumës.

lesions by conservative or surgical path. We are of the opinion that lesions below 1 cm when therapeutic treatment has failed several times should be re-treated with correct endodontic treatment of the canal and apical resection, while in lesions over 1 cm the teeth affected by the cyst should be endodontically treated and cystectomy should be performed.

The periodontium formation ends approximately one year after the formation of root apex. In patients with mixed dentition in addition to the milk absorption phenomenon, periodontal space is reduced. Periodontium is replaced by granulates. Thus during these developments the periodontal has no stable structure and thickness. Its thickness ranges between 0.2 -0.25 mm. This thickness can change from a variety of reasons, from the tooth function, age or any pathological process. The periodontal is composed of collagen yarn, of elastic fiber, short hairline connective tissue, cellular elements and many blood vessels, lymph and nerves.

Periodontal blood supply is partially provided by the arterial branches before they are inserted into the root canals. With interstitial arteries they form anastomoses for the jaw. In addition, there are other anastomoses between arterioles or periodontal and gingival capillaries. Blood vessels provide, especially in the period of osteogenesis or osteolysis, the needs of mineralized tissue for bone cement. These blood vessels serve at the same time as dental shock absorbers during the pressure exerted on them in chewing. Lymphatic periosteus and soft tissue lymph vessels together with the lymphatic vessels of the outer and inner limbs of the jawbone end up in the regional lymph nodes, this explains their involvement in the inflammatory processes. **Periodontia is rich in cellular elements that allow it to perform a number of important functions.**

a) Formation: This is accomplished mainly by cementoblasts and osteoblasts. This is important for the treatment of periodontitis.

b) Holder and support: This limits the tooth movements when it is not in use, causes its fibers to disappear and be replaced with conjunctival tissue.

c) Sensitive: This serves as a warning system in cases of overload or trauma.

d) Feeder: This is necessary for the bone of cement.

e) Adaptive: This in the case of functional stimulants helps in the formation of the new cement needed



d)Ushqyes: Ky është i domosdoshëm për kockën e cementin.

e)Përshtatës: Ky në rastet e stimuluesve funksionalë ndihmon në formimin e cementit të ri që nevojitet në regjenerimin biologjik në rast procesesh patologjike periapikale.

f)Fiksues: Ky favorizon lëvizjen fiziologjike të dhëmbëve pasi jo vetëm lidh dhëmbin me alveolën por e mban atë nëpërmjet ligamentit cirkular.

g)Amortizues: Ky arrihet nëpërmjet ndryshimit të vëllimit të enëve të gjakut dhe ndërthurjes së një sasive të madhe lëngu me koloidin e qelizave.

Nga ky këndvështrim duhet ta shikojmë periodontin të lidhur ngushtë me indet përreth, kjo theksohet sidomos gjatë proceseve inflamatore kur ndryshimet fillestare prekin njërën nga strukturat gjë do të reflektohet edhe në strukturat fqinje.

MATERIALI E METODA

Për këtë punim kam shfrytëzuar eksperiencën time personale teoriko-praktike në trajtimin kirurgjikal të pacientëve të cilët janë paraqitur dhe i janë nënshtruar ndërhyrjeve kirurgjikale dhe jo vetëm për një periudhë disa vjeçare. Në këtë punim do të paraqes disa raste klinike si më poshtë.

RASTE KLINIKE

Pacienti XH.L 45 vjeç paraqitet dhe diagnostikohet: 'Cysta regio fossa caninae'.

Ndërhyrja e rekomanduar është : 'Cystectomy me rezeksion të 21,22' (Fig 1).

Pas ekzaminimeve ndihmëse radiologjike e laboratorike pacienti iu nënshtrua ndërhyrjes ku menjëherë u pa që patologjia kistike kishte mbivendosje të infamacionit sekondar biles inflamacion purulent .Githsesi u pastrua kaviteti kistik me kujdes u përgatit grafiti kockor (sticky bone) dhe membrana e përfituar nga përpunimi i gjakut të u vendosën në kavitetin kistik. (Fig 1).

