

The teaching of temporomandibular disorders and orofacial pain at undergraduate level in Brazilian dental schools

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ABSTRACT

Objectives: Evaluate the way the topics for the study of pain mechanisms in general, and Orofacial Pain (OFP) and temporomandibular disorders (TMDs) more specifically, are addressed in undergraduate courses curricula, and also to verify the existence of specialist OFP/TMD teachers in Brazilian dental schools. Methods: Between July 2010 and January 2011, course Coordinators/Directors of all dental schools duly registered at the Ministry of Education were invited to answer a questionnaire on topics related to OFP/TMD teaching in their institutions. Results: Fifty-three dental schools representatives answered the questionnaire. The study of pain mechanisms was found to cover an average of less than 10% of the courses' total time. Pharmacology, Endodontics and Physiology were identified as the departments usually responsible for addressing pain mechanisms in dental courses. Psychosocial aspects were found to occupy a very small proportion in the syllabi, while most of the content referred to biological or somatic aspects. OFP/TMD is addressed by a specific department in only 28.4% of the participating dental schools, while in most cases (46.3%), OFP/TMD is under the responsibility of the Prosthodontics department. Only 38.5% of respondents indicated that they had a specialist OFP/TMD teacher in their Schools. Conclusion: Among the Brazilian dental schools participating in the study, the teaching of OFP/TMD was found to be insufficient, segmented or with an extremely restricted focus. This initial assessment indicates that Curricular Guidelines for the study of OFP/TMD at undergraduate dental schools should be developed and implemented to facilitate their appropriate inclusion into the curricula and in specific pedagogical projects.

Key words: Education. Dentistry. Temporomandibular joint dysfunction syndrome. Facial pain.

INTRODUCTION

The diagnostic and treatment of orofacial pain (OFP) has been part of the dental practice since Dentistry has become a recognized profession in the 19th century. Epidemiologic and demographic studies indicate that orofacial and chronic pain conditions, especially temporomandibular disorders (TMDs), will represent not just a health problem but also a significant social and economic onus to society, as the majority of the population will be composed by middle-aged and elderly people, in whom painful conditions are specially prevalent¹⁹. The impact of

pain in individuals with chronic TMDs can negatively affect their performance at work and at school, in their leisure and domestic routines, family relationships, as well as lead to sleep and appetite disorders¹⁴. Patients with chronic pain submit themselves to a considerable number of clinicians and tend to suffer for several years (an average of 4.2 years) before they look for experienced clinicians capable of dealing with OFP. Due to the complexity involved in treating patients with chronic pain, a considerable number of clinicians often prefer to refer patients to other professionals, as they usually feel insufficiently trained⁵.

A study carried out by Schönwetter, et al.¹⁸ (2011) assessed the educational experience of recently-graduated students from Manitoba Dental School in Canada, examining the confidence and the perceived importance of several competences acquired during graduation. Students reported having low confidence levels in areas such as Implantology, Orofacial Pain, Trauma and Surgical Treatment. The authors concluded that the training received by these recently-graduated students could have an important impact on their clinical routine. From this study, it becomes evident that the study of orofacial pain, as well as other important areas, is still a problem to be addressed by dental courses curricula nowadays.

Advances have been taking place in all areas of science and research, resulting in new knowledge and technologies with the potential to transform the dental practice. However, the incorporation of new information into dental schools' curricula has been considerably slow. For instance, occlusion is still widely believed to be the primary cause of TMDs. However, growing knowledge of associated pain mechanisms and the use of reliable tools, multidisciplinary approaches, and somatic as well as psychosocial components, have resulted in important changes in the diagnostic and treatment of OFP and TMDs^{2,6,7,10,21}.

