

# The Temporomandibular Pain-Dysfunction Syndrome

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## SUMMARY

The temporomandibular pain-dysfunction syndrome is reviewed. The functional anatomy and the neurophysiological mechanism of the temporomandibular joint are discussed. The purpose of treatment is to reintroduce synchronisation of the moving parts of the joint.

*S. Afr. Med. J.*, **48**, 1103 (1974).

At academic level the aetiology of the temporomandibular (TM) pain-dysfunction syndrome is controversial because of confusion at clinical level, and this results in the application of principles and methods of therapy which are often ineffective, excessive, or even damaging to the joint.

Headache is man's most common complaint, and for the clinician one of the most perplexing problems which may confront him. To pinpoint the source of the problem is difficult, because the symptoms are subjective and the distribution of the pain can seldom be related to the actual structure involved.

Disturbances in the region of the TM joint give rise to a symptom complex where the pain distribution is such that more than one discipline of medicine may become involved: the ear, nose and throat specialist because of pain in the ear and temporal area; the neurologist, orthopaedic surgeon and specialist physician because of headaches, especially those involving the occipital and neck areas; dentists, oral surgeons and prosthodontists, because dental problems often cause pain referring to the face.

The temporomandibular pain-dysfunction syndrome is due to a functional imbalance arising in the stomatognathic complex, involving the masticatory muscles, the temporomandibular joint itself and an incorrect jaw relationship.

## REVIEW OF LITERATURE

Costen<sup>1,2</sup> in 1934 first focused attention on the dysfunction syndrome of the temporomandibular joint, and for many years the syndrome bore his name.

The mechanism of this syndrome was based on the supposition that the bite of the jaws was too closed, leading to a posterior displacement of the condyle with concomitant compression of the Eustachian tube and even medial pressure on the chorda tympani nerve and

that retrusion of the mandible affected the auriculo-temporal nerve. The syndrome included the following symptoms: pain in the region of the ear; a 'blocked' feeling in the ear and tinnitus; neuralgia in the distribution of the second and third divisions of the fifth cranial nerve; and headache, pain, or a burning sensation of the tongue.

Those who rejected Costen's anatomical explanation<sup>3-6</sup> suggested a disturbance of the TM joint.

Since the time of Costen, many theories have been advanced. Granger<sup>7</sup> supported the theory of occlusal disharmony, and suggested that tooth cusps are arranged in a manner which prevents free lateral and protrusive movements of the jaw during mastication. It was also suggested that this disharmony is the result of early loss of teeth, which leads to a backward displacement of the condyles with resultant compression of the highly vascular and nerve-rich posterior part of the meniscus. The tooth-muscle theory, less mechanically orientated, postulated that, as a result of occlusal disharmony, proprioceptive impulses arise which are responsible for muscular imbalance and the associated symptoms.

Schwartz<sup>8</sup> is perhaps the one who has contributed most to our knowledge of the TM joint and its functional disturbances, which he ascribes primarily to a masticatory muscle imbalance.

In association with this theory is the psychophysiological concept of Yemm<sup>9</sup> and Newton,<sup>10</sup> viz. that muscle spasm, as a result of tension, is the primary factor in the dysfunction syndrome. Pathological changes in the joint only arise at a much later stage. The muscular imbalance may also result in cuspal interference of the teeth, and may be responsible for a vicious cycle of muscular spasms.

Not one of the above theories is wholly accepted. The pathogenesis of the symptom complex remains to a great extent a mystery, but in the light of our clinical observations and treatment, our knowledge is increasing.

## THE STOMATOGNATHIC SYSTEM AND THE MECHANISM OF PAIN

This system represents an anatomical and physiological unit and includes the teeth and supporting tissues, the TM joints, ligaments, muscles and bones, as well as the afferent and efferent nerves and that part of the central nervous system responsible for co-ordination and control. The teeth and the emotional state of the patient are the most variable components of the system.

During movement of the mandible, the muscles, ligaments and the meniscus are more important than the

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condyle and the glenoid fossa. Traditionally, only the masticatory muscles are associated with movements of the TM joints, but it is known that a tonic reaction occurs in the whole of the muscular system, which extends from the sternum to the hyoid bone, thence to the mandible, the temporal, the occipital, the post- and prevertebral areas and the pectoral girdle. With every movement of the mandible the tonus of this group of muscles is influenced.

Patients suffering from the dysfunction syndrome experience abnormal muscle spasms and a pain pattern related to a group of muscles forming part of the system responsible for the maintenance of tonus and jaw movements (Fig. 1).

