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Research Article

Mandibular Third Molars in Southern Bulgaria – A Clinical and Radiological Study of 1518 Patients

Summary

The normal eruption time of third molar is after 16 years of age. The impaction rate is higher for third molars when compared with other teeth.

The aim: of this study was to evaluate mandibular third molars among southern Bulgarians.

The objects: of evaluation were 1518 dental patients visited four dental practices in Plovdiv, Bulgaria in the period between May 2013 and May 2016. The presence and position of the left and right mandibular third molar, and the type of performed extraction was investigated (3036 records).

Results: From 1518 patients, 851 were females, 667 were males. The mean age of patients was 45.31 years with a standard deviation of 15.64 years. The largest part of the third mandibular molars were properly erupted - 28.43% /863 teeth/ from all studied teeth. The incidence of impaction of mandibular third molars was 18.74% /569 teeth/. The frequency of semiimpacted mandibular third molars was 7.48% /227 teeth/. From both - impacted and semiimpacted teeth, 46.86% /373 teeth - 245 impacted and 128 semiimpacted/ show mesioangular impaction. The next most frequent position was vertical - 29.4% /234 teeth, from which 178 were impacted, and 56 were semiimpacted/. Horizontal was position of 92 impacted and semiimpacted mandibular third molars /11.56%/, 76 teeth /9.56% / show distoangular impaction, 15 teeth /1.88% / were positioned buccolingually, 6 teeth /0.75% / were classified as other than mentioned position. The frequency of agenesis of the mandibular third molars was 6.69% /203 missing buds/. The cases of standard extraction of mandibular third molars, representing 25.69% /780 teeth/. Surgical removal of mandibular third molars was observed in 12.65% /384 teeth/.

Introduction

Third molars are the only teeth in the human dentition without strictly specified time for their eruption. The normal eruption time of third molar is after 16 years of age [1]. According Favre, et al. [2]. Impacted teeth are classically defined as retained in the jaw beyond their normal date of eruption, surrounded by their coronary bag and without communication with the oral cavity. Hashemipour, et al. [3]. Defined tooth impaction as a pathological situation in which a tooth cannot or will not erupt into its normal functioning position.

The aim of this study was to evaluate mandibular third molars.

Material and Methods

The objects of evaluation were 1518 dental patients visited two dental practices in Plovdiv, Bulgaria in the period between May 2013 and May 2016. A clinical, radiographic and

questionnaire study was performed. The presence and position of the left and right mandibular third molar, and the type of performed extraction was investigated (3036 records).

Results

Females were 851 patients /56.06%/, 667 patients /43.94% / were males. The youngest patient included in the study was 17 years old, the oldest - 89 years. The mean age of patients was 45.31 years with a standard deviation of 15.64 years. The distribution of the patients by age groups is presented in Table 1. Most patients are aged between 30 and 39 years /358 patient/, the smallest group is of patients to 19 /44 patients /. T-test and chi 2-test ($p > 0.05$) showed no statistically significant difference in age distribution between two genders.

The distribution of mandibular third molars in both sides - right and left, is presented in Table 2.

The study showed that the largest part of the third man-

dibular molars were properly erupted - 448 left /29.51%/ and 425 right /28% /. They represent 28.43% /863 teeth/ from all studied teeth. No statistically significant differences between females and males were observed - the ratio is 1.1: 1 (p> 0.05). The majority of cases of properly erupted mandibular third molars are in patients of fifth and fourth decade of life.

Impacted mandibular third molars represent a large part of all examined teeth - 310 teeth in the right side /20.42%/ and 259 teeth in the left side/17.06%/. The incidence of impaction of mandibular third molars in patients included in our study was 18.74% /569 teeth /. The results clearly show the prevalence at young age, especially in the third and fourth decade (Figure 1). The incidence of impaction decreased significantly in older patients (p<0.05). Female: male ratio was 1.25: 1 (p<0.05).

The frequency of semiimpacted mandibular third molars was 7.48% /227 teeth/. On the right side were 122 teeth /8.04%/, 105 teeth were on the left side /6.92%/ (Figure 2). Semiimpacted mandibular third molars were more frequent in young patients especially in third and fourth decade, their number decreased by almost half in the fifth decade, while in the older patients establishment of a semiimpacted mandibular third molar is a casuistic entity. The ratio between females and males with semiimpacted mandibular third molars was 1.14: 1 (p> 0.05).