The need to adequately prepare dental professionals to deal with and control pain in their practice has been already addressed by several authors along the past years, particularly in the USA^{5,8,23} and EU^{11,12,13}, but also in Brazil^{9,10}, with calls for the implementation of Curricular Guidelines that can direct the study of pain mechanisms in dental courses at both under and postgraduate levels. Dental courses curricula still dedicate a considerable amount of hours to conditions which students may never encounter in their clinical practice, while they spend little, and sometimes no time, learning about conditions that present primarily as painful symptoms, which will be much more common and prevalent during their professional career²³. Therefore, it seems logical and necessary that the diagnostic and treatment of pain should be significantly present in dental educational programs. Unfortunately, it seems that in the majority of dental schools around the world the adequate study of pain still represents a minor part in the curricula^{19,23}. Education conferences involving American and Canadian dental schools have tried to establish formal curricular directives for the study of TMDs at undergraduate level. Despite this effort, TMDs are still a source of dissonance, leading to widely different levels of training, with the potential for confusion for recently-graduated dentists at the start of their clinical practice^{9,20}.

In Brazil, a resolution by the Federal Dentistry Council (CFO) establishes that OFP/TMD is a specialty

aiming at developing and promoting a sound scientific knowledge basis for better understanding, diagnosing and treating pain of the masticatory apparatus, orofacial region and other related structures (CFO – Art. 64, resolution nº 22). The areas of competence of an OFP/TMD specialist are the following: diagnosis and prognosis of complex orofacial pains, including temporomandibular disorders, especially those of chronic origin; interrelationship with and participation in multidisciplinary teams for the study of pain in teaching, research and healthcare institutions; implementation of epidemiologic and pathophysiological studies concerning TMDs and other varieties of pain in the orofacial region; and treatment of OFP and TMDs through dental procedures¹⁶.

Despite this resolution, to this moment, very little information concerning the status of the teaching of OFP/TMDs in Brazil is available. Therefore, in order to stimulate discussion about courses curricula in Brazilian dental schools concerning the teaching of pain, the objectives of this study were: i) Evaluate the way the topics for the study of pain mechanisms in general, and OFP/TMD more specifically, are addressed in dental courses curricula at undergraduate level; and ii) Verify the existence of specialist OFP/TMD teachers at undergraduate level. The working hypothesis is that the teaching of OFP/TMD in Brazilian dental schools is generally outdated and too minimal to deal with the complexity of pain-related disorders in the orofacial region.

METHODS

A pilot questionnaire was devised taking as reference the directives found in the curriculum guidelines for the teaching of OFP/TMDs established by the American Association of Dental Schools¹, the European Academy of Craniomandibular Disorders¹³, and the Curricula Outline on Pain for Dentistry (IASP).

Based on our personal knowledge, the pilot questionnaire was sent to course Coordinators/Directors of eight dental schools located in different regions of the country (Paraná, Santa Catarina, Rio Grande do Sul, Mato Grosso do Sul, Minas Gerais, Brasília, Pernambuco and Piauí), which were informed on the purpose of the study and agreed to contribute with suggestions and criticisms to the proposed survey. Based on the suggestions received, minor changes were made to the pilot questionnaire in order to improve it according to the objectives of the study (Figure 1).

A consultation was also carried out in the database of the National Institute of Educational Study and Research (INEP) at the Brazilian Ministry of Education (MEC). Only those dental schools which offered dental courses at undergraduate level, and

were duly registered with and approved by MEC until 2009, were included in the sample.

The revised questionnaire was then applied to course Coordinators/Directors firstly in person, during the Brazilian Association of Dental Teaching (ABENO) 2010 annual meeting. Electronic messages

were then sent to all remaining course Coordinators/Directors using the electronic address registered at INEP, with a direct access link to the questionnaire. A template of the questionnaire was made available on a site on the Internet specifically created for this study. When no response was obtained after a period



QUESTIONNAIRE

São Leopoldo Mandic - Master Degree in Dentistry
Focus Area: TMD/ Orofacial Pain

Coordinator: Dr. Antonio Sergio Guimarães, DDS, Ph.D
Researcher: Wagner Simm, DDS, MSc

Institution: Public Private Other: _____

How long has the respondent been as course coordinator/director in your Dental School? _____

Concerning the Dental Course Curriculum:

