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REVIEW ARTICLE

PROXIMAL VIEW OF TEMPOROMANDIBULAR DISORDERS IN CHILDREN: A REVIEW

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ABSTRACT

Objective: To review the literature concerning prevalence, risk factors, etiology, diagnosis and treatment in children with temporomandibular disorders (TMDs).
Literature search: Research of the dental literature regarding TMDs in children was performed in Medline, PubMed, Ebsco and Google databases, including manuscripts, original articles, reviews, case reports and published thesis from 1990 to 2016. The descriptors were TMDs disorder, temporomandibular joint syndrome, temporomandibular joint disorder, prevalence studies, dysfunction, disorder, children.
Conclusions: The TMDs prevalence in children varies in the widespread literature. Caliberated and standardized methods are needed to identify the presence of TMDs in this population, allowing a better understanding of the pathological aspects in order to address more effective preventive and therapeutic procedures.

INTRODUCTION

Temporomandibular disorders (TMDs) is multifactorial broad term that embraces chronic pain conditions and dysfunction in the orofacial region affecting, the temporomandibular joints (TMJ) and their associated structures.[1]

According to the American Dental Association Americana (ADA) temporomandibular disorders (TMDs), refers to a group of disorders characterized by temporomandibular joint (TMJ) pain in the periauricular area or in the muscles of mastication, in addition to TMJ sounds during mandibular function, and deviation or restriction of mandibular movements. [2]

According to the available literature the prevalence of TMDs in infants, children, and adolescents varies considerably.[3-7] This variation could be due to differences in populations investigated, criteria used for diagnosis, methods of examination, and inter- and/or intra-examiner variations of examining practitioners.[8,9]. One study reported that the symptoms of TMDs were rare in 3-5 year old whereas the symptoms among 10 and 15 year olds were more severe proving the staircase prevalence of signs and symptoms with age.[10] TMDs affects more of adults but still its signs and symptoms are prevalent among children as well.[11,12] Studies assessing the prevalence of TMDs in survey by The Cochrane Collaboration stated that approximately 75% of the population have at least one sign of joint dysfunction (abnormal jaw movement, joint noises, tenderness on palpation etc) and around 33% have at least one symptom (facial pain, joint pain etc).[13-15] Several studies also concluded that TMDs are more prevalent in females because of the hormonal disturbances.[16] There are also the studies proving an association between TMDs symptoms and impaired general health and its negative impact on oral health related quality of life.[17,18]

The purpose of this article is to review the literature regarding prevalence, risk factors, diagnostics and treatment of TMDs in children and to find out methods for its early diagnosis and detection by which more chronic condition can be prevented through interceptive interventions.

METHOD OF LITERATURE SEARCH

A thorough computer literature search was done by using Medline, PubMed, Ebsco and Google databases, including manuscripts, original articles, reviews, case reports and published thesis from 1990 to 2016. Reports/ studies in the gray literature such as dissertation, unpublished studies were not included. The search was restricted to the studies/ reports written in English only. Keywords like TMDs disorder, temporomandibular joint syndrome, temporomandibular joint disorder, prevalence studies, dysfunction, disorder, children were used for search. Relevance of the article for inclusion into the review was assessed based on tiltle, abstract and content of the selected article. The identified studies was indirectly reviewed by two reviewers for eligibility (PA, PT).
A total number of 80 titles were reviewed for inclusion. Based on inclusion and exclusion criteria fourteen titles were dropped down and a total of 66 articles were than reviewed.

Normal Anatomy and Function

The temporomandibular joint (TMJ) is diarthromoidal joint of the condylar variety. It forms the articulation between jaw and head, bilaterally and helps man to perform certain functions like chewing, speech, etc[19,20]. Articular disc is a fibrocartilageneous structure which is present in between the condyles of TMJ and the articular fossa which acts like a cushion to absorb stress.[21]This disc divides the joint cavity into two compartments – upper and lower. The two compartments of the joint are filled with synovial fluid which provides lubrication and nutrition to the joint structures.[22,23]

The bony structures consist of the articular fossa, the articular eminence, and the condylar process.

Epidemiology

The difference in the prevalence of signs and symptoms of TMDs in children can be explained on the basis of difference in the population investigated, diagnostic criteria for evaluation and different perception of examiners. TMDs issues in children rises with age in both the sexes.

Etiology

Although its unclear, but TMJ disorders are likely to have mutlifactorial etiology. There are various predisposing, precipitating factors, and perpetuating factors that contribute to the development of TMDs.

