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Knowledge and Beliefs Regarding TMD: Has Anything Changed After 20 Years?

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Abstract

Background: Due to the variety of factors involved in TMDs it is not surprising to see a wide range of treatment modalities being suggested for TMD patients. However, one determinant of treatment for TMD that is often overlooked is the practitioner's knowledge and beliefs about the syndrome itself.

Objectives: To evaluate changes in experts' knowledge and beliefs regarding Temporomandibular Disorders (TMD) since the administration of the first such survey by Le Resche, Truelove and Dworkin in 1993.

Patients and Methods: A survey invitation was emailed to 62 dentists and 19 psychologists, all determined to be experts in the orofacial pain/TMD field. All dentists selected to be part of this survey were members of the American Academy of Orofacial Pain. Psychologists were selected based on their publications in this field. The Le Resche et al. questionnaire was used with the following adaptations: four new statements were inserted; one statement was removed; and a 6-point Likert agreement scale for each statement was used instead of the original 11-point scale. Reminder emails were sent at one week and one month to maximize the response rate. Changes in responses to each item from the original survey were assessed using z-test.

Results: Thirty-four dentists but only three psychologists responded to the survey. Therefore only responses from dentists were used in the analysis. Overall there was a high level of agreement between the original sample and the current sample. Of the 34 original items there was very clear consensus on 24. There was consensus on two new items in the survey on the need for a tomogram and splint therapy.

Conclusions: Twenty years after the original survey, the knowledge and beliefs regarding TMDs among experts in this field have not changed significantly.

Keywords: Temporomandibular Disorders, Orofacial Pain, Health Survey, Knowledge, Beliefs

1. Background

The American academy of orofacial pain (AAOP) defined temporomandibular disorder (TMD) as a "collective term that embraces a number of clinical problems that involve the masticatory muscles, the TMJ, and the associated structures" (1). As the definition states, TMD is not a single clinical entity, but a syndrome, and its etiology has been debated since the conditions were first described. (2-8) Due to the variety of factors involved in TMDs it is not surprising to see a wide range of treatment modalities being suggested for TMD patients (9-15). However, one determinant of treatment for TMD that is often overlooked is the practitioner's knowledge and beliefs about the syndrome itself (16-18).

In 1993, Le Resche, Truelove and Dworkin (17) evaluated knowledge and beliefs regarding TMD and its treatment among dentists using a survey. Two panels of experts were used to create the knowledge survey. The responses of these experts were used to determine the criterion response for each knowledge/belief item evaluated. Thirteen dentists who had extensively published about TMD composed one panel of experts. Their responses were used to determine criterion responses for items relating to the areas of psychophysiology, chronic pain and pathophysiology. The second panel of experts included fourteen psychologists who had experience in multidisciplinary chronic pain clinics. Their responses were used to determine criterion responses in the areas of chronic pain and psychiatric disorders. Le Resche et al. (17) mailed the survey to 247 general dentists and 212 specialists involved in seeing patients with TMD. Results of the survey indicated that among both general dentists and specialists of the time there was considerable variation in knowledge about the psychophysiological and pathophysiological aspects of TMD.

One reason for the large variation in knowledge about TMD, its etiology, and its treatment, is that orofacial pain is often not considered a dental specialty, and therefore many dental schools in the U.S. do not have a specific orofacial pain (and/or TMD) discipline. Instead, any teaching about orofacial pain is usually divided up among sev-

eral disciplines such as oral surgery, orthodontics, and prosthodontics (19). As an attempt to improve the knowledge about orofacial pain and TMD, pre-doctoral courses focused on orofacial pain have been discussed and recommended, but few are in place (20-22).

Given the fragmented nature of TMD/orofacial pain instruction in the dental community one question that presents itself is whether multiple providers, even those considered experts, can come to consensus about the etiology and treatment of TMD.

2. Objectives

The present survey aimed to evaluate experts' knowledge and beliefs regarding temporomandibular disorders (TMD), and to determine whether such knowledge has changed since the administration of the first such survey by Le Resche, Truelove and Dworkin (1993) (17). The results could guide the development of much needed unified curricula in TMD pain for dental students.

3. Patients and Methods

Institutional review Board approval was sought and obtained prior to the beginning of this study.

