

INFORMATIVE VALUE OF THE NEW HYGIENE INDEX OF THE THIRD MOLARS IN PATIENTS WITH TRAUMATIC FRACTURES OF THE LOWER JAW

Authors Details

Irina O. Pohodenko-Chudakova^{1*}

Belarusian State Medical University,
83, Dzerzhinsky Ave. Minsk, 220083, Republic of Belarus.

Ali Thergam A. Ali²

Belarusian State Medical University,
83, Dzerzhinsky Ave. Minsk, 220083, Republic of Belarus.

Corresponding Author: *Irina O. Pohodenko-Chudakova*

ABSTRACT: Currently, the specialized medical literature deals a lot of attention to the issues related to the third molars [1, 2, 3, 4]. This is due to a significant number of odontogenic inflammatory complications caused by third molar [5, 6]. In most of cases, these complications are developing right during the wisdom teething, the frequency of which, according to various researchers, varies from 13.8%, according to O.N. Bolonkin (2012) to 50.0% according to I.V. Gaivoronsky et al. (2015) and Ali Tergam Abdulamir Ali et al. (2022) [7, 8, 9]. Second group of inflammatory complications consists of the processes that are developing after the operation of removing the third molar. They are about 40.0% [10, 11].

The frequency of infectious and inflammatory processes (IIP) which are significantly provoked by third molars of the mandible, can be explained firstly by the intensity of vascularization, the volume of fatty tissue, as well as loose fibrous connective tissue. Secondly, the complexity of surgical intervention due to the involvement of both soft tissues and bones which explains the high rate of abnormalities developmental and

frequent eruption of this tooth. In addition, the more extensive the tissue damage, the longer the vascular spasm that develops in response to the damage. It leads to disruption of the formation of a clot in the alveoli of the removed third molar up to its complete absence as well as to the involvement of a massive vascular network in the pathological process which ultimately contributes to the quick spread of IIP.

In case of greater tissue damage, a longer vascular spasm develops followed by the absence of a clot in the alveoli of the extracted tooth and the involvement of a very extensive vascular network in the pathological process which together contributes to its fastest spread [10]. At the same time fractures of the bones of the facial skeleton belong to one of the leading positions in the list of reasons for hospitalization of patients in specialized departments. Special attention should be paid to the clear trend towards an increase in their number, an increase in the proportion of inflammatory and destructive complications manifested by post-traumatic osteomyelitis [12]. This situation is complicated by the fact that 80.0% of people who have suffered traumatic fractures are men 20-49 years old. Moreover, the primacy in the age groups for fractures of the bones of the facial skeleton belongs to people 20-29 old which make 41.1% [13]. The rate of fractures of the lower jaw currently varies between 70.0-85.0% of the total number of traumatic injuries to the bones of the facial skeleton [14, 15].

According to A.I. Bychkov (1993), the contamination of the oral mucosa (OM) with microorganisms in the area of the retromolar space significantly exceeds that in other areas of the upper and lower jaw. The situation is aggravated by the chronic injury of the antagonist tooth to the mucosal duplication over the non-ruptured part of the third molar called the "hood" [16]. Microbiological research data indicate that the microbiota during the development of the infectious and inflammatory process in this area is represented by *Fusobacterium*, *Prevotella*, *Peptostreptococcus* which often have resistance to amoxicillin, amoxicillin/clavulanic acid and metronidazole [6, 17] which significantly exacerbates the severity of the course of IIP localized in this area.

All of the above confirms the justification of the performed research, its timeliness and it's also proof of the relevance of the issue under consideration.

The aim of the study was to compare the hygiene index of the third molars (HITM) in patients with traumatic fractures of the lower jaw and individuals who do not have such damage.

Materials and methods. The work was carried out taking into account the requirements of biomedical ethics [18]. Permission was received from the Bioethics Commission of the Belarusian State Medical University. All participants in the research have personally signed an consent to be involved in this research. The criteria for inclusion of patients in the study were: age 18-60 years; presence of more than two-thirds of molars in the mouth of the subject. The exclusion criteria were: age less than 18 years and over 60 years; patients have a history of somatic diseases that require medical rehabilitation; pregnancy and lactation in women.

