Dental students' knowledge assessment of TMD and Bruxism at UFSM

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ABSTRACT

Bruxism and temporomandibular disorders (TMD) have become increasingly frequent in clinical practice. Recognizing its mechanisms is necessary for successful management and treatment. The aim of this pilot study was to investigate the knowledge and perception about TMD and bruxism of dental undergraduate students from the Federal University of Santa Maria (UFSM). A questionnaire with 15 questions was applied to 20 students from this institution, 10 from the 7th and 10 from the 10th semester. All evaluated students reported hearing about TMD during the Dentistry course, but 70% considered that they had little or no knowledge on the subject. Ninety percent of students reported not knowing the instrument used in research to diagnose TMD. There was no statistical difference between the evaluated groups, and the overall average of correct answers was 54%. Data show little knowledge about the subjects and fragility regarding the teaching-learning process of these topics. Moreover, the non-evolution of knowledge about TMD and bruxism throughout the evaluated course is evident, as the group of students in the 10th semester showed poorer results when compared to the 7th semester, which have recently finished the discipline in which these themes are addressed.
Descriptors: Temporomandibular Joint Dysfunction Syndrome. Bruxism. Surveys and Questionnaires. Students, Dental. Educational Measurement.

1 INTRODUCTION

Bruxism is defined as the repetitive action of the masticatory muscles, leading to clenching or grinding of the teeth and/or bracing or thrusting the jaw[1,2]. It is classified as awake bruxism (AB) when it occurs when the patient is awake, or as sleep bruxism (SB) when the patient is asleep[1,2]. Furthermore, these conditions are considered risk factors for the development of temporomandibular disorders (TMD). TMD covers a series of functional changes in masticatory muscles, temporomandibular joint (TMJ), and associated orofacial structures[3]. Its etiology is multifactorial and complex, including trauma, genetic factors, cognitive triggers, emotional stress, and biological factors such as muscle hyperactivity[4,5]. These disorders are predominant in females and typically have a recurrent and chronic course, with decreased mouth opening amplitude, presence of trigger points, and pain as the main signs and symptoms reported by patients or found by the dental surgeon[5,6]. Often, bruxism and TMD are mistakenly confused or encompassed in the same clinical condition, as they have different etiologies and therefore need different clinical protocols.

TMD and orofacial pain are important components of the new philosophy of Dentistry, focusing not only on teeth, but on the patient as a whole. However, these conditions were considered a specialty a few years ago. In 1993, the International Association for the Study of Pain (IASP) proposed for the first time the “study of pain” in undergraduate dentistry curricula[6,7]. However, to date, the model adopted by dental schools has little credit hours to adapt the new contents of the study of pain[6]. Furthermore, the study about TMD is almost never taught by experts on the subject, but mostly by dental prosthesis professors[8]. At the Federal University of Santa Maria, Brazil, TMD and bruxism are taught at the Occlusion Clinic.

Approximately 40 to 50% of the population has some sign or symptom of TMD, however only 5% of individuals seek treatment[9]. Of these, many are treated as having pain of odontogenic origin, due to the dentist's lack of knowledge of the complexity of pain mechanisms, resulting in iatrogenic and treatment failures, such as worsening symptoms or reporting the onset of new pain. Despite being an extremely relevant subject, the lack of standardization of academic curricula makes it difficult to acquire and implement knowledge about orofacial pain[10], without focusing on teaching pain[11], resulting in low confidence of undergraduate students in treating patients with TMD[12].

Thus, this pilot study aimed to compare students from different semesters in a Dentistry course, in order to assess their knowledge and perceptions about the subjects of TMD and bruxism experienced during Dental School.

2 METHODS

This pilot observational cross-sectional study was approved by the Ethics Committee of the Federal University of Santa Maria (UFSM) in 2019 (CAAE 24282719.1.1001.5346, protocol number 052935).