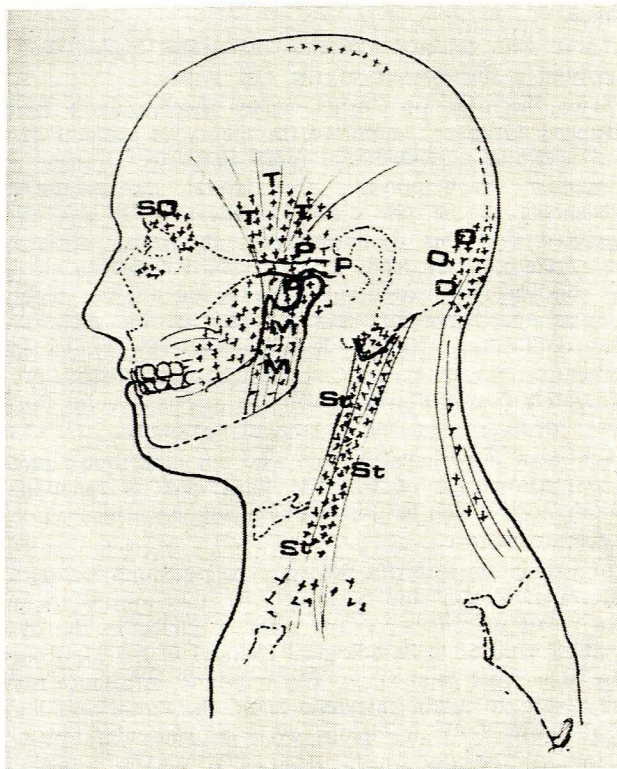


Fig. 1. Schematic diagram of areas of referred pain radiating from the temporomandibular joints. T = temporal area; P = pre-auricular; M = masseteric area; SO = supra-orbital; O = occipital; St = sternomastoid muscle extending down to shoulder girdle.

The neurophysiological mechanism of the TM joint depends on the proprioceptive impulses arising from the periodontal membrane (the membrane around the tooth root), the muscles, lips, cheeks, tongue and ligaments of the TM joint (Fig. 2, left). This stream of afferent impulses, mainly responsible for the maintenance of muscle tone, eventually reaches the reticular formation of the brain stem. The functions of the complex include mastication, deglutition, speech and facial expression. Certain habits, such as clenching or jaw posturing, are

associated with the emotional state of the patient. For example, where a patient continually bites heavily on a raised filling in a tooth or on a tooth cusp, a constant stream of afferent nerve impulses originate, which influence the muscle tone. If this persists long enough, it becomes a habit, and will result in the setting-up of an oscillating circle of nerve impulses (Fig. 2, right).

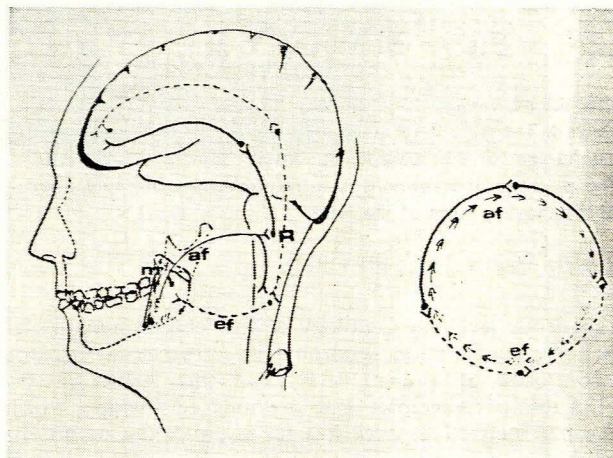


Fig. 2. Left: The neurophysiological mechanism responsible for the maintenance of muscle tone. Afferent impulses reach the reticular formation. m = masseter muscle; R = reticular formation; af = afferent nerve fibre; ef = efferent nerve fibre. Right: Constant irritation such as a raised restoration in a tooth may result in an oscillating circle of impulses.

The rhythmical muscle spasms lead to muscular fatigue which can result in a dull neuralgic muscle pain.

The same principle holds good in cases where patients wearing ill-fitting dentures adapt themselves by certain habits of jaw posture, for example, to the development of a bite of convenience.

The seemingly simple explanation of a possible mechanism responsible for the dysfunction syndrome becomes complicated when it is borne in mind that the muscles of mastication, like the optic muscles, are innervated bilaterally and symmetrically. The effective movement of the mandible therefore depends on the integrated and co-ordinated muscular action which will then assure a synergistic movement. In the event of this system being influenced by any form of imbalance, it will give rise to a symptom complex associated with a pain distribution as illustrated in Fig. 1.

## DIAGNOSIS AND SYMPTOM COMPLEX

It is generally accepted that 20% of patients visiting a dentist experience discomfort to some extent due to the TM joint syndrome. It occurs more frequently in young females and usually on the side opposite to that on which the patient usually chews.

Two aspects determine the success of treatment; correct diagnosis, and a profound knowledge of the aetiology.

The aetiological aspect of the syndrome covers a wide field, from the purely mechanical concept of an occlusal aetiology (it is where the teeth do not fit well) to the broader concept of a functional disturbance of the whole stomatognathic complex, which is under the influence of the higher centres and where the psychological character or make-up of the patient plays an important role.