95 persons were involved into the examination represented by 63 men (66.3%) and 32 women (33.7%). Their distribution into the observation groups and the ratio of the latter by gender are shown in Table 1.

Table 1 – distribution of patients in groups depending on gender.

Patient groups	Distribution of patients in groups by gender			
	Men		Women	
	The absolute number	Share (in %)	The absolute number	Share (in %)
Group 1 (persons with traumatic fractures of the lower jaw)	31	32,6%	12	12,6%
Group 2 (persons without traumatic fractures of the lower jaw with poor and satisfactory IHTM)	14	14,7%	7	7,4%
Group 3 (persons without traumatic fractures of the lower jaw with good IHTM)	18	18,9%	13	13,7%

Note: the total number of examined patients – 95 people was accepted as 100%.

The diagnosis of a traumatic fracture of the lower jaw without displacement was confirmed using radiological examination methods of patients which were performed according to standard methods described in the specialized literature [19]. Moreover, the frequency of occurrence of fracture line localization in this group was as follows. A fracture in the canine region was diagnosed in 12 (12.6%) people. A fracture of the mandible body was

detected in 16 (16.8%) patients. A fracture in the area of the angle of the jaw occurred in 15 (15.8%) representatives of group 1.

All of these individuals underwent a dental examination which included the following items. The condition of the dentition and hard tissues of the teeth was assessed according to the caries index of dental fillings (CIDF). The caries intensity level (CIL) was calculated. The assessment of the hygienic status of the oral cavity was established on the basis of the simplified hygiene index Green-Vermillion (J.C. Green, J.R. Vermillion) = Oral Hygiene Index-Simplified (O-HIS) (1964). The condition of periodontal tissues was determined using the complex periodontal index (CPI) proposed by P.A. Leus (1988) [20].

IHTM was installed in all examined individuals on the basis of method¹ proposed by the authors for bandages and replacement of the interdental rubber traction. In persons belonging to groups 1 and 2, this indicator was 0.34 or more which indicated a satisfactory and poor hygienic status of the third molars. In group 3, the IGTm index was 0.33 or less which corresponded to a good hygienic condition of the third molars.

The primary data obtained during the study were statistically processed using "Statistica 10.0" (Version 10-Index, license no. STAF999K347156W, StatSoft Inc., USA) and "Excel". What was the type of distribution of quantitative characteristics determined by the Kolmogorov-Smirnov criterion. When the quantitative feature was different from the normal one, the median (Me), lower (LQ) and upper (UQ) quartiles were calculated. A comparative assessment of the

¹Pohodenko-Chudakova I.O., Ali Thergam Abdulameer Ali. Eurasian patent no 202100013 A1. Method for assessing the hygienic condition of third molars – index of hygienic condition of third molars (IGTM). Published 30.06.2022. Eurasian Server of Publications Bulletin. 2022. no 12.

indicators of the three observation groups was carried out according to the Kraskel-Wallis criterion (H). The result was considered reliable at $p < 0.05$ [21].

The results and discussion. All the study participants had a high CIL. The oral hygiene index – O-HIS ranged from 2.1-2.5 with an average of 2.3 ± 0.1 which indicated poor oral

hygiene. The CPI values were in the range of 2.1-3.5 amounting to 3.3 ± 0.2 , which indicated a periodontal pathology of moderate severity.

The combination of these indicators allows to conclude that the patients in the selected groups had approximately the same dental status which allows for a comparative assessment and considers its results legitimate.

The average age of patients in groups 1, 2, and 3 was 30.7 ± 1.6 years, 33.3 ± 2.4 years and 31.1 ± 2.1 years respectively. The results of a comparative assessment of the distribution of patients in the selected groups by age and gender are presented in Table 2.

Table 2 – Comparison of the distribution of patients in the selected groups by age and gender.