1. In which areas of study are inserted the contents for the study of pain mechanisms?

- Not addressed Endodontics Pedodontics Pharmacotherapeutics Anatomy
 Pathology Radiology Psychology Social and Preventive Dentistics
 Prosthodontics Physiology Oral Biology Orthodontics Periodontics
 Other: _____

2. Concerning the total hours involved in the course, what percentage is estimated dedicated to the study of PAIN mechanisms? %

3. For the teaching and study of PAIN mechanisms, please, indicate below the items that are effectively addressed in the course's curriculum:

- Pain as public health problem Terms related to pain
 Economic and social impact of pain Imaging exams for the diagnostic of pain
 Definition of different types of pain Dental pain
 Nervous system anatomy Neuropathic pain
 Transmission mechanisms of pain Myofascial pain
 Pain pathways Ways to inhibit pain
 Interpersonal approach to pain Referred pain
 Physical examination and anamneses Pain modulation mechanisms
 Pharmacology to control pain Acupuncture
 Acute x chronic pain Psychological consequences of pain
 Temporomandibular Disorders Psysiopathology of pain

Specifically concerning Temporomandibular Disorders (TMD) and Orofacial Pain (OFFP):

4. How is TMD/OFP addressed in the undergraduate course curriculum:

- Not addressed Specific Subject Inside other subjects Extension Projects

5. If addressed inside other subjects, which is the main area responsible for TMD/OFP?

- Integrated Clinic Prosthesis Orthodontics Surgery Other: _____

6. What specialty does the teacher responsible for TMD/OFP have?

- TMD/Orofacial pain Prosthesis Orthodontics Surgery Other: _____

Figure 1- Questionnaire applied to dental schools Coordinators/Directors

Table 1- Estimated time dedicated to the study of pain mechanisms in dental schools in Brazil

Institutions N (%)	% of Course's total hours					NI
	<5%	6% to 10%	11 to 15%	16 to 20%	>21%	
Private	5 (17.2%)	1 (3.4%)	5 (17.2%)	8 (27.6%)	0	10 (34.5%)
Other	2 (50%)	0	0	0	1 (25%)	1 (25%)
Public	8 (40%)	4 (20%)	0	0	3 (15%)	5 (25%)
Total	15 (28.3%)	5 (9.4%)	5 (9.4%)	8 (15.5%)	4 (7.5%)	16 (30.2%)

NI: Not Informed

Table 2- Departments responsible for addressing pain mechanisms in undergraduate dental courses

Departments	Institutions	Percentage
Pharmacotherapeutics	43	81.1%
Endodontics	41	77.4%
Physiology	40	75.5%
Pathology	33	62.3%
Pediatric Dentistry	29	54.7%
Prosthodontics	25	47.2%
Anatomy	22	41.5%
Psychology	22	41.5%
Restorative Dentistry	21	39.6%
Periodontics	19	35.8%
Occlusion	14	26.4%
Orthodontics	11	20.8%
Radiology	8	15.1%
Social and Preventive	8	15.1%
Oral Biology	6	11.3%
TMD	6	11.3%
Surgery	5	9.4%
Anesthesiology	4	7.5%
Stomatology	3	5.7%
Integrated Practice	3	5.7%
Not addressed	0	0%

of approximately three months, a second effort was made for a new contact, and new messages were sent requesting participation. The site with the questionnaire remained open from August 2010 to January 2011.

In the questionnaire, course coordinators/directors were requested to answer questions concerning the areas of study, contents addressed and time dedicated to the study of pain mechanisms in their course curriculum. Moreover, they were also requested to indicate how the topics for teaching OFP/TMD were being addressed in the course programs: if by a proper OFP/TMD department; within other departments; in complementary extension projects; or if it was simply not being addressed at all. The respondents could indicate more than one correct answer, since didactical and/or practical topics may be connected to more than one alternative proposed (Figure 1).

Statistical analysis was not performed as the answers to this questionnaire were descriptive and observational.

