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Temporomandibular Disorders – An Overview

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ABSTRACT

Temporomandibular disorders (TMD) have been an area of increased clinical and scientific inquiry in dentistry. This is due to increased patient awareness and desire for treatment as well as scientific advances in the fields of epidemiology, neurobiology and diagnostic imaging. This article sets out to introduce this disorder and describes its aetiology and management.

Keywords: temporomandibular joint disorders, temporomandibular joint pain dysfunction syndrome, craniomandibular disorders

INTRODUCTION

Temporomandibular disorders (TMD) is a collective term embracing a number of clinical problems that involve the masticatory musculature, the temporomandibular joint, or both. The term has been used synonymously with a host of other terms including temporomandibular joint (TMJ) disorders, TMJ dysfunction syndrome and myofascial pain dysfunction syndrome. Although traditionally viewed as a syndrome, current research and opinion supports the view that TMD are a cluster of related disorders in the masticatory system which have many common features[1,2]. The most frequent presenting symptom is pain, usually localised in the TMJ and/or the muscles of mastication. This pain is usually aggravated by chewing, talking and other jaw functions. Other complaints include joint sounds (clicking, popping, grating or crepitus), limited mandibular movement (opening and lateral excursions) and headaches. Stuffiness or ringing in the ears may also be present. A summary of the signs and symptoms characteristic of TMD is shown in Table I. Cross-sectional epidemiological studies in specific populations showed that about 75% have at least one sign of joint dysfunction (tenderness, joint noise, etc) and about 33% have at least one symptom (face pain, joint pain, muscle pain, etc)[3,4]. Clinical population studies have, however, shown that a smaller percentage of people have problems severe enough to seek care for TMD and those who sought treatment included more women than men by about 8 to 1[3,5]. Reasons for this discrepancy is not known and need to be investigated.

Table I – Signs and sympyoms that are characteristic of TMD

Signs and symptoms that are characteristic of TMD
▪ Pain in and around the temporomandibular joint and muscles of mastication
▪ Clicking, popping or grating sounds in the temporomandibular joint
▪ Limited or asymmetric mandibular movements
▪ Jaw function difficulty eg. eating and yawning
▪ Headaches
▪ Ear symptoms eg. blocked feeling, ringing sound etc.

Aetiology

The aetiology of TMD is still widely disputed in the literature and claims of success have been made for a wide variety of treatment modalities ranging from psychotherapy to complex occlusal rehabilitation. There are several possible reasons for these disagreements, some of which are obvious. Firstly, such patients are treated by diverse medical and dental specialties which will invariably view the problem from different perspectives. Psychological stress, which is an important element in TMD, renders patients susceptible to placebo effects of any treatment carried out. In fact, placebo effects for a variety of dental treatments has been shown to be effective in 40% – 60% of cases treated[6]. It is thus essential that only objective signs such as mandibular movements, and not subjective ones, be used as a measure for success. Finally, there exists the problem of standardisation of diagnostic criteria. Complicating this issue even further, is the fact that patients are often not diagnosed on initial presentation. The two major concepts that have evolved pertaining to the aetiology of TMD, are morphofunctional and psychological.

Morphofunctional concept

Historically, a number of occlusal factors have been linked with TMD. These include the number of teeth in contact, loss of vertical dimension and orthodontic malocclusion. Over the past two to three decades, occlusal interferences (contacts between teeth that interrupt the free sliding movement of the mandible) and poor intercuspal contacts (the contact between cusps of opposing teeth) have been considered of prime importance. Based on comparative anatomy and histology, Robinson[7] concluded that the temporomandibular joints are not intended to be stress bearing. As one

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can postulate that a fairly intact dentition with an adequate intercuspal position can dissipate forces produced by the masticatory muscles during function and parafunction, it is conceivable that posterior teeth loss can predispose to overloading of the joints. The mode of action of interferences and deflective contacts have been attributed to the induction of parafunction activity[8] and aberrant function[9]. Aberrant function may be defined as changes in functional movements and mandibular posture that occur as a result of subconscious avoidance of aberrant tooth contacts.

Psychological

Psychological stress has been shown to cause masticatory muscle hyperactivity[10]. Muscle hyperactivity may be expressed in parafunctional activities such as clenching and grinding; leading to pain in the muscles as well as repeated overloading of the joints. A study by Moody and co-workers[11] suggests that patients suffering from TMD experienced a greater number of life crises and health changes (life-change units – LCU) over a given period of their lives than patients with other illnesses. There are a number of possible explanations as to why TMD patients have higher LCU totals. One explanation may be that as the number of life changes being experienced by a patient increases, so does psychological stress, which is an aetiologic factor in TMD. Another explanation may be that as life changes increases, the patient's ability to cope with existing symptoms decreases. Rao and Glaros[12] also indicated in their report that TMD patients have significant life stress but unlike non-patients, they do not exhibit the usual habitation responses to stress. In either case, the symptoms are accentuated to the extend that the patient will seek professional help.

