Temporomandibular disorders in Turkish children with mixed and primary dentition: prevalence of signs and symptoms

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SUMMARY: Muhtaroğulları M, Demirel F, Saygılı G. Temporomandibular disorders in Turkish children with mixed and primary dentition: prevalence of signs and symptoms Turk J Pediatr 2004; 46: 159-163.

The prevalence of signs and symptoms related to TM (temporomandibular) disorders was examined in 40 children with primary dentition and in 40 children with mixed dentition. The purpose of this study was to evaluate the relationship between dentition and TM disorders in the examined population. Maximum mouth opening was also evaluated. Clinical examination was done by one investigator. A questionnaire was used in combination with the clinical examination.

The results showed that there was an increase in signs and symptoms from the primary to the mixed dentition group, but only the joint sounds were found significantly different between the two groups. There was no statistically significant difference in maximum mouth opening capacity between the groups.

Key words: temporomandibular joint, permanent dentition, mixed dentition.

Temporomandibular joint (TMJ) dysfunction has been generally presumed to be a condition affecting only adults; however, many studies have reported incidence of signs and symptoms in children as high as that seen in adults[1-7].

Study of TMJ dysfunction in children could be important in determining whether early problems predispose patients to craniofacial growth abnormalities, TMJ-related pain, or mandibular dysfunction in adulthood[8].

Surveys have shown that TMJ dysfunction may produce no symptoms in young children[2]. Symptomatic cases may be misdiagnosed as headache or otalgia by the pediatrician or otolaryngologist[9-12].

The age of onset and the prevalence of TMJ dysfunction in the pediatric population are unknown. Intracapsular dysfunction appearing as joint noises such as clicking, popping or crepitus may be perceived as normal by the young patient or parents[8].

Bernal and Tsamtsouris[13] found 21.2% of children with one or more signs in their study. De Vis et al.[14] in an epidemiological survey of functional conditions of the masticatory system in Belgian children aged three to six years found that dysfunction occurred only in 3.5% of the sample. Some studies on children and adolescents reported a TMJ dysfunction prevalence varying between 6%-68%[15-16].

According to a study by Okeson[6], prevalence of signs related to TMJ disorders in children ranges from 22% to 68%. The American Academy of Pediatric Dentistry reported only 7% of TMJ disorders in children younger than 10 years old[17].

The purpose of this study was to evaluate the prevalence of signs and symptoms related to TMJ disorders in mixed and primary dentition in Turkish children.

Materials and Methods

Forty children with primary dentition and 40 children with mixed dentition, aged between 4 and 13 years, were selected randomly from patients who visited the Pediatric Dental Clinic at Hacettepe University Faculty of Dentistry. The study group was a population of average socioeconomic status and a rather homogeneous group. A self-report questionnaire was completed by all subjects or their parents to the clinical examination. Signs investigated during the clinical examination included maximal mandibular opening capacity, joint noises, deviation and

deflection of mandibula during opening and closing, tenderness of the TMJ s and masticatory muscles, headache and pain in TMJ area.

All clinical examinations were carried out by one dentist. Children with a history of rheumatoid arthritis, psoriatic arthritis or muscle diseases and children who had received orthodontic treatment were excluded from the study.

Examination of TM disorders included the following seven aspects:

I) Examination of TMJ sounds (clicking, popping and crepitus) was done using a stethoscope over the TMJ area and by having the patient open and close the mouth.

II) Associated muscle disorders were determined by (1) palpation of TMJ area and (2) digital palpation and functional manipulation of the masticatory muscles according to Okeson[18]. Functional manipulation of inferior lateral pterygoid muscle was done by having the patient protrude against resistance provided by the examiner (for contraction and clench the teeth (for stretching). For functional manipulation of superior lateral pterygoid muscle, the examiner had the patient clench the teeth (for contraction) and open the mouth wide (for stretching). Functional manipulation of medial pterygoid muscle was done by having the patient clench the teeth (for contraction) and open the mouth wide (for stretching). The anterior and posterior portions of the temporal muscle, and the superficial and deep portions of the masseter and sternocleidomastoid muscles were palpated.

