

VARIJACIJE U BROJU KVRŽICA DONJIH PRVIH I DRUGIH MOLARA M1 I M2

VARIATION IN THE NUMBER OF CUSPS OF LOWER FIRST AND SECOND MOLARS M1 AND M2

Mirjana Burić¹, Ljiljana Tijanić², Vesna Rusić-Tasić¹

¹KLINIKA ZA STOMATOLOGIJU- ODELENJE ZA ORTODONCIJU, ²UNIVERZITET U NIŠU- MEDICINSKI FAKULTET, NIŠ, SRBIJA

¹CLINIC OF DENTISTRY-DEPARTMENT OF ORTHODONTICS, ²UNIVERSITY OF NIS-FACULTY OF MEDICINE, NIS, SERBIA

Apstrakt

Cilj Ispitati postojanje varijabilnosti u broju osnovnih kvržica donjih prvih i drugih molara M1 i M2.

Materijal i metode Ispitivanje je obavljeno na studijskim modelima 400 ortodontskih pacijenata (164 osoba muškog pola i 236 osoba ženskog pola).

Rezultati Utvrđeno je da donji M1 u grupi molara najmanje podleže redukciji, tako da najveći broj pacijenata u okviru polnih grupa (75,61% dečaka i 66,95% devojčica) ima prisustvo svih pet osnovnih kvržica tip M1-5. Tip M1-4, gde postoji potpuno odsustvo Hld- hipokonulida ima 21,35% dečaka i 32,63% devojčica. Prisustvo šeste kvržice je nadjeno kod 3,05% dečaka i 0,42% devojčica.

Tip M2-4 dominira kod oba pola (86,59% dečaka i 91,1% devojčica), dok je tip M2-5 nadjen u mnogo manjem procentu (13,41% dečaka i 8,9% devojčica).

Zaključak Ispitanici našeg uzorka odlikuju se visokim procentom prisustva M1 sa pet kvržica (70,5%) i M2 sa 4 kvržice (89,25%). Utvrđeno je i potpuno odsustvo samo distovestibularne kvržice –hipokonulida.

Ključne reči: broj kvržica, varijacije, prvi molar, drugi molar

Uvod

Zubi su po svom sastavu najotporniji elementi ljudskog organizma, i zbog toga veoma važni u razumevanju toka evolucije¹. Njihova morfološka struktura prilagodjena je vrsti konzumirane hrane pa samim tim podložna promenama i eventualnoj redukciji. Redukcija kvržica odvija se sa 5 kvržica na 3 kvržice i to na donjim molarima ovim redom : hipokonulid, entokonid i hipokonid tj., na distalnom delu zuba². Taj deo, je mlađi deo zuba od mezijalnog. Donji

Abstract

Aim: To find the existence of variability in the number of primary cusps of the lower first and second molars M1 and M2.

Materials and methods The study was conducted on the models of 400 orthodontic patients (164 males and 236 females).

Results It was found that the lower molars M1 in the group is least subject to reduction so that the majority of patients within gender groups (75.61% boys and 66.95% girls), have the presence of all five basic cusps type M1-5. Type M1-4, where there is complete absence of hypoconulid has 21.35% 32.63% boys and girls. The presence of the sixth cusp is found at 3.05% and 0.42% of boys of girls. Type M2-4 dominated in both sexes (86.59% boys and 91.1% girls), while type M2-5 found in much smaller percentage (13.41% boys and 8.9% girls).

Conclusion The subjects of our sample are characterized by a high percentage of the presence of M1 with five cusps (70.5%) and M2 with 4 cusps (89.25%). It has been established the total absence of only distovestibular cusp-hypoconulid.

