Original article

Daytime bruxism in individuals undergoing non-elective maxillofacial surgery: a cross-sectional study

Bruxismo diurno em pessoas submetidas a cirurgia maxilofacial não eletiva: estudo transversal

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ABSTRACT | INTRODUCTION: A Daytime bruxism is a repetitive and sustained masticatory muscle activity involving tooth contact without the functional purpose of chewing, which can negatively impact the biomechanics of masticatory functions. Studies have pointed to the possible harmful consequences of bruxism, however, in cases of mandibular fractures where early joint movement is essential for functional recovery these effects have not been explored. **OBJECTIVE:** To identify the frequency of daytime bruxism in individuals undergoing non-elective mandibular surgery and to investigate the possible relation between bruxism, masticatory limitations, and full mouth opening. **MATERIALS AND METHODS:** The sample consisted of 289 individuals who underwent non-elective maxillofacial surgeries. Oral behavior and mandibular function were assessed using the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD). Pearson's chi-square test was used, with significance set at $p \leq 0.05$. **RESULTS:** Possible daytime bruxism was observed in 203 participants (70.2%); 177 (61.2%) reported being unable to achieve full mouth opening; 94 (32.5%) presented limitations in chewing soft foods, 218 (75.5%) in chewing firm foods, and 232 (80.3%) in chewing hard-consistency foods. **CONCLUSION:** Awake bruxism was frequent in this population. There was a high prevalence of masticatory dysfunction for hard foods. Limitation in full mouth opening was related to the frequency of bruxism. Further longitudinal studies are needed to confirm these results.

KEYWORDS: Bruxomania. Maxillofacial Trauma. Mandible. Mastication. Recovery of Physiological Function.

RESUMO | INTRODUÇÃO: O bruxismo diurno é uma atividade muscular mastigatória repetitiva e sustentada dos dentes sem a finalidade da mastigação, que pode impactar negativamente na biomecânica das funções mastigatórias. Estudos apontam para as possíveis consequências deletérias do bruxismo, entretanto, em casos de fratura mandibular, onde o movimento articular precoce é fundamental para a recuperação funcional, esses efeitos não foram explorados. **OBJETIVO:** Identificar a frequência do bruxismo diurno em pessoas submetidas a cirurgia mandibular não eletiva e investigar a possível relação do bruxismo com a limitação mastigatória e a abertura completa da boca. **MATERIAIS E MÉTODOS:** A amostra foi composta por 289 pessoas submetidas a cirurgias maxilofaciais não eletivas. O comportamento oral e a função mandibular foram avaliados através dos critérios de diagnóstico para tratamento da disfunção temporomandibular (DC/TMD). O Teste utilizado foi o Qui-Quadrado de Pearson, considerando significativo $p \leq 0,05$. **RESULTADOS:** O possível bruxismo diurno foi frequente em 203 (70,2%) dos participantes, 177 (61,2%) relataram não realizar a abertura completa da boca, 94 (32,5%) apresentaram limitação para mastigação de alimentos moles, 218 (75,5%) para mastigação de alimentos firmes e 232 (80,3%) para mastigação de alimentos consistentes. **CONCLUSÃO:** O possível bruxismo diurno foi frequente nesta população. Houve grande prevalência de disfunção mastigatória para alimentos consistentes. A limitação para abertura completa da boca está relacionada à frequência do bruxismo. Novos estudos com um acompanhamento longitudinal são necessários para confirmar os resultados.

PALAVRAS-CHAVE: Bruxomania. Traumas Maxilofaciais. Mandíbula. Mastigação. Recuperação da Função Fisiológica.

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List of abbreviations and acronyms

CAAE – Certificate of Presentation for Ethical Consideration
DB – Daytime bruxism
DC/TMD – Diagnostic Criteria for the Treatment of Temporomandibular Dysfunction
FICF – Free and Informed Consent Form
FMO – Full Mouth Opening
ICU – Intensive Care Unit
MF – Mandibular fracture
MFLS-8 – Mandibular Functional Limitation Scale - 8 Items
ROM – Range of motion
TMD – Temporomandibular disorder
TMJ – Temporomandibular joint

1. Introduction

Mandibular fractures (MF) account for around 42.0% of all facial fractures and their main causes are automobile accidents, physical assaults, falls[1,2] and bone lesions of infectious or inflammatory origin[3]. These fractures can cause significant functional deficits in mastication, due to biomechanical changes resulting from trauma and surgical intervention[4].

