

# On the Management of Temporomandibular Disorders: A Plea for a Low-Tech, High-Prudence Therapeutic Approach

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**T**herapeutic efficacy for temporomandibular disorders (TMD) has been defined almost exclusively in terms of symptom relief. This is because symptom management has dominated treatment focus and has precluded necessary emphasis on disease-specific parameters and generic outcome measures. Consequently the scientifically based options for assessing and determining treatment outcomes beyond the relief of pain remain in an early state of development. This fact limits the scientific validity of the conclusions drawn from published reports dealing with disease-specific measures other than pain.

As clinical educators and practitioners we have had to recognize our profession's limitations when dealing with patients with TMD. For example, a huge gap exists between those scenarios studied in randomized clinical trials (RCTs) and actual clinical problems. Furthermore, there are no formal rules to test the validity of the extrapolation of findings from one condition to another. Our literature searches and analyses yielded many uncertainties and inadequate data, as well as an overall paucity of rigorously documented scientific information. Given this predicament, we sought to propose a conceptual framework that articulated a concern for patient safety as the overriding objective in the management of patients with TMD.

## **Many Treatments Offered, But No Cures**

Dentists and many types of care providers (eg, family physicians, neurologists, ear-nose-throat specialists, chiropractors, osteopaths, rheumatologists, physical therapists, psychologists, acupuncturists, psychiatrists) have had a long-standing commitment to providing treatment for TMD.<sup>1</sup> Since the dental professional deals with complaints that are specific to the dental practice, such as addressing patients' concerns with occlusion ("the bite"), dentists provide a unique service for this group of patients. A ranking of the therapies administered by a sample of 2,544 dentists in the United States revealed that interocclusal appliances, occlusal equilibration, thermal packs, pharmacotherapy (nonsteroidal anti-inflammatory drugs and muscle relaxants), relaxation and stress management, and diet counseling represent the most frequently offered services. Considerable variations in the ways in which common treatments are performed were also noted.<sup>2</sup>

**Key words:** benefit, risk, cost, clinical decision-making, pain, temporomandibular disorder management

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Between 65 and 95% of TMD patients who seek care for the first time are reported to improve with an array of diverse dental or non-dental therapies.<sup>3-7</sup> Variations in treatment risks and cost appear to be far greater than differences in analgesic efficacy among the therapies prescribed for TMD. There is also the impression that individual practice styles contribute more to the choice of therapy than do the patient's particular features. Each health profession seems to have its own favorite approach that is specific to the discipline but not necessarily appropriate for the condition for which treatment is sought. Irrespective of the type of treatment, most published works reporting treatment outcomes do not employ standardized or validated measures, and the study design does not include any controls. In the absence of information on what happened to controls, the question of whether the improvement might have occurred anyway remains unanswered. Symptoms undergo fluctuations in intensity that can be incorrectly attributed to the effect of treatment. Since expectations of benefit are attached to participation in research, uncontrolled reports on short-term treatment interventions cannot be regarded as a reliable indication of treatment efficacy.

Regrettably, cited claims for treatment of TMD, no matter how sophisticated, do not provide a "cure." Cure assumes knowledge of the causal processes and the availability of biotechnologies that interfere with causal mechanisms. If the TMD persists, multiple interventions may be useful for clinical management, including patient education and physical and occupational therapies. Some of the medical technologies that are employed in the more complex case histories clearly fall beyond the scope of general dentistry. In these situations, coordination of management with the primary care physician becomes a necessity. In addition, with health care being administered increasingly often by large health care organizations, linking, managing, or coordinating services will become more the rule than the exception. This trend will in all likelihood include the dentist as well.

### **A Heterogeneous Population with Different Temporomandibular Disorders and Shared Symptoms**

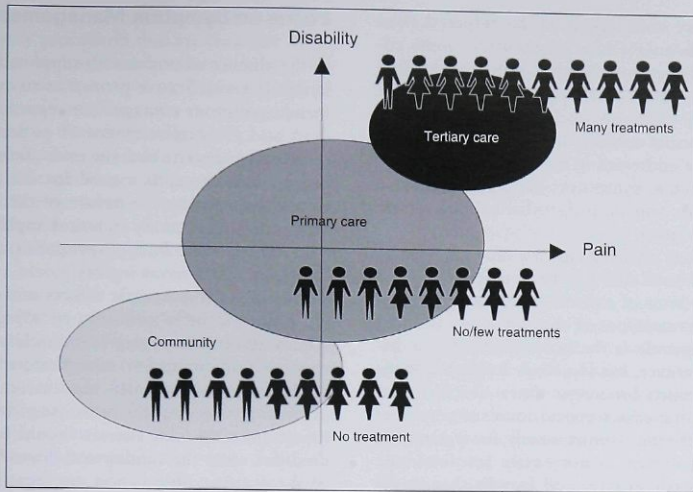
Therapeutic reasoning must start with a good problem description that includes useful detail. Information is valid and usable if it facilitates the elimination of therapeutic options during the search for the most promising care choices for a