Gjëndja postoperative e mirë pacienti pasi bëri grafinë e kontrollit iu dha mjekim ambulator.Plaga u shërua 'Per primum'.

for biological regeneration in the case of periapical pathological processes.

f) Fixing: This favors the physiological movement of the teeth as it not only connects the tooth with the alveolar but keeps it through the circular ligament.

g) Amortization: This is achieved by changing the volume of blood vessels and the combination of a large amount of fluid with colloidal cells.

From this point of view we should look at periodontium as closely related to the surrounding tissues, this is emphasized especially during the inflammatory processes when the initial changes affect one of the structures, which will also be reflected in the neighboring structures.

MATERIAL AND METHOD

For this paper I have used my personal theoretical-practical experience in the surgical treatment of patients who have been exposed and have undergone surgical interventions during a time period of many years. In this paper I will present some clinical cases as below.

CLINICAL CASES

Patient XH.L 45 years old is presented and diagnosed: 'Cysta regio fossa caninae'.

The recommended intervention is: 'Cystectomy with 21.22 resection' (Fig 1).

After radiological and laboratory auxiliary examinations, the patient undergoes surgery, where it was immediately discovered that the cystic pathology had overlapping secondary of purulent inflammation. However, the cavity was carefully cleansed, sticky bone was prepared and the bloodstream membrane was placed in the cave cavity. (Fig. 1).

The postoperative condition of the patient is good, after doing the control chart ambulatory treatment was recommended to the patient. The wound was cured 'Per primum'.