RESULTS

Dental schools were divided into private, public (federal, state or municipal) and others

Table 3- Pain topics addressed in the syllabi

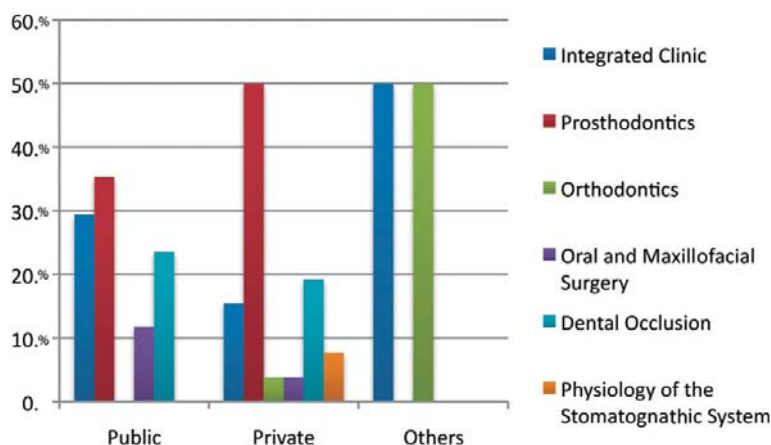
Topics	Institutions	Percentage
Definition of types of pain	52	98.1%
Pharmacology for controlling pain	52	98.1%
Dental pain	50	94.3%
Nervous system anatomy	48	90.6%
Pain transmission mechanisms	47	88.7%
Acute pain x chronic pain	47	88.7%
Temporomandibular disorders	46	86.8%
Physiopathology of pain	46	86.8%
Physical examination and anamnesis	45	84.9%
Ways to inhibit pain	42	79.2%
Pain pathways	38	71.7%
Myofascial pain	36	67.9%
Pain modulation mechanism	36	67.9%
Terms related to pain	33	62.3%
Pain psychological consequences	30	56.6%
Referred pain	29	54.7%
Neuropathic pain	27	50.9%
Interpersonal approach to pain	18	34.0%
Imaging exams for the diagnosis of pain	18	34.0%
Pain as a public health problem	16	30.2%
Pain social economic impact	11	20.8%
Acupuncture	8	15.1%

(communitarian, confessional and philanthropic). A total of 208 dental schools were duly registered at MEC until December 2009, 77 private, 57 public and 74 others. A total of 15 dental schools responded to the questionnaire at ABENO 2010 meeting. Until the survey's closing date (January 2011), 38 dental schools responded to the questionnaire on the site, resulting in a final sample of 53 dental schools from all over the Brazilian territory, 29 private (54.7%), 20 public (37.7%) and 4 others (7.5%).

When asked to state the number of hours dedicated to the study of pain mechanisms at undergraduate level, approximately 30% of participating course coordinators/directors reported to be unable to answer the question. The reason stated was lack of sufficient and detailed information on course curricula. On average, dental courses in Brazil require a total of 4,530 h for its completion. In the vast majority of dental schools consulted,

Table 4- Specialty of teachers responsible for teaching orofacial pain (OFP)/temporomandibular disorders (TMD)

Institutions	Specialty of teachers responsible for teaching OFP/TMD N (%)					Total
	OFP/TMD	Prosthodontics	Orthodontics	Physiology	Geriatric dentistry	
Public	16 (55.2%)	10 (34.5%)	2 (6.9%)	1 (3.4%)	0	29
Private	8 (25%)	19 (59.4%)	1 (3.1%)	3 (9.4%)	1 (3.1%)	32
Other	1 (25%)	1 (25%)	2 (50%)	0	0	4
Total	25 (38.5%)	30 (46.2%)	5 (7.7%)	4 (6.2%)	1 (1.5%)	65

**Figure 2-** Areas of study responsible for addressing orofacial pain/temporomandibular disorders (expressed in percentage)

pain mechanisms were addressed in less than 10% of the total time (Table 1).

When asked to identify the different departments responsible for addressing pain mechanisms in the dental course curricula, Pharmacotherapeutics, Endodontics, and Physiology were the departments more commonly mentioned (Table 2).

