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Non Invasive Treatment Modalities of Temporomandibular Joint Disorders

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Abstract

Temporomandibular disorders (TMDs) are the disorders affecting temporomandibular joint and its supporting structures. The management of TMDs may range from non-invasive to surgical therapies. Various noninvasive therapies should be attempted before invasive and surgical treatment modalities. The present article reviewed various non-invasive treatment modalities of TMDs.

Keywords: Temporomandibular Disorders; Non-Invasive Treatment; Pain; Temporomandibular Joint.

Introduction

Temporomandibular disorders (TMDs) is a musculoskeletal disorder that cause impairment of the temporomandibular joint (TMJ), its supporting structures and associated neuro-muscular system, causing TMD-related pain [1]. TMD is a broad term that refers to various disease entities like headache, trouble in jaw movements, pain in TMJ and masticatory muscles; and clicking sound in TMJ while opening and closing the mouth [2].

Different etiological factors leading to TMD are occlusal disturbances, iatrogenic, systemic, trauma, and mental health disorders [3-4]. Around 60–70% of the affected population has at least one associated sign and symptom of TMD [5].

The diagnosis of temporomandibular disorders (TMD) is convoluted by varying etiological factors and diversity in signs and symptoms of disorders [6]. But to provide a quality care to patients, a proper diagnosis and treatment management is an important aspect.

The goal of treatment is based on eliminating or reducing pain and clicking sounds of joint, and returning TMJ to its normal function. Various treatment options available are surgical and non-surgical treatment modalities. Non-surgical

management includes soft diet, inter-occlusal splints, pharmacotherapy, behaviour modification, arthrocentesis, intra-articular injections, arthroscopy, physical therapy, etc. [7].

The minimally invasive therapies are also common that require intra-articular injections delivering intra-articular drugs, biologically active compounds (as platelet-rich plasma), and enhancing lubrication using hyaluronic acid. These strategies are being used in regenerative medicine to deliver cells, stem cells, and Nano- or micro-biomaterials [8]. Low-level laser therapy (LLLT) is another non-invasive physical treatment that has been introduced as a non-invasive treatment modality for TMDs and myofascial pain.

Aim of This Review Article

The Aim of this review article is to study the non-invasive treatment modalities for temporomandibular disorders (TMD).

Different Non-Surgical Treatment Modalities:

Non-invasive treatment modalities are the effective methods for management of around 90% of patients suffering with TMD disorders.5 These interventions involve treatment by different clinical specialists working as a multi‐disciplinary team.

I. Conservative Management

1. Reassurance and patient education: Patients should be educated and re-assured by explaining them nature and cause of disorder.
2. Self-Care: A self‐care routine should be formulated that include stress avoidance, home exercises, limiting mandibular functions, and modifying habit. Mandibular functions like excessive chewing, singing, wide yawning and talking should be avoided, encouraging promote rest and immobilisation of muscular and articular structures [9]. Lengthy dental appointments are avoided.
3. Muscular training: aimed at achieving muscle restoration after traumas and injuries. It is one of the most conservative, simple non-invasive treatment modality of TMD disorders. Muscular exercises should be done moderately with increasing intensity with time, to restore the muscular equilibrium [3, 10]. The exercises involve isometric movements, relaxation and stretching.
4. Occlusal splint therapy: Centric relation (CR) is restored using occlusal splint, an occlusal appliance affecting the relationship of mandible to maxillae. Occlusal splints are used for occlusal stabilization, treating TMD disorders [11].

They are fabricated by dentist and dental technician; used to rehabilitate the static and dynamic symmetry of the stomatognathic system [12].

II. Pharmacological Management

No single drug has been proven to be effective for treating all cases of TMD disorders. Various drugs are being used for management including corticosteroids, muscle relaxants, opiates, non‐steroidal anti‐inflammatory drugs (NSAIDS), tranquillisers, antidepressants, and anxiolytics [13].

Non-steroidal anti-inflammatory drugs: Local inflammatory mediators like substance P, prostaglandins, histamine, and bradykinin are released due to repetitive trauma to masticatory muscles. To relief the pain, NSAIDs are being commonly used, reducing peripheral sensitization [5]. They eradicate pain by blocking inflammation-induced upregulation of sodium channel 1.7 (Nav1.7) in the trigeminal ganglion (TG). They also reduce inflammation by inhibiting COX-1 and COX-2 [15]. Different types of NSAIDs used are diclofenac sodium, ibuprofen and meloxicam.

Antidepressants: TMDs are commonly associated with depression. Thus tricyclic antidepressants (TCAs) having analgesic properties are the good choice for treating depressed patients suffering with TMD. 75mg of Amitriptyline, a TCA is commonly used in TMDs [16].