Key words: cusps number, variation, first molar, second molar

Introduction

Teeth are the most resistant elements of the human body, and therefore very important in understanding of the human evolution¹. Their morphology is adapted to the type of food consumed and therefore subject to change and the possible reduction. Reduction of cusp occurs out from 5 cusps to 3 cusps and on the lower molars in this order: hypoconulid, entoconid and hypoconid therefore the distal part of teeth². It is a younger part of the medial tooth. The

molari razlikuju se po obliku krune od gornjih molara i uglavnom su četvorougaoanog oblika. Postoji 4 tipa broja kvržica : 6,5,4,3. Među njima najveća pažnja se posvećuje 6. i 4. kvržičnoj formi (M1- 6 i M1 -4) na prvom molaru(M1) i 4. kvržičnoj na drugom molaru (M2) , što se vidi na reprezentativnim modelima pacijentata (slika.1)

lower molars differ in the form of the crown of the upper molars and generally a square shape. There are 4 types of cusps: 6,5,4,3. Among them the most attention is given to the sixth and four cusps forms (M1 and M1-6 -4) on the first molar (M1) and four cusps on the second molar (M2), as shown on representative patient's plaster models (Fig. 1).



a)



b)



c)

Slika 1. Donji prvi molar: a) sa 6 kvržica (tip M1-6); b) sa 4 kvržice (tip M1-4 i M2-4) i c) sa 4 kvržice (tip M1-5 i M2-4)

Figure 1. Lower first molar: a) with 6 cusps (type M1-6); with 4 cusps (type M1-4 and M2-4) and c) with 4 cusps (type M1-5 and M2-4)

Cilj ovog rada je bio istražiti postojanje varijabilnosti u broju osnovnih kvržica donjih prvih i drugih molara M1 i M2.

The aim of this study was to investigate the existence of variability in the number of basic cusps of first and second lower molars M1 and M2.

Materijal i metode

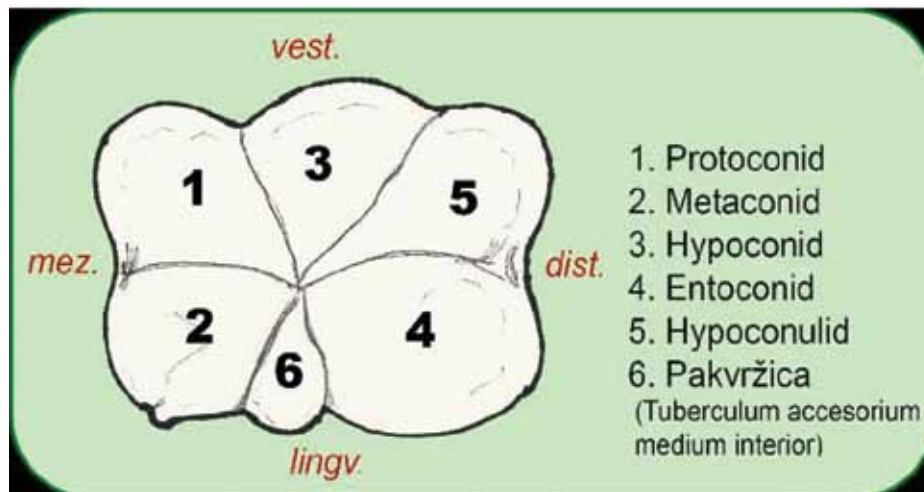
Ispitivanje je obavljeno na studijskim modelima 400 ortodontskih pacijenata (164 osoba muškog pola i 236 osoba ženskog pola) Klinike za stomatologiju u Nišu, koji su imali prisutne M1 i M2 , koristeći latinske nazive kvržica .. Na oralnoj strani nalaze se dve kvržice: mezijalna – metakonid i distalna – entokonid, a na ves-