III) Motion abilities were found by examining (1) deviation of the mandible on maximal opening, and were recorded if the midline deviated more than 2 mm during the movement; (2) deflection of more than 2 mm was recorded.

IV) TMJ tenderness was measured by the response to palpation of the lateral and posterior aspects of the condylar head.

V) The maximum opening capacity of the mouth was recorded as the distance between the incisal edges of the maxillary and mandibular central incisors. Vertical overlap was added to this measurement. A distance of less than 30 mm was regarded as restricted opening[19].

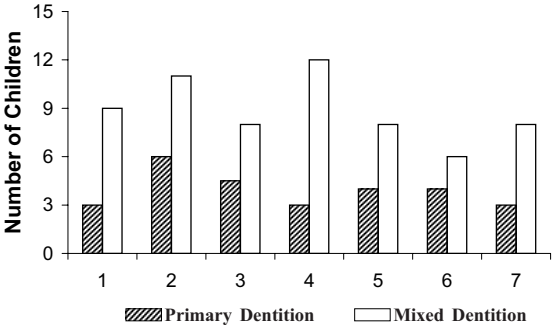
VI) Pain in the TMJ area on mandibular movement or history of spontaneous pain was recorded.

VII) Headaches reported more than once a week were included in the records. Other data were gathered directly from the children and parents through the use of a questionnaire.

Statistical analysis was carried out using chi-square and t-tests (p=0.05).

Results

The prevalence of signs and symptoms for the two groups are presented in Table I and Figure 1.



1. Pain in TMJ area
2. Headache
3. Restricted mouth opening
4. TMJ sounds
5. Deviation-deflection
6. Palpatory tenderness in TMJ
7. Masticatory muscle tenderness

TMJ: temporomandibular joint.

Fig. 1. Distribution of signs and symptoms in primary and mixed dentition groups.

Table I. Frequency (%) of Reported Symptoms in Children Surveyed

	n=40 Primary dentition		n=40 Mixed dentition			
	n	%	n	%	Chi-square	P
Pain in TJ Area	3	7.5	9	22.5	2.451	0.117
Headache	6	15.0	11	27.5	1.195	0.274
Restricted mouth opening	4	10.0	8	20.0	0.0882	0.348
TMJ sounds	3	7.5	12	30.0	5.251	0.022*
Deviation-deflection	4	10.0	8	20.0	0.882	0.348
Palpatory tenderness in TMJ	4	10.0	6	15.0	0.114	0.735
Masticatory muscle tenderness	3	7.5	8	20.0	1.686	0.134

*: Significant, p= 0.05, TMJ: Temporomandibular joint.

All signs and symptoms included in this study demonstrated an increase in prevalence from the primary to the mixed group, but the differences were not statistically significant, except for joint sounds.

A significant difference was recorded only for TMJ sounds between the two groups (p=0.022). In the primary dentition group only three subjects had TMJ sounds, while 12 subjects had TMJ sounds in the mixed dentition group.

Headache was the symptom most frequently reported followed by TMJ sounds, but reports of frequent headaches were rare. Headache was frequently reported with TMJ sounds and masticatory muscle tenderness.

The average maximum opening was 38.2 mm (range: 27 mm to 47 mm; n=40) in the primary dentition group. For the mixed dentition group, the average maximum opening was 40.7 mm (range: 23 mm and 55 mm; n=40). There was no significant difference between the two groups (t=1.455, p=0.150) (Table II).

Table II. Average Maximum Opening Capacity of Primary and Mixed Dentition Groups

	Primary dentition (n=40)	Mixed dentition (n=40)	t	P
Average Maximum Opening (mm)	38.175 (±6.1264)	40.65 (±8.8392)	-1455	0.150

In primary dentition, the prevalence of signs related to TM disorders in our samples was 25%. In the mixed dentition group, the prevalence of signs of TM disorders was 57%.

Discussion

According to cross-sectional studies, the frequency of signs and symptoms of TM disorders increases during childhood, and reaches in adolescence a prevalence level close to that found in adults[5,20-24]. Morawa and Loss[25] found that signs and symptoms of TMJ dysfunction increased with age. However, there are large variations in the frequency of occurrence of clinical TM disorder variables. The difference might be caused by differences in methodology. These studies reflect the lack of agreement in the definition of the diagnosis of TM disorders for youth. But, Nydell et al.[26] reported less variation among the studies for prevalences of eight TM disorder signs and symptoms in their review of 40 relevant epidemiologic studies.

