10.5937/bjdm2503151Q

BALKAN JOURNAL OF DENTAL MEDICINE

ISSN 2335-0245

Masticatory Muscles Pain and Dysfunction

SUMMARY

Masticatory muscles dysfunction is the most frequent damage to them that is encountered in everyday prosthetics. The most frequent type of muscle dysfunction can also be accompanied by limitation of the mobility of the mandible, and difficulty in chewing. The causes of functional muscle disorders are emotional stress, increased muscle functional activity, various traumas, infectious pathologies, etc. ***Purpose of the Study*****:** *To determine the causes of abdominal muscle dysfunction as well as the methods of its treatment.* ***Material and Method:*** *The study includes about 227 subjects in the age group of 18-45 years, who completed a questionnaire prepared specifically for this topic, and where they provided data: regarding the use of chewing gum, teeth grinding and fatigue of the muscles of the upper extremities. The collected data were statistically analyzed to verify, if there is any correlation between the use of chewing gum and masticatory muscles pain. The treatment of muscle dysfunction and pain is done according to the causes, avoiding trauma, stress and excessive use of gum. In addition to these treatments, in special cases, drug treatment with inflammatory drugs and analgesics, as well as prosthetic treatment has been possible.* **Results:** *The study showed that 208 (91.7%) of the examinees used chewing gum. About, 45.8% of those examined used the gum up to 30 minutes, while 54.2% over 60 minutes. Of the examinees, 157 (69.2%) did not feel pain in the chew muscles, while 59 (26%) of the examinees felt pain in the masticatory muscles. According to gender, women predominate where they were around 75.5%, while men 24.5% with prevalence value* ***P=0.046****. The examinees had masticatory muscle pain on palpation, which phenomena was observed more in women 84.70%, compared to men, where it was observed in nearly 15.3% of them, with prevalence value* ***P=0.020.*** *From the study, it was observed that there is a significant association between gender and the use of gum, from which it was concluded that women are more regular and frequent users of gum, compared to men, respectively associated with more pronounced pain and dysfunction in muscles with prevalence values* ***P=0.046. Conclusions*****:** *From our study, it was concluded that there is a statistically significant relationship between gender and masticatory muscles pain, where 84.7% of women present with pain and in prevalence values* ***P=0.020.***

Key words: dysfunction, masticatory muscle pain, emotional stress, physical trauma, etc.

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ORIGINAL PAPER (OP)
Balk J Dent Med, 2025;151-156

Introduction

The most common type of the masticatory muscle dysfunction is myofascial pain. It is characterized by constant regional pain that increases during the function [(1)]. Palpation can identify painful muscles. Dysfunction of the masticatory muscles can be accompanied by limitation of the mobility of the mandible and difficulty in chewing.

There are different opinions about the appearance of the pain symptom. According to the author *Sicher*, the origin of pain must be sought in the musculature[(1)]. Other authors such as *Schwartz, Mussed, Echler* claim

that pain is only a consequence of muscle spasms. Spasms bursting areas appear in a whole muscle or in separate bundles[1]. Each muscle, even each part of the muscle projects its pain in a special area where it is located. Thus, the Masseter muscle projects the pain to the cheek, while the Temporal muscle projects the pain to the area around the ear. The pain appears with different intensities, which depended on the threshold of excitation of the nervous system. However, whatever the origin of the pain, its severity, the author *McNeil* points out, depends on the expression that the patient uses "*Pain Language*" to describe it and its symptoms [2].

There are different theories that explain the causes of muscle pain[3,4]. Theories that explain the appearance of pain are bruxism, the presence of psycho-emotional stress, and premature contact. This fact is explained by the above-mentioned pathologies causing muscle spasms that are reflected in masticatory muscle pain. Another cause encountered in daily practice is the use of gum for a long time during the day. In this regard, its use for a long time causes muscle contraction and is responsible for the appearance of pain. Muscular hyperactivity causes muscle spasms, fatigue and hard work that lead to further stimulation of nerve endings, resulting in a vicious circle of pain-spasm-pain[5,6]. Among the consequences of muscular dysfunction we can mention:

a] pain in the masticatory muscles such as masseter, temporal; ***b]*** pain around the ear area; ***c]*** difficulty in opening the mouth and reduction of jaw mobility; ***d]*** pain in the TMJ temporomandibular joint; ***e]*** muscular hypertrophy in the corner of the jaw[7].