The chosen institution includes in its curriculum the study of TMD and bruxism in the Clinic of Occlusion discipline, based in the Department of Restorative Dentistry, and offered in the 6th semester. It has a full-time load of 60 hours, being 45 hours dedicated to practical activities, such as taking impressions, using of the semi-adjustable articulator, and waxing of the Michigan plate, and 15 hours referring to theoretical lectures and study of

clinical cases. Its syllabus is divided into 5 units: 1) Introduction to the Study of Dental Occlusion; 2) Anatomy and Physiology of the Stomatognathic System; 3) Principles of Occlusion; 4) Application of the Principles of Occlusion to Other Specialties; and 5) Temporomandibular Disorders (concept, etiology, diagnosis, classification, treatment, and bruxism).

In order to assess the knowledge and perception of students about TMD and bruxism, students from the 7th semester were selected, due to the fact that they have been recently enrolled in the Occlusion Clinic discipline, and from the 10th semester, as they are attending the last semester of the University graduate. Only 20 of them (32.78% of a total of 61 students) answered a questionnaire, 10 from each selected semester, as data collection started just before the start of the pandemic caused by COVID-19. Each participant received and signed an Informed Consent Form, keeping a copy for themselves.

The questionnaire consisted of 15 objective and discursive questions. The first three questions were of a personal nature, where the student should mark “yes” or “no” to inform whether during the course they had heard of TMD and if they knew this term and classify the level of knowledge that the institution offers about TMD in a 10-point scale, from “little or no basis” to “deep kowledge”. The following 12 questions were divided into sections, five of them to assess knowledge about the etiology and symptoms of TMD and bruxism, and seven about the students' attitude towards possible treatments in specific clinical situations. The questions were developed by the authors, based on books and articles considered references in the study of TMD and bruxism. Participants were not allowed to consult any type of materials, printed or electronic, for the resolution of the questionnaire.

After completing the questionnaire, data were collected and revised. The percentage of correct answers for the groups in each question was calculated, and the groups were compared using Fisher's exact test. This was the method of choice, as it applies to all survey sample sizes. A statistical significance of 5% was considered.

3 RESULTS

The questionnaire was answered by 20 students (10 from the 10th semester and 10 from the 7th semester), separated into two groups. Table 1 lists the results obtained in the first three questions, personal and self-evaluative. The results of the following section, whose five questions addressed knowledge about TMD and bruxism, are shown in table 2. The results related to the section on attitudes (seven questions) are listed in table 3.

Ninety percent of students in both groups reported not knowing the tool used in research for the diagnosis of temporomandibular disorders mentioned in question #8 - the Research Diagnostic Criteria of Temporomandibular Disorders (RDC/TMD). Those who reported having knowledge proceeded to the descriptive part of the question, detailing what they knew about it. At the end of the survey, the average of correct answers in each group was calculated, and the results showed 60% of correct answers for the 7th semester and 49% for the 10th semester. Overall, the average of correct answers was 54%.

4 DISCUSSION

From the authors' perspective, students

Table 1. Results obtained in the self-evaluative questions

Questions	7th semester n (%)	10th semester n (%)
1. Have you ever heard about temporomandibular disorders during the course?	10 (100) yes	10 (100) yes
2. Do you know what temporomandibular disorder is?	10 (100) yes	10 (100) yes
3. In your opinion, what level of knowledge the undergraduate course provides about temporomandibular disorders?	6 (60) little or no base 4 (40) deep	8 (80) little or no base 2 (20) deep