From both - impacted and semiimpacted teeth, 46.86% /373 teeth - 245 impacted and 128 semiimpacted/ show mesioangular impaction. The next most frequent position was vertical - 29.4% /234 teeth, from which 178 were impacted, and 56 were semiimpacted/. Horizontal was position of 92 impacted and semiimpacted mandibular third molars /11.56%/, 76 teeth /9.56%/ show distoangular impaction, 15 teeth /1.88%/ were positioned buccolingually, 6 teeth /0.75%/ were classified as other than mentioned position (Table 3).

The frequency of agenesis of the mandibular third molars was 6.69% /203 missing buds/ - 103 on the left side /6.79%/ and

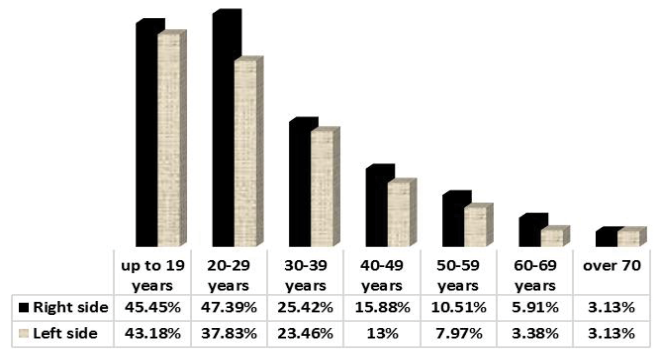


Figure 1: Distribution of impacted mandibular third molars on the right and left side by age groups.

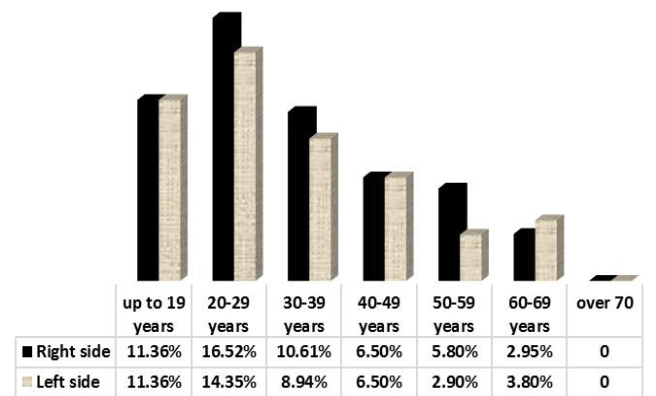


Figure 2: Distribution of semiimpacted mandibular third molars on the right and left side by age groups.

100 on the right side /6.59%/ (Figure 3) Statistically significant difference was observed between left and right mandibular side in patients of fourth decade. Agenesis, a statistically significant (p<0.05), is a more frequent phenomenon in females versus males - 1.57: 1. Statistical processing of the data establish that probability (odds ratio) of agenesis of right mandibular third molar was 30.58 times higher in the absence of the left germ (p<0.001); probability (odds ratio) of agenesis of left mandibular third molar was 29.94 times higher in the absence of the right germ (p<0.001). These data indicate a very strong correlation.

The cases of standard extraction of mandibular third molars, representing 25.69% /780 teeth - 403 left and 377 right/. Their frequency increase with age of the patients. Females, compared with males, statistically significant more often loses mandibular third molars by standard extraction - a ratio of 1.44: 1 (p<0.05).

Surgical removal of mandibular third molars was observed in 12.65% /384 teeth - 200 on the right side, 184 on the left side/. This procedure was more frequent in females - female: male ratio was 1.39: 1 (p<0.05). Patients of the fourth decade were more involved (Table 4).

Discussion

The possible time limit for the formation of the third molar germ is 13 years [4]. Third molars erupt between 17 and 21 years of age [5]. Difference in time for eruption of the third molars

Table 1: Distribution of patients by age groups.

Age group	Number of patients	%
Up to 19 years	44	2,90
20 - 29 years	230	15,15
30 - 39 years	358	23,58
40 - 49 years	277	18,25
50 - 59 years	276	18,18
60 - 69 years	237	15,61
Over 70 years	96	6,32
Total	1518	100

Table 2: Distribution of right and left mandibular third molars.