Daytime bruxism (DB) is a masticatory muscle activity characterized by repetitive and sustained contact of the teeth and/or jaw propulsion during wakefulness, without masticatory purpose. It can be classified as primary, when there is no identifiable cause, or secondary, when associated with a specific health condition. According to current criteria, the diagnosis can be considered possible (based on self-report), probable (confirmed by clinical examination), or definite (identified by electromyography)[5].

The prevalence of DB in the adult population is approximately 15.4%[6] and it is estimated that about 90.0% of the population will develop this behavior throughout their lives. This repetitive muscle activity generates constant shear force on the articular disc, which can overload the orofacial structures, reducing intra-articular space, deforming the structure, and limiting mouth opening, causing muscle hypertrophy, tooth wear, and pain throughout the craniofacial framework[7].

Despite the high prevalence of both MF[2,4] and DB[6], the characteristics and repercussions of this behavior in people undergoing mandibular surgery have not been explored[4]. Studies point to the possible deleterious consequences that bruxism can cause to orofacial structures[7], however, the literature suggests that early joint movement is essential for adequate functional recovery in cases of mandibular fracture[8].

Given this, the hypothesis arises that daytime bruxism, although traditionally dysfunctional, may be related to favorable masticatory behavior in the postoperative period following mandibular surgery. The initial approach to this topic may provide important clinical insights into the contribution of bruxism to postoperative functional masticatory recovery. Thus, the objective is to identify the frequency of daytime bruxism in patients undergoing non-elective mandibular surgery without rehabilitation and to explore its possible relationship with masticatory limitation and mouth opening.

2. Methodology

This was a cross-sectional observational study design, conducted with people undergoing non-elective mandibular surgery at a public referral hospital in the city of Salvador, Bahia. It was based on a doctoral thesis from the postgraduate program in Medicine and Human Health, titled Evolution of masticatory function after mandibular surgery: A prospective study.

The sample calculation was performed using the Winpepi online calculator, version 3.18, considering a sampling error of 5.0%, with a confidence level of 95.0% and an estimated prevalence of 15.0%[6]. The need for 268 participants was estimated. The selection took place between September 2021 and December 2022, based on telephone data provided by the hospital's oral and maxillofacial surgery team, and contacts were made on three days of the week, in two shifts per day.

The study was approved by CAAE 47812621.4.0000.5544. Individuals who agreed to participate in the study received the Free and Informed Consent Form (FICF) individually, without the use of group messages, and those who accepted were considered positive upon affirmative response. After acceptance, participants answered anamnestic questionnaires to collect clinical and sociodemographic data. The responses were obtained by two previously trained evaluators reading

the questions or by self-completion of the digital form, developed on the Google Forms platform, sent via a link on WhatsApp. The medical history took an average of nine minutes, and the evaluators remained available to answer questions throughout the process.

The study included individuals of both sexes, aged 18 years or older, who had undergone jaw surgery, regardless of the cause. Those who underwent surgical procedures as a result of multiple traumas involving fractures of four or more skull bones; who underwent other surgeries in the same region up to the time of data collection; who began any follow-up with a physical therapist, psychologist, or dental surgeon during the evaluation period; who had a diagnosis of significant psychological, psychiatric, visual, or musculoskeletal impairments, and difficulties in understanding the questionnaire, requiring the same question to be repeated three times, were excluded from the study. Finally, when participants were unable to answer a question, it was left blank and the interview continued, excluding those who failed to answer more than 15.0% of the total questions in the questionnaire.

The population was divided into subgroups according to postoperative time. Group A (3rd month), Group B (6th month), Group C (9th month), Group D (12th month). The Oral Behavior Checklist, included in the diagnostic criteria for the treatment of temporomandibular dysfunction (TMD), was used to assess oral behavior. Mandibular function was assessed using the "Mandibular Functional Limitation Scale - 8 Items," also from DC/TMD. This scale investigates the degree of difficulty in performing routine facial and mandibular movements, such as smiling, opening the mouth, yawning, and eating. The participant chooses a level of limitation for each of the eight functions, ranging from 0 (no limitation) to 10 (severe limitation). All verbal commands and guidelines for applying the questionnaires and physical examination are provided by the instrument and were trained by the responsible examiners.