Findings of this study are in line with those of Okeson[6], but our values are higher than those reported by De Vis et al.[14] and Bernal and Tsamtsouris[13].

Some of the studies were based on interview or questionnaires for subjective symptoms while others also included clinical examination. This study was conducted with a questionnaire in combination with a clinical examination.

In our study, incidences of pain in the TMJ area, headache, restriction in mouth opening, TMJ sounds, deviation and deflection, masticatory muscle tenderness and palpatory tenderness in the TMJ area increased in incidence from the primary dentition to the mixed dentition group. Eruption of more teeth along with growth and great changes in occlusion and TMJ may be the cause of the increase. Although some studies have found a significant relationship between occlusal factors and clinical signs of TM disorders[25,27,28], many studies have shown a lack of significance between the type of occlusal variables and signs and symptoms of TM disorders[6,17,29].

In the present study, the most frequent sign was headache. Swanson[30] indicated that prevalence of headache in childhood was high and as in adults, the etiology was usually benign. Prevalence of headache in the seven-to 15-year-old range has been estimated to be almost 60% and at least 85% in 10 to 16 years olds.

Vanderas and Papagiannousils[32] reported muscle tenderness as the most frequent sign in a sample of children aged 6-8 years. Könönen and Nyström[33] found that headache had the highest prevalence among the other subjective symptoms in finnish adolescents.

In this study TMJ sounds were recorded as clicking or crepitation. Previous studies reported clicking in children at a rate ranging from 6.8 to 65%[2,4,5,7,27,28]. This large range of results can probably be attributed to the examination methods. Different techniques for recording joint sounds reveal different findings.

This study showed very high incidence of TMJ sounds in mixed dentition, probably because of our strict clinical examination and use of

stethoscope. Nilner and Lassing[5] proposed that the rates of clicking are more evident with increasing age.

Children with an opening capacity of less than 30 mm are deemed to have restricted mouth opening according to the World Health Organization[29] criteria. In the present study four children in the primary dentition group and eight children in the mixed dentition group had restricted opening. The average maximum opening capacity was 38.1 m in the primary dentition group and 40.6 mm in the mixed dentition group. Our findings about the opening capacity are in line with those of previous studies[13,19,29,30] which revealed no statistically significant differences in either dentition group.

Some clinical signs of TM disorder, e.g. tenderness to palpation of the TMJ and masticatory muscles, usually show interobserver differences depending on the pressure applied to the tissues. Since all the groups were clinically examined by one trained observer, it is likely that comparison of the clinical signs within the group was reliable. Extraoral muscles were examined by digital palpation and others by functional manipulation. Wahlund et al.[31] in their reliability study of examination methods, indicated that reliability was good for extraoral muscles but only acceptable for intraoral muscles.

In mixed dentition, all eight patients with muscle tenderness and four of the subjects with TMJ pain showed clicking. History of injury and thumb or finger sucking habit may be related to signs and symptoms of TMJ disorder. Bruxism increased in mixed dentition, while incidence of thumb or finger sucking decreased. It is well known that bruxism is frequently associated with TM disorders[31]. Additional findings from the questionnaire showed that all of the subjects with awareness of clenching or bruxism had a least one of the symptoms: TMJ sounds, difficulty in mouth opening or masticatory muscle tenderness. The present study has indicated signs and symptoms of TM disorders at anamnestic and clinical examination, but further studies are needed to establish the etiology.

As the symptoms are common among youth, it has been recommended that a TMD evaluation should be part of the routine examination. On the other hand. Carlsson et al.[34] demonstrated that it could not be concluded whether or not the symptoms recorded in childhood (oral parafunction, tooth wear, TMJ clicking and deep bite) could be used for predicting TM disorder in adult hood.

In spite of the high frequency of signs and symptoms, there has been little need or demand for treatment of TM disorder in children and adolescents because of its mild and occasional character[2,23,24].

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