Mandibular third molar	Right side		Left side	
	number	%	number	%
Agenesis	100	6.59%	103	6.79%
Normally erupted tooth	425	28.00%	448	29.51%
Semiimpacted tooth	122	8.04%	105	6.92%
Impacted tooth	310	20.42%	259	17.06%
Extracted tooth	377	24.84%	403	26.55%
Surgically extracted tooth	184	12.12%	200	13.18%
Total	1518	100%	1518	100%

Table 3: Position of impacted and semiimpacted mandibular third molars.

Position of the tooth	Impacted teeth				Semiimpacted teeth				Total	
	Right side		Left side		Right side		Left side			
	number	%	number	%	number	%	number	%	number	%
Vertical	97	31.3	81	31.27	27	22.13	29	27.62	234	29.4
Mesioahgular	127	40.97	118	45.56	72	59.02	56	53.33	373	46.86
Horizontal	53	17.1	39	15.06	0	-	0	-	92	11.56
Distoangular	19	6.13	14	5.41	23	18.85	20	19.05	76	9.55
Buccolingual	9	2.9	6	2.32	0	-	0	-	15	1.88
Others	5	1.61	1	0.39	0	-	0	-	6	0.75
Total	310	100	259	100	122	100	105	100	796	100

Table 4: Distribution of extracted and surgically extracted mandibular third molars on right and left side by age groups.

Age group	Right side				Left side			
	Extracted teeth		Surgically extracted teeth		Extracted teeth		Surgically extracted teeth	
	number	%	number	%	number	%	number	%
Up to 19 years	-	-	5	11.36	1	2.27	3	6.82
20 - 29 years	9	3.91	26	11.30	6	2.61	36	15.65
30 - 39 years	33	9.22	59	16.48	34	9.50	67	18.72
40 - 49 years	58	20.94	38	13.72	69	24.91	38	13.72
50 - 59 years	95	34.42	25	9.06	108	39.13	37	13.41
60 - 69 years	106	44.73	28	11.81	116	48.95	18	7.59
Over 70	76	79.17	3	3.13	69	71.88	1	1.04
Total	377	24.84	184	12.12	403	24.84	200	13.18

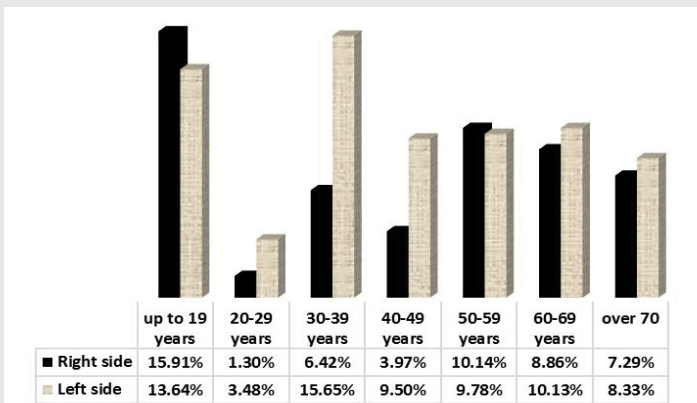


Figure 3: Distribution of agenesis of mandibular third molars on the right and left side by age groups.

between different races exist [6]. Our study included patients over 17 years, which coincides with the recommendations given in the literature [7], and established facts - jaws grow and reach their basic size in the age to 17 years, which means that 17 years is the minimum age at which can to assess whether a mandibular third molar will erupt or remain impacted into the jaw.

Third molars impaction is more common in the mandible and varies between 16.7% and 68.6% in different studies [8]. We find frequency of mandibular third molars impaction of 20.42% for the right side and 17.06% for left side; the rate of semiimpaction was 8.04% for the right side and 6.92% for the left side. Our investigation found that surgically been removed 13.18% right and 12.12% left mandibular third molars, which is an indirect indication of the presence of impaction. We believe that surgically removed mandibular third molars were probably impacted or semiimpacted and this is the reason to assume that the total number of impaction and semiimpaction of

mandibular third molars in our study was 41.64% for the right side and 36.10% for the left side. The incidence of impaction of mandibular third molars worldwide are varied. Breik and Grubor [9], show the frequency of impacted mandibular third molars of 58.76%. A study of Dachi and Howell [10], a few decades earlier, establish impaction rate of mandibular third molars of only 17.5%. A study, conducted in South Africa on 1215 patients, establishes 17% frequency of impaction of mandibular third molars [11]. Quek determine impaction of mandibular third molars in 18% - 32% [12]. Some regions of the world impressed by the low incidence of impaction of third mandibular molars - by 4.7% [13]. To 9.2% in Nigeria [14], 2.23% in Sri Lanka [15], and only 1.6% in Kenya [16].