Etiologic factors suggested as contributing to the development of TMDs are:

Macrotrauma and Microtrauma

Includes impact injuries such as trauma to the chin. Chin trauma, a common occurrence in childhood because of falling has been reported to be a factor in the development of TMDs in pediatric patients.[25,26,27]Other macrotraumatic injuries may include sports, physical abuse, forceful intubation, and third molar extraction.[28] Improper treatment of unilateral and bilateral intracapsular or subcondylar fractures can result in ankylosis and facial asymmetry.[29] Parafunnctionl habits like bruxism, clenching, hyperextension, and other repetitive habitual behaviors are thought to contribute to the development of TMDs. A study revealed 38% prevalence of bruxism in patients younger than 17 years. But the literature on the association between parafunctional habits and TMDs in children is contradictory. [30]

Anatomical factors (skeletal and occlusal)

Malocclusions found to be associated with TMDs are: [31]

- Skeletal anterior open bite & Posterior cross bite.
- Overjet greater than six to seven millimeters.
- Class III malocclusion.

Psychosocial factors

Psychosocial factors may play a part in the etiology of TMDs. Emotional stress predisposes to clenching and bruxism which in turn contribute to orofacial pain. [32]

Systemic factors

Systemic factors contributing to TMDs in paediatric patients include connective tissue diseases such as rheumatoid arthritis, systemic lupus erythematosus, juvenile idiopathic arthritis, and psoriatic arthritis. Other systemic factors include joint hypermobility, genetic susceptibility, and hormonal fluctuations. [33]

Diagnostics

According to the available literature diagnosis of TMDs are based on questions and clinical evaluation. Questions most frequently asked are about pain while mouth opening or pain during jaw movements, restricted eating (eating only from one side, referred pain in head or ear.

Clinical examination

Jaw pain, headache, limited or painful jaw movement, neck pain or stiffness, clicking or grating sound within the joint, and an inability to open the mouth comfortably are the common symptoms of TMJ disorders.[34]Examination of the TMJ should include complete, careful and precise palpation of all the surrounding structures.

There are two methods for examining the proper functioning of TMJ ie intra-auricular and extra-auricular method. In intra-auricular method examiner has to place little finger into the ear canal while the patient opens and closes the mouth. In extra-auricular method trigger points may be determined by palpation of the muscles on face specially masseter or sternocleidomastoid,[9] which is performed by placing the index finger over the TMJ, 2cm in front of the tragus. Patient should be seated in an upright position while examination to nullify the effect of gravity. An audible/palpable clicking or popping sound that occurs while mouth opening and closing indicates displacement/dislocation of the intra-articular disk of TMJ.[35]

Only in the cases of severe and chronic symptoms diagnostic testing and radiologic imaging of the TMJ is recommended.[36]

Diagnostic classification of TMJ disorder[35]

Articular disorders of the TMJ
Ankylosis
Congenital or developmental disorders Aplasia, hyperplasia, or hypoplasia of the cranial bones or mandible Neoplasia of the TMJ or associated structures
Disk derangement disorders Articular disk displacement with or without reduction
Fracture of the condylar process
Inflammatory disorders Synovitis, capsulitis, polyarthritides including the TMJ
Osteoarthritis TMJ dislocation
Masticatory muscle disorders
Local myalgia (unclassified Neoplasia)
Myofascial pain
Myofibrotic contracture
Myositis Myospasm

DISCUSSION

TMDs is a consequential that if left undiagnosed and untreated may lead to condition that may to a stage of irreversible damage to the internal structure of TMJ such as articular disc which ultimately leads to mandibular dysfunction.[37,38] The prevalence of TMDs ranges from 16.3to 68% as reported in the studies evaluated in this review. Such variation in the frequency of prevalence can be due to different evaluation methods used.[39,40,41] The high prevalence of TMDs is a matter of concern in children. A study done by Branco *et al* and Keeling *et al*[34] concluded that there is lack of a straight association between TMDs and age .[35] But a study done by Tecco *et al* stated that there is a direct association between TMDs and age, as well as with gender and the presence of posterior unilateral crossbite.[41]

In a transition period from deciduous to permanent dentition, when there are number of adaptive physiological changes in TMJs, epidemiological studies are required for the investigation of signs and symptoms of TMDs during childhood.[42] In this mix dentition phase, most of the observed problems associated with TMJ are usually temporary[38]and in order to determine the preventive treatments, the analysis of function of TMDs with respect to age is very crucial. So in this regard, taken into consideration the various age groups, many studies observed a greater percentage of signs and symptoms of TMDs with advancing age.[43,44,45,46,47,48]

