

Temporomandibular Disorders in Children

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In 1982 the president of the American Dental Association convened a conference designed to address the etiology, diagnosis, and treatment of temporomandibular joint problems¹. The term temporomandibular (TM) disorders was adopted at that meeting to describe all disorders related to function of the masticatory structures. The emphasis of the meeting was on the adult patient, not the child. To this date there has been no such meeting designed to address these problems in children. The purpose of this paper is to review the scientific literature concerning TM disorders in children. In many areas the pediatric dental literature is scanty and it is tempting to extrapolate information from adult studies. Although some conditions are similar, differences do exist. One of the most obvious differences is in the area of craniofacial growth and development; when treatment plans are developed for the growing child these differences must be considered. Another apparent difference relates to the child's increased ability to tolerate change in the masticatory structures. Abrupt occlusal alterations (i.e., a high stainless steel crown) often seem to go almost unnoticed by a child where as an adult with smaller changes seems to encounter much more difficulty. Although this phenomenon is regularly seen clinically it has not been scientifically documented or explained.

In order to understand TM disorders in children the following three questions must be addressed:

1. Are TM disorders a problem in children?
2. How are TM disorders treated in children?
3. Can early treatment prevent TM disorders?

To answer these questions, a review of the scientific literature related to pediatric dentistry is presented.

1. Are TM Disorders a Problem in Children?

A review of the scientific literature reveals a significant number of epidemiologic studies of the child and young adolescent²⁻²⁶. Although several of these studies include the 5-7 year old (primary dentition), most report on the young adolescent (10-

18 year old). These studies give insight to the prevalence of signs and symptoms of TM disorders. Most studies place the findings into one of two categories, symptoms or signs. Symptoms are conditions reported by the subjects during the evaluation. Signs are conditions that are identified during an examination of the subject.

Symptoms:

In most studies the presence of symptoms was determined by questioning the subjects for common complaints associated with TM disorders. The most common questions asked were:

- Is it painful to open your mouth?
- Is it painful to chew?
- Do you have or hear TMJ sounds?
- Are you aware that you clench or grind your teeth?
- Do you have frequent headaches?

Signs:

Subjects in each study were examined for common signs that are associated with TM disorders such as muscle tenderness, TM joint tenderness, TM joint sounds, and limited range of mandibular movement. In many studies the occlusal conditions was also reported.

Table 1 shows the percentage in seven studies of self-reported symptoms and identified signs according to age. These studies suggest that the percentage of TM disorder-related symptoms and signs is quite high in

TABLE 1. Signs and Symptoms of TM Disorders in Children

Study	Number of Subjects	Age	Self-Reported Symptoms	Signs
Williamson ²	304	6-16	---	35%
Nilner et al. ³	440	7-14	36%	64%
Nilner ⁴	309	15-18	41%	55%
Grossfeld et al. ⁶	250	6-8	---	56% (Signs & Symptoms)
	250	13-15	---	67% (Signs & Symptoms)
Grossfeld et al. ⁵	400	15-18	---	68% (Signs & Symptoms)
	400	19-22	---	67% (Signs & Symptoms)
Egermark-Eriksson ¹¹	136	7	39%	33%
	131	11	67%	46%
	135	15	74%	61%
Wanman et al. ^{14,15}	285	17	20%	22%

children. It is interesting to note that the incidence of signs and symptoms generally increase with age, and that these studies reveal a large degree of variation in findings.

These studies and others^{7-10,12,13,16-26} suggest that the prevalence of symptoms related to TM disorders is between 20 and 74%, while the prevalence of signs is between 22 and 68%. Many clinicians would question both the high percentages and the great variation in findings for signs and symptoms.

In order to better understand the significance of these findings one must look closer at the signs and symptoms examined. An important question to ask is whether or not the reported findings are true indicators of health or disease in the masticatory structures. For example, are frequent headaches always indicative of TM disorders? Another factor to consider is the method by which levels of muscle hyperactivity (bruxism) is assessed. In these studies a common question asked was: Do you clench or grind your teeth? Clenching or grinding usually occurs when the child is asleep and therefore subjects frequently have no awareness of the activity. Pullinger et al.²⁷ showed that there is a very poor correlation in young adults between awareness of tooth grinding and significant tooth wear. A similar problem exists when subjects are asked to report the presence of joint sounds. Riolo et al.²⁸ showed, in a population of 6 to 19 year olds, that there is a very poor correlation between the subjects' report of TMJ sounds and the identification of sounds during a TMJ examination. They also reported that there was very poor correlation between what the subject reported and what was identified during an examination, even when patients were questioned about pain and range of movement. After reviewing these studies one must question whether this high percentage of reported symptoms is indicative of a high incidence of TM disorders.