given patient. Multi-axial diagnostic assessment, as proposed by the Research Diagnostic Criteria for TMD (RDC/TMD),<sup>8</sup> provides the clinician and patient with an understanding of case complexity and scope of treatment. Multi-axial assessment must be especially useful to the inexperienced clinician in helping to identify patient care needs that are greater than what can be handled in a given setting. On the other hand, overly ambitious data-gathering that provides no valid information for narrowing down treatment options appears to serve no useful purpose.

Diagnosis of the TMD is based on positive findings rather than on extensive investigations to exclude other disorders. The absence of specific biomarkers for the different TMD underscores the merits of the symptom-based criteria diagnoses. This approach encourages diagnosis of a TMD through history-taking, as well as through standardized clinical examination of patients. What Dworkin and LeResche<sup>8</sup> proposed logically eclipses the well-intentioned, however simplistic, temporomandibular joint (TMJ) dysfunction indices of the past.

In retrospect, the demise of the so-called Dysfunction Index is not surprising, since its determinants were never scientifically validated. Dysfunction, like the term "malocclusion," had inadvertently become an easy yet erroneous label for a very wide spectrum of frequently encountered morphologic occlusal variations in both patient and non-patient population groups. Regrettably, the impact of normative data on such a spectrum was not seriously questioned. As a result, many non-patients were incorrectly diagnosed as treatment-needing patients because of their TMJ dysfunctions—or for that matter for their malocclusions. The RDC/TMD constitutes a useful diagnostic scaffolding, which lends itself to the co-opting of "red flags" that could suggest alternative or coexisting diagnoses. These include chronic/persistent pain and/or psychosocial indicators of difficulties in coping with the TMD in question.

There is no "one-size-fits-all" approach to the management of the TMD or any of its physically defined subsets involving muscles or joints. Most people with TMD have relatively mild forms, while a minority endure more persistent and even debilitating pain. Unlike tertiary care patients, primary care individuals are more likely to exhibit a condition that tends to flare and then abate.<sup>9</sup> They are also less likely to experience significant limitation in activities, although some activity limitations resulting from TMD tend to be present in all



**Fig 1** Women comprise the majority of TMD patients who seek primary care. Both patient- and professional-mediated perceptions of the disorders that accompany pain and disability impact upon selected management strategies. These include options for little or no treatment. Tertiary care recipients who present with a similar set of physical symptoms are predominantly female. However, the severity and time-dependence of symptoms differ, and the diverse available treatments are not readily reconcilable with disease-specific parameters or generic outcomes.

clinical situations. While the overwhelming majority of patients encountered in primary care settings appear to improve with a wide array of treatments, the remaining ones are impacted by the condition for longer times, with resultant lifestyle and livelihood sequelae. In tertiary care settings, such as academic research centers, patient pools include an overwhelming number of patients who exhibit a persistent condition that was not satisfactorily controlled by, often, more than 1 attempt.<sup>1</sup> Although physical symptoms, such as limitation of range of motion and joint noises, appear to be comparable between cases in primary and tertiary care settings, differences with respect to severity, persistence, and impact exist between these patient populations (Fig 1).

Until recently, available and inadequate taxonomies, which focused on physical attributes, did not capture those critical features that have a bearing on the scope of treatment. Consequently, a significant portion of the dental workforce has not appreciated the heterogeneity of patient case histories and their significance for care. Pain is not just

pain, limitation of mouth opening can have different reasons, and the impact of the condition on mood and life in general can vary from subject to subject. Pain can occur in the form of attacks, or it can have a constant, unrelenting component with occasional bouts of breakthrough pain. On the other hand, bouts of pain may or may not be related to specific incidents. Unfortunately, epidemiologic data have not yet determined whether any of these attributes indicate greater risk. Consequently, clinical trials do not acknowledge these distinguishing attributes in examining treatment efficacy.

