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Review Article

Functional disorders of the temporomandibular joints: Internal derangement of the temporomandibular joint

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Abstract Temporomandibular joint (TMJ) is one of the most complex joints of the human body. Due to its unique movement, in terms of combination of rotation and translator movement, disc of the joint plays an important role to maintain its normal function. In order to sustain the normal function of the TMJ, disc must be kept in proper position as well as maintain normal shape in all circumstances. Once the disc is not any more in its normal position during function of the joint, disturbance of the joint can be occurred which will lead to subsequent distortion of the disc. Shape of the disc can be influenced by many factors i.e.: abnormal function or composition of the disc itself. Etiology of the internal derangement of the disc remains controversial. Multifactorial theory has been postulated in most of previous manuscripts. Disc is composed of mainly extracellular matrix. Abnormal proportion of collagen type I & III may also leads to joint hypermobility which may be also a predisposing factor of this disorder. Thus it can be recognized as local manifestation of a systemic disorder. Different treatment modalities with from conservative treatment to surgical intervention distinct success rate have been reported. Recently treatment with extracellular matrix injection becomes more and more popular to strengthen the joint itself. Since multifactorial in character, the best solution of the treatment modalities should be aimed to resolve possible etiology from different aspects. Team work may be indication to reach satisfied results.
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Definition

The temporomandibular joint (TMJ), which performs important roles in dental occlusion and the neuromuscular system, is one of the most complex joints of the human body [1]. The TMJ is classified as a compound joint and at least three bones presented by definition, yet the TMJ is comprised of only two bones. Okeson reasoned that from a functional viewpoint, the articular disc is actually a non-ossified bone, the main function of which is to increase joint mobility to facilitate more-complicated movement [2,3]. From another point of view, McKay et al. [4] regarded the TMJ as a double joint because the articular disc between the mandibular fossa of the temporal bone and the condyle, dividing the joint cavity into superior and inferior compartments is not a real bone. The articular part of the healthy disc is composed of dense, fibrous connective tissue empty of any nerves or vessels; contrarily, the posterior attachment of the disc is richly vascularized and innervated [5,6]. Rotational movement of TMJ occurs between the condyle and the inferior surface of the disc during early opening (the inferior joint space), and translation takes place in the space between the superior surface of the disc and the fossa (the superior joint space) during later opening. Distinct from most synovial joints, the articulating surfaces of the TMJs are lined with dense fibrocartilage instead of hyaline cartilage [7]. It is generally less susceptible to the effects of aging, less likely to break down over time, and possessed with much better ability to repair than hyaline cartilage [8]. Functional disorders of the TMJs are perhaps the most common findings due to the high prevalence of signs.

Terminology

James Costen presented a group of symptoms that centered on the ear and TMJ in 1934, and the term "Costen syndrome" developed [9]; later "temporomandibular joint disturbances" became popular. Shorev introduced the term "temporomandibular joint dysfunction syndrome" in 1959 [10], and afterwards "functional temporomandibular joint disturbances" was coined by Ash and Ramfjord [11]. Bell suggested problems not merely to the joints but all disturbances associated with the function of the masticatory system should be included [12], and the term "temporomandibular disorders" (TMDs) has gained wide acceptance and popularity.

History

In the late 1930s, the most common therapies provided were bite-raising appliance for mandibular dysfunction, but only a few dentists became interested in handling these pain problems [13,14]. Into the 1950s, the dental profession questioned the appliance therapy and payed more attention to occlusal interferences as the major causes of TMD complaints [15,16]. Early scientific studies mentioned that the occlusal situation could influence the function of the masticatory muscles in the 1950s and the electromyographic studies were applied to correlate such relationships [17,18]. Through the 1960s into the 1970s, occlusion and later emotional stress were recognized as the major causes of functional disorders of the masticatory system. Then in the 1970s an explosion of interest in pain disorders arising from intracapsular sources was concerned and described by Farrar and McCarty [19]. Not until the 1980s did the profession begin to recognize fully and appreciate the complexity, furthermore striving to find its proper role in the management of TMDs and orofacial pains.

Symptoms

The most frequent emerging symptom is pain, usually localized in the preauricular area and/or the muscles of mastication, besides patient frequently have a limited range of mandibular movement and TMJ sounds often described as "popping," "clicking," "grating," or "crepitus." General complaints from patients include earache, headache, jawache, and facial pain. Nonpainful hypertrophy of masticatory muscles and abnormal occlusal wear associated with oral parafunction (tooth grinding and jaw clenching), may be affiliated problems.

Epidemiology

The prevalence of TMDs from cross-sectional epidemiological studies varied considerably from study to study due to different data collection, descriptive terminology, analytic methods, and the individualized selected factors. A systemic review informed a prevalence of up to 13% for masticatory muscle pain, 16% for disc derangement disorders, 9% for TMJ pain disorders including only studies adopting the Research Diagnostic Criteria for TMD [20,21] in the general population. While the prevalence of the different diagnoses varied widely in TMD patients, the results of a meta-analysis revealed 45%, 41%, and 34% for muscles, disc derangement, and joint pain disorders, respectively. Although children and young adults do display an increase in signs of TMD, even patients who are more than 60 years of age rarely complains of any significant TMD symptoms [22,23]; therefore, the most TMD symptoms are reported in patients between 20 and 40 years of age [24,25]. Only 3.6%—7.0% of individuals are reckoned to be in need of treatment [26—28], because joint sounds are general, often pain free, and not progressive. Benign chronic reducing and nonreducing disc displacements in the absence of pain and/or impaired function should be avoided overtreatment is important [29]. Incidence up to 35% of asymptomatic individuals were assessed with magnetic resonance imaging (MRI) appear to have disc displacements [30].

Clinical examinations

Maximum interincisal distance

When measured interincisally the normal range of mouth opening is between 53 and 58 mm [31], even a six-year-old child can reach 40 mm or more [32,33]. Less than 40 mm of mouth-opening seems to denote a reasonable point to designate restriction, however, age and body size of the

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