3.1. Subjects

The survey was administered to samples of experts in the area of TMD. Two distinct TMD expert groups were selected. One group was called Dentists-TMD experts and the second group was called Psychologists-TMD experts. The Dentists-TMD experts' responses answered all domains of the survey. Experts were chosen by the investigators based on knowledge about the TMD field and publication history in TMD. A total of 62 academic dentists were selected, all of whom were involved with the management of orofacial pain patients and members of the American Academy of Orofacial Pain. Additionally, 19 psychologists involved in orofacial pain research and/or clinical management of orofacial pain patients were selected to participate in this study. No financial compensation was offered for participation.

3.2. Measures

TMD beliefs and knowledge were assessed using a 38-item questionnaire adapted from a survey used by Le Resche et al. (17). As in the original survey, this questionnaire consisted of four domains: Pathophysiology (15 items), Chronic pain (10 items), Psychophysiology (9 items), and Psychiatric Disorders (4 items). On the original questionnaire used by Le Resche et al. (17), items were answered on a 11-point scale, from 0 - 10, where 0 represented "strongly disagree", 10 represented "strongly agree", and 5 represented neutral. On the current questionnaire each item consisted of a statement to which respondents were asked to indicate their agreement on a 6-point scale, where 0 represented I don't know, 1 represented strongly disagree, 2 represented disagree, 3 represented neutral, 4 represented agree, and 5 represented strongly agree. The respondents had the option to skip any of the questions.

The statements on the pathophysiology domain were related to the interaction of physical and psychological factors in TMD etiology, diagnosis, and treatment. The chronic pain domain included questions regarding the causes, diagnosis, and appropriate treatment of chronic pain conditions, as applied to TMD. The psychophysiology domain contained questions about the biomedical or biomechanical aspects of TMD etiology, diagnosis, and treatment. Finally, the psychiatric disorders domain included questions related to anxiety, depression, and somatization associated with TMD. The Psychologists-TMD experts' survey excluded the pathophysiology domain.

Few changes were made to the original survey. On the Pathophysiology domain: the question "transcranial films are the most accurate method for viewing the TMJ joint," which was present on the original survey, was excluded on the current questionnaire since this technique is no longer used. Three new questions were inserted on the current survey: a) "panoramic film is a reasonable method to evaluate the bony structures of the TMJ;" b) "when bony changes are seen on a panoramic film, a tomogram is mandatory in order to define the treatment plan;" and c) "splint therapy is only effective when used more than 16 hours/day."

On the Chronic Pain domain the question "poor quality of sleep is a major factor in the development of TMD" was inserted on the current survey. If considered as an overall measure of beliefs and attitudes about TMD and its treatment, the 38 items do cohere as a scale, with an internal reliability of alpha = 0.65.

3.3. Procedures

The Dentists and Psychologists-TMD experts were solicited via e-mail and requested to complete the survey online, via a secure link to an online survey program, Questionmark (Norwalk, CT), which itself operates on a secure system (SAS 70 Type II-certified data center). The e-mail explained that the purpose of the study was to evaluate current knowledge and beliefs about the treatment of TMD. It was stressed that the completion of the survey was entirely voluntary, and that responses would be anonymous. No personal identification was requested. Two reminder e-mails were sent; the first reminder was e-mailed one week after the initial solicitation, and the second reminder was sent after one month.

In the current study each respondent's score on each item was recoded to either Disagree (for scores of 1 or 2) or Agree (for scores of 4 or 5). For each item the number of agreements and disagreements over all respondents were tallied. A consensus was considered present when there was a significant difference by non-parametric binomial distribution test between agreements and disagreements. Percent of respondents agreeing or disagreeing with each item was then calculated.

In order to draw comparisons with responses from the Le Resche et al. survey, the percent agreement for each item among the experts in the Le Resche group was com-

pared to the percent agreement for each item among the dental experts in the current survey group using a two-proportion z-test for each item (17).

4. Results

Thirty-four Dentists-TMD experts (response rate 54.8%) and three Psychologists-TMD experts (response rate 15.7%) completed the online questionnaire. Three of the 34 Dentists who answered the questionnaire did not answer all questions. The Psychologists' responses were not used because the response rate was so low. Tables 1 - 4 summarize the results of the current survey compared to those of the original survey. Of the 34 original items, levels of agreement between the original expert sample and the current sample were significantly different on 10. In the pathophysiology domain the present sample was slightly more skeptical about the value of orthodontic treatment, and slightly more accepting or arthroscopic surgery, than was the original sample. Current experts were also slightly less accepting of icepacks and passive muscle stretching than were the earlier experts, and were less likely to commit to the idea that TMJ clicking did not always require treatment.