The clinical, surgical, and immediate postoperative histories were collected through patient self-reports. The form investigated etiology, location, length of hospital stays, and admission to the intensive care unit (ICU).

The categorical sociodemographic and clinical variables were gender, education level, reason for surgery, fracture sites, and ICU admission. The numerical sociodemographic and clinical variables were age, height, BMI, surgical time, days of hospitalization, and days in the ICU. All data were collected using a sociodemographic form and the participants' surgical and post-surgical medical history. The independent variable corresponded to "Possible daytime bruxism," collected by self-report through the oral behavior checklist, which was categorized into five groups: "never clenches," which is equivalent to stage 0 bruxism; "clenches a small part of the time," which is stage 1 bruxism; "clenches some of the time," corresponding to stage 2 bruxism, "clenches most of the time," corresponding to stage 3 bruxism, and "clenches all the time," corresponding to stage 4 bruxism. The dependent variables were "Complete mouth opening," collected dichotomously (yes/no), "Chewing soft foods," "Chewing firm foods," and "Chewing consistent foods," assessed using the Mandibular Functional Limitation Scale.

The primary outcome is the frequency of possible daytime bruxism, and the secondary outcomes are masticatory dysfunction, mandibular range of motion, and functional limitation.

The research questions were taken into account throughout the research planning process. The data obtained was systematized and analyzed using IBM® SPSS® statistical software, version 27, and the results were presented in tabular form. The descriptive analysis of the categorical variables was presented in absolute numbers and percentages. The normality of the numerical variables was verified based on descriptive statistics, and variables that showed normal distribution were expressed as mean and standard deviation, while those with non-normal distribution were expressed as median and interquartile range.

Question 1: How often does daytime bruxism occur in people who have undergone non-elective jaw surgery without rehabilitation? This question was answered using a staging score: never (Stage 0), a small part of the time (Stage 1), some of the time (Stage 2), most of the time (Stage 3), and all the time (Stage 4), the results of which were categorized and expressed in absolute numbers and percentages through descriptive analysis.

Question 2: What is the frequency of masticatory dysfunction and full mouth opening in patients who have possible daytime bruxism and are in the postoperative period of non-elective mandibular surgery without rehabilitation? To answer this question, the mastication variable was categorized as "no dysfunction," corresponding to values from "0 to 2" on the Mandibular Functional Limitation Scale, and "with dysfunction," corresponding to values from "3 to 10" on the same scale. This categorization was assigned to soft, firm, and consistent foods. Pearson's Chi-square test was used to assess the association between the independent variable and the dependent variables of dysfunction, considering a significance level of 5.0%.

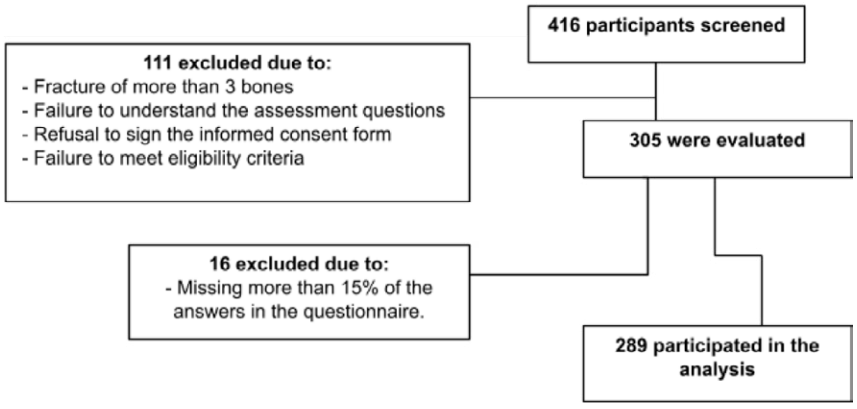
Question 3: Does possible daytime bruxism have any influence on chewing and full mouth opening in patients after non-elective mandibular surgery without rehabilitation? This question was answered by categorizing the variable "chewing" according to the intensity of the limitation, with scores of "no limitation" when the value was "0," "mild limitation" for values from "1 to 3," "moderate limitation" from "4 to 5," "severe limitation" from "6 to 7," and "very severe limitation" from "8 to 10." The statistical test used was the Chi-square test, which assessed whether there was a significant percentage difference in the degree of functional limitation between the groups, considering a significance level of 5.0%.