Concerning the topics related to pain mechanisms in the syllabi, it was possible to observe that only a small proportion of topics concerned the psychosocial aspects of pain, whereas a high proportion referred to the biological and somatic aspects (Table 3).

All respondents stated that OFP/TMD topics were studied at undergraduate level, but when the different dental schools were compared, OFP/TMD topics were more frequently dealt with by a proper OFP/TMD department (34.4%) or in extension projects (37.5%) in state institutions, while in private institutions OFP/TMD topics were normally offered within other departments (77.4%).

Considering that many dental schools reported that OFP/TMD topics were addressed within non-specific departments, it was further questioned which departments were responsible for teaching OFP/TMD topics to students. The answers obtained indicated that Prosthodontics is the department mainly responsible for teaching OFP/TMD (46.3%), followed by Integrated Practice, Dental Occlusion, Oral and Maxillofacial Surgery, Orthodontics and the Physiology of the Stomatognathic System (Figure 2).

An attempt was made to identify the specific qualifications possessed by teachers responsible for teaching OFP/TMD topics at undergraduate level in dental schools, regardless of the dental schools having specific departments or not. Among the dental schools participating in this survey, 38.5% (25) stated to have in their faculty team OFP/TMD specialists. Analyzing each type of dental school, it was possible to observe that professional OFP/TMD specialists are more frequently found in public institutions, while in private institutions the responsibility for teaching OFP/TMD falls under teachers specialist in Prosthodontics (Table 4).

DISCUSSION

The results of this survey fully confirm the working hypothesis. The responses obtained from participating dental schools suggest that there is still a long way before it may be stated that pain mechanisms are being adequately dealt with both at a didactical and clinical level around the country. Among the Brazilian dental schools participating in the study, the teaching of OFP/TMD was found to be insufficient, segmented or with an extremely restricted focus.

The problem concerning the teaching of pain mechanisms in dental schools in Brazil can be clearly seen on the fact that a considerable number of participating course coordinators/directors (30%)

was unable to report the approximate number of hours dedicated to this topic. This seems to reveal a lack of any specific interest in the subject, characterizing it as just one among the several in the curricula. Among the respondents, the hours dedicated to pain mechanisms corresponded to an average of less than 10% of the course's total time. Although there are schools dedicating more than 20% of their time to pain mechanisms, the majority dedicate 5% or less. This result clearly indicates that the teaching of pain mechanisms is, in general, limited to a minimum. This small number of hours spent in the study of pain topics, addressed by dental curricula, may explain the perception of complexity among clinicians concerning the treatment of patients with chronic pain. As a result, dental professionals find themselves unable to develop competences and abilities needed to deal with patients with pain syndromes in the orofacial region¹⁸.

The teaching of pain mechanisms in dental schools in Brazil is mainly addressed by basic science departments such as Physiology and Anatomy, and clinical departments such as Pharmacology, Pathology, and Endodontics. Therefore, great emphasis is placed on biological or somatic conditions such as the different types of pain, and on pharmacology for controlling pain, while a very small number of topics concern the psychosocial aspects of pain such as pain as a public health problem or its social impact. This seems to indicate that pain mechanisms are being taught in an outdated fashion and with a very restricted focus.

This is further reinforced by the way OFP/TMD is addressed in the participating dental schools. Although there are some professional specialists in OFP/TMD, the teaching of OFP/TMD was found to be still mainly the responsibility of Prosthodontics departments and teachers. Although this may not be universally true, this seems to demonstrate that old concepts that link occlusion to OFP/TMD diagnosis and treatment may currently be transmitted to students during their training. Changes of paradigm in the study and treatment of temporomandibular disorders meant that occlusal therapy, selective occlusal adjustment stabilization therapy with the use of plates should no longer be in use^{2,21}. The growing understanding is that psychosocial mechanisms associated to orofacial pain have an impact on the treatment of OFP/TMD^{2,6,7,10,17,21}. Thus, an educational process planned in the format of a matrix that makes it possible to identify the several possible areas for the development of competences and abilities for the study of pain along the academic formation of students should be established.