In the chronic pain domain current experts were much less likely to disagree with the idea that TMJ patients should be advised to rest, and slightly less likely to disagree with the idea that previous treatment failures are an indication for surgery.

In the psychophysiology domain there were minor differences in levels of agreements regarding the mechanisms of acute and chronic pain and the role that stress and tension play in TMD pain. And in the psychiatric disorders domain current experts were less likely to disagree with the idea that depression is rare in TMJ patients. Despite the differences in levels of agreement noted here, however, the degree to which past and current respondents agreed with each other is striking.

Among all questions, four questions received more than 15 percent "neutral" responses: a) Chronic TMD patients should be advised to rest and limit their work and social activities when they are experiencing pain (neutral = 29%); b) Panoramic film is a reasonable method to evaluate the bony structures of the TMJ (neutral = 21.2%); c) Stress is a major factor in the development of TMD (neutral = 19.3%); and d) Poor quality of sleep is a major factor in the development of TMD (neutral = 16.1%).

Among the four new questions, the questions regarding the panoramic film as being a reasonable method to evaluate the bony structures of the TMJ, and the question regarding the poor quality of sleep as being a major factor in the development of TMD presented no consensus (Table 5).

Table 1. Pathophysiology Domain

Item	Original Survey[a]	Current survey[a]	Z Value	P Value
Balancing interference are commonly related to TMD	85 disagree	81.8 disagree	0.478	0.631
Occlusal equilibration is a useful early treatment for TMD	85 disagree	90.9 disagree	-0.914	0.363
Orthodontic treatment can prevent the onset of TMD	77 disagree	93.9 disagree	-2.257	0.024
Arthroscopic surgery is almost completely effective in repositioning the disk in patients with internal derangements	100 disagree	93.9 disagree	3.552	< 0.001
Orthodontic therapy is the best treatment to resolve TMD in a patient with a skeletal malocclusion	92 disagree	90.9 disagree	0.217	0.826
TMD caused by trauma is much more difficult to treat and has a far worse prognosis than other types of TMD	83 disagree	75.7 disagree	1.025	0.303
Panoramic film is a reasonable method to evaluate the bony structures of the TMJ	Not Asked	No consensus	NA	NA
When bony changes are seen on a panoramic film, a tomogram is mandatory in order to define the treatment plan	Not Asked	79.7 disagree	NA	NA
The presence of arthritic changes on tomograms, along with crepitus in the joint indicates the need for treatment	77 disagree	81.8 disagree	-0.622	0.535
The position of the condyle in the fossa as seen on tomogram is a very accurate indicator of internal derangement	92 disagree	84.8 disagree	1.356	0.174
Mandibular repositioning splints are more effective than maxillary repositioning splints	90 disagree	87.8 disagree	0.391	0.696
Splint therapy is only effective when the splint is used more than 16 h/d	Not Asked	90.9 disagree	NA	NA
Nocturnal bruxism is caused by occlusal interference	85 disagree	87.8 disagree	-0.428	0.667
Ice packs and/or heat packs and passive muscle stretching are good early treatments for TMD	100 agree	78.7 agree	6.695	< 0.001
All individuals with clicking TMJs require treatment	100 disagree	90.9 disagree	4.337	< 0.001

Abbreviation: NA, not available.
[a]Values are presented as No. (%).