Imotun: Imotun is an extract of avocado-soybean unsaponifiable (ASU) with anabolic, anti-catabolic, and anti-inflammatory effects on chondrocytes. It reduces inflammation by inhibiting prostaglandin E2, cyclooxygenase A2, and nitric oxide, thus improving joint function, reducing pain and stiffness [17].

Other Pharmacological Therapies:

Muscle relaxants: are prescribed with NSAIDs in case muscular component is involved in TMD.

Infusion of Anesthetic Agents: TMJ pain can be temporarily blocked and resolves after 10 minutes by local infusion of anesthetic agents like 1% or 2% of lidocaine in the joint space.

Intra-articular steroid injection is used for TMJ synovitis, when joint inflammation is confirmed by MRI scan or during arthroscopy [18].

III. Physiotherapeutic Techniques

Various techniques like iontophoresis, lamp exposure, biofeedback, ultrasound and transcutaneous electrical nerve

stimulation (TENS) are used.

Biofeedback is the technique used to stimulate the muscles and achieve maximal relaxation. It involves electromyography that is used to guide the adequate neuromuscular tension and to develop the ability to alter a physiological response [19].

Transcutaneous Electrical Nerve Stimulation (TENS) is a common technique of relieving TMD pain. It involves electrical stimulation of areas of pain using surface electrodes. It relieves chronic and acute pain in joint and/or muscle disorders [20].

Kinesio Taping (KT) is a new method of rehabilitation that aim at stabilizing jaws and TMJ and provides mouth closure. A "Y"-shape tape is cutted and placed proximal to the joint; having superior tail shorter than the inferior tail. Muscular tone is aligned by improving proprioception [22].

Ultrasound therapy is effective method for reducing pain, decreasing muscular tonus and improving muscle function. Therapy consists of three different types of signals: constant waves, sound impulses and ultrasound combined with stimulation current, which is found to be most effective [21].

Iontophoresis using different medications (like nonsteroidal anti-inflammatory drugs, steroids and analgesics), is commonly used in cases of TMDs.

Low level laser therapy (LLLT): Inflammatory processes may be healed with a laser light at a wavelength of 904 nm, with a frequency of 700 Hz at 30 mm depth into the skin.21 It works through photobio-modulation, changing the permeability of the duct to sodium (Na+) and potassium (K+) ions, thus decreasing the action potential frequency. It has analgesic and anti-inflammatory properties [23].

IV. Occlusal Splint Therapy

Occlusal splints are used to improve or prevent degenerative forces placed on dentition, articular disk and TMJ [24]. This is also known as a bite raising appliance, occlusal appliance or bite guard. It protects and reduces the load on the TMJ, especially in patients with bruxism. Occlusal splint therapy has been observed to resolve symptoms of temporomandibular disorders in over 70 per cent of patients [5]. Most occlusal splints are custom made, comfortable to wear, and safe [25].

V. Acupuncture

Acupuncture is being used in the treatment of myofascial TMD in 6 to 8 sessions lasting for 15 to 30 minutes. Needles are inserted around the ear and jaw and within the pain area. Acupuncture should be associated with pharmacotherapy. Needle puncture at trigger points change the biochemical environment of the painful muscles of TMD patients.

VI. Massage Therapy

TMD myofascial pain can be relieved by massage therapy. It reduces inflammation and re-establishes the muscular flexibility and relieves pain. The massage therapy involves friction, effleurage, stretching, kneading, and petrissage, leading to the permanent adaptation of the muscles. The pressure used during massage should not be too intense and increase over time at each therapeutic session [26]. Therapy should be done twice a week, with 30 min of session. Heating or cooling of the affected muscles is also recommended [27].

VII. Joint Injection with Hyaluronic Acid (HA)

Osteoarthritis is a common TMDs, exhibiting the reduction in intra-articular HA concentration. Two HA injections at weekly intervals are effective in increasing condylar mobility and mouth opening [28].

VIII. Muscle Injection with BTX

BTX is a strong biological exotoxin produced by *Clostridium botulinum*, act by blocking the release of acetylcholine from a presynaptic neuromuscular synapse. BTX-A is used to treat bruxism, myofascial pain, disorders associated with TMJ disc displacement, and habitual dislocation of the mandible. After the first dose, doses are repeated after 2 to 6 months to strengthen the effect of the previous injection.

CONCLUSION

Various conservative treatment modalities including counselling of patients, exercises, occlusal splint therapy, physiotherapeutic techniques, massage, pharmacological therapy, manual therapy etc. should be considered as the first line of treatment for TMD pain because of their low risk of side effects.

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