Update on the Primary Treatment of Temporomandibular Joint Disorder

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The pathogenesis of temporomandibular disorders (TMD) had been puzzling. In the last century, disc displacement theory had been the main stream of thought. By the advance of biochemical technology, new thought had been placed. Pathogenesis of the TMD or TMJ internal derangement had become more cling to the biochemical causes.

It has been suggested that internal derangement of the temporomandibular joint is a progressive disease. It will progress from the first stage, where there is clicking with normal maximal mouth opening to the stage where clicking gradually ceases constantly with varying degrees of restriction in opening (closed lock)[1]. The latter stage is customarily attributed to a nonreductible, interiorly displaced disc acting as an obstacle to the gliding condyle[2-6]. In the past, the treatment for temporomandibular joint dysfunction that did not respond to conservative treatment was surgical disc repair and repositioning to re-establish normal maximal mouth opening[5]. With the introduction of arthroscopy, simple lyses and lavage and the use of hydraulic pressure in the upper joint space were found to be highly effective in re-establishing normal MMO and relief of symptoms[7-10].

When a diagnosis of TMJ pain dysfunctional syndrome is established, non-surgical management is indicated as an initial management and treatment. Non-surgical management of TMD tries to achieve the goals: reduction of pain, reduction of dysfunction and promotion of healing. In the literature most patients responded well to non-surgical treatment. The reported success rate ranged from 74 to 85%.

Modalities

The diet

Mastication of hard food produces significant forces that are transmitted to the jaw and associated structures. The avoidance of hard and chewy food helps to reduce the loading forces on the joint and to rest the hypertonic jaw muscles. Most patients respond well to soft diet. Patients are instructed to cut and break food into small pieces. They should be warned not to bite into any thick foods and avoid wide opening of the jaw. The length of time a patient should be maintained on a soft diet depends on the diagnosis and severity of symptoms. There is no established guideline in the prescription of soft diet therapy and hence is quite empirical. It is recommended that joint inflammation resulting from trauma often resolves within 2 weeks should stick to soft diet temporarily. Those who had chronic pain may require dietary changes that soft diet therapy may be needed for a lifetime.

Physical therapy

Jaw exercise

Exercise was long an important nonsurgical management of this pathology. The mandible and its attached muscles can be exercised passively, actively or isometrically.

There are many different exercise programmes advocated, for instance, Schwartz (1959) Friedman (1985), Rocobado (1983), Travell (1983), Friction (1988) and Abramovitch (1988).

Patient compliance is the key to any successful jaw exercise programme. The exercise programme must be kept simple and easy. It should not take too much time to complete each session. Small repeated sessions are preferable to one, long, daily routine. It should be designed to be done at home and at the patient's place of employment and should not require any unusual apparatus or facilities if possible.

The patient should be instructed on how to monitor progress. Performing the exercise routine in front of a mirror provides a simple feedback mechanism. A ruler or other measuring device provides a helpful method for the patient to mark progress and gain a sense of improvement.

Thermal agents and ultrasound therapy

Thermal agents have long been used to alleviate muscle pain. Cold and heat application have been shown to be effective. Cold application is effective because it stimulates the large A delta (temperature-sensitive) nerve fibres which inhibit pain input from the small c fibres.

Ultrasound can deliver heat to a depth of about 5 cm without causing excessive heating of the superficial tissue. High frequencies (3Mkz) dissipitate energy into the superficial tissue layers to a 1-2cm depth, whereas lower frequencies (800k Hz to 1MHz) penetrate to deeper levels.

Occlusal appliances splint therapy

Splint therapy refers to various occlusal appliances : bite plates, bite planes, bite appliances, occlusal appliances, mouth guard, night guard and others. Collectively, they are usually acrylic devices that snap onto the dentition and disocclude the jaws. The efficacy of splints is reported in the literature, with an overall success rate of 70% - 90%.

Splints appear to have several physiological effects.