Table 2. Chronic Pain Domain

Item	Original Survey[a]	Current Survey[a]	Z Value	P Value
Chronic TMD patients should be advised to rest and limit their work and social activities when they are experiencing pain	86 disagree	51.6 disagree	4.742	< 0.001
PRN narcotics ("as needed" for pain) are a treatment of choice when TMD pain is severe	93 disagree	90.3 disagree	0.557	0.575
Antidepressants are never indicated in the management of TMD	88 disagree	93.5 disagree	-0.941	0.347
An extensive history of previous treatment failures in a TMD patient is usually an indication for surgery	100 disagree	96.7 disagree	2.601	0.009
Chronic pain is a behavioral, as well as a physical problem	96 agree	93.5 agree	0.661	0.509
Although some TMD patients have psychological problems, these problems are usually unrelated to their pain	85 disagree	83.8 disagree	0.181	0.857
Poor quality of sleep is a major factor in the development of TMD	Not Asked	No consensus	NA	NA
Difficulty with sleep is a common finding in chronic pain	96 agree	96.7 agree	-0.195	0.841
Some patients use pain as an excuse to avoid unpleasant chores	89 agree	83.8 agree	0.872	0.384
Behavior modification treatments are appropriate for patients with chronic TMD pain	88 agree	87.1 agree	0.149	0.881

Abbreviation: NA, not available.
[a]Values are presented as No. (%).

Table 3. Psychophysiology Domain

Item	Original Survey[a]	Current Survey[a]	Z Value	P Value
The mechanisms of acute and chronic pain are the same	100 disagree	96.7 disagree	2.601	0.009
Biofeedback can be useful for treating TMD	77 agree	87 agree	-1.313	0.190
Oral parafunction habits are often significant in the development of TMD	85 agree	74.2 agree	1.569	0.116
Patients with TMD who clench/brux do so either during the day or at night, but not both	92 disagree	90.3 disagree	0.333	0.741
Stress management is indicated for many TMD patients	100 agree	90.3 agree	4.480	< .001
Stress is a major factor in the development of TMD	85 agree	74.1 agree	1.583	0.114
Tension and stress increase jaw muscle EMG levels in susceptible patients	100 agree	61.2 agree	9.154	< .001
Progressive muscle relaxation is not an effective treatment for TMD	82 disagree	80.6 disagree	0.196	0.841
Information on the daily pattern of the TMD symptoms can be helpful for identifying contributing factors	92 agree	90.3 agree	0.334	0.741

[a]Values are presented as No. (%).

Table 4. Psychiatric Disorders Domain

Item	Original Survey[a]	Current Survey[a]	Z Value	P Value
Clinical depression is rare in chronic TMD patients	100 disagree	80.6 disagree	6.373	< .001
Depressed mood is fairly common in chronic TMD patients	86 agree	93.5 agree	-1.157	0.246
Anxiety disorders are more common in TMD patients than in the population at large	79 agree	74.2 agree	0.605	0.549
Depression can be an important etiologic factor in chronic pain	79 agree	74.1 agree	0.630	0.528

[a]Values are presented as No. (%).

Table 5. Analysis of Questions not Presented on the Original Questionnaire, Results of Non-Parametric Tests of Binomial Distribution, Departure or Responses from 50%[a]

Item	N	Agree + Strongly Agree[b]	Neutral[b]	Disagree + Strongly Disagree[b]	P Value
Panoramic film is a reasonable method to evaluate the bony structures of the TMJ	31	42.4	21.2	30.3	0.541
When bony changes are seen on a panoramic film, a tomogram is mandatory in order to define the treatment plan	33	6	12.1	79.7	< .001
Splint therapy is only effective when the splint is used more than 16 h/d	33	3	0	90.1	< .001
Poor quality of sleep is a major factor in the development of TMD	31	54.8	16.1	25.8	0.108

[a]Comparing the disagree column with the agree column.
[b]Values are presented as No. (%).

5. Discussion

The purpose of this paper was to update the findings of Le Resche et al. (1993) (17) about consensus on the etiology and management of TMDs among experts in this field. It is heartening that, despite the different backgrounds and philosophies of the experts surveyed here, there was largely consensus among this group about key aspects of TMD etiology, diagnosis and treatment. Furthermore, there was little change in consensus on most items from that reported by the original experts surveyed by Le Resche et al. (17).

Some differences were noted. On the current survey 93.9% of the respondents disagreed with the statement "Orthodontic treatment can prevent the onset of TMD", against 77% of the respondents in the original survey. This topic has been extensively investigated, and despite the fact most of the publications support that Orthodontic treatment is not able to prevent TMD (23-27), some papers support the opposite (28, 29). Most of the papers that stated that orthodontic treatment does not prevent TMD were published after 1990, and this might explain why the current survey shows a higher percentage of respondents who disagreed with the above-mentioned statement.