In the null hypothesis, daytime bruxism has a low frequency in this population and does not influence chewing and full mouth opening in patients undergoing non-elective mandibular surgery without rehabilitation. In the alternative hypothesis, daytime bruxism has a high frequency in this population and influences chewing and full mouth opening in patients undergoing non-elective mandibular surgery without rehabilitation.

3. Results

In the detailed analysis of the data, a sample of 289 participants was obtained (Figure 1), most of whom, 203 (70.2%), reported maintaining sustained masticatory muscle activity, 108 (37.4%) were in the 9th month post-surgery (Group C), followed by 12 months (Group D) with 69 (23.9%) of the participants, 63 (21.8%) 6 months (Group B), and 49 (17.0%) were in the 3rd month post-surgery (Group A). Most of the sample had only fractured the mandibular bone 209 (72.3%), with the largest volume in the stage one group, 95 (80.5%) and the stage two group 20 (35.7%), reporting fractures in two locations (Table 1).

Figure 1. Data collection flowchart



Source: adapted from von Elm E et al[26].

Table 1. Sociodemographic and clinical characteristics among the 5 groups of people undergoing non-elective maxillofacial surgery. Salvador-BA. 2022

Variables	Possible daytime bruxism					p-value
	Stage 0 86(29.8%)	Stage 1 118(40.8%)	Stage 2 56(19.4%)	Stage 3 20(6.9%)	Stage 4 9(3.1%)	
Age (m±SD)	35.95±11.9	33.83±8.8	33.52±8.5	33.95±7.3	36.78±16.6	0.496*
sex	**n(%)**	**n(%)**	**n(%)**	**n(%)**	**n(%)**	
Female	14(16.3)	25(21.2)	7(12.5)	6(30.0)	3(33.3)	0.279***
Male	72(83.7)	93(78.8)	49(87.5)	14(70.0)	6(66.7)	
Height/m (m±SD)	1.70±0.094	1.68±0.096**	1.72±0.093**	1.66±0.099	1.64±0.48	0.012**
Weight/kg (m±SD)	74.2±11.7	74.0±11.0	76.4±12.9	71.3±13.2	77.2±18.4	0.484*
BMI (m±SD)	25.7±3.7	26.3±3.8	25.8±3.8	25.8±4.0	28.7±7.4	0.236*
Education level	**n(%)**	**n(%)**	**n(%)**	**n(%)**	**n(%)**	
Incomplete primary education	24(28.2)	20(16.9)	7(12.5)	3(15.0)	3(37.5)	
Complete primary education	11(12.9)	20(16.9)	10(17.9)	7(35.0)	1(12.5)	
Incomplete secondary education	18(21.2)	50(42.4)	23(41.1)	6(30.0)	2(25.0)	0.030***
Complete secondary education	32(37.6)	28(23.7)	16(28.6)	4(20.0)	2(25.0)	
Reason for surgery	**n(%)**	**n(%)**	**n(%)**	**n(%)**	**n(%)**	
Traffic accident	35(40.7)	37(31.4)	28(50.0)	10(50.0)	5(55.6)	
Aggression	19(22.1)	37(31.4)	19(33.9)	6(30.0)	1(11.1)	
Fall	15(17.4)	16(13.6)	2(3.6)	4(20.0)	2(22.2)	0.233***
Firearm	3(3.5)	3(2.5)				
Work accident	1(1.2)	5(4.2)	2(3.6)			
Other	13(15.1)	20(16.9)	5(8.9)		1(11.1)	
Fracture site(s)	**n(%)**	**n(%)**	**n(%)**	**n(%)**	**n(%)**	
1 bone	63(73.3)	95(8.,5)	33(58.9)	14(70.0)	4(44.4)	0.006***
2 bones	16(18.6)	21(17.8)	20(35.7)	6(30.0)	3(33.3)	
3 bones	7(8.1)	2(1.7)	3(5.4)		2(22.2)	
ICU admission	**n(%)**	**n(%)**	**n(%)**	**n(%)**	**n(%)**	
No	58(67.4)	69(58.5)	34(60.7)	10(50.0)	5(55.6)	0.567***
Yes	28(32.6)	49(41.5)	22(39.3)	10(50.0)	4(44.4)	
Surgical time/months (m±SD)	8.7±4.1	8.2±3.6	8.0±3.3	7.1±3.0	7.4±2.6	0.380*
Group	**n(%)**	**n(%)**	**n(%)**	**n(%)**	**n(%)**	
Group A	11(12.8)	21(17.8)	10(17.9)	5(25.0)	2(22.2)	
Group B	18(20.9)	28(23.7)	10(17.9)	5(25.0)	2(2.2)	0.646***
Group C	36(41.9)	35(29.7)	26(46.4)	7(35.0)	4(44.4)	
Group D	21(24.4)	34(28.8)	10(17.9)	3(15.0)	1(11.1)	