Table 2**.** Results obtained in the knowledge questions

Questions	7th semester Correct answers n (%)	10th semester Correct answers n (%)	p-value*
4. Is bruxism the most prevalent type of temporomandibular disorder in the population today? *Correct answer*: I DISAGREE	4 (40)	4 (40)	0.429
5. Which of the following items contribute to the etiology of temporomandibular disorders? *Correct answer:* ALL			
Emotional distress	9 (90)	8 (80)	0.598
Trauma in the maxillofacial region	7 (70)	5 (50)	0.490
Sleep Bruxism	8 (80)	8 (80)	0.236
Awake Bruxism	8 (80)	8 (80)	0.236
Abnormal body posture	7 (70)	5 (50)	0.490
Mouth breathing	7 (70)	5 (50))	0.490
Malocclusion	8 (80)	8 (80)	0.429
Genetics	4 (40)	1 (10)	0.389
Hyperextension trauma	4 (40)	5 (50)	1.000
Associated with other musculoskeletal disorders	7 (70)	8 (80)	**0.016**
6. Which individuals are the most affected by temporomandibular disorders? *Correct answer:* YOUNG AND MIDDLE-AGED INDIVIDUALS			
Young individuals	4 (40)	4 (40)	0.598
Middle-aged individuals	8 (80)	5 (50)	1.000
Elderly individuals	10 (100)	8 (80)	-
7. A person with temporomandibular disorder may have symptoms of: *Correct answer:* ALL			-
Pain in the pre-auricular region	10 (100)	8 (80)	-
Difficulty opening your mouth	9 (90)	9 (90)	0.725
Joint noises	10 (100)	8 (80)	-
Muscle pain	9 (90)	10 (100)	-
Referred pain in the cervical region	9 (90)	5 (50)	0.292
Altered mouth opening pathway	8 (80)	6 (60)	0.747

*Fisher's exact test

Table 3. Results obtained in the attitude section assessment

Questions	7th semester Correct answers n (%)	10th semester Correct answers n(%)	p-value*
9. Is identification and removal of occlusal interferences effective in treating temporomandibular disorders? *Correct answer:* I DISAGREE	3 (30)	2 (20)	0.301
10. Should orthodontic treatment be an option of choice in the treatment of temporomandibular disorders? *Correct answer:* I DISAGREE	7 (70)	8 (80)	0.490
11. Can orthodontic treatment be started in patients with temporomandibular joint disorders? *Correct answer:* I DISAGREE	4 (40)	6 (60)	0.598
12. Do all individuals with joint noises not require treatment? *Correct answer*: I DISAGREE	10 (100)	9 (90)	-
13. Do all individuals with TMD not need to undergo radiographic evaluation before formulating the treatment? *Correct answer:* I DISAGREE	10 (100)	9 (90)	-
14. Is botulinum toxin one of the main treatments for muscle temporomandibular disorders? *Correct answer:* I DISAGREE	9 (90)	5 (50)	0.292
15. Are disc recapture surgeries very effective in patients with disc displacement with rediction? *Correct answer:* I DISAGREE	9 (70)	4 (40)	0.260

*Fisher's exact test

had little knowledge about TMD and bruxism due to the insufficient credit hours offered to study these subjects. There was no improvement of knowledge from the 7th semester to the 10th. The course evaluated has a broad curriculum structure and was recently reformulated in 2017[13], and does not have specific disciplines that are focused on the study of TMD and bruxism.

In 2011, a survey carried out in 53 Dentistry courses in Brazil showed that less than 5% of the total credit hours, on average, was dedicated to the study of pain[8]. The subjects are, in general, distributed in the basic curricular components, such as Physiology and Anatomy, and clinical ones, such as Pharmacology, Pathology, and Endodontics. The same happens with the study of TMD: those responsible for its teaching are not professionals who are experts in the subject, but rather dental prosthesis teachers in the vast majority[8]. Still, studies indicate that clinical practice right after the theoretical study on TMD increases students' knowledge[7]. Identifying risk factors, making a diagnosis, planning treatments, and acting in cooperation with a multidisciplinary team are competencies achieved through clinical training[10].