The two items related with surgical approach in TMD reached consensus on the original and current surveys. However, on the current survey, for both items the percentages of consensus were significantly different from the original survey. On the current survey 93.9% disagreed with the statement "arthroscopic surgery is almost completely effective in repositioning the disk in patients with internal derangements", and 96.7% disagreed with the statement "an extensive history of previous treatment failures in a TMD patient is usually an indication for surgery" while on the original survey 100% of the respondents among the group of experts disagreed with both statements. The literature regarding arthroscopic surgery success in repositioning disk (30-33), and regarding the indication for surgery in TMD patients (33, 34) is not conclusive.

The statement "Tension and stress increase jaw muscle EMG levels in susceptible patients" that 100% of the respondents agreed with in the original survey was endorsed by only 61.2% in the current survey. Several studies have investigated the relationship between stress and jaw muscle activity (35-38), and concluded that there is an increase of the masticatory muscles EMG levels when exposed to mental stress. Therefore, the responses on the original survey seemed to more accurately reflect the state of the science than the current survey's responses. It was surprising that 19 percent of the experts could neither agree nor disagree with this statement. It is possible that the neutral responses on this item stemmed from the use of the word "major," indicating some remaining

skepticism among some dentists regarding the significance of the role of stress in development of TMDs. Two other statements on the psychophysiologic domain presented statistically significant differences between the two surveys. While on the original survey 100% disagreed with the statement "the mechanism of acute and chronic pain are the same", on the current survey 96.7% opposed the same statement. The literature seems to agree that the mechanism involved in chronic pain present similarities and differences from the one in acute pain (39, 40); but the fact that the first is a consequence of the second, may explain why some respondents did not disagree with this specific statement. The other statement presenting significant difference from to the original survey to the current one is "stress management is indicated for many TMD patients". The use of stress management for patients with TMD has been proved to be an excellent treatment approach (41, 42); it is surprising that there was a decrease in agreement with this statement on the current survey when comparing to the original survey.

Several items received more than 15 percent of neutral responses. The statement with the highest neutral response was: "Chronic TMD patients should be advised to rest and limit their work and social activities when they are experiencing pain" (neutral = 29%). It is possible that on the current survey the dentists, who responded neutral, felt that this question is not related to their area of expertise. On the original survey the Psychologists' responses were used as the "expert response" for this same question.

The item, "poor quality of sleep is a major factor in the development of TMD," also received a score of neutral in more than 15 percent of cases (16.1%). Again, the relationship between pain and sleep quality in TMD patients is well documented, (43-47) but whether poor sleep is a cause or a result of TMD may have given some respondents pause.

Among the items added to the survey, one showed greater than 15 percent of neutral responses; it was related to the use of panoramic films when evaluating the TMDs. In fact, one of the two items related to this topic elicited no agreement among the experts (Table 5). The studies regarding the utility of panoramic radiographs for diagnosis or screening of TMD are mixed (48-50), and the lack of agreement among the respondents reflects these mixed findings.

A major shortcoming of the paper was the poor response rate among psychologists (15%), limiting the study only to dentists whose response rate was more acceptable at 54.8%. The authors acknowledge that the response rate being slightly over fifty four percent is also low, but it is important to consider that the current survey had 34 responses from TMD experts while the original survey used the responses from 13 TMD experts.

The current survey indicates that, despite the fragmented nature of education in the area of TMD/orofacial pain, and the different practices and philosophies of the many kinds of practitioners involved with these disorders, great consensus exists among experts about the nature and treatment of TMD/orofacial pain. Thus surveys like the one used here may provide good tests of knowledge for those studying these disorders.

Additionally, it was seen that, despite the proliferation of research and new publications about TMD, knowledge and beliefs regarding this topic have not significantly changed in the past 20 years. Further research will be needed to expand this knowledge base, and provide a common set of topics for effectively educating students in best practices for treatment of TMD/orofacial pain.

Footnote

Authors' Contribution: Study concept and design: Felipe B. Porto and Miranda E. Jennings; analysis and interpretation of data: Felipe B. Porto and Mark Litt; drafting of the manuscript: Felipe B. Porto, Hisham Rifaey, Mark Litt and Susan Reisine; critical revision of the manuscript for important intellectual content: all authors; statistical analysis, Felipe B. Porto and Mark Litt.

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