Figure 1. Patients L.M. with strong pain in TMJ as result of using gum for long time

In determining this diagnosis, the type of pain is important, its form, such as severe, throbbing, strong, light dull, prolonged or throbbing pain, etc. [8,9,10]

The areas of pain propagation are: in the TMJ joint, in the area in front of the ear, in the zygomatic arch, in the temporal area, in the frontal area and in the corner of the jaw[11,12].

To determine the disfunction diagnose of the muscle should be taken in consideration some criteria's: ***1]*** pain aspect; ***2]*** pain perception aspect; ***3]*** pain character as well as pain reaction aspect.

Figure 2. Gingivitis from gum inflammation, bleeding of patient L.M. with pain of TMJ.

For the treatment of muscular dysfunction, the following protocol is used: Anamnesis is taken to discover the cause of muscle pain. When the dysfunction is caused by bruxism, prosthetic treatment is performed with relaxing splints and medication with muscle relaxants. When the dysfunction is caused by emotional stress, combined psycho-neuralgic treatment is performed, while when muscle fatigue is caused by the use of gum chewing for a long time, it is recommended not to use it, using analgesic and muscle relaxant preparations[13].

Purpose of the Study: *To determine the causes of abdominal muscle dysfunction as well as the methods of its treatment.*

Objectives of the study

1] *To study the distribution of subjects included in our study according to their gender.*

2] *To study the negative role played by the long-term use of cimcakzi in the muscles of the persons included in the study*

3] *To apply the appropriate therapeutic-prosthetic treatment to patients with muscle dysfunction problems.*

4] *To draw appropriate conclusions with the occurrence of muscle dysfunction according to the results obtained with the subjects of the study.*

Material and Method

The study started in *October 2023* and ended in *February 2025*. The study included 227 subjects in the age group of 18-45 years, who completed a questionnaire prepared specifically for this topic, and where they provided data regarding the use of chewing gum, teeth grinding and muscle fatigue. The collected data were

statistically analyzed to verify if there is any correlation between the use of chewing gum and masticatory muscle pain. From this group of patients, we treated 23 patients with the therapeutic-prosthetic method.

Patient selection criteria

1] We excluded from the number of 227 patients those who used gum for a long time.
2] We singled out patients with high psycho-emotional characteristics.
3] We selected those patients, who agreed to cooperate with the study authors.

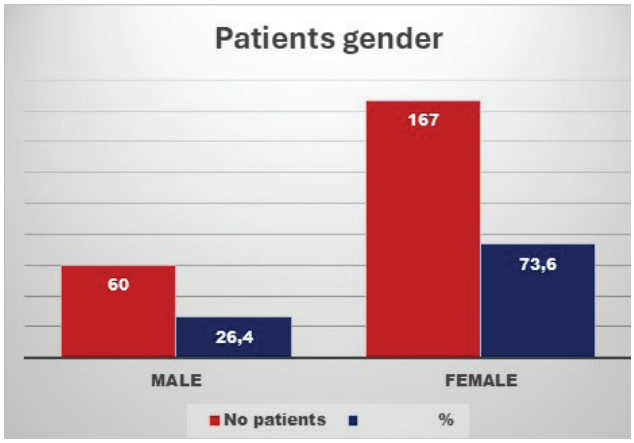
The statistical analysis procedures are described in the results of the study. For the categorical variables, the corresponding values and percentages are calculated. The comparison of percentages for categorical variables was possible through the Chi-square test. For all cases, a value of $P \leq 0.05$ is considered statistically significant. All statistical analysis was performed in SPSS version 21.0.

Results

From *October 2023* to *February 2025*, about 227 subjects in the age group of 18-45 years were included in the study.