Source: the authors (2024).
*Anova; **Anova followed by Turkey's post hoc; *** Chi-square; m=mean; SD=standard deviation;
Stage 0 (never tightens); Stage 1 (tightens a small part of the time); Stage 2 (tightens some of the time);
Stage 3 (tightens most of the time); Stage 4 (tightens all the time).

3.1. Masticatory function and full mouth opening between independent groups

3.1.1. Masticatory dysfunction x Possible daytime bruxism

Of the total number of participants, 52 (18.0%) presented masticatory dysfunction for soft foods, with the highest percentage in the second stage group 13 (23.2%), followed by the third stage group 4 (20.0%), the first stage group 21 (17.8%), and the zero-stage group 14 (16.3%). The fourth stage group did not present masticatory dysfunction for soft foods. For masticatory dysfunction of firm foods, the frequency of dysfunction was 200 (69.2%) of the participants. The highest percentage was in the third stage group 16 (80.0%), followed by the first stage group 87 (73.7%), the second stage group 40 (71.4%), the fourth stage group 6 (66.7%), and the zero-stage group 51 (59.3%).

The frequency of dysfunction for solid foods was 223 (77.2%), of which 48 (85.7%) were in the second stage group, followed by the third stage group with 17 (85.0%), the first stage group with 100 (84.7%), the fourth stage group with 7 (77.8%), and finally the zero-stage group with 51 (59.3%), (Table 2).

3.1.2. Complete opening of the mouth x Possible daytime bruxism

Of the 289 study participants, 177 (61.2%) reported being unable to open their mouths completely, 107 (37.1%) reported being able to open their mouths completely, and 5 (1.7%) individuals did not respond. Of the participants in the third stage, 16 (80.0%) were unable to open their mouths completely, followed by the first stage group with 87 (73.7%), the second stage with 39 (69.6%), and the zero-stage group with 33 (40.2%). 6 (75.0%) of the participants in the fourth stage were able to maintain complete mouth opening, followed by 49 (59.8%) of the participants in the zero stage and 17 (30.4%) in the second stage (Table 2).

3.2. Comparison of the degree of functional limitation x Possible daytime bruxism between independent groups

3.2.1. Limitation in chewing soft foods x Possible daytime bruxism

Most participants, 195 (67.5%), did not report limitations in chewing soft foods, with the highest percentage in the fourth stage group, 8 (88.9%), followed by 65 (75.6%) in the zero-stage group. The stage 0 bruxism group had the highest percentage of severe limitations in chewing soft foods, with 4 (4.7%) of the participants, followed by the stage 1 group, with 1 (0.80%). The other stages did not show a severe limitation score for chewing soft foods. For mild limitations, the stage 0 group had the lowest percentage, 8 (9.3%), and for moderate limitation, the stage 4 group was the only one that did not show this limitation (Table 2).