Materials and methods

The research was done on the plaster models of 400 orthodontic patients (164 males and 236 females) of the Dental Clinic of Nis, who had present M1 and M2, using the Latin names of cups according to Cope and the Osborn⁴. On the oral side there are two cusps: mesial - meta-

tibularnoj strani : mezijalno - protokonid , zatim hipokonid , a distalno hipokonulid. Oralno, između dve kvržice javlja se prakvržica kod nekih rasa (američkih Crnaca) koju Selenka naziva „ tuberculum accesorium medium interior³ „. Korišćena je šema kvržica po Cope-u i Osborn –u⁴ .(slika. 2).

conid and distal - entoconid, and on the vestibular side: mesial - protoconid, then hypoconid and distal hypoconulid. Orally, between two cusps appear *precusps* in some races (African Americans), described by Selenka and named “*tuberculum accesorium medium interior*³”. We used a scheme of cups according to Cope and Osborn-in⁴. (Fig. 2).



Slika 2. Šema kvržica po Cope-u i Osborn-u³

Figure 2. Scheme of cusps according to Cope and Osborn

Rezultati

Procentualna zastupljenost broja kvržica na donjem M1, prikazana je na grafikonu 1. Dobijeni rezultati pokazuju da kod oba pola dominiraju prvi molari sa 5 kvržica 70,5% i statistički ih je više no zuba sa 4 (28%) ili 6 (1,5%) kvržica ($p < 0,001$). Kod ženskog pola je statistički značajno veći broj prvih molara sa 4 kvržice (32,63%) nego kod muškaraca (21,35%) ($p < 0,05$). Donji prvi molari sa 5 kvržica prisutni su kod ženskog pola u 66,95% slučajeva, dok kod muškaraca u većem procentu 75,61%.

Utvrđeno je i postojanje donjeg prvog molara sa 5 kvržica (slika. 3).

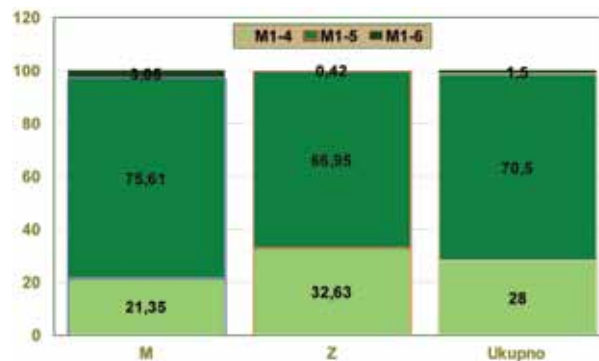
Utvrđeno je postojanje, kod ženskog pola, statistički (32,63%), značajno veći broj prvih molara sa 4 kvržice (sl. 4).

Tip M1- 6 je bio veoma redak(1,5%) kod naših pacijenata, i češći kod dečaka 3,05% nego kod devojčica 0,42% (slika 5).

Procentualna zastupljenost broja kvržica na donjem drugom molaru (M2)-, prikazana je grafikonom 2. Kod oba pola nadjeno je statistički značajno više donjih drugih molara sa