The diagnosis of the syndrome is based on the following symptoms:

1. Pain occurs in the pre-auricular area, usually unilaterally, and is described as a dull pain. It may radiate to the angle of the jaw, temporal and cervical areas, and may be severe, especially on awakening, and may often increase in severity during the day. Due to the close association between the TM joint and external auditory meatus, the patient is sometimes convinced that the origin of the pain is in the ear.

2. There is a tenderness of the muscles in and around the joint, especially the pterygoid, masseter and temporal muscles.

3. The patient often complains of crepitus or clicking noises in the affected joint. This clicking noise is often an indication of dysfunction of the muscles affecting the joint.

4. Limited mandibular movement and, on opening the mouth, deviation to the side where the symptoms originate.

5. Clinically and radiologically there are no pathological changes to be seen in the TM joint, and palpation through the external auditory meatus elicits no pain.

From this can be deduced that the primary causative factor of the TM joint pain-dysfunction syndrome is a functional one, which may well lead to organic change on the articular surfaces at a later stage.

It would appear that the symptoms develop suddenly or gradually, and the first complaint is often a vague headache or earache, or a stuffy, blocked feeling in the ear. Quite often the pain comes on after an innocent chewing movement or an exaggerated yawn. In keeping with this, pain may develop after some innocent dental procedure requiring a patient to maintain the mouth in an open position for some time, or may follow tonsillectomy.

Clicking or crepitus in the joint is a common sign. The patient usually waits from 3 to 6 months before seeking medical opinion. There are sometimes complaints of fibrositis and rheumatism.

At clinical examination, special note is taken of the presence or absence of sufficient support in the posterior segments of the jaw; abnormal facets on the teeth which are indications of detrimental jaw movements, especially grinding of teeth (bruxing); any deviation in the final 3 mm of closure of the jaws; the free-way space; and the jaw relationships. It is also very important to form an opinion of the emotional state of the patient. It is imperative to examine the mouth critically to eliminate any form of underlying pathology such as retained roots, impacted third molars etc., since these alone may give rise to abnormal muscular spasm as a result of chronic infection.

## TREATMENT

The patient must be assured that the problem is not serious and that it can be treated conservatively. The mechanism of jaw movements is explained, and muscle exercises prescribed to correct the imbalance and to normalise the movements of the mandible.

This involves changing the habits of the patient; myo-therapeutic exercises and relief of acute episodes of pain with sedatives, analgesics or tranquillisers. Where the patient can be well-motivated, active treatment with a removable appliance is usually unnecessary, since 50% of patients react favourably to conservative treatment. This treatment can be supplemented by physiotherapy.

Heat and cold, alternately applied, may have a calming action, which is analgesic and relieves pain resulting from muscle spasm. Microwave and ultrasonic treatment is of greater value because it penetrates the tissues to a depth of 4-5 cm. They are applied for 3-10 minutes daily for 10 days and are contra-indicated when the orbital area is affected, especially in young children.

Muscle exercises against resistance are encouraged. Retrusive relaxation exercises are of great value. Local anaesthetics and the spraying of ethyl chloride on the skin sometimes aid in relieving muscle spasm.

Nervous tension and anxiety sometimes play an important role in the pathogenesis and continuation of the pain-dysfunction syndrome. Tranquillisers combined with aspirin can be advantageously prescribed in these cases. Increased muscular activity is a common manifestation of subjugated emotional stress, fear, anxiety and frustration, and may give rise to abnormal jaw movements.

Concerning the active treatment, it is very important to remove irregular occlusal cuspal interferences and to replace lost molars. Prevention of abnormal chewing habits by means of a removable appliance is of value. Surgery and intra-articular injections are resorted to in special cases only.

Cortisone preparations sometimes give dramatic relief. The mechanism is unknown, since there is no proved inflammation present in the TM joint of the patient.

The benefit derived may lie in the fact that the limited movement in the joint after injection ensures a forced period of rest. From a psychological point of view, the very fact that something positive is being done, as well as the patient's faith in injections, may also be beneficial. All surgical techniques are aimed at relieving muscle spasm. Procedures which can be considered for suitable cases are a partial or complete myotomy of one of the muscles of mastication; or a high neck or intracapsular condylectomy, with or without the removal of the disc. Even a coronoidectomy is successful in a large percentage of cases, probably because it brings about an altered jaw relationship. In so doing, the overactivity of the muscles attached to the specific bone fragments is altered, with resultant immediate relief of symptoms.

Once again, it must be emphasised that the indications for surgery in these cases of temporomandibular dysfunction syndrome are extremely limited, and should only

be considered when all conservative measures have failed to restore the correct jaw relationship to within normal physiological limits.

It is our belief that myofacial pain-joint dysfunction syndrome is basically a reversible physiological condition, and treatment should aim at reintroducing synchronisation of movements of the joint and other structures involved, thus restoring over-all functional harmony.

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