Table 1. Subjects distribution according their gender

Gender	Number of patients	Percentage %
Male	60	26.4
Female	167	73.6



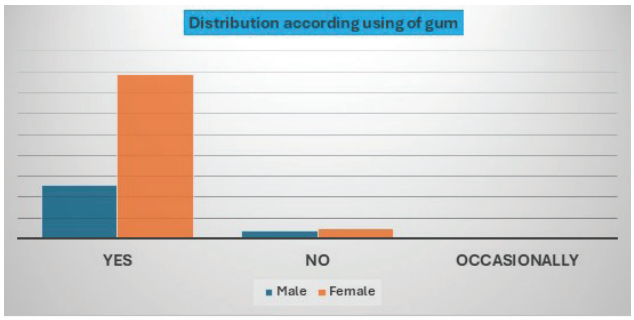
Graph 1. Subjects distribution according their gender

From table 1 and graph 1 it can be seen that 60 individuals (*26.4%*) are male, and167 (*73.6%*) are female.

The cause of muscle pain, among others, is the use of chewing gum for a long time, and the data are presented in table and graph 2.

Table 2. Subject distribution according the using of gum

Subjects whom use gum	Patients number	Percentage %
Yes	208	91.7
No	18	7.9
Occasionally	1	0.4



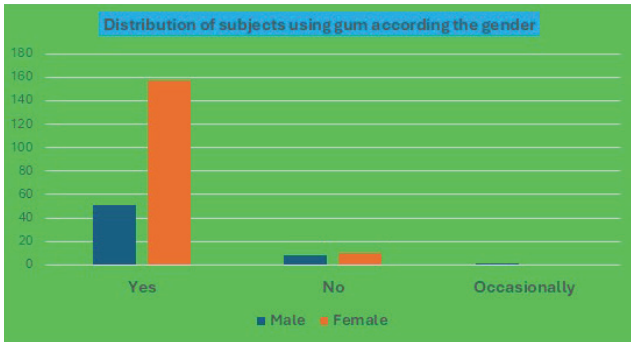
Graph 2. Subject distribution according the using of gum

From the table and graph 2 it is shown that muscle pain caused by the long-term use of gum is in 208 (*91.7%*) of all cases taken in the study.

According to the study and analysis of the data in the table and graph 3, the most who use gum are women.

Table 3. Distribution of subjects using of gum according the gender

Variables	Yes	No	Occasionally	P- values
Male	51 (24.5%)	8 (44.4%)	1 (100%)	
Female	157 (75.5%)	10 (55.6%)	0(0 %)	**P = 0.046**



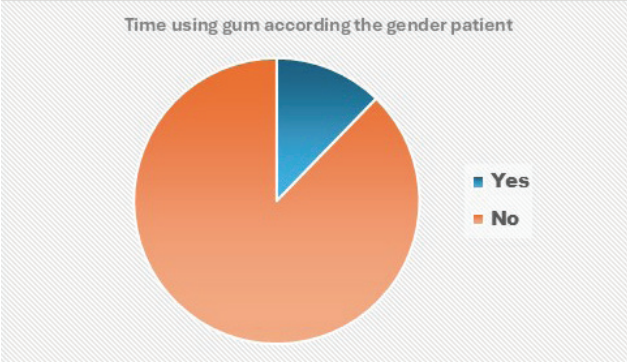
Graph 3. Distribution of subjects using of gum according the gender

From the table and graph 3, it can be seen that in daily life, women use gum more, 157 (*75.6%*) individuals from all cases. According to the statistical analysis, a statistically significant association is reported where the value of ***P=0.046.***

The time of using gum by the individuals interviewed varies from 30 minutes to over 1 hour and the data are given in table and graph 4.

Table 4. Time of using gum by the gender patient

Time of using gum	Number of Patients	Percentage %
till 30 minutes	104	45.8
over 1 hour	123	54.2



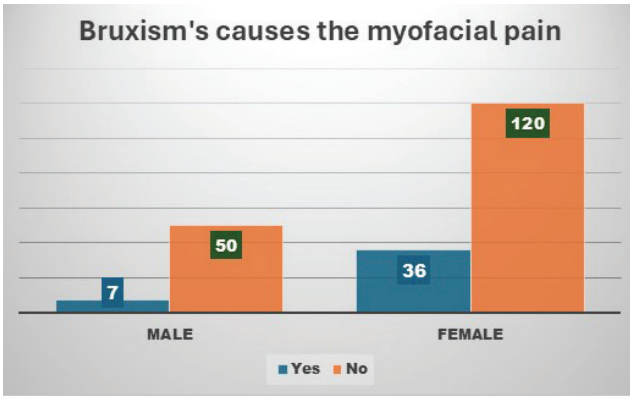
Graph 4. Time of using gum by the gender patient

From the table and graph 4, it can be seen that gum is used by the interviewees in 123 (*54.2%*) cases for more than 1 hour.