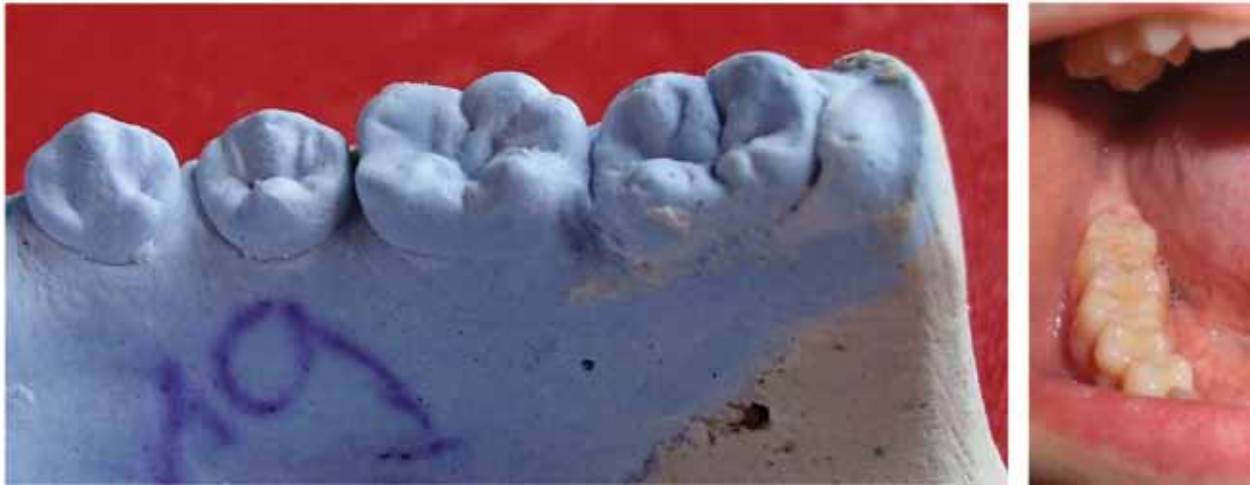
Results

Percentage of the number of nodules on the lower M1, is shown on chart 1. The results show that in both sexes is dominated by the first molars with five cusps, and 70.5% were statistically no more teeth with 4 (28%) or 6 (1.5%) nodules ($p < 0.001$). Females have a significantly higher number of first molars with 4 cusps (32.63%) than men (21.35%) ($p < 0.05$). The lower first molars with five cusps are present in females at 66.95%, while in men there is a greater percentage of 75.61%.



Grafikon 1. Procentualna zastupljenost broja kvržica na donjem M1

Chart 1. Schematic summary of results. A diagram shows percentage of number of cusps of the lower M1



Slika 3. Donji prvi molar sa 5 kvržica (tip M1-5)
Figure 3. Lower first molar with 5 cusps (M1-5)



Slika 4. Donji prvi molar sa 4 kvržice (tip M1-4)
Picture 4. Lower first molar with 4 cusps (type M1-4)

4- 89,25% no sa 5 kvržica 10,75% ($p < 0,001$). Mada je nešto veći procenat zuba sa 4 kvržice kod ženskog pola 91,1%, naspram muškog pola 86,59% i nisu utvrđene statistički značajne razlike između polova u broju donjeg drugog molara sa 4, odnosno 5 kvržica.

Utvrđeno je da Tip M2 -4- dominira kod oba pola (sl. 6).

M2-5 tip- je u našoj studiji dijagnostikovao u 10,75% ispitanika (sl.7).

Frekvencija redukcije hipokonulida kod M1 i M2 prikazana je na grafikonu 3. Statistički je značajno veći broj donjih prvih molara sa redukcijom hipokonulida kod ženskog (32,63%) u odnosu na muški (21,35%) pol ($p < 0,05$). Kod ženskog pola je veća redukcija hipokonulida i kod donjih drugih molara, ali ne i statistički veća.



Slika 5. Donji prvi molar sa 6 kvržica (tip M1-6)
Picture 5. Lower first molar with 6 cusps (typ M1-6)

It was determined the existence of the lower first molar with five cusps (Fig. 3).

There existed, females, statistically (32.63%), with significantly more first molars with 4 cusps (Fig. 4).

Type M1-6 was very rare (1.5%) in our patients, and more common in boys 3.05% than in females 0.42% (Fig. 5).

Chart 2 shows percentage of the number of cusps on the lower second molar (M2) in both sexes; it is found significantly more lower second molar with 4 cusps - 89.25% than with 5 cusps 10.75% ($p < 0.001$). Although a somewhat higher percentage of teeth with four cusps was in females 91.1%, versus 86.59% of male subjects, and there were no statistically significant differences between the sexes in the number of lower second molar with 4 or 5 cusps.

It was found that Type M2 -4- dominated in both sexes (Fig. 6).

M2-5-type in our study was diagnosed in 10.75% of the respondents (Fig. 7).