3.2.2. Limitation in chewing firm foods x Possible daytime bruxism

For chewing firm foods, 80 (27.7%) of the participants presented a moderate limitation, with the greatest limitation in the first stage group 40 (33.9%) and the lowest percentage in the fourth stage group, 1 (11.1%). In the stage 0 group, 32 (37.2%) had no limitation for firm foods, followed by the stage 4 group, with 3 (33.3%). The stage 2 group had the highest percentage for mild limitation, with 18 (32.1%), followed by the stage 1 group, with 16 (13.6%). The third stage and zero-stage groups remained equivalent, and only the fourth stage group did not present mild limitations; however, this group presented the highest volume of severe limitations, 3 (33.3%), followed by the third stage group, 6 (30.0%). These same groups accounted for the highest percentage of very severe limitations, with 2 (22.2%) and 4 (20.0%) respectively (Table 2).

3.2.3. Limitation in chewing solid foods x Possible daytime bruxism

Limitation in chewing solid foods showed similar percentages for limitation scores, except for mild limitation, which encompassed 22 (7.6%), with a higher volume of limitation in the stage 0 group, 10 (11.6%). Of the individuals in the third stage group, 6 (30.0%) had very severe limitations, followed by the second stage group with 16 (28.6%). The stage 0 group had the lowest percentage of severe limitations, 9 (10.5%), followed by the fourth stage group with 2 (22.2%). The third stage group had the lowest volume of moderate limitation, 2 (10.0%). Of the participants in the zero-stage group, 31 (36.0%) had no limitation in chewing consistent foods, followed by 2 (22.2%) in the fourth stage group and 3 (15.0%) in the third stage group (Table 2).

Table 2. Frequency of masticatory dysfunction and full mouth opening among independent groups of people undergoing non-elective maxillofacial surgery. Salvador-BA. 2022

Variables	Possible daytime bruxism					p-value
	Stage 0 86 (29,8%)	Stage 1 118 (40,8%)	Stage 2 56 (19,4%)	Stage 3 20 (6,9%)	Stage 4 9 (3,1%)	
Chewing	**n(%)**	**n(%)**	**n(%)**	**n(%)**	**n(%)**	
Soft foods						
No dysfunction	72(83.7)	97(82.2)	43(76.8)	16(80.0)	9(100.0)	0.519
With dysfunction	14(16.3)	21(17.8)	13(23.2)	4(20.0)		
Firm foods						
No dysfunction	35(40.7)	31(26.3)	16(28.6)	4(20.0)	3(33.3)	0.175
With dysfunction	51(59.3)	87(73.7)	40(71.4)	16(80.0)	6(66.7)	
Consistent foods						
No dysfunction	35(40.7)	18(15.3)	8(14.3)	3(15.0)	2(22.2)	<0.001
With dysfunction	51(59.3)	100(84.7)	48(85.7)	17(85.0)	7(77.8)	
Full mouth opening	**n(%)**	**n(%)**	**n(%)**	**n(%)**	**n(%)**	
No	33(40.2)	87(73.7)	39(69.6)	16(80.0)	2(25.5)	
Yes	49(59.8)	31(26.3)	17(30.4)	4(20.0)	6(75.0)	<0.001
Omissions	4(0.04)				1(0.11)	
Degree of limitation	**n(%)**	**n(%)**	**n(%)**	**n(%)**	**n(%)**	
Soft foods						
No limitation	65(75.6)	81(68.6)	31(55.4)	10(50.0)	8(88.9)	
Mild limitation	8(9.3)	24(20.3)	17(30.4)	7(35.0)	1(11.1)	
Moderate limitation	9(10.5)	12(10.2)	8(14.3)	3(15.0)		0.033
Severe limitation	4(4.7)	1(0.8)				
Very severe limitation						
Firm foods						
No limitation	32(37.2)	26(22.0)	7(12.5)	3(15.0)	3(33.3)	
Mild limitation	9(10.5)	16(13.6)	18(32.1)	1(10.0)		
Moderate limitation	21(24.4)	40(33.9)	13(23.2)	5(25.0)	1(11.1)	0.009
Severe limitation	12(14.0)	21(17.8)	12(21.4)	6(30.0)	3(33.3)	
Very severe limitation	12(14.0)	15(12.7)	6(10.7)	4(20.0)	2(22.2)	
Consistent foods						
No limitation	31(36.0)	15(12.7)	6(10.7)	3(15.0)	2(22.2)	
Mild limitation	10(11.6)	8(6.8)	4(7.1)			
Moderate limitation	22(25.6)	38(32.2)	13(23.2)	2(10.0)	3(33.3)	<0.001
Severe limitation	9(10.5)	3(28.8)	17(30.4)	9(45.0)	2(22.2)	
Very severe limitation	14(16.3)	23(19.5)	16(28.6)	6(30.0)	2(22.2)	