Analyzed indicators	χ^2 indices of the selected patient groups and the significance of statistical differences		
	Group 1	Group 2	Group 3
Age	$\chi^2=12,98$; $p=0,00467$	$\chi^2=0,94$; $p=0,33217$	$\chi^2=3,60$; $p=0,1650$
Gender	$\chi^2=148,82$; $p=0,00000$	$\chi^2=18,71$; $p=0,00002$	$\chi^2=37,53$; $p=0,00000$

The results presented in the table are the basis for the conclusion that the groups of individuals formed for the study are almost homogeneous in age and gender and therefore can be considered comparable.

When analyzing IHTM group 1, the following was determined. Poor hygienic condition was found in 65.1% (28) of patients. A satisfactory result was obtained in 34.9% (15) of the individuals in this group. A good hygienic condition of the third molars was not diagnosed in any person. The IHTM index was 0.70 (0.65-0.76).

In group 2, the results of the IHTM study revealed poor hygienic condition of the third molars in 23.8% (5) people, satisfactory in 76.2% (16) patients. The IHTM value in this group was 0.50 (0.44-0.61).

In group 3, the results of the IHTM study revealed a good hygienic condition of the third molars in 100.0% (31) of patients. The IHTM index was 0.27 (0.23-0.30).

A comparative assessment of the IHTM of the selected groups revealed significant differences. A comparison of the index of groups 1, 2 and 3 based on the Kruskal-Wallis criterion for multiple comparisons revealed a significantly lower index in group 2 $z_{1-2}=3.78$ ($H=74.87$, $p=0.0000$) and in group 3 $z_{1-3}=8.63$ ($H=74.87$, $p=0.0000$). A comparison of the IHTM index in groups 2 and 3 revealed significantly lower values in group 3. $z_{2-3}=3.63$ ($H=74.87$, $p=0.0000$). The results of a comparative assessment of the observed patient groups are illustrated in Figure 1.

Special attention should be paid to the fact that in group 1, 16.3% (7) of patients subsequently had infectious and inflammatory complications. At the same time, in all patients, IHTM indicated a poor hygienic condition of the third molars and varied in this group of individuals within the range of 0.74-0.79.

Considering that IHTM is a new index, the results presented in this article represent fundamentally new data on the hygienic status of the third molars of individuals with traumatic fractures of the mandible which do not contradict the information provided earlier on the hygienic condition of the oral cavity of patients in this category [22, 23].

Conclusion

The results of the research allow us to conclude the following. IHTM is an informative and well-reproducible indicator in assessing the hygienic status of the third molars. The condition of the third molars including hygiene has a significant effect on the

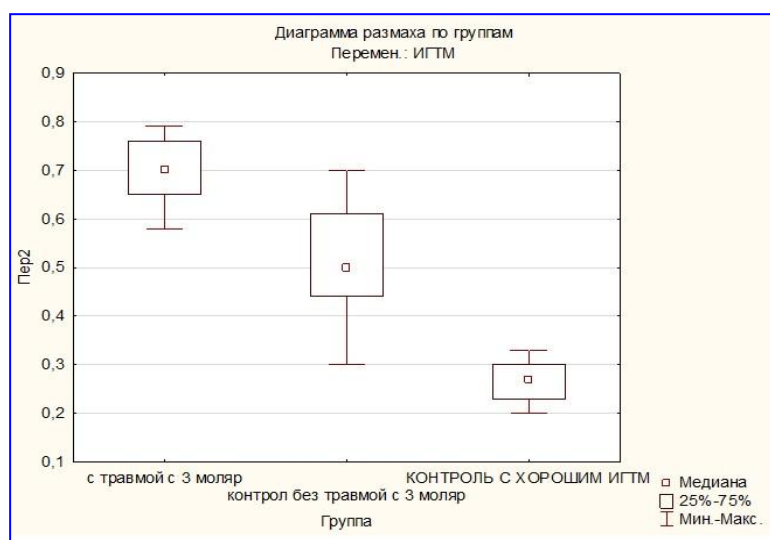


Figure 1 – A box diagram of a comparative comparison of IHTM indicators of the examined patient groups.

homeostasis of the oral cavity. It convinces us of the need to use IHTM in conjunction with O-HIS for a more accurate conclusion about the hygienic status of the patient's oral cavity. There is a need for targeted development of effective hygiene measures with an emphasis on the third molars for patients with traumatic fractures of the jaw bones.

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