Bodily involvement is subject to variation as well. Some patients minimize or conceal ailments, and others describe symptoms freely and in great detail. Symptoms, most notably pain, can be unilateral or bilateral and can even spread beyond their primary facial location. In fact, tertiary care patients exhibit comorbid conditions in body parts other than the face much more often than their condition is limited to the face.<sup>10</sup> This should not come as a surprise, since patients with more than 1

condition are more likely to be referred than patients with only 1 condition. While some comorbid conditions may be trivial, other comorbid ailments may have a major impact on the patient's total severity of illness, including physical functioning and social connectedness. The latter conditions must be addressed in the treatment plan and include systemic symptoms such as depressive mood, fatigue, and sleep disturbance, in addition to widespread pain.

Most clinical presentations are characterized as benign conditions that can be compared to mild headache in terms of treatment strategy and need. Spontaneous remissions of symptoms are believed to occur frequently in the first months after a disorder's appearance, but less likely to happen if the condition persists for longer times. On the other hand, the worst-case scenario involves persistent pain and suffering. Unfortunately for patients in whom the problem is not easily resolved, the underlying pathogenesis and factors that might indicate increased risk for pain persistence and severe disability are unclear, and although treatment over longer periods is required, clinical trials typically focus on the short-term efficacy of applicable therapies. Therefore, data on the population with the greatest treatment need are scarce. Devastating complications linked to adverse treatment effects may further compound the problem and amplify the already existing management complexity. The health care service careers of these unfortunate patients indicate increased need for services as the severity of the condition worsens. Good data on this sub-sample of patients, who have both the greatest need and the greatest demand, are seriously deficient in support of clinical decision-making. Consequently, the next step in the quest for symptom relief is shaped by the skills, experience, and intuition of the provider. Evidence-based standards simply do not exist.

In view of the heterogeneity of TMD cases, it becomes clear that a "one-size-fits-all" approach that is solely based on crude descriptions of physical features, such as the "classical TMD triad" (tenderness, limited range of motion, and joint sounds), is very risky. There is the realization that future trial designs will have to be sensitive to issues of case complexity, including the presence of comorbid conditions. Comorbidities have not been subject to research in any sufficient detail and are expected to influence generic outcome assessments, such as quality of life or disability measures, and the extent to which intense pain in areas other than the primary region of interest affects local pain scores has also not been determined.

## Focus on Symptom Management

In the absence of evidence to support disease-modifying or even curative properties of current treatments, symptom management represents the prudent and essential element of patient care. We therefore emphasize that the *unavailability* of compelling data demands a need for the utmost caution in overstating the nature of the offered service, irrespective of its technical sophistication. A plea for a low-tech, high-prudence approach to managing TMD seems logical.

Traditional therapeutic efforts aim at reducing (1) pain, (2) inflammation, or (3) psychologic effects and/or increasing (4) muscle strength, (5) range of motion, and (6) bite comfort. Elimination of TMJ clicking has also been a treatment goal. However, therapeutic reasoning that involves information on joint sounds should be viewed as doubtful, since the validity and disease implication of the acoustic observation are regarded as questionable in the first place.<sup>11</sup> Since the pathogenesis of symptoms and signs are interlinked, ie, pain causes reduction in range of motion, bite strength, and/or bite comfort,<sup>12</sup> treatment effects are not limited to their primary symptomatic target.

With treatments targeting individual symptoms, and with symptomatic outcome assessments having been validated only for the symptom of pain, it is not surprising that the primary outcome variable in most TMD trials is centered on the patient's appraisal of pain and pain intensity rating, in addition to the effects of pain on the patient's life, such as the capacity to perform the activities of daily life, or health-related quality of life. Other disease-specific symptomatic outcomes have occasionally been subject to reporting; however, insufficient consideration has often been given to issues of measurement validity. Although treatments are assumed to be similarly effective in both men and women, there is no study that has examined this question in an appropriate manner.

The major difficulty for the clinician lies in the selection from a wide range of choices of the "appropriate" treatment for a given patient. If the clinician is competent to offer all types of treatment equally well, the question on how a particular selection is made deserves consideration. Clearly, upon reaching this point, the practitioner is no longer supported by a trained process that helps him or her reach the best solution from among the available choices. We all know that the choices are significant and consist of patient education, self-care, pharmacotherapy, dental-occlusal treatment, physical therapy, cognitive and behavioral

intervention, alternative medicine, and surgery. In addition, many procedures that are distinctly different fall under each of these headings. In case the provider is versed in only 1 or 2 procedures, the problem is simplified. The patient simply gets what the provider does most frequently.

