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Temporo-Mandibular Dysfunction: A Great Mimic For A Multitude of Cranio-Cervical Dysfunction, A Case Series

Medical Science

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ABSTRACT

Temporomandibular joint dysfunction is a frequently undiagnosed condition but is the cause of a large number of headaches which have been erroneously treated as tension type headache, migraine, or any other type of headache. There have been studies which showed disappearance of headache, which were otherwise treated as migraine, by the management of the TM joint dysfunction. The present case series discussed the result of twelve patients who were managed for various diagnoses migraine, for a long duration, only to be relieved by interventions to the TM joints and the tender and trigger points as well as musculoskeletal manipulations.

Introduction

Temporomandibular joint dysfunction(TMD) comes under the fault-line between dentistry and medicine. There has been a Lack of widespread acceptance and attention regarding this condition among the medicine fraternity. Temporo-mandibular disorders are common, but they are diagnostically challenging due to the complex anatomy and innervation of the head, face and neck. TMD is sometimes classified as a subtype of a secondary headache disorders[1]. Various authors [2, ,3,4,, 5]have shown this condition to be avery frequent cause of tension type headache and precursor of cervical and shoulder pathologies. They can also manifest as neck, eye or arm pain, dizziness, ear pain, stuffiness and tinnitus etc. Various authors demonstrated a positive correlation between TMJD and headache in children and adolescents, independently of gender and age. In a study by Christine-Espinola-Bandierramelloet al[6] it was reported that most of the patients with temporo-mandibular disorders had the headache appeared before pain from TMD and is tempting to speculate headache as triggering factor to TMD development. Pain from masticatory muscles and TMJ may act as a perpetuating and/or aggravating factor in headache patients. Bevilaqua-grossiet al[7] cited that TMD could be associated to transformation of episodic headache in chronic headache.

The present study describes the clinical and treatment history of 12 patients who were treated for a considerable period of time, for diagnosis ranging from migraine to trigeminal neuralgia, tension headache, cervical spondylosis etc. Inability of the management given to mitigate their symptomsled to further exploration of other plausible diagnosis and search for other modes of treatment. Eventually on further probing and extensive examination, TM joint was found to be the causes of many of these sufferings.

PROFILE OF THE PATIENTS IN OUR STUDY

The First patient:

A 42 years old lady, an insurance agent, with right sided facial pain and headache, diagnosed as migraine and being treated for it for 3 years. She was on multi drugs, but she could not get enough relief and she had sleepless nights. She had history of dental caries, loose teeth and frequent swelling of gum right for three and a half year.

On questioning, her headache would start mainly after prolonged stressful posture or situation, having sumptuous meals. Her symptoms would aggravate on exposure to light, sound or fasting. No significant derangement of blood parameters including thyroid profile, blood sugar or any inflammatory markers.

On examination, there was slightly restricted ROM of the cervical spine, grade 3 tenderness of right>left TM joint, clicking sound on opening and closing of TM joints. She also had multiple tender points over trapezius, sternocleidomastoid,deep cervical muscles. There was no focal neurological deficits or cranial nerves involvement.

Keeping in view of the tender right TM joint, X-rays of the TMJoint in open mouth, closed mouth and occluded views revealed features of arthrosis of TMJoint.

NSAIDs, amitryptiline were prescribed and stretching and strengthening of the neck muscles taught. Trigger point injections of the para-cervical muscles involved was given. Stretching of the mandibular muscles, soft food diet and correct chewing technique was shown.Only limited improvement was seen 3 weeks later. So a trial of 10 mg methylprednisolone with 2% lignocaine injections to TMJ led to almost disappearance of pain. She came for follow up at 1 month and at 2nd month, and she was symptomless.

The Second patient:

A 36 years old lady reported with neck pain and frequent episodes of giddiness, tingling and burning sensation over right shoulder and arm for 4 years but no neurological deficit on examination.She was a research scholar and gave history of prolonged laptop use. She had injury to her face (domestic violence) and reported swelling of face and teeth pain followed later. An orthopaedic surgeon asked for X-rays cervical spine which showed straightening of cervical spine and features suggestive of early cervical spondylosis.MRI of the brain revealed nothing significant.

On examination, there was restricted ROM of the cervical spine and diffuse tender points over temple, forehead, trapezius and other cervical muscles. Spurling's sign was negative. There was crepitus on palpation of TM join with tenderness. Evidence of mal-alignment of mandibular condyle and fossa was seen on radiograph.

She was prescribed NSAIDs, muscle relaxant, hot fomentation, stretching of tight muscles. Jaw muscles were stretched and correct eating technique taught. Gradually increasing isometric strengthening of cervical muscles given. there was improvement in neck pain and headache, but facial pain persisted. Methylprednisolone injection to right TM joint was given and the patient became almost pain free days later.

The Third patient:
A 32 years old, obese lady working asa banking Assistant manager had dental problems and recurrent periodontal infections on the left side since 12 years. She also complained of tinnitus. She started having headache and right sided facial pain which is peri-orbital to start with, progressing to neck and back of head for the last 7 years, for which she was diagnosed as migraine by a neurologist.