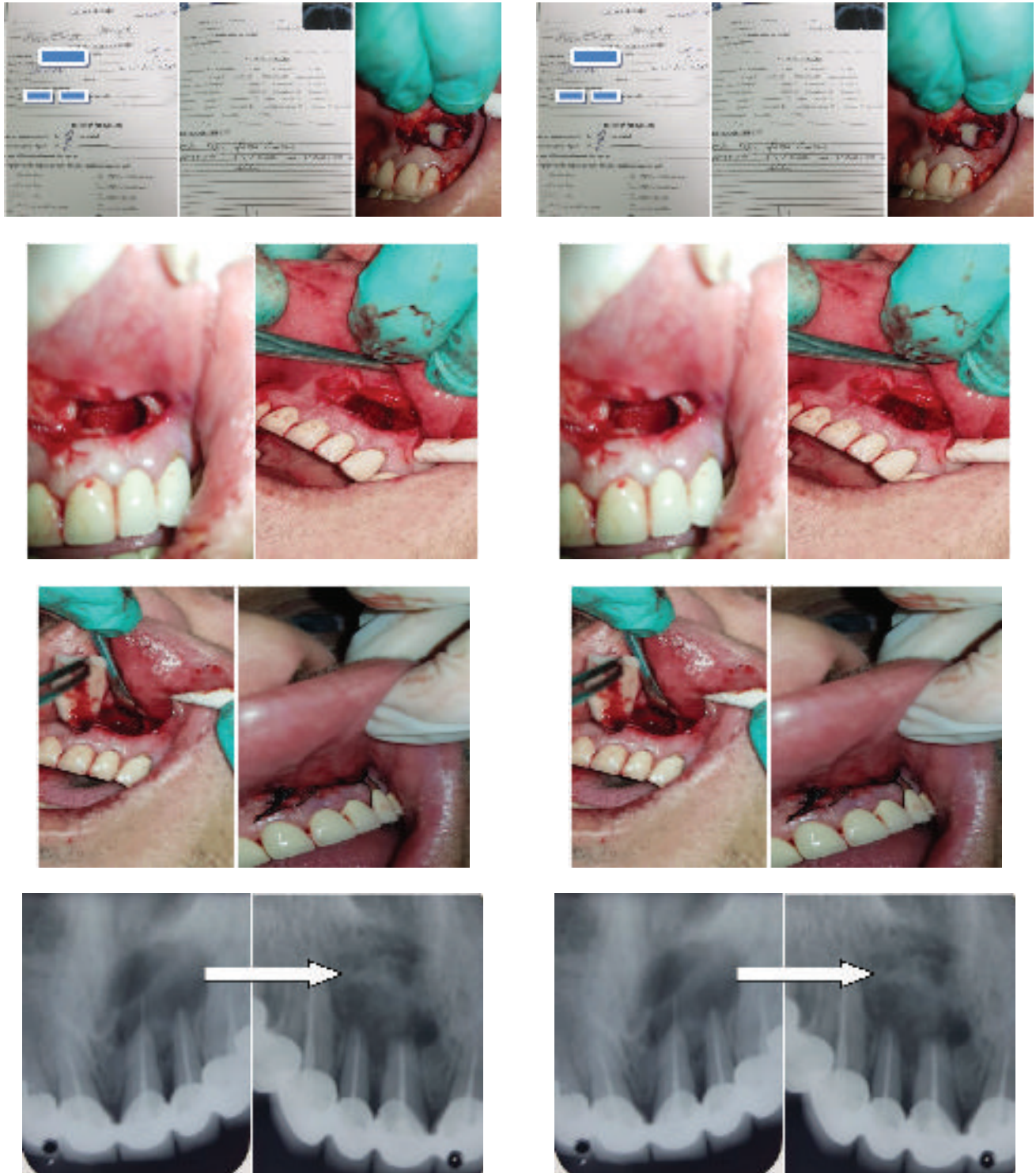


Fig 1

Fig 1

Rasti 2. Pacienti DH.Z. 32 vjeç paraqitet në klinikë me edemë të regionit perimandibular. Grafia panoramike konfirmon diagnozën: 'Cysta regio corpus mandibulae dextra' (Fig 2).

Ndërhyrja e rekomanduar është : 'Cystectomy me ekstraksion të radix 45,46'.

Case 2. The DH.Z. 32-year-old patient appears in the clinic with a perimandibular edema clinic. Panoramic graph confirms the diagnosis: 'Cysta regio corpus mandibulae dextra' (Fig. 2).

The recommended intervention is: 'Cystectomy with radix extraction 45,46'.



Pas ekzaminimeve ndihmëse radiologjike e laboratorike pacienti iu nënshtua ndërhyrjes.

U tentua dhe u realizua heqja intakte e sakusit kistik (Fig 2). Gjëndja postoperatore e mirë pacienti pasi bëri grafinë e kontrollit iu dha mjekim ambulator.Pacienti është në observim.

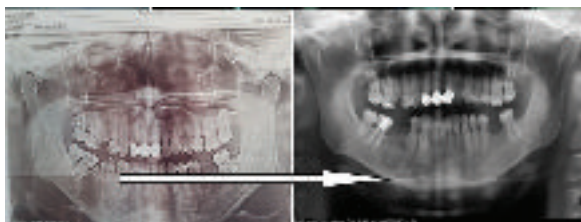


Fig 2

After radiological and laboratory auxiliary examinations, the patient underwent surgery.

Attempts were made and the intakes of the clay sacus were removed (Fig. 2). The patient's postoperative posture status after doing the control chart was given ambulatory medication. The patient is under observation.

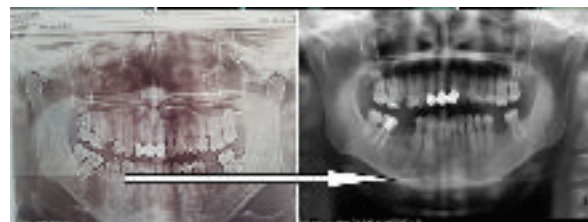


Fig 2



DISKUTIM

Pjesa më e madhe e formacioneve kistike zbulohen gjatë ekzaminimeve radiologjike. Gjithsesi edhe gjatë vizitës klinike në rastet kur evidentohen tumefaksione që nuk shoqërohen me dhimbje duhet dyshuar për një patologji kistike ose jo ndaj duhet të kryhen ekzaminimet suplementare ndihmëse. Duke qenë se kemi të bëjmë me dyshime të arsyeshme është e nevojshme që mjeku stomatolog të udhëzojë pacientët të kryejnë këto ekzaminime radiologjike jo vetëm për të kryer një diagnostikim sa më të saktë nga ana profesionale por edhe për të shmangur komplikacionet e mundshme apo pasojat që rrjedhin prej tyre.