Quite regrettably, available practice guidelines avoid the challenge of providing a construct that would facilitate the selection process; instead, it is left up to the clinician to choose 1 or more treatments, "depending on the need of the patient."<sup>13</sup> If the provider places safety concerns first, he or she can, without too much difficulty, reach a decision regarding what is considered appropriate, and other professionals are likely to regard the solution as a wise choice. On the other hand, if the emphasis focuses on efficacy, therapeutic reasoning will not go very far, since no single treatment has been shown to be superior to another, whether in a primary or tertiary care setting.

## Guiding Principles

Ours is a lingering impression that early and milder TMD may be vulnerable to overtreatment, while the current means to manage patients with chronic, disabling TMD leave much to be desired. Given the preponderance of mild forms of TMD, a low-tech approach seems to be appropriate for most people. In fact, for mild cases, there is no evidence that therapy of any kind prevents the progression of the disease. The rationale to escalate care from simple to complex treatments in patients with unmet expectations is indeed questionable, because the superiority of invasive procedures over conservative therapies has not been demonstrated by any kind of systematic research.

The treatment of pain is clearly imperfect. Helping a patient to cope with reality until appropriate technology becomes available seems better than unwarranted risk-taking. For those patients with severe symptoms, a decision to perform surgery should not be determined by the availability of the service or by the persistence of unrealistic demands. No compelling data have been presented with respect to any kind of treatment possessing either disease-modifying or even curative properties.

Given the range of observable symptom severity, extent of disease involvement, and personal matters including alterations of mood, it should be obvious that treatment decisions need to be tailored to an individual rather than an entire population with a particular diagnostic label, for which

a "one-size-fits-all" approach is recommended. Apart from immediate physical and psychologic case parameters, beliefs, values, and preferences must be considered in the selection of a patient-specific approach. Unfortunately, current guidelines do not consider the role of patients' preferences but leave it up to the provider to gain the necessary information in informal discussions with the patient.

Clinical researchers practicing in academic health care centers tend to have a greater exposure to persistent and severe TMD. They have come to understand that there is a kind of "malignant" pain in these patients that differs from terminal pain. In such situations of suffering, analyses of benefit and risk become highly individual and difficult to rationalize on scientific grounds. In fact, science often takes a step backward, behind compassion, in such situations. Judgment must complement and supplement structured therapeutic decision-making. Many clinicians question the validity of data from RCTs that were performed on patients with distinctly different features. In this respect, we need to remind ourselves that a chronic pain patient experiences chronic pain because none of the offered treatments provided a satisfactory outcome. If this is translated into the framework of RCTs, we find ourselves looking at a patient who repeatedly received the "active ingredient" but did not respond favorably to any therapy.

Patients' explanations for persistent pain range from biologic to supernatural causes (ie, divine vengeance). Many patients appreciate simple, mechanical explanations that make intuitive sense but contradict the response characteristics of biologic systems. Moreover, since religion, ethnicity, and race influence beliefs, an understanding of the psychosocial dimension of illness becomes essential to case management. Unrealistic expectations about a quick cure, along with positive illusions versus acceptance of painful realities, seem to influence the provider's action (certainly our own) to a greater extent than any physical finding. Since TMD may be an invisible disorder for many sufferers, it fosters ambiguities and has the potential disadvantage of inducing stigma.

Randomized clinical trials, including appropriate case selection based on sound inclusion and exclusion criteria to achieve uniformity, random allocation to adjust for confounding variables, double-blind treatments to eliminate bias, sufficient power to permit valid generalization, and appropriate handling of missing data, have become the standard for documenting therapeutic efficacy.

While some of the newer data are applicable to primary care, the clinical scenarios addressed in such trials have little in common with the "real-world" phenomena encountered in tertiary care, in which long-term application involving flexible dosages, often in combination with other treatments, is more the rule than the exception. Guidelines that suggest that treatments be combined depending on the needs of patients, however, fall short of providing the underlying framework for choosing treatments that should be offered concurrently.

Questions regarding the benefit of repeating old solutions (a situation often encountered in the management of persistent, disabling pain) cannot be readily answered, since data are simply not available. Furthermore, therapeutic reasoning is difficult to apply for those patients who most need it, due to a shortage of data. Difficulties are also encountered when the current literature is used to derive solutions to new problems. When faced with complications, the clinician does not have easy access to data on explanations of failure or applicable repair strategies.