1. Disocclusion diminishes loading forces on the diskal tissue
2. Distracting the condyle slightly out of the fossa reduces pressure on the intracapsular tissue.
3. Interrupting the normal proprioception of the

masticatory system reduces muscle activity.

There are 2 general categories of splint: repositioning and flat plane or non-repositioning appliances.

Repositioning appliances cover all the occlusal surfaces in 1 arch and have indentations or vamp to guide the mandible to new position. Repositioning appliance can be relied on to restore the patient to a new occlusion. Flat plane or non-repositioning appliances do not intentionally change the occlusion and they represent a more reversible form of treatment.

There are numerous splint designs. They can be maxillary or mandibular splint, hard or soft, may cover all the teeth in one arch or provide partial coverage, may have a group function or cuspid-guided function and may have a flat occlusal surface or a tooth imprinted surface.

Pharmacological therapy

Anti-inflammatory medication remains the treatment of choice as long as the signs and symptoms of inflammation are dominantly present. Other medications like corticosteroids, anxiolytic, muscle relaxants or even anti depressant medications can be used but should be used with caution.

Biochemical Theory of TMD

The mechanical theory was well accepted in the past century. However, a lot of researchers focused themselves in the biochemistry of the synovial fluid in various stages of the TMJ disease[11]. The role played by the inflammation as an underlying mechanism of pain and dysfunction of the TMJ had been investigated and radiographic, cellular and biochemical signs of inflammation were frequently found on the TMJs of patients who had had long standing pain and tenderness of this joint. It was found that intra articular injections of corticosteroid combined with a local anaesthetic had a long-term palliative effect on subjective symptoms and clinical signs of TMJ pain[12,13]. Due to the unpredictable prognosis of intra articular injections of corticosteroids for patients who have TMJ osteoarthrosis and the uncertainty regarding local side effect of these drugs[14] on the joint tissue, high molecular sodium hyaluronate has been tested in animals and humans with good promising results[15,16]. Experimental use in patients who had severe arthritis not responding to conventional treatment received considerable relief of symptoms.

Visosupplemention therapy with Sodium Hyaluronate (Hyaluronic Acid)

Sodium hyaluronate is the sodium salt of hyaluronic acid. It is a high molecular polysaccharide and a major natural component of synovial fluid. The importance of hyaluronate to the lubrication of synovial tissue had been established but its function in relation to the occurrence of joint disease is not precisely known.

Hyaluronate is largely responsible for the viscosity and rheologic properties of normal synovial fluid. Its capacity to function as molecular sieve is thought to be important both in regulating the nutrition of articular cartilage and in physical interactions with the macromolecules of the articular surfaces, hyaluronate is a good soft tissue lubricant under low loads and may exert important interactions with the synovial lining to preserve the latter's physical properties, especially its characteristic smoothness and low function surfaces[17]. Hyaluronate had been reported to prevent intra articular adhesions and elicit little if any immune response when injected into humans or animals. Hyaluronate is not known to have induced damage or elicited tissue reactions when used as intra articular administration. Even repeated injections of hyaluronate into the joints of experimental animals have not shown to have any deleterious result, only resulted in transient infiltration of polymorphonuclear macrophage-like cells into the synovial fluid. No clinical signs of inflammation can be demonstrated after the use of hyaluronate.

The development of the use of hyaluronate in the treatment of internal derangement of TMJ has opened an exciting new therapeutic area. The University of Hong Kong discipline of Oral and Maxillofacial Surgery had introduced the use of injection of megamolecule hyaluronate acid (synivsc) intra articularly. A total of 27 patients with 34 temporomandibular joint disorder had received treatment, and closely followed up from 6 months to 24 months.

The pain intensity significantly decreased with time and patients complained of less pain after the injections. The mouth opening was improved, nearly 80% of the test group improved from this treatment which gives new direction to the further research on the use of viscosupplemention therapy.

Conclusion

TMD is a complex disease. Optimal management relies on early diagnosis and proper treatment. Conservative treatment remains the mainstay of treatment but now with the introduction of new viscosupplemention therapy, satisfactory disease control can be achieved.

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