KONKLUZIONE

1. Futja në përdorim e grafteve kockore ose sintetike e kombinuar kjo me përdorimin e membranave të përfutur nga përpunimi i gjakut të pacientit ka sjellë një risi pozitive dhe tepër të dobishme gjatë trajtimit kirurgjikal të kistave me një ndikim absolut në mbarëvajtjen e tyre qoftë në stadin postoperator por edhe më tej në ndjekjen afatgjatë.
2. Diagnostikimi dhe trajtimi i hershëm i lezioneve periapikale në bazë të protokolleve bashkëkohore, parandalon kalimin në kista masive të nofullave, gjë që për pacientin sjell probleme të mëdha shëndetësore e jo vetëm.
3. Metoda bazë për trajtimin e kistave radikulare është cistektomia dhe sipas rasteve konkrete duhet të realizohet ruajtja e dhëmbëve në brendësi të kistës sidomos kjo më e vlefshme tek moshat e reja.

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DISCUSSION

Most of the cystic formations are discovered during radiological examinations. However, even during a clinical visit to cases of painlessness of the tonsils, there should be suspicion of a cystic pathology or not, and additional auxiliary examinations should be performed. Given reasonable doubts, it is necessary for the dentist to instruct patients to perform these radiological examinations not only to carry out the most accurate professional diagnosis but also to avoid the possible complications or consequences that stem from them.

CONCLUSIONS:

1. The introduction of bone or synthetic bone grafts combined with the use of the membranes obtained by processing the patient's blood has brought a positive and incredibly useful innovation during the surgical treatment of the cysts with an absolute impact on their progress either in the postoperator stage and in the long-term pursuit.
2. Diagnosis and early treatment of periapical lesions based on contemporary protocols prevents the passage of massive cysts into the jaws, which causes major health problems to the patient.
3. The basic method for the treatment of radicular cysts is cystectomy and in some cases it is necessary to perform tooth preservation inside the cyst, this is especially necessary when dealing with patients of young ages.

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Hyrja: Paraqet prezntim të qartë dhe të shkurtë të problemit dhe të qëllimit të punimit. Në formë të shkurtë ceken punimet të cilët janë në mënyrë direkte të lidhur me problemin të cilin e shkoqit artikulli në fjalë. Në fillim të faqes ku është hyrja edhe një herë shkruhet titulli i punimit, por pa emrat e autorëve dhe të institucioneve.

Materialet dhe metodat të cilat janë përdorur në punim prezentohen shkurt por mjaftueshëm që lexuesit t'i mundësohet përsëritja e hulumtimit të përshkruar. Metodot paraqiten sipas rënditjes së përdorimit të tyre. Barërat theksohen sipas emrit të tyre gjenerik. Metodot e njohura nga literatura nuk përshkruhen, por vetëm ceket e dhëna burimore në literaturë.

Rezultatet: duhet të jenë të saktë dhe qartë të paraqitur. Vlerat e rezultateve duhet statistikisht dhe në mënyrë profesionale të përpunohen.

Diskutimi dhe përfundimi: prezentohen ndaras. Qëllimi i diskutimit është që të bëjë interpretimin e rezultateve dhe krahasimin e tyre me njohuritë ekzistuese me vlerë në atë lëmi, prej nga dhe rrjedhin përfundimisht.

TABELAT DHE FOTOGRAFITË

Punimi mund të shoqërohet me fotografi dhe tabela

Tabelat: Çdo tabelë shkruhet ose vizatohet në fletë të veçantë dhe jo në tekst, duhet të ketë titull dhe numër rendorë i cili ndërlidhet me tekstin.