In both evaluated groups, 60% of students mistakenly agreed with the statement that "bruxism is the main type of TMD". Bruxism can lead the masticatory muscles to a state of hyperfunction, causing an overload on the temporomandibular joints and, consequently, causing muscle and joint pain[16,17]. Awake bruxism is a significant risk factor for the occurrence of TMD, as it is six times more

frequent than sleep bruxism[1].

Considering the multifactorial etiology of TMD, most students did not recognize genetics as a possible contributing factor: 40% of the 7th semester and only 10% of the 10th semester answered correctly. However, studies show that chronic pain is the example of an interaction in the genetic environment, where an injury is necessary, but there are also susceptibility factors that can be inherited[18]. Genes involved in nociceptive pathways may also be involved in the susceptibility to a chronic pain condition, as well as genetic alterations, and functional polymorphisms in these genes may result in disturbances in pain regulatory pathways. These, in turn, lead to the development of persistent pain and therefore contribute to TMD. Likewise, changes in anti-inflammatory activity can lead people to respond differently to trauma or stress[19].

In the knowledge section, where they were asked about other musculoskeletal disorders contributing to the etiology of TMD, there was a statistical difference ($p = 0.016$) when comparing the responses of the two groups, with a higher percentage of correct answers for the 10th semester. This result can be justified by the approach and study of musculoskeletal factors and their changes in other clinical activities, such as the interrelationship of TMD with Occlusion and Orthodontics[8,20]. TMD affects up to 15% of adults, with a peak incidence and development of symptoms between 20 and 40 years of age, that is, young and middle-aged individuals[5,21]. In this item, the alternatives offered for answers were “young individuals”, “middle-aged individuals” and “elderly individuals”. The age groups that each item would represent were not described in the questionnaire, a factor that could induce a bias when choosing one or the other alternative. However, few students opted for multiple-choice, characterizing a lack of knowledge or misinterpretation of the question. Students who answered correctly by checking the first two options represented only 20% of the 7th semester and 10% of the 10th semester.

For possible TMD symptoms, most students answered correctly. The exception was referred pain in the cervical region, as 90% of the 7th semester students and only 10% of the 10th answered correctly.

The evidence-based diagnostic method for TMD, called RDC/TMD, was created in 1992 and came from the need for a diagnostic system that was reliable to distinguish, define and differentially diagnose common TMD subtypes related to chronic pain for research purposes[22]. In 2014, the update of the change from RDC to DC/TMD (Diagnostic Criteria for Temporomandibular Disorders) was published[23,24]. However, its validation for the Portuguese language only took place in 2019, and for this reason the students were still asked about the RDC/TMD. Despite being a globally recognized instrument, a small number of volunteers (10% in each group) reported knowing the diagnostic method, however, none of them mentioned its most important principle, its biopsychosocial scope. Incomplete semiology may deprive patients of the opportunity to have an adequate treatment with consequent improvement in their quality of life[25].

In regard to the knowledge related to TMD treatment, few participants were aware that identifying and removing occlusal interferences is not effective, as a larger percentage of students demonstrated that they knew that orthodontic treatment cannot be started in patients with joint disorders. There are no studies that support the hypothesis that dental occlusion interferes with the development of TMD, so treatment based on irreversible techniques, such as occlusal adjustment by selective wear, orthodontic therapy, orthognathic surgery, or oral prosthetic

rehabilitation techniques in the treatment of TMD is wrong[20,26,27,28]. Similar results are observed in a study that assessed the knowledge of students about TMD in four dental schools in Brazil, where most agreed with the orthodontic approach and occlusal adjustment as important tools for the treatment of TMD, something not scientifically supported[12].

Regarding the invasive treatment of TMD, the number of students in the 7th and 10th semester who answered correctly, disagreeing with the statement that "disk recapture surgeries are very efficient in cases of patients with disc displacement with reduction", was 70% and 40%, respectively. Currently, it is known that conservative treatments should be the first choice, as they are effective for most symptoms. Among them are self-care guidelines, referrals for psychological care, physiotherapy, low-power laser application, drug therapy, complementary therapies, rigid interocclusal devices, and dry or local anesthetic needling for muscle approaches[4,28,29].