The headache would start with exposure to loud noise, light, fasting and after stressful work or sitting in uncomfortable posture. She would feel nauseating with each headache episode and took rescue medications for migraine. She was on sumatriptan, propranolol and NSAIDs. She stopped taking the medications for three months.She had excessive sleep due to headacheand the medications

She had hypothyroidism, and had history of caesarean delivery 4 years ago. X-ray of the right TM joint revealed decreased joint space and deformed mandibular head. X-ray of the cervical spine showed straightening of the spine.No neurological deficits were elicited but coarse crepitation of the right TM joint was felt with tenderness.The ROM of the cervical spine was restricted and paracervical muscles tender on palpation. Injection of 10 mg methylprednisolone with 2 % lignocaine was given intra-articularly to the right TM joint.

She was referred to dental surgeons for necessary dental corrections. Ice pack, soft food diets, NSAIDs, gentle mobilization of jaw and cervical muscles were advised for a few days. She was pleased with complete subsidence of her headache symptoms for 3 weeks after which she started having headache of low intensity, in contrary to the severe symptoms which she had prior to this intervention.

The fourth patient:
An 18 year old girl, studying in college, with chronic headache and left sided face pain for 2 years, has been consulting physicians and an orthopaedic surgeon without much help. Radiograph of her cervical spine was taken with no pathological findings. Her headache would come towards the end of the day, after an exhausting or stressful day. The headache was accompanied by giddiness and sometimes blurring of vision. She said her problem would subside after proper rest or sleep.

There was no associated mood change or any menstrual irregularities. As she had frequent blocked nose, she also consulted an ENT surgeon as and an X-ray was taken to rule out sinusitis. It turned negative for the same. She took help of a dentist but they found no features of malocclusion problem. X-rays of the TM joint and the cervical spine were not significant.

On examination, she seemed depressed and had slumped sitting posture and drooping shoulder. Even though ROM of cervical spine was full, para-cervical muscles were tender on palpation. On palpation, there was tenderness and audible click of the TM joint on the left side. The temporal region and jaw on the same were also tender.The sensorimotor and the cranial nerve examinations were normal.

NSAIDs and low dose amitryptiline were started and stretching and strengthening programme of the paracervical muscles given. Jaw exercise and mobilization of the TM joint was taught and warm water fomentation of the jaw and temple area was applied with soothing result. She was refrained from eating hard foodstuffs and proper sitting and standing posture was advised. Within two months, her symptoms improved considerably.

Rest of the 8 patients, aged between 16 to 58 years,were treated as migraine or other conditions ranging from trigeminal neuralgia, maxillary sinusitis, refractive errors, tension headache, cervical spondylosis or myofascial pain syndrome. Involvement of TM joints was seen in all these patients and their symptoms reduced considerably with intervention for the TM joints. Table 1 gives the number of patients who were diagnosed with various conditions before the interventions.

Table 1

Diagnosis prior to intervention	No. of patients
Migraine	5
Cervical spondylosis	2
Tension headache	1
Maxillary sinusitis	1
Trieminal neuralgia	1
Myofascial pain syndrome	1
Refractive errors	1

CAUSES OF TEMPOROMANDIBULAR DYSFUNCTION
There are many documented causes of temporomandibular dysfunction, such as

- Dental malocclusion[8].
- Arthritis and degenerative changes in the TM Joint [9].
- Traumatic dislocation or subluxation of TMJ.
- Bruxism[10].
- Mood disorders and other psychiatric disorders[11,12].
- Head injuries with subluxation/injury to TMJ[9].
- Rheumatoid arthritis[9].
- Stress related events[13,14,15].

In addition to the above causes mentioned above, De Wijer A, Steenks MH, et al[16] found that there is a considerable overlap in the signs and symptoms of patients with TMD and patients with cervical spine disorders

ANATOMY AND PATHOGENESIS
Temporomandibular joint is a diarthrodial synovial joint, formed between the mandibular condyle and the maxillary fossa on the temporal bone. It consists of 2 compartments, upper and lower which are divided by a disc withtwo fibrous connections at both ends. Rotation of the condyle within the fossa occurs within the initial 25 mm of mouth openingand the next 25 mm, translation of the disc condyle along the articular eminence.

The proposed mechanism of temporo-mandibular joint dysfunction is the malocclusion or chronic or significant injury to the periodontal tissues and ligaments. Afferent fibers are sent to trigeminal spinal tract nucleus. The efferent fibers return to the masticatory musculature causing contraction. Prolonged contraction leads to lactic acid build up within muscle fibers leading to toxic ischaemia. This cycle repeats with each chewing stroke. Abnormal tone in the musculature especially lateral and medial pterygoids leads to abnormal resting position of the condyle against the fossa leading to changes in the pressure area of the cartilage leading to cartilage degeneration and osteoarthritis.

