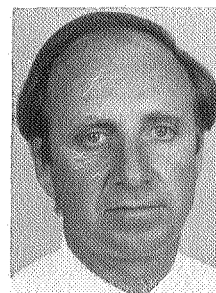


An alternative view of the temporomandibular joint pain — dysfunction syndrome

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Abstract

An alternative view of the aetiology and treatment of TMJPDS has been presented emphasising the part that a sprain of the temporomandibular joint(s) plays in initiating the condition and the subsequent influence of preexisting occlusal and other factors in maintaining the painful problem rather than allowing the sprain to resolve spontaneously. The rationale for the specific occlusal splint therapy described has been briefly discussed.

Key Words: TMJ, pain, sprain, counselling, splint, malocclusion.

INTRODUCTION

As far as I can tell from the literature the subject of pain associated with temporomandibular joint dysfunction predates Hippocrates, but was only begun to be written about in detail towards the end of last century. It seems appropriate that today we should acknowledge a century of such writings which began in a book written by Heath on "Injuries and Diseases of the Jaws" in 1884. Summa (1918) and Prentiss (1918) are credited in the American literature with having first referred to temporomandibular joint disturbances other than organic diseases and from then on there has been a veritable flood of literature on the subject. In 1934 the otolaryngologist Costen drew together the various aspects of a pain-dysfunction disorder related to disturbed temporomandibular joint function and this became known as "Costen's Syndrome". However because Costen's anatomical explanation was shown to be incorrect by Sicher (1948) and others the term fell into disuse in most places by the 1950's. It is interesting to note, however, that even though Costen's ideas were developed largely as a theoretical proposition his focus on dental occlusion and "bite raising" therapy has been sustained.

Since Costen's time many names have been given to this painful condition and new ones are still being coined! The plethora of articles in the dental literature and the numerous synonyms used for its name provide the interested reader with a confusing view. It seems to me that the most satisfactory term is that of temporomandibular joint pain — dysfunction syndrome (TMJPDS).

From the early, rather simple concepts, embellishments have been added from time to time and some of these have become incorporated into the generally accepted, but rarely substantiated, dogma concerning the syndrome. A major embellishment came from the knowledge that muscles generally play an important role in the fine tuning of the function of their associated joints and this led to a change in emphasis, from the part that the temporomandibular joints were considered to have in the pain-dysfunction syndrome to a concentration on a neuromuscular explanation. Following results obtained from his studies, Schwartz (1956), proposed that the painful problem was due to masticatory muscle incoordination and spasm which derived from psychological stress and excessive muscle function in turn deriving from prolonged grinding and clenching of teeth. Laskin (1969) further developed the psychophysiological theory and suggested the term myofascial pain-dysfunction (MPD) to indicate that the symptoms were based on muscle dysfunction rather than on joint disturbance. In recent times the results of research have been taken to show that the MPD syndrome is not a unique dental problem but rather it is one of a group of tension-related functional disorders which occur in patients with psychophysiological disorders. On the other hand some current theories pay little or no attention to psychological factors and claim that the basis for the painful syndrome is a "disharmonious relationship" between temporomandibular joints, masticatory muscles and teeth.

Although an enormous amount has been written and spoken about this painful problem there are many questions

about it of fundamental importance that do not seem to have been satisfactorily answered.

It has been an attempt to find answers to some of these questions that an alternative way of looking at TMJPDS has been derived and from this a therapeutic approach has been reasoned. It is the purpose of this presentation to describe this alternative view.

QUESTIONS WHICH NEED ANSWERS TO ACHIEVE AN UNDERSTANDING OF TMJPDS

It seems important to ask what starts a TMJPDS and what stops it. Why are the majority of patients young and female and why patients with this problem have a variety of painful and other symptoms? Why is it that a variety of widely different therapies achieve a similar degree of success and why is it that following resolution of the painful problem most patients can return to their unchanged occlusion without a return of the TMJPDS?

To begin at the beginning what starts TMJPDS? On detailed questioning approximately half of the patients that we see can recall the time or the circumstances from which their painful problem developed. A traumatic incident is the common component which may have been associated with something as simple as a wide, uncontrolled yawn, a vigorous kiss, a long dental appointment, or to a more obvious event, such as a general anaesthetic or a blow to the mandible. It is possible that a negative history of trauma is related to forgetting the incident, to not connecting the incident with the onset of the painful problem — this is particularly so with general anaesthetic-related TMJPDS — or to being too embarrassed to discuss the incident.

With this knowledge in mind we have developed the idea that TMJPDS begins with, or is initiated by, trauma to one or both temporomandibular joints. It is argued that this initiating trauma injures the soft parts of the joints — capsule, ligaments, meniscus or synovial membranes — rather than the bony components. It is generally accepted that radiographs of the temporomandibular joints in patients with this syndrome show no evidence of injury to bone. It seems acceptable to describe this injury as a "sprain" — a term which has some meaning for both patients and clinicians



Fig. 1. A photograph of the type of occlusal splint used by the author. Note that the splint has been adjusted to accommodate balanced occlusal movements and that there is no tooth-to-splint contact in the anterior region.

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alike and indicates the wrenching of a joint with injury to its attachments but without a persistent dislocation. If the idea of a sprain occurring as an accident is acceptable to explain the initiating cause of a TMJPDS it helps answer the questions as to why a TMJPDS can occur at any time in a patient's life and why it can occur with any degree of malocclusion.

It appears that the currently held views of the causes of TMJPDS cannot be correct — the emphasis on abnormalities of dental occlusion and psychological stress as causes of TMJPDS is difficult to support if one considers that both of these factors occur universally — we all have less than a text book, ideal occlusion, perhaps less importantly we all suffer stress and most, if not all of us, have parafunctional mandibular habits. Why is it, for example, that only a small proportion of those with lack of molar support, Class II or III malocclusion, premature contacts or who brux or clench, suffer, or will suffer in the future, from TMJPDS? These questions seem to be best answered by the proposition of a TMJPDS being precipitated by an accidental sprain rather than something of a predetermined or unavoidable event. This proposition also helps answer the question of why the preponderance of young? — it seems reasonable to suggest that this is because of their greater physical activity in recreational activities and hence chance of trauma. Why the preponderance of females? It seems most likely that this is in line with the proportions of the sexes who present to hospitals and clinics with painful problems — approximately 3 or 4 females to one male. This disproportion is taken to reflect social pressures whereby it is acceptable for females to talk about and seek medical care for their painful problems, while most males do not do this, but seek their solace at a pub or club. Epidemiological studies (Helkimo, 1976) show that there