Ilustrimet: Çdo ilustrim duhet të ketë përshkrimin dhe numrin rendor me të cilin paraqitet në tekst. Përshkrimi i fotografive - legjenda shkruhet në fletë të veçantë sipas numrit rendor. Fotografitë mund të jenë kolor ose bardh e zi. Në shpinën e fotografive duhet të shkruhen inicalet e autorit të parë si dhe titulli i shkurtuar. Me anë të shigjetës duhet të tregohet pjesa e epërme e fotografisë.

Porositet që pjesët me rëndësi në fotografi të shënohen me shigjetë ose me shenja të përshtatshme.

Të sëmuruve në fotografi duhet t'u mbnuohet identiteti.

Vizatimet: Punohen në letër të bardhë, në disketë ose në CD dhe dërgohen në origjinal. Germat dhe shenjat doemos të jenë të qarta, të kenë madhësi të njëjtë, përmasat të jenë të tilla që çdo e dhënë me zvogëlim të ngel e qartë. Shfrytëzimi i fotografive dhe tabelave nga burime të ndryshme duhet të përcillet me të dhëna se nga janë marrë.

Introduction should provide a brief and concise account of the problem and aim of the study. Previous articles directly related to the study should be briefly mentioned. The introduction section should be preceded by the title of the paper written on the top of the page (without the authors and institutions).

Materials and Methods used in the study should be described briefly but clearly enough as to allow the readers to repeat the study if they wish to. The methods should be presented chronologically as they were used. Drugs should be cited by their generic names. Methods known from literature should not be described but the original literature data listed.

Results should be presented clearly and accurately. Significance of the results should be statistically obtained.

Discussion and Conclusions should be written separately. The purpose of the Discussion is to give an interpretation of the results and compare them to the existing important knowledge in the field, from which the Conclusions should naturally follow

TABLES AND FIGURES

The paper can be supplemented with figures and tables.

Tables: Each table should be written or drawn on separate paper and not in the body of the text numbered according to their appearance in the text and titled.

Illustrations: Each illustration should be numbered according to their appearance in the text, and carry a description. Legend to figures should be typed on a separate paper according to the ordinal number. Photographs could be black-white or color. Each photograph should have on the back the initials of the first author, and running title of the paper. Top of the figure should be indicated by an arrow.

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Drawings should be made on white paper, on disket or in CD and submitted as original. Letters and signs should be clear, equal size, allowing possible reduction in size. When using figures and tables from other sources, are not should be provided stating the source where they have been taken from.

Only tables should be designated "Table", and any other documentation should be designated as "figure". The number of tables and figures together



Sipas rregullës, tabelat shënohen si “Tabelë”, ndërsa i tërë fotodokumentacioni tjetër shënohet si “Foto”. Tabelat dhe fotografitë nuk duhet të jenë më shumë se 12 në numër.

Përshkrimi i literaturës: Literatura shkruar het në fletë të veçantë. Sipas Stilit Vankuver. Revistat duhet të përshkruhen me shkurtesa të cilat përdoren në Index Medicus.

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Punimet të cilët botohen në revistë klasi- fikohen në: Punime burimore shkencore, kumtesa pararendëse, punime profesionale, ekspozë nga tubimet shkencore, vështrime, prezente rastesh.

VËREJTJE

Për profesionalizëm të punimeve përgjegjësi mbajnë vet autorët dhe recenzuesit. Të gjitha hulumtimet duhet të jenë në pajtueshmëri të plotë me parimet themelore të deklaratës së Helsinkut (World, Health Authority - 1975).

Punimet të cilët nuk janë shkruar sipas udhë- zimeve të lartpërmendura nuk mund të pranohen për botim.

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Dorëshkrimet, fotografitë dhe dokumenta- cioni tjetër nuk kthehen, ndërsa të gjitha shtojcat e botuara dhe botimet e veçanta janë në pronësi të botuesit. Autorëve u takojnë nga 10 ekzemplarë të revistës.

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