Two compelling realities underscore our convictions about the significance of a prudent, low-tech management of TMD. The first is that the etiology and pathophysiology of the disorders are poorly understood, although episodes of macro-trauma or recurrent micro-trauma, along with hormonal factors, may play a role. Furthermore, neither dental nor psychologic factors per se have been shown to cause TMD, although they can be associated with the onset of symptoms. The second reality recognizes the collective clinical experience that most patients with TMD can be efficaciously managed at a primary care level. This is quite similar to the predicament of most patients with other types of musculoskeletal disorders. Therefore a stepwise, patient-centered approach to management, based on symptom severity, is advocated in these proceedings by Zarb and Carlsson.<sup>14</sup> This approach recognizes that symptoms of TMD may wax and wane over time or else disappear. Above all, it addresses the need to encourage each patient to discuss his or her function, ideas, fears, and expectations in relation to the symptoms experienced. Patient reassurance about the frequently innocuous nature of TMD should be an integral part of the message given to patients. The signs and symptoms of most TMD are very rarely a cause for concern since their outcome is unlikely to compromise life quality. Most patients respond favorably to minor interventions such as explanation, advice, reassurance, and short-term drug treatment.

When clinical academicians call for a low-tech approach to the treatment of TMD in the primary care setting, they merely express concern that high-tech or radical treatments have not been shown to be superior to a low-tech approach. Radical approaches can cause significant adverse effects for which solutions are also not readily available (ie, failed TMJ implants<sup>15</sup>). In such cases, the condition for which treatment was sought continues to be an issue, with the net effect that the patient is overall in a worse condition than before treatment was initiated. New problems have now been caused to add to existing ones. The call to always consider—and if possible employ—low-tech treatment should be viewed as a sensible solution to address the identified problem with the expectation that, upon deployment of the solution, the number of iatrogenic complications will be reduced. Studying failed low-tech treatment approaches must be particularly promising for improved understanding of the mechanisms that contribute to debilitating persistent pain. However, disease progression, even on a long-term basis, in patients who are given low-tech care is an unlikely scenario.<sup>3,5,16</sup>

It is therefore prudent and safe to conclude that a low-tech approach to TMD is in order in the primary care setting. If the problem persists, priority in treatment decisions should be given to safety concerns, given the likelihood that treatment will need to be offered for long periods of time. Although the literature provides information on the relative efficacy of treatments for acute disease, no single treatment has been shown to exhibit superior efficacy in long-term trials. On the other hand, treatments vary significantly with respect to risk. Consequently, the decision of what is best for the patient is more an issue of minimizing risk than maximizing analgesic efficacy.

## Conclusions: Challenges Ahead

Patient organizations increasingly express their uneasiness with the lack of standards of care and professional or societal responsiveness to the care needs of their constituents. Disagreement in the dental community with respect to what constitutes appropriate treatment tends to fuel an already tense discussion. There is always a provider who is willing to offer more aggressive steps and who will be regarded as the only person who cares. Unfortunately, the absence of data limits the development of sound restrictive policy, as exemplified by the summary statements of the recent TMD

Technology Assessment Conference convened by United States government agencies.<sup>17</sup> The TMD are not alone among chronic care needs that are poorly served, in the medical model, in which a mixture of acute and chronic care services are offered. While maximizing efficacy represents the guiding principle in the treatment of acute conditions, a caring and safe approach is necessary if long-term treatment is required.

Society views the patient as the chief decision-maker and expects the professional to abide by the patient's wishes. Consequently, patients want to know more about their care and show increased willingness to participate in the decision-making. The challenge faced by the practitioner consists of keeping professional biases out of the discussion while presenting a truthful picture in a form that the patient can understand. Clinicians are expected to furnish information as to risks, benefits, and alternatives. Although most patients have a high desire for information, patient involvement in decision-making varies substantially.<sup>18</sup> In general, as patients experience treatment failure and complications, they make an effort to become more educated and develop increasing expectations for care and the clinician.

We are in the midst of an age of information explosion. Health information is globally available in printed and electronic form. By accessing the World Wide Web, patients can obtain data on any medical technology, including safety, efficacy, feasibility, and indications for use. As medical biotechnologies continue to change and evolve, situations are foreseeable in which the patient's information on case-specific matters may outstrip the knowledge of the provider, particularly with respect to breakthrough discoveries and technologies. This represents a new challenge for the professional that is difficult to face in a field in which answers are far from being clear-cut.

The development of the RDC/TMD has helped define the most frequently encountered TMD. However, much confusion still exists, as reflected in the apparent reluctance to abandon dearly held dogmas on dental occlusion as a primary focus for disease etiology and treatment.<sup>19</sup> Clearly, clinical investigators face major challenges as they seek to improve both our understanding of TMD and develop and validate appropriate outcome measures to assess treatment efficacy at all levels of care. In the meantime, all health professionals who seek to manage such affected patients must recognize the time-dependent and relapsing but benign nature of most TMD encountered in primary care settings.

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