A similar survey carried out by Krasser and Greene⁸ (2007) demonstrated that 34% of dental schools in the USA and Canada used specific subjects to teach TMDs at undergraduate level,

while 66% reported having a combination of clinical and didactical subjects to that aim. In this research, the data obtained showed that only 28.4% of participating dental schools have a specific TMD department, while in 52.2% TMD topics are dispersed among other subjects in the curriculum. This result indicates that the teaching of OFP/TMD in Brazil seems to be even more fragmented than in countries like the USA and Canada.

Etiological and treatment concepts concerning OFP/TMDs have undergone considerable conceptual change, from a dental-based to a bio-psychosocial-based model⁸. The inclusion of newly acquired knowledge in the dental teaching should take place under continued education proposals not only for better technical, scientific and professional awareness, but also to offer patients the widest range of access to health care. OFP/TMD is becoming increasingly important in the context of Holistic Dentistry, due to the increased demand for this type of treatment. The importance of establishing a more precise diagnosis demands the use of standardized and validated tools in order to develop interdisciplinary treatment strategies capable of preventing or minimizing patient disablement^{4,16}. Thus, a multidisciplinary approach could provide better integration between basic science, preclinical and clinical OFP/TMD contents. Clinical experiences could then be presented as examples to students at the same time that basic knowledge on the matter is being built. The integration of the teaching team would be essential for establishing an adequate scientific basis to capacitate students to work with OFP/TMD patients¹⁹. Therefore, dental schools should reassess their curricula, establish plans, and nominate a commission for the execution of new pedagogical proposals. Curricular changes are based on educational policies adopted by each country. Class entities and specialized organisms should produce documents to establish the foundations to improve OFP/TMD teaching, closing the existing gap between research and clinical services, especially those provided by the general dental clinician.

The competences of a TMD specialist must include patient care in a wider sense, i.e., provide care based on evidence, give adequate instructions to patients, ability to work in teams, and establish a clinical base and professional development through permanent education, working in private offices as well as specialized centers^{3,22}. Some of the directives that have been suggested to guarantee a wide platform for OFP/TMD learning include: didactical components, integrating basic science to clinical science; laboratorial components, aiming at providing the exposition and the hands-on experience necessary to develop those abilities fundamental to the area; and clinical components, for the care of patients under the supervision of an

integrated panel of teachers, and with a favorable interrelationship with other health areas^{3,11,15,19,22,23}.

Taking into consideration the results obtained in this study, it may be concluded that the number of hours dedicated to the study of pain mechanisms in the participating dental schools is insufficient to adequately treat patients with pain in the orofacial region. Moreover, it is expected that the number of TMD professionals in activity in the country is at present insufficient to provide adequate treatment to the population and training to new professionals in the area. In face of these results, we urge agencies like ABENO and the newly created Brazilian Society for Orofacial Pain (SBDOF) to devise curricular guidelines on the molds of the American and European agencies in order to define standards for the teaching of OFP/TMD both at under and postgraduate levels. Emphasis should be placed not only on the time but also on the topics required to manage dental pain and non-dental orofacial pain in a multidisciplinary approach, especially for patients with chronic pain. Although the curriculum may be different from school to school, the presence of professional OFP/TMD teachers would certainly contribute to the achievement of this aim.

A clear limitation of this type of study is the fact that it is a self-reported questionnaire, in which the authors have no control over the answers provided. Nonetheless, all respondents were course Coordinators/Directors, and answers should provide a fairly accurate representation of what is being taught at their schools.

In addition to that, the low participation rate (26%) seen in the survey raises the possibility of non-response bias, i.e., when the potential answers of non-respondents could be quite different from the answers collected. Although this may also represent an important limitation of this study, the total number of respondents (53) corresponds to a broad and diverse representation of the Brazilian reality concerning the teaching of pain mechanisms and OFT/TMD. Schools from all over the Brazilian territory, both private and public, participated in the survey, and the results obtained can be considered as an important reference for the discussion on how to approach orofacial pain teaching in the future.

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