The current most widely accepted theory however, is that the symptoms of TMD are primarily a group of psycho-physiological disorders in which an injury producing activity may be initiated, resulting in an overload of the temporomandibular joint and its supporting musculature and surrounding soft tissues. Such injury-producing activities include both acute trauma (any incident that stretches and loosens the disc attachment) and chronic trauma (any factor that cause excessive loading of the joint or masticatory muscles). Examples of acute trauma are overstretching from iatrogenic dental and oral surgical procedures and direct injuries to the face and jaw. Chronic trauma can arise from unilateral chewing habits, frequent mastication of hard foods, lack of occlusal stability and stress-induced muscle tension and bruxism/clenching. Arthritic diseases like rheumatoid arthritis and osteoarthritis may also precipitate TMD. Pathology and pain occurs when the reparative capacity of the tissue is exceeded. Other systemic diseases like systemic lupus erythromatosus, scleroderma and psoriatic arthritis also give rise to inflammatory joint diseases and should be considered when assessing joint pain.

MANAGEMENT

Diagnosis

TMD can be classified as joint or muscular disorders or both. Joint disorders include internal derangement (disc displacement with and without reduction), dislocation, inflammatory conditions (synovitis, capsulitis, retrodiscitis), arthritides (osteoarthrosis and osteoarthritis), ankylosis (fibrous and bony) and deviation in form. Myofascial pain (previously used terms: myaligia, trigger point pain, muscle contraction headache, tension headache), myositis, spasm, splinting, muscle contracture comprise the muscular group. History taking and clinical examination are the primary diagnostic tools and radiographs are required to confirm diagnosis when organic pathology is suspected. Bony changes can only be visualised on radiographs when there is a reduction of 40% of the calcium content. As such, any bony changes associated with TMD can only be observed fairly late in its existence. Commonly used radiographs include transcranial, transpharyngeal views and orthopantomogram. The usual features assessed on such radiographs are irregularities in the surfaces of the condyles and fossa such as erosions or lipping, limited condylar movement as shown by open and closed views, and abnormalities in the joint spaces. Computerised tomography (CT) gives the most precise view of the joint in relation to osseous changes and condylar changes. The most revolutionary method of imaging the joint is the use of magnetic resonance imaging (MRI). MRI has the advantage of being non-invasive, needing no radiation, and providing an accurate diagnosis of soft tissues including discal position. It is important that differential diagnosis be considered for TMD to be managed successfully.

Treatment

Joint disorders

Joint disorders can be divided into Stage 1 and 2 disorders. Stage 1 disorders, which can be managed conservatively and non-surgically (phase 1 treatment), consist of muscle or joint trauma or overload and the earlier mechanical disorders of the disc (disc displacement with reduction). Stage 2 disorders are those with continual limited mandibular movement and deviation, locking and crepitus of the joint, which persist despite phase 1 treatment.

Phase I treatment consists of:

- explanation of the disorder to the patient, reassurance and counselling
- rest and isokinetic exercises for the jaw
- physiotherapy modalities eg. moist heat, ultrasonic energy, transcutaneous electrical nerve stimulation (TENS) (Fig 1)
- orthopaedic appliance therapy (occlusal splints) (Fig 2 and Fig 3)
- rehabilitation of dental deficits if such inadequacies in dentition result in excessive masticatory effort or pathology

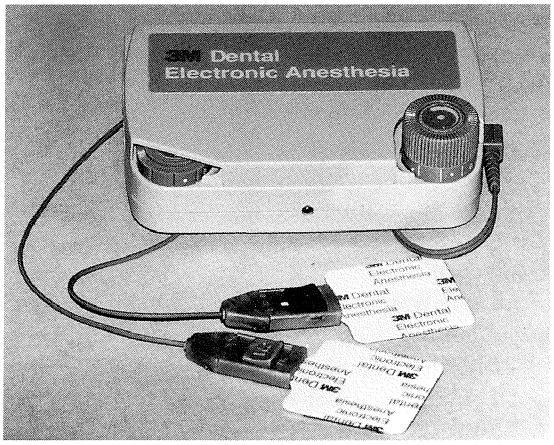

Fig 1 – Transcutaneous nerve stimulator (TENS).

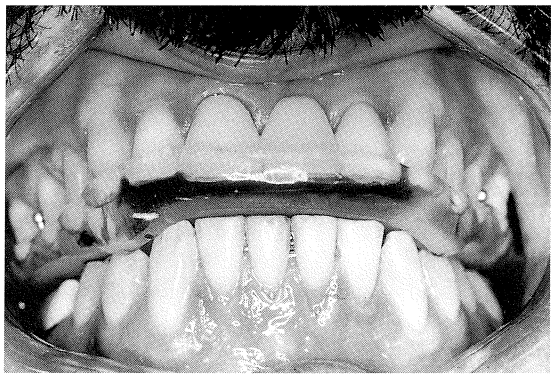

Fig 2 – Hard acrylic occlusal splint (front view).