Frequency reduction of hypoconulida in M1 and M2 is shown in chart 3. Statistically, there was significantly greater number of lower



Slika 6. Donji drugi molar sa 4 kvržice (tip M2-4)
Picture 6. Lower second molar with 4 cusps (type M2-4)

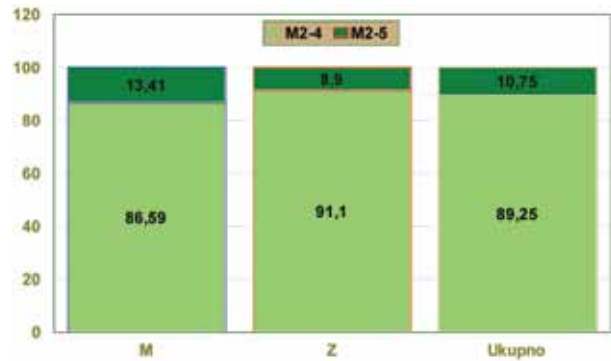


Slika 7. Donji drugi molar sa 5 kvržica (tip M2-5)
Picture 7. Lower second molar with 5 cusps (type M2-5)

Diskusija

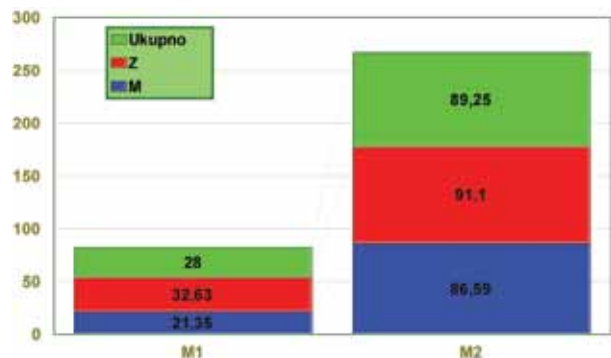
Naši nalazi su najbliži nalazima Kallay-a³ od 72,6% i Tijanić⁵ od 72,52% za tip M1- 5. Ismagulov i Sihimbaeva⁶ su utvrdili na stanovništvu Kazahstana da imaju veći procenat (83,5%) , sa slabo izraženim polnim razlikama. Kallay³ je našao izraženije polne razlike kod devojčica i veću tendenciju ka normalnom M1-5, dok su dečaci imali tendenciju ka M1- 6. Na ruskom stanovništvu je zabeležen nalaz od 66,4% ,dok na ukrajskom je viši procenat ovih anomalija a na Mongolima znatno manji 54,1%.

Utvrđeno je u ovoj studiji postojanje M1- 5 tipa, što je karakteristično i za američke Indijance koji u u 100% imaju M1- 5 tip, zatim australijske urodjenike , kao i Kineze. Visok



Grafikon 2. Procentualna zastupljenost broja kvržica na donjem M2

Chart 2. Schematic summary of results. A diagram shows percentage percentage of number of cusps of the lower M2



Grafikon 3. Frekvencija redukcije hipokonulida kod M1 i M2

Chart 3. Schematic summary of results. A diagram shows reduction frequency of hypoconulid at M1 and M2

first molars hypoconulida reduction in female (32.63%) than in malegender (21.35%) ($p < 0.05$). Females have greater reduction hypoconulida and the lower second molar, but not statistically significant.

Discussion

Our findings are closest to the findings of Kallay³ and Tijanić⁵ , who founds 72.6% and 72.52% respectively of the type M1-5 . Ismagulov and Sihimbaeva⁶ found in the population of Kazakhstan to have a higher percentage (83.5%), but with poorly marked gender differences. Kallay³ found pronounced gender differences in girls and a greater tendency for normal M1-5, while boys tended to M1-6. The Russian population was recorded finding of 66.4%, while the Ukrainian higher percentage of these anomalies in comparison to Mongols with the much lower percentage being 54.1%.