Source: the authors (2024).
Pearson's Chi-Square Test
Stage 0 (never tightens); Stage 1 (tightens a small portion of the time); Stage 2 (tightens some of the time); Stage 3 (tightens most of the time); Stage 4 (tightens all the time).

4. Discussion

The results of this study demonstrated a high frequency of possible daytime bruxism in people undergoing mandibular surgery and functional differences between the stages of behavior. The frequency of masticatory dysfunction for consistent foods and full mouth opening behaves differently depending on the level of bruxism. There is also a difference in the degree of masticatory limitation between the groups, with a higher frequency of severe limitation for consistent foods in the third stage of possible bruxism.

The data found on the epidemiological profile of facial trauma are consistent with the literature regarding the cause of trauma, predominant gender, and age group. Some discrepancies may arise depending on the state in which the data was collected. In Brazil, in more recent studies that evaluated the etiological profile of facial fractures in the states of São Paulo and Bahia, the main cause of maxillofacial fractures is traffic accidents, with a higher incidence among males in the 35-year-old age group[2]. The results of this study are consistent with those from Asia[9]. Older studies disagree on the main cause of MF. An epidemiological analysis study in Pernambuco found that accidental trauma was the main factor, followed by traffic accidents and assault[10]. In another study conducted in Rio Grande do Sul, the authors cite aggression as the main etiology, similar to what occurs in Europe[11].

The frequency of TMD in this population was high, reaching 70.2% of participants who reported having the habit of grinding or clenching their teeth. The prevalence of TMD in the general population has been much lower[6], but it was not possible to identify studies that evaluated the prevalence in a population similar to ours. In population-based studies involving Dutch adults, the prevalence of TMD was 5.0%[12], in Finland it was 10.1%[13], in Italy it was 9.4%[14], and in Spain it was 15.8%[15]. These differences can be explained by the target population, which in the case of the present study seems to be more susceptible to developing DB.

The literature shows that the prevalence of DB in patients with orofacial pain is high. In a population-based cross-sectional study in England, a prevalence of 9.0% of DB associated with the presence of temporomandibular disorders was found[16]. In another study conducted in the city of São Paulo with university students with TMJ dysfunction, it was found that the presence of DB was 37.1% associated with joint pain and 30.4% associated with maximum mouth opening[17]. Other authors who evaluated the presence of TMD in primary health care users concluded that 16.3% had the habit of clenching their teeth[18]. Although a few citations indicate a possible beneficial effect of clenching[19], to date there is no research in the literature associating daytime bruxism with possible benefits. A recent study that investigated the relationship between probable nocturnal bruxism, daytime bruxism, and TMD using DC/TMD in 143 participants concluded that the habit of clenching, both nocturnal and daytime, are important risk factors for joint disc displacement. However, greater emphasis was given to the fact that DB causes greater arthralgia, which is related to greater functional limitation of the jaw[20].

The findings of the present study suggest that sustained clenching is directly associated with masticatory dysfunction for consistent foods. Several authors have suggested deleterious consequences in the cranial framework of sustained muscle activity. A study of the TMJ during bruxism, for example, revealed that sustained clenching for five minutes generates extensive shear forces on the articular disc, increasing tension and consequently overloading the TMJ[7]. Another more recent study concludes that prolonged use of the mandibular muscles can generate changes in tissue metabolic activity, causing muscle disorders[21] which, associated with joint pain, can have a negative impact on the chewing of more consistent foods[20].