Fig 3 – Hard acrylic occlusal splint (lateral view).

- Medication eg. analgesics, non-steriodal anti-inflammatory drugs (NSAIDS), muscle relaxants, tri-cyclic anti-depressants (TCA)

Unless the psychological side of the aetiology is not too dominant, correctly carried out phase 1 treatment should provide a successful and conservative way of helping TMD patients. From a study of 154 patients, it was concluded that most TMD patients have minimal recurrent symptoms 7 years after conservative treatment[13]. Although symptoms can resolve swiftly in some patients, in others, however, treatment may need to continue for a number of months. Efforts should be directed towards the reduction of both initiating and perpetuating factors. It is important that stage 1 joint disorders be differentiated from stage 2 disorders. Patients should be referred for specialist treatment if they do not respond to phase 1 treatment, if stage 2 disorders are diagnosed and, in particular, if there is any suggestion of emotional illness.

Phase 2 treatment refers to the definitive rehabilitative occlusal and jaw corrective procedures aimed at maintaining the optimal mandibular and cervical musculoskeletal relationships achieved in phase 1 treatment. It may also refer to surgical joint treatment procedures used in the treatment of TMD.

Rehabilitative procedures include:

- occlusal equilibration (modification tooth form with the intent of equalising stress)
- orthodontic therapy (correction of bite discrepancies by movement/realignment of teeth with braces, removable and functional appliances)
- restorative therapy (replacement of lost tooth structure, teeth or oral tissues with crowns, bridges, overlay prostheses, dentures etc)
- orthognathic surgery (surgical repositioning of all or parts of the maxilla and/or mandible)
- combination of the above treatments

Surgical treatment for stage 2 disorders include:

- arthrocentesis (joint "washout" procedures)
- arthroscopy (closed surgical procedure using an arthroscope)
- arthrotomy (open surgical intervention on the temporomandibular joint ranging from discoplasty, discal repositioning and repair, or disectomy with or without replacement to arthroplasty)

The decision to treat the patient surgically depends on the results of phase 1 treatment, the degree of pathology present or anatomic derangement present within the joint, the reparability of the condition, and the extent of disability that the joint pathology creates for the patient. It should be noted that stage 1 joint disorders frequently resolves spontaneously. Studies on the epidemiology of these disorders support the concept that, in most patients, joint disorders are self-limiting and is not likely to progress to a physically destructive condition. This supports the view that irreversible interventions, either dental or surgical, are generally not indicated. The appropriate duration and complexity of conservative non-surgical treatment before considering surgery are determined by a combination of factors including the expected prognosis compared with the actual patient improvement, the degree of disability, and the patient's compliance with the program. Patients with complicating factors like litigation, depression or uncontrolled nocturnal bruxism may have poorer prognosis.

Muscular disorders

Pain from the musculature of the head and neck is very commonly perceived in the region of the mouth and the associated structures[14] and consequently, dental professionals are frequently approached for

management. After a complete history has been recorded, this may include a psychological or psychiatric evaluation, masticatory and neck musculature are examined for the presence of trigger points which may be referring pain to the temporomandibular joint or other facial structures. Trigger points can be localised by application of pressure to the muscle with the tip of the finger or by squeezing between the thumb and the forefinger. This often accentuates the pain both locally and at the referral area. Autonomic concomitants may include blurred vision, excessive lacrimation, rhinitis, conjunctival reddening and congestion of the maxillary sinus. Management of muscular disorders include:

- patient education, awareness of physical and emotional components
- restriction of extreme mandibular movement and soft diet
- moist heat applications followed by stretching exercises
- deactivation of trigger points [vapocoolant spray and stretch, trigger point injection with local anaesthesia, ultrasound, ischaemic pressure, acupuncture (Fig 4) or TENS]
- orthopaedic appliance therapy, if clenching or parafunctional activities are present
- a well designed self-care programme to maintain the benefits of therapy, eg. passive stretching exercises, good posture and avoidance of prolonged contraction of muscle groups

Behaviour modification

Approaches to changing maladaptive habits and behaviour is an important part of the overall treatment of TMD patients. Significant modification in the patient's lifestyle or even occupation may be necessary to alter the contributing factors. Treatments which have been shown to be effective include habit-reversal program, life-style counselling, relaxation techniques, autogenic training, meditative techniques, hypnosis, biofeedback and cognitive stress management. Such treatment are individualised to fit the patient's problems, preferences and life-style.

CONCLUSIONS

TMD is undoubtedly a highly controversial area of dentistry and it is impossible to discuss all the issues involved in this single article. It is however, important for us, health professionals, to know that this group of psycho-physiological problems do exist and that the majority of TMD patients get better with time. Only a minority of patients require surgical interventions. However, it is still advisable that referrals to the relevant specialists be undertaken when in doubt about its diagnosis. Treatment protocols in general, are conservative, non-invasive and reversible.

Fig 4 – Acupuncture needling in the temporomandibular joint region

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