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

Dovolani T, Veliçkovski B, Dimitrovski O.

Universiteti "Shen Kirili dhe Metodij"-Shkup, Fakulteti i stomatologjise-Shkup
Ordinanca stomatologike private: Nova Dental Group-Shkup
R. Maqedonise se Veriut

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

Dovolani T, Veliçkovski B, Dimitrovski O.

University "St. Kiril and Methodius" –
Faculty of stomatology-Skopje.
Private dental clinic: Nova Dental Group-Skopje
Republic of North Macedonia

## ABSTRAKT

**Hyrje:** Vleresimi radiografik eshte kyç ne planifikimin e trajtimit me implante dentare. Metodat 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 dhembi 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 cdo zone e planifikuar per implant, matej dimensioni 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. ± 4.51), kurse vlera mesatare me e madhe e matur permes panorameksit, ishte ne zonen e premolarit te pare-djathtas (16.50 mm. ± 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. ± 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. ± 4.51), while the greatest mean value measured with orthopantomogram was in the region of right-first premolar (16.50 mm. ± 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. ± 4.15).

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



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

**Fjale 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 komponenetet e tyre jashte-kockore (abatmentet), sherbejne si mbeshtetes te konstruksionit protetik.[2] Bazuar ne njohurite shkencore dhe pervojes 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 titaniumi 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 dyshemese se sinusit maxillar, dyshemese se hundes dhe kanalit nasopalatin. Gjithmone duke siguruar distance prej 1 mm. ndermjet pjeses apikale te implantit dhe struktures anatomike fqinje.[2] Implantet planifikohen qe te qendrojne 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 bukale 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 hight.

**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 lartesise, gjeresise, gjatesise dhe angulimit te kockes.[2] Lartesia e kockes e cila nenkupton distancen nga kreshta alveolare deri tek struktura anatomike fqinje, perveç permes metodes 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 defiçite 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 demtimi i strukturave fqinje anatomike. Gjithashtu permes panorameksit eshte i pamundur percaktimi i gjeresise 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 membranes se sinusit maxilar.[16]

## QELLIMI

Qellimi i ketij studimi ishte analiza krahasuese e te dhenave 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 dhembi 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 ordinanca stomatologjike private Nova Dental Grup- Shkup. Aparati perdorte rryme elektrike prej 2 mA-12 mA, dhe tension prej 60 kV-86kV. Permes metodes me panorameks perfitohej nje pamje e vetme e regjionit maksifacial, kurse permes metodes 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 definciencies 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.

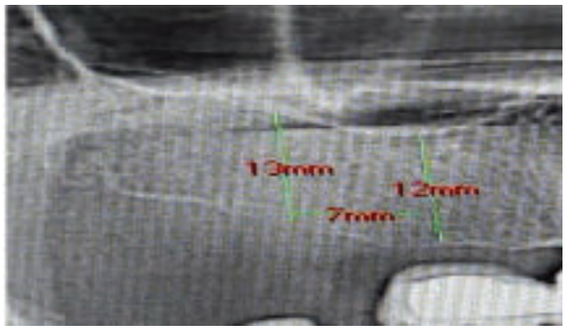
## MATERIALS AND METHODS

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

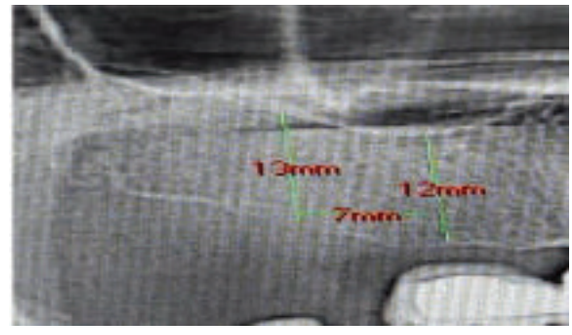


thore ne planin horizontal, vertikal dhe antero-posterior te regjionit maksilofacial. Madhesia e çdo pikseli tek panorameksi dhe prerjeve terthore te TKRK ishte 120 **µ**m., kurse madhesia e vokselave tek TKRK ishte 175 **µ**m.. Trashesia e prerjeve terthore te TKRK ishte 0.175 mm.. Kurse numri i shkalleve 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.