Masticatory muscle pain had other causes such as bruxism in the data presented in table and graph 5.

Table 5. Bruxism as a cause of myofascial pains

Gender	Bruxism's	Percentage %
Male	115	50.6
Female	112	49.4



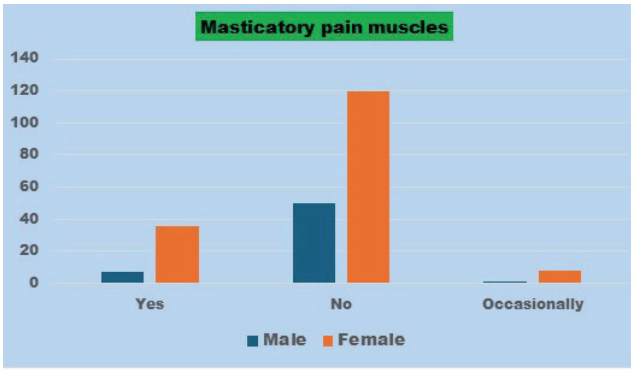
Graph 5. Bruxism as a cause of myofascial pains

From the table and graph 5, it can be seen that about 115 (*50.6%*) of male patients suffer from bruxism, and about 112 (*49.4%*) of women also suffer from bruxism as a result of muscle pain.

Palpation of the masticatory masseter and temporal muscles is accompanied by pain in those muscles, the data of which muscles are presented in table and graph 6.

Table 6. Individual distribution with masticatory pain muscles

Gender	Yes	No	Occasionally	P = values
Male	9(15.3%)	49(31.9%)	0 (0%)	
Female	50 (84.7%)	108(68.8%)	6(100%)	**P=0.020**



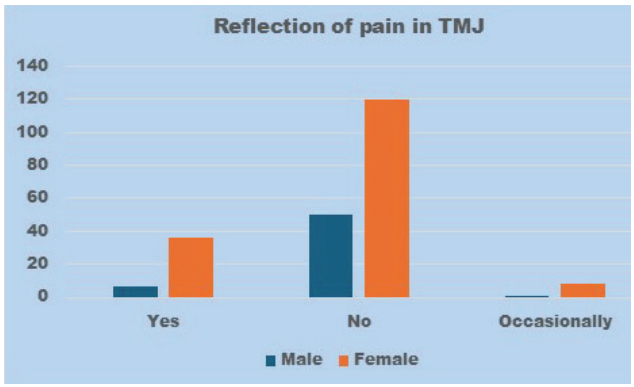
Graph 6. Individual distribution with masticatory pain muscles

From the table and graph 6, it is observed that touching the masticatory muscles of both sexes presents with pain, from which a significant statistical association is reported as the values of ***P=0.020.***

Masticatory muscles pain is also reflected by pain in the Temporomandibular joint with the data presented in table and graph 7.

Table 7. Reflection of pain in Temporomandibular articulation

Gender	Yes	No	Occasionally	P=values
Male	7 (16.3%)	50(29.4%)	1 (11.1%)	
Female	36(83.7%)	120(70.6%)	8(88.9%)	P=0.125



Graph 7. Reflection of pain in Temporomandibular articulation

From the table and graph 7, it can be seen that the reflection of the pain is also reflected in the temporomandibular joint, since 36 (*83.7%*) of the cases are women, from which no significant statistical association is reported, since the values of ***P=0.0125***.

Treatment of patients

From this group of patients, 23 patients were treated with the combined therapeutic-prosthetic method, of

which 18 were women and 5 of them were men. The above patients were treated according to the following protocol:

1] Drug treatment that included: ***a]*** the use of muscle relaxants with preparations such as analgesics (against pain such as ibuprofen 40 mg., 2 times a day) and anti-inflammatory Narox 60 mg., with 1 tablet a day; ***b]*** for sleep and daily emotional stress, anxiety was used perse forte 1 capsule /day.