When asked if botulinum toxin is one of the main treatments for muscle TMD, 90% of students in the 7th semester and 50% of students in the 10th semester were right when answering that they disagreed with the question. This substance has no role in combating the etiology of TMD or bruxism[30] and, despite helping to reduce pain, studies show that botulinum toxin should not be the first-choice treatment, as muscle manipulation is more effective in reducing symptoms painful, in addition to being a more conservative option[31].

The results of this study are also similar to those obtained by other authors who assessed the knowledge of Polish[32] and Indian[33] dentists. Both concluded that the knowledge of professionals is insufficient and that the curricula offered in undergraduate and graduate dentistry schools need revision. Still, low practical credit hours and theoretical activities lead to less confidence in the management of TMD[32,33].

The UFSM Dentistry course does not offer a specific discipline for TMD and bruxism, and the students were below the average grade for approval by the institution (70%), with 60% of the 7th semester group and 49% of the 10th. The knowledge acquired initially proves to be insufficient and can be forgotten because there are no practical activities for recognition, fixation, and improvement of the content covered in theoretical classes. The need to devote more attention to TMD and bruxism within Dentistry is evident, following the National Curriculum Guidelines that value the social relevance of health and teaching actions, which implies the construction of curricula that prepare the professional to work according to the needs of the population[34,35]. There is also a lack of public policies that address the issue and welcome individuals who suffer from TMD[36].

The use of a small sample size is a limitation of this study. Due to the pandemic caused by COVID-19, it was not possible to apply the questionnaire to a larger number of students. It was decided not to use virtual forms to avoid the consultation of teaching materials. It is important to emphasize that the results of this study are in line with the understanding that the teaching-learning process must be an ongoing activity and that more studies must be encouraged, with larger samples coming from other educational institutions.

5 CONCLUSION

The study found that there is no improvement of knowledge on TMD and bruxism throughout the course in the evaluated institution, as the group of students in the 10th semester showed poorer results when compared to the 7th semester, who recently went through the Occlusion Clinic discipline, in which these

subjects are taught. Those also showed knowledge flaws, highlighting the need to rethink the insertion of these subjects during the course.

RESUMO

Avaliação do conhecimento dos estudantes de Odontologia da UFSM sobre DTM e bruxismo

Casos de bruxismo e disfunção temporomandibular (DTM) têm se tornado cada vez mais frequentes na prática clínica. Reconhecer seus mecanismos é necessário para o sucesso do controle e tratamento. O objetivo deste estudo piloto foi investigar o conhecimento e a percepção sobre DTM e bruxismo dos estudantes de Odontologia da Universidade Federal de Santa Maria (UFSM). Para isso um questionário com 15 questões foi aplicado a 20 estudantes dessa instituição, sendo 10 do 7º e 10 do 10º semestre. Todos os estudantes avaliados relataram ouvir sobre DTM durante a graduação, mas 70% consideraram que possuíam pouca ou nenhuma base de conhecimento sobre o assunto. Noventa por cento dos estudantes relatou não conhecer a ferramenta utilizada em pesquisas para diagnóstico das DTM. Não houve diferença estatística entre os grupos avaliados e a média geral de acertos foi de 54%. Os dados evidenciam o pouco conhecimento sobre os assuntos abordados e a fragilidade do ensino destas alterações, especialmente pela não evolução do conhecimento sobre DTM e bruxismo ao longo do curso avaliado, pois o grupo de estudantes do 10º semestre apresentou resultados inferiores quando comparados ao do 7º semestre, que passaram recentemente pela Clínica de Oclusão, na qual os temas são abordados.

Descritores: Síndrome da Disfunção da Articulação Temporomandibular. Bruxismo. Inquéritos e Questionários. Estudantes de Odontologia. Avaliação Educacional.

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