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TMJ joint mechanoreceptors are projected to the sensory and spinal nucleus of cranial V. Prolonged and continuous peripheral input may lead to a central sensitization at the spinal dorsal horn or trigeminal level.The trigeminal nucleus has connection with the locus cerulous and the periaqueductal grey matter. LC has projections to the spinal cord, the brain stem, cerebellum, hypothalamus, the thalamic relay nuclei, the amygdala, the basal telencephalon, and the cortex[17]. The norepinephrine from the LC has an excitatory effect on most of the brain, mediating arousal and priming the brain's neurons to be activated by stimuli.

As an important homeostatic control center of the body, the locus coeruleus(LC) receives afferents from the hypothalamus. The cingulate gyrus and the amygdala also innervate the LC, allowing emotional pain and stressors to trigger noradrenergic responses. The cerebellum and afferents from the raphe nuclei also project to the LC, particularly the raphe pontis and raphe dorsalis.It is related to many functions via its widespread projections. The LC-NA system modulates cortical, subcortical, cerebellar, brainstem and spinal cord circuits[18].There is substantial evidence that both peripheral as well as CNS sensitization of the second order neurons in the spinal cord or brain stem cue to chronic trigeminal nerve stimulation.

Psychiatric research has documented that enhanced noradrenergic postsynaptic responsiveness in the neuronal pathway (brain circuit) that originates in the locus coeruleus and end in the basolateral nucleus of the amygdala is a major factor in the pathophysiology of most stress-induced fear-circuitry disorders[19].The trigeminal nerve is also "married" to the facial, hypoglossal, and vagus nerves. These nerves control sensation and function of almost all other muscles of your head, neck, and throat. The facial nerve is also intimately associated with the TMJ. Movement of the TM joint and compression causes on these nerves lead to upsetting any of these 4 nerves usually ends up disturbing the other three.

DIAGNOSTIC AND TREATMENT MODALITIES

In 1992, the Research Diagnostic Criteria for temporomandibular joint disorders was introduced to standardize diagnostic criteria, and is the only comprehensive diagnostic scheme for TMD. Observation of the face in vertical and horizontal plane, position of the head and neck at resting position is required. Evaluation of the oral cavity for malformed teeth, dental caries or malocclusion is needed. Palpation of the masticatory muscles for tenderness, hepertrophy or spasmor clicking sound on opening and closing the mouth should not be missed. Patients may also present with limitation in jaw opening, which is defined as <40 mm inter-incisor distance with assisted opening [20]

Plain film studies should include an anteroposterior view for condylar shape and a lateral view with jaw open and closed to see condylar movement and joint space. MRI can be used to assess the disc or evaluate for other soft tissue pathology or infection.

The multifactorial etiology for TMD pain has resulted in a wide variety of treatment approaches including physical therapy, pharmacological, interventional, psychological and surgical treatments. One of the most common forms of therapy employed by dentists is the use of oral appliances or splints dent 1.stabilization splints are custom fitted to the patient's teeth and worn at night to prevent grinding. There is short term evidence for the use of these splints to reduce TMD related pain but limited long term evidence[21].

Physical therapies for TMD have included acupuncture, manual therapy, electrotherapy, heat and manual exercises. Acupuncture has been found superior to no therapy or other conservative threatment in several studies. Jaw exercises have shown benefit when compared to controls in several studies[21]. Education of the patient to avoid extreme jaw movements and eat softer foods may improve pain or limit worsening of the condition. The use of moist hot or cold packs, active exercises, and manual manipulations may improve mouth opening distance in patients with disc displacement or arthritis.

A systematic review of studies found evidence for the use of cognitive behaviour therapy with or without biofeedback for reducing pain, depression and the interference of TMD symptoms with activity. Studies have shown pain reduction for both intraarticular injections of steroid and hyaluronic acid, but little difference in effect between the steroids and the hyaluronic acid[22]. Surgery for TMJ is reserved for those patients who are refractory to more conservative therapies[23]. Most studies have involved the use of arthroscopy, arthrocentesis, discectomy and joint replacement generally have had similar results but these studies lacked rigorous study designs[21].

CONCLUSION

Sincetemporo-mandibular joint disorder may be involved in a plethora of conditions ranging from headache to neck pain, migraine to tension headache, myofascial pain syndrome to shoulder pain, examination of the TM joints should be included in any of these cases. Many patients have to attend multiple OPDs of neurology, orthopedics,PMR, ENT, psychiatry, dental etc. Is there a diagnostic lacunae? Hugh amount of money are being spent on investigations, great deal of manpower lost for doctor appointment apart from the suffering and apprehension of the patients. Interventions to the TM joints should always be tried if there are no contraindications. The lack of good evidence for the treatments available has resulted in limited guidance for treating clinicians. Further studies are needed to explore the complexities of these involvements. Imaging studies like MRI, functional imaging of the brain, psychological aspect of these conditions and better management aspects should be worked on for meaningful insight into this intriguing entity.

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