As with symptoms, the percentage of signs reported by these studies must be looked at carefully. For example, it has been demonstrated that different techniques for recording joint sounds will reveal different findings even in the same patients²⁹. Also, reliability between examiners is not always dependable³⁰. All these variables must be considered when assessing the significance of reported TM joint sounds.

In summary, it appears that the signs and symptoms of TM disorders are quite common in the young population. It is interesting to note that few children complain of such problems. Perhaps these high percentages are not really a measurement of true masticatory dysfunction in the young population. It has been estimated that 10% of the adult population has some difficulty with masticatory function while only 5% actually seek

treatment³¹. It is the author's opinion that these percentages are even less in children.

2. How Are TM Disorders Treated in Children?

Although various articles and textbooks address the treatment of TM disorders in children, little scientific data is available to support the need or effectiveness of these treatments. Well-controlled studies have not been published. In one of the few studies that examines these problems, Ingerslev³² describes the treatment of 366 children with various signs and symptoms of TM disorders. Although the study contains a significant number of patients, it is not well-controlled for diagnosis or treatment. The study suggests that conservative, reversible treatments are effective in managing most TM disorders in children. Ingerslev reports that after 6 months, 57% of the children were free of signs and symptoms while 34% were free of symptoms but continued to have some mild signs. Only 9% of the children were unchanged after 6 months of conservative therapy.

In the absence of well-controlled studies for the treatment of TM disorders in children one tends to extrapolate from adult studies. A review of long-term treatment for TM disorders in adults³³ suggests that conservative, reversible therapy is effective for about 80% of the patients. These results appear to be in accord with Ingerslev's study in children.

In summary, it would appear that most TM disorders in children can be managed effectively by relatively conservative and reversible therapies. Treatments such as mild physical therapy (i.e., heat, massage) mild analgesics and occlusal appliances are appropriate. The most appropriate occlusal appliances are not intended to permanently alter the patient's occlusal condition. Instead, flat plane appliances are likely to improve muscle function, therefore reducing muscle pain. One must appreciate, however, that an occlusal appliance, especially one made of hard acrylic, which is maintained over a long period of time could restrict arch growth. It would seem appropriate, therefore, to limit occlusal appliance therapy to no more than 2 months. It is the author's opinion that most children respond quickly to therapy and elimination of the occlusal appliance is usually possible in four to six weeks.

There is certainly a need for well-controlled studies that evaluate treatment of TM disorders in children. It is important that these studies evaluate treatment and are controlled for diagnosis. Most TM disorders in children can be separated in one of two major categories: masticatory muscle disorders and disc-interference disorders (internal derangements). It is likely that the etiology and treatments are different, and therefore these disorders need to be studied separately.

3. Can Early Treatment Prevent TM Disorders?

At this time there are no scientific studies that suggest TM disorders can be prevented. Although some clinicians and authors suggest that early treatment of a child with certain occlusal conditions will decrease the likelihood of TM disorders as an adult, no documentation is available. Long-term studies in this area are needed.

When one considers the concept of preventing a disorder, control of etiologic factors is paramount. Prevention of TM disorders must include the control of etiologies considered to be responsible for the disorder. It is generally accepted that TM disorders have a multifactorial etiology¹. One of these factors (the significance of which is highly debated) is the occlusal condition. Some clinicians suggest that occlusal conditions such as deep bites, cross bites, and dual bites are predisposing factors that lead to TM disorders. If the occlusal condition were the only etiology, then therapy to correct the problem could be expected to decrease the likelihood of future TM disorders. Unfortunately, other etiologies such as trauma, emotional stress, bruxism, and certain systemic conditions may be responsible for the development of a TM disorder. This suggests that even if a child's occlusal condition were improved, a TM disorder may still develop unless all other etiologic factors were controlled. Here lies the dental profession's problem. Is it reasonable to expect a dentist to control all etiologic factors and therefore predictably prevent TM disorders? Can a dentist control factors such as trauma, emotional stress, systemic conditions, and bruxism? This author believes that this is an impossible task.