2] Prosthetic treatment: was carried out with the placement of a relaxing splint.

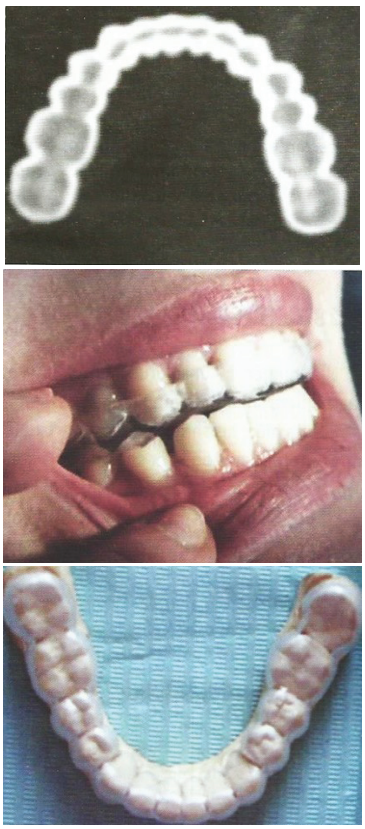


Figure 3. Patient Zh. L, 45 years old with a relaxing splint caused by muscle pain in TMJ

3] for the part of patients who had pain caused by gum for a long time, it was recommended to stop using of gum.

Discussions

The results of the study showed that the majority of the examinees included in the study were women 167 (*73.6%*) compared to men who were 60 (*26.4*%).

In the individuals examined by us, it showed that the pain in the masticatory muscles was caused by excessive use of glasses and bruxism. Thus, *91.6%* of the examinees used gum, of which *75.5%* were female, and *84.7%* of them felt pain in the abdominal muscles.

The results of the study showed that there is a significant association between gender and the use of gum, from which it was concluded that women are the biggest users of it in the region, presented in the value of ***P=0.046***.

In his study, the author *Throckmorton* emphasizes that the excessive use for a long time of more than 1 hour of gum is accompanied by muscle fatigue, which is reflected by pain in it and especially in the palpation phase [16] .

Another cause of muscle pain was bruxism, which in our study was observed in *50.6%* of cases in women, while it affected men in *49.4*% of all cases. This fact is explained according to the author Okessan that bruxism is a psycho-emotional pathology that is expressed by muscle spasms and their pain [17]. Pronounced muscle spasms caused by teeth grinding reflects pain in them.

Regarding pain in the TM joint, the interviewees reported the presence of pain in the TMJ from using of gum in *18.9%* of cases. From the results of the study, a statistically significant association was found between gender and masticatory muscle pain on palpation. The results of the study concluded that women in relationships with men felt more pain when opening the mouth from long-term use of the gum.

Patients were treated with relaxing splints for a period of 6-9 months and the removal of the relaxing splint was done gradually. Patients with masticatory muscle pain and users of gum for a long time were recommended to use it, as well as anti-pain and muscle relaxant medications. positive results were achieved in 86.9% of cases, as three patients stopped using the gum, but kept the relaxing splint for the time limit determined by the gnathologist.

Conclusions

At the end of the study and based on the collected data, it was concluded:

1] Women have the highest percentage of using glasses in (73.6%) of the cases compared to men.

2] The data shows a statistically significant relationship between gender and the use of gum where it is noted that 75.5% of the women included in the study regularly used gum as the value of P=0.046.

3] Also, from the collected data, a statically significant relationship is shown between gender and muscle pain perceptible on palpation, from which it can be seen that 84.7% of women presented pain as the value of P=0.020.

4] Not using gum and combined therapeutic-prosthetic treatment reduces and almost immediately eliminates muscle pain and TM joint dysfunction.

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Received on February 28, 2025.
Revised on March 01, 2025.
Accepted on November 11, 2025.

Conflict of Interests: Nothing to declare.
Financial Disclosure Statement: Nothing to declare.
Human Rights Statement: None required.
Animal Rights Statement: None required.

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