The inability to open the mouth fully was present in 62.3% of participants who “clench.” In addition, the results indicate that 75.4% and 80.3% of people had limitations with firm and consistent foods, respectively, and that these limitations were more frequent in the groups that clenched more frequently. The stage five group had the most severe chewing limitations. This finding is justified by the presence of deficits in oral mobility in the post-surgical period, in addition to lower muscle activity

and asymmetry in masseter activity during maximum voluntary clenching[22]. The greater consistency of food increases the duration of the masticatory cycle and reduces chewing speed, and chewing harder foods requires greater activation of the masticatory muscles and greater bite force, unlike soft foods[23]. This finding in the literature justifies the results of this study, since achieving FMO requires adaptations to various biomechanical factors, which, due to poorer performance in the execution of oral movements resulting from increased muscle fatigue, reduced length, hypomobility, and changes in biomechanical efficiency, directly impact the achievement of a normal range of motion[22].

Authors indicate stress and anxiety as the main factors involved in the pathogenesis of behavior[21]. These symptoms, in turn, can often be triggered by individuals undergoing surgical procedures of any kind[24]. In particular, facial surgeries add other aggravating factors such as fear of deformities, facial paresthesia and/or hypoesthesia, inability to perform work activities, and difficulty eating[4]. In addition, studies reveal that low food intake leads to vitamin and mineral deficiencies in the central nervous system, increasing the individual's sensitivity to stres[21]. These scientific findings imply the possibility that mandibular surgeries may be a risk factor for the development of repetitive and sustained oral behavior such as teeth clenching and/or jaw thrusting.

It is important to highlight the fragility of the measures used for the outcomes found, especially in relation to self-reported oral behavior. Although it was not a goal of the study to address signs and symptoms of TMD, self-reported MBR was considered a limitation, as it was not evaluated numerically, but only dichotomously, based on the presence or absence of pain. Although self-reported ROM assessment is an uncommon practice, there are reports of good reliability of patient measurements in relation to the gold standard caliper, with an intraclass correlation coefficient of 0.92[25]. Many participants answered the questionnaires alone, without requiring assistance from the team, and this may favor response biases. Just as surgical techniques and types were not evaluated in this study, leaving out a possible predictive criterion, this topic may be better explored in the future by oral and maxillofacial surgeons. In addition, the comparison of the data collected with previous studies was deficient due to the limited number of studies on the subject, and the comparison of frequency with similar data was restricted, since few authors address data on people undergoing surgery for facial trauma. High-quality clinical studies on populations undergoing non-elective facial surgery need to be conducted so that clinical reflections are closer to reality.

Professionals should be aware of the high frequency of this behavior and its repercussions on jaw functionality in the postoperative period, so that the assessment of bruxism is included in the pre- and postoperative protocols for jaw surgery. In addition, there may be a correlation between mouth opening amplitude and mandibular function, highlighting a suspicion that suggests the inclusion of early measures to increase mandibular amplitude in this population, while obviously safeguarding safety and respecting tissue healing. Randomized clinical trials with bruxism control protocols are recommended in an attempt to contain masticatory limitations or accelerate functional recovery in this population.

5. Conclusion

Possible daytime bruxism was common in this group of patients. The relationship between bruxism and masticatory dysfunction for soft foods was rare, however, there was a high prevalence of masticatory dysfunction for consistent foods. The limitation to complete mouth opening is related to the frequency of bruxism. It is important to adopt preventive measures and/or control motor behavior in the immediate postoperative period. Further studies with longitudinal follow-up are needed to confirm the results.

***Declaration of use of Large Language Models*:** During the preparation of this work, the author used the Gemini AI and Perplexity AI tools on July 17th, 2024, for the purpose of a detailed analysis of the study, insights, and discourse for a presentation on daytime bruxism in the postoperative period of non-elective mandibular surgery. After using these tools, the author reviewed and edited the content as necessary and assumes full responsibility for the content of the publication.

Authors contributions

The authors declared that they had made substantial contributions to the work in terms of the conception or design of the research; the acquisition, analysis, or interpretation of data for the work; and the drafting or critical revision of relevant intellectual content. All authors approved the final version to be published and agreed to take public responsibility for all aspects of the study.

Competing interests

No financial, legal, or political conflicts involving third parties (government, private companies and foundations, etc.) were declared for any aspect of the submitted work (including, but not limited to, grants and funding, participation in advisory boards, study design, manuscript preparation, statistical analysis, etc.).

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