Taking a different posture, however, one might say that if certain occlusal conditions do lead to TM disorders, than early correction of those conditions would certainly be indicated to decrease the likelihood of future disorders. Some studies^{2,6,7,11,12,16-19,34} do suggest that certain occlusal conditions are significantly correlated with certain signs and symptoms of TM disorders. Still other studies^{8,24,25,35-38} reveal no significant correlation. In the studies that do suggest a positive relationship between occlusion and TM disorders the type of occlusal condition is not consistently reported. If the relationship between occlusion and TM disorders was a simple cause and effect one would expect to see consistently reported positive (or negative) findings. In the seventeen studies reported here, little consistency is noted. These results depict the complicity of the problem and only add to the difficulty in discussing prevention.

It is this author's opinion that certain occlusal conditions might very well represent predisposing factors for certain TM disorders. A unilateral cross-bite created by

a lateral functional shift is one such condition. It would appear that in such a condition the condyle on the side to which the jaw shifts might be forced posterior to its stable relationship with the articular disc and fossa³⁹. Such a condition might lead to condyle/disc dysfunction. It would appear, therefore, that early correction of such a condition would decrease the likelihood of future TM disorders. As logical as this appears, we must remember that there is no scientific documentation to support this theory. Therefore, treatment is based solely on empirical clinical judgment. Well-controlled longitudinal studies are greatly needed to test such clinical guesses.

Presently, some clinicians are providing treatment for malocclusions in the primary and mixed dentition in the name of prevention. These treatments are based solely on clinical judgment and not scientific data. Not only does the dental profession have a responsibility to investigate the effectiveness of these treatments but also to look at the converse question; Does early treatment cause TM disorders? This question is as legitimate as the first.

It is the author's opinion that in the absence of scientific data, the clinician should maintain a conservative posture. It is hopeful that a conservative approach will minimize abuse of our patients. It should be noted that we can abuse our patients not only with unnecessary alteration of tissue structures but also by charging inappropriate or unnecessary fees.

Summary

1. Are TM disorders a problem for children?

There is a high prevalence of signs and symptoms (20-74%) reported in the literature. This percentage seems to increase with age and is similar to the adult population. One must question whether this high percentage of signs and symptoms is a true indication of masticatory dysfunction. It does not appear that many children complain or seek treatment for TM disorders.

2. How are TM disorders treated in children?

It appears that short-term reversible therapy is adequate to resolve most symptoms of TM disorders in most children. Certainly studies are needed to confirm these findings. Studies that evaluate the effectiveness of treatments need to be controlled for each specific diagnosis (i.e., masticatory muscle disorders versus disc-interference disorders).

3. Can early treatment prevent TM disorders?

At this time there is no scientific documentation that early correction of malocclusion will prevent TM disorders. Well-controlled longitudinal studies are desperately needed in this area.

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Standards for temporomandibular evaluation in the pediatric patient

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As part of the overall dentofacial evaluation of every patient, the pediatric dentist should be aware of significant signs and symptoms of temporomandibular dysfunction (TMD). The history and examination should include specific elements which will aid in determining whether the child's masticatory system is functioning normally.

History

As in all aspects of the clinical sciences, the history plays an essential role in diagnosing TMD. The history form for the pediatric patient should include such questions as:

1. Does your child report any pain during chewing or while opening the mouth wide?
2. Does your child report any discomfort in the jaws upon awakening?
3. Does your child complain of headaches?
4. Is there a history of trauma to the jaws or neck region?
5. Is there a history of allergies?
6. Does your child's jaw "click" or lock upon opening?

If the response to any of these questions is positive, further investigation is necessary. If there is a history of jaw pain or headaches, it is important to determine when the pain manifests. Is it most commonly in the morning, after eating, or after school? Is it associated with allergic symptomatology or periods of stress, e.g., school exams, social or sporting events, etc. Does the child eat a balanced diet? The answers to these questions may help sort out psychological problems, allergic responses, and nutritional imbalances from true TMD.

Care must be exercised in reviewing the history so that the parent or child is not "led" to answer a question in a manner that pleases the doctor. For example, "Your jaw hurts sometimes in the morning, doesn't it?" has a far different connotation than "Does your jaw ever hurt in the morning?"

If there is a history of joint sounds, inquiries should be made about sleeping posture, since this can be an influencing factor in joint dysfunction.