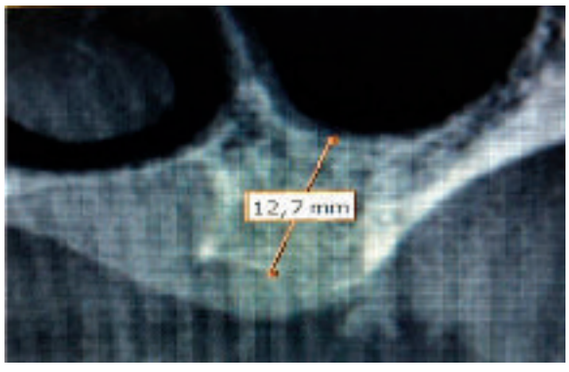
antero-posterior plane of the maxillofacial region. The dimension of each pixel in orthopantomogram was 120 **µ**m., and the dimension of voxels was 175 **µ**m.. The thickness of cross sections in CBCT method was 0.175 mm.. The number of gray values, by which the anatomical structures were presented 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.



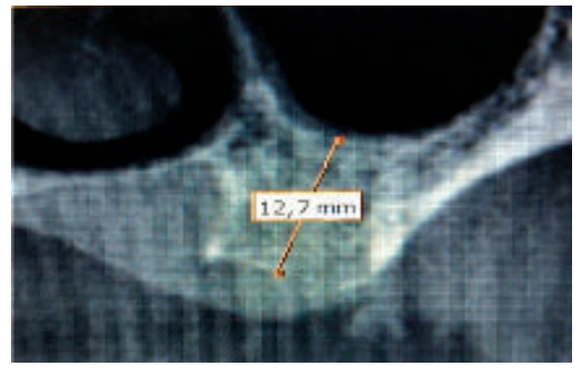

Fotografia 1. Dimensioni vertikal i procesit alveolar, ne zonen e maksiles posteriore (panorameks).




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

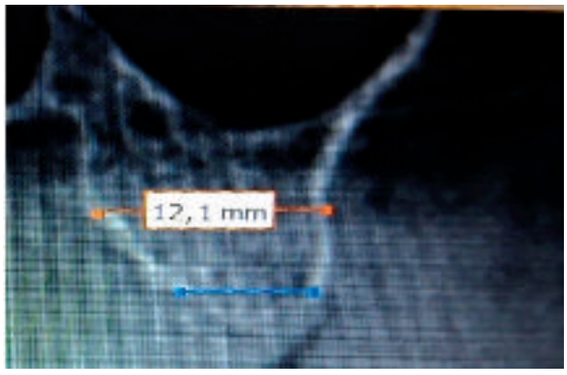



Fotografia 2. Dimensioni vertikal i procesit alveolar, ne zonen e maksiles posteriore (TKRK).

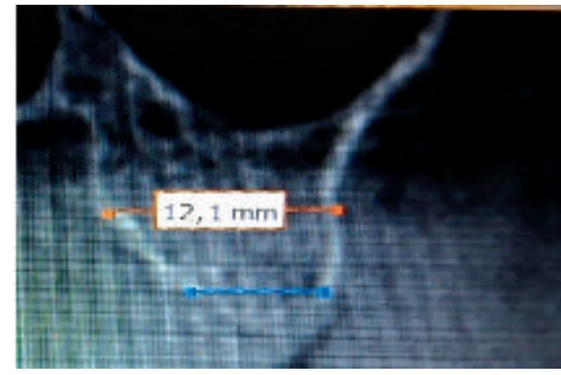



Picture 2. Vetical dimension of the alveolar process, in posterior maxillary region (CBCT).






Fotografia 3. Dimensioni 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 kreshta 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. ± 4.51, kurse vlera mesatare me e vogel ne regjionin e molarit te dyte-majtas (2.7): 9.74 mm. ± 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. ± 4.15, kurse vlera mesatare me e vogel ne regjionin e molarit te dyte-majtas (2.7): 9.79 mm. ± 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. ± 4.51, while the smallest mean value in the left-second molar region (2.7): 9.74 mm. ± 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. ± 4.15, while the smallest mean value in the left- second molar region (2.7): 9.79 mm. ± 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.

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 orthopanomogram and CBCT. Whereby, the values acquired using orthopanomogram were greater than those acquired using CBCT (exept for the left-first premolar region).

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

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. ± 2.06, kurse vlera mesatare me e vogel ne regjionin e premolarit te pare-majtas (2.4): 7.38 mm. ± 1.13.

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. ± 2.06, while the smallest mean value in the left-first premolar region (2.4): 7.38 mm. ± 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 Nunes[16], 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 Ozalp[15] 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 kundershtim me ato te Ozalp, pasi qe dimensioni 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 orthopatomogram 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 Ozalp[15] 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 Sahota[20], nga studimi i tij erdhi ne perfundim se planifikimi i gjeresise 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 Deeb[21], rezultoi korelacion (lidhshmeri) 0.77 dhe 0.99 i planifikimit te gjeresise 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 lartesie 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 Sahota[20] 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 Deeb[21] 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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