Quek, et al. [12], found 63% bilateral impaction of third molars. Hashemipour, et al. [3]. Found no statistically significant differences between impacted third molars in the right and left mandibular side. Deshpande, et al. [17], reported a higher incidence of impacted right mandibular molars - 58.8%, which is consistent with our findings of low prevalence impaction of the right mandibular third molars.

Data from our study show that the impaction of mandibular third molars is most common in the second and third decade of life, which coincides with the findings of Osborn, et al. [18], Hashemipour, et al. [3], found that more than half of patients with impacted third molars are in the third decade of life. The majority of authors who study the problem of the mandibular third molars impaction established predominantly affecting the young patients [9,16].

Mandibular third molars in males erupted three to six months earlier compared with females [19], in the literature prevailing conception that cases of mandibular third molars

impaction are more common in females [3,7,12]. The possible explanation is different rate of enlarging and development of bone - jaw growth in females finished during the eruption of the third molars, while in males the increase of the jaws continued during the eruption of the third molars, which provides more space for the tooth [20]. Other authors reported no statistically significant prevalence of mandibular third molar impaction in females [19].

We distinguish two types of impaction - fully impacted and semiimpacted mandibular third molars. Mandibular third molars, which are fully retained in the mandible, covered with gingiva and/ or bone and cannot be found in the oral cavity during clinical examination, we called "impacted". Partially erupted tooth which are not taken its properly place in the tooth arch, but part of a tooth was visible during clinical examination behind the second mandibular molars, called "semiimpacted".

The most often position of impacted and semi impacted mandibular third molars in our study was mesioangular, which coincides with reports in the literature [3,12,19]. The explanation for the prevalence of mesioangular position of the tooth, probably is connected with the fact that normal development and the course of the tooth eruption is the anterosuperior. [16], in some studies, the frequency of vertically impacted mandibular third molars was higher [21]. In Hong Kong has established the highest incidence of the horizontal position of impacted mandibular third molars, followed by mesioangular, vertical, distoangular and others position [22]. Among Nigerian population the highest is the frequency of mesioangular impaction, followed by the vertical, the horizontal, distoangular and others position [23]. In South Africa, most often found vertical impacted mandibular third molars, followed by mesioangular and horizontal impaction, while distoangular position was rare [24].

Congenital absence of a germ (agenesis) of third molars is a state whose frequency varies widely - from 0% in the study of skulls from Tasmania to 49% in Europe (Hungary) and X-ray studies of Caucasians establish agenesis of the third molars between 7 and 26% [4]. Our study found that agenesis of at least one bud of mandibular third molar has a frequency of 6.59% on the right side and 6.79% on the left side. In Spain, the incidence of agenesis of third molars of 17.5% was found [25]. A study conducted among adolescents Americans [26], found that 15% of them missing a bud of at least one third molar, while almost 2% absent buds of all four third molars. Sandhu and Kaur [27], reported a frequency of agenesis of third molars of 11.5%. According Banks [28]. Most frequently observed agenesis of two third molars, followed by agenesis of one, three or all four third molars, Trisovic al. [29]. Found that agenesis of third molars is often bilateral and this fact explains with a correlation between the phases in the development of third molars on both sides of the jaw.

The conception of this study excluded patients with mental problems and those without memories for the wisdom teeth procedures, their eruption and removal. In our study these cases were calculated as very limited, so the authors believe that they were no matter for the general results [30].

Conclusion

The mandibular third molar is the only tooth that is unpredictable in his form, position and time of eruption. The impaction of mandibular third molars is common phenomenon. In the present study, 18.74% of patients had impacted teeth, 7.48% had semiimpacted mandibular third molars. The prevalence of impacted third molars in female was more than male. The frequency of agenesis of the mandibular third molars was 6.69%.

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