A child's reactions may differ from an adult in clinical situations, which makes interpretation of the clinical examination and interview comparatively less reliable. In addition to standardized methods of clinical examination and questionnaires validated in studies on TMDs children's functional and psychological characteristics should also be evaluated to obtain a reliable diagnosis.[49]

Prevalence of TMDs among different gender is still an issue for debate. Some authors stated its higher prevalence in males and some in females. In this context, Pereira *et al.*[50] also highlighted in his study about gender-related disparities at the beginning of puberty in girls despite the observation that menarche has no effect on TMDs diagnosis. Smith *et al*[51] also suggested less prevalence in females as they maintain a healthy relationship with the health professionals. Contrasting to the study conducted by Bonjardim *et al* nd Garcia *et al* women had a higher prevalence of TMDs due to stress and environmental factors. This corroborates the studies conducted by Widmalm *et al*[52], Sonmez [53]and Yap *et al*,Weinberg *et al*, Lewitt *et al*, Mikinney *et al*[51,56] and Sandstron who also concluded that females get affected more as they cannot handle stress easily. The presence of estrogen receptors in the TMJ have also been suggested to be important factor for prevalence difference among genders.

Occlusion also affects the prevalence of TMD's among children. Henrikson, Ekberg and Nilner concluded that children with normal occlusions have comparatively lower TMDs signs and symptoms, where as children with class II malocclusion suffer more from problems like posterior condylar displacement with predisposition to TMDs.[17]

Quality of life and stress have a direct effect on the prevalence of TMDs.[57]According to Beaton *et al* and Niemi *et al* there was found a higher level of stress among TMDs patients when TMDs patients were compared to healthy subjects. Thus, considering that stress is associated with psychological disturbances, such as anxiety and depression.[57]

Furthermore, other factors such as masticatory system development and parafunctional oral habits have been reported as indicators of TMDs in children.[58]

However, due to the constant burden of learning activities in children physically as well as academically, high level of anxiety may result. In one study, considering TMDs as the dependent variable, children with anxiety were about 18 times more likely to develop TMDs than those without anxiety, confirming the role of psychological factors in TMDs reported.[59,60,61]

Treatment

Early discussion and intervention may prevent the development of chronicity in any disease. Conservative, reversible treatments are effective in managing most TMJ disorders in children.[62]It is important to mention that only 2% to 5% of all patients treated for TMJ disorders undergo surgery, suggesting the conservative management up taken by many patients at early stages itself.[63,64,65]

Physiotherapy: This approach seems to be more effective in sub-acute and chronic non-specific conditions. Electrophysical modalities (transcutaneous electric nerve stimulation (TENS), ultrasound, and laser) helps in improving the range of motion and may be used to relieve pain in TMJ.[27] Physiotherapists may implement these kind of therapy with behavioural modifications such as stress relieving exercises, dietary advice etc. Such electrophysical modalities are used to reduce acute inflammation surrounding joint, by promoting muscle relaxation.[2]

Occlusal therapy: Occlusal therapy include occlusal adjustment and appliances used for establishing the balance in the occlusion and TMJs. Splints and occlusal adjusments are used to achieve the most stable and least joint- traumatizing bite position thus minimizing the pain in TMJ. According to a review by Ingawale and Goswami, splints can also be used for preventing bruxism, which could be one of the primary etiological risk factor for TMDs in children.[66]

Pharmacological therapy: The drugs effective in the management of TMDs are non-steroidal anti-inflammatory drugs (NSAIDS), corticosteroids, muscle relaxants, anti-depressants, sedative hypnotics.[66]

Joint surgery is the only resort to restore mandibular function in the cases with TMDs where conservative nonsurgical methods fail.

CONCLUSION

The prevalence and risk factor associated with TMDs are difficult to establish so further research is required to investigate the aetiological patterns of this disorder. Management of TMDs requires a multi-disciplinary approach. Strategical management of TMDs require a collaborative approach performed by a team of dentists, maxillofacial surgeons, psychologists, psychiatrists and physiotherapists to prevent the serious complication of TMDs.[65,66]

Recommendation

TMDs is a complex clinical condition of yet unknown pathogenesis. More research is needed using the same diagnostic criteria and clinical examination method for

evaluating the TMJ functioning so that the results of the article could be compared.

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