It was found in this study the existence of M1-5 type, which is typical for American Indians who have uu 100% M1-5 type, then the

procenat M1- 5 tipa imaju i crnci iz Afrike u 99%, Eskimi u 97%, američke bele žene u 87% i drevni Evropljani u 83%.

Upoređujući naš nalaz prvih donjih molara sa 4 kvržice Tip M1-4 (28%), zaključili smo da se dosta razlikuje od nalaza raznih autora, od potpunog odsustva ovog tipa: kod Mongola i kod Kirgiza svega 1,4 %. Crnci (Afrike i Amerike) 1%. Ismagulov⁶ (1989) nalaz je utvrdio takodje nizak, svega 2,3%, Kallay³ (1974) 16,45% , M. de Terra⁷ 11,6 %, Jonge 18%, Minkov⁸ (2006) na bugarskom stanovništvu 7% -23%,. Najbliže našim nalazima su rezultati istraživanja Tijanić⁴ (2008) 26,69%,. Kod Rusa i Ukrajinaca svega 10,8% i 10,5%.

Tip M1- 6 je bio veoma redak(1,5%) kod naših pacijenata, i češći kod dečaka 3,05% nego kod devojčica 0,42% . Drugi autori kao što su Tijanić⁵ i Minkov⁸ su utvrdili procenat od 0,5 -2%. Kallay³ je našao nešto viši procenat 5,08%, Ismagulov⁶ 13,8% kao i Zubov⁹ 11,3% kod Kirgiza , dok je kod Mongola dosta visok 45,9%.

Najbliži našem istraživanju su rezultati kod Rusa i Ukrajinaca⁶. Viši nalaz ima Tijanić⁵ 95,96% , dok Ismagulov⁷(1989) navodi manji procenat 65,8% kao i Zubov⁹ koji je na Kirgizima (61%) i kod Mongola svega 5,6%. Po Minkovu⁶, 4 kvržice ima 79% do 94% ispitanika .

M2-5 tip je utvrdio de Terra⁷, sa 9,35% zastupljenosti, koji je blizak nalaz našem (10,75%). Ismagulov⁶ je našao dosta viši procenat (31,5%) kao i Zubov⁹, koji je kod Kirgiza jako visok 61%.

Redukcija kvržica odvija se na donjim molarima ovim redom : hipokonulid, entokonid, hipokonid, svi na talonidu , odnosno na distalnom delu zuba. U našem uzorku nadjen je samo nedostatak hipokonulida. Na donjem prvom molaru u 28% slučajeva, a na donjem drugom molaru u 89,25%. Kod belih muškaraca Amerike nadjen je vrlo visok procenat 99% , drevnih Evropljana 86%, azijskih Mongola i američkih Indijanaca 69,0%, Eskima 57,0% i australijskih urođenika 52,0%.

Rezultati u ovoj studiji su omogućili da se ustanovi povećanje broja kvržica u zavisnosti od tipa molara. Pitanje koje se nameće je da li postoji i povećanje debljine gleđi u odnosu na tip molara¹⁰, što će biti tema daljih istraživanja.

Australian natives, and Chinese. A high percentage of M1-5 types are blacks from Africa and 99%, 97% in Eskimos, American white women and 87% of ancient Europeans in 83%.

Comparing our findings of the first lower molars with 4 cusps type M1-4 (28%), we found to be quite different from the findings of various authors, the complete absence of this type: the Mongolian and Kirgiz of only 1.4%. Blacks (African and American) 1% . Ismagulov⁶ also found low, only 2.3%, Kallay³ found 16.45%, de Terra⁸ 11,6% Minkov⁸ in the Bulgarian population found 7% -23%, . Closest to our findings is the results of Tijanić⁴ who found 26.69%. In the population of Russian and Ukrainan it was only 10.8% and 10.5%.

Type M1-6 was very rare (1.5%) in our patients, and more common in boys than 3.05% 0.42% in girls. Other authors such as Tijanić⁵ , and Minkov⁸ and found the percentage of d 0.5 -2%. Kallay³ found a slightly higher percentage of 5.08%, Ismagulov⁶ 13.8% and 11.3% in Kirgiz, while the Mongols have rather high percentage 45.9%.

Other results⁶ which are closest to our research results with 85.6% and 85.51% within the Russians and Ukrajinaca. Higher findings had Tijanić⁵ 95.96%, while Ismagulov⁶ give a lower percentage of 65.8% and Zubov² found to Kyrgyzstan 61% and the Mongols only 5.6%. By Minkovu⁷, 4 cusps are present at 79% to 94%.

M2-5-type is found by de Terra⁷ in percent of 9.35% which is very close to our findings (10.75%) . Ismagulov⁶ found a much higher percentage (31.5%) which is in the Kirgiz very high (61%). Reduction of cusp occurs on the lower molars in this order: hypoconulid, entokonid, hipoconid, all on the talonidu i.e., the distal part of the tooth. In our sample we find only a lack of hypoconulid on the lower first molar in 28% of cases, and the second molar to 89.25%. White American, we found a very high percentage of 99%, 86% of ancient Europeans, Asian Mongols and Native American 69.0%, 57.0% of Eskimos and Australian natives 52.0%.

The results in this study allowed to determine the increase in the number of cusps, depending on the type of molar. The question that arises is whether there is increased thickness of enamel in relation to the type of molars¹⁰, which will be the subject of further investigations.

Zaključak

U ovoj studiji dobijeni su podaci koji nameću sledeći zaključak:

1. Ispitanici našeg uzorka odlikuju se visokim procentom prisustva M1 sa pet kvržica (70,5%) i M2 sa 4 kvržice (89,25%).
2. Prvi molar kod 28% ispitanika ima 4 kvržice i svega kod 1,5% njih 6 kvržica.
3. Drugi molar samo kod 10,75% ima 5 kvržica.
4. Postoji prednost devojčica kod M1-4 i M2 4 tipa da bi zatim kod M1-5, M1-6 i M2-5 prešla na stranu dečaka.
5. Utvrđeno je potpuno odsustvo samo distobukalne kvržice- hipokonulida.
6. Redukcioni proces na donjim molarima pokazuje znatno viši stepen izraženosti na M2 (89,25%) u odnosu na M1 (28,0%).
7. Prisustvo tipa M2 -4 je u granicama vrednosti koje vrede za zapadnu odontološku grupu.

Conclusion

In this study, data were obtained by imposing the following conclusion:

1. The subjects of our sample are characterized by a high percentage of the presence of M1 with five cusps (70.5%) and M2 with 4 cusps (89.25%).
2. The first molar in 28% of respondents have four cusps and only in 1.5% of subjects are with 6 cusps.
3. The second molar with 5 cusps are found in only 10.75% of subjects.
4. There is an advantage of girls in M1 and M2-4 4 types that would also, at M1-5, M1-6 and M2-5 turn over to the boys group.
5. It was found the complete absence of only distobuccal cusp-hypoconulid.
6. Reduction process on the lower molars showing a much higher level of expression on the M2 (89.25%) compared to M1 (28.0%).
7. The presence of type M2 -4 is in the range of values that are valid for the western group of Odontology.

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Adresa za korespondenciju:

Dr.Stom. Mirjana Burić
Specijalista Ortodoncije
Klinika za Stomatologiju-Odelenje ortodoncije
Bulevar Dr Zorana Đinđića 52
18000 Niš
E-mail:mirjana_buric@yahoo.com

Address of correspondence:

Mirjana Buric, D.D.S.
Specialist in Orthodontics
Clinic of Dentistry-Department of Orthodontics
Dr Zoran Djindjić 52 BLVD
18000 Niš
E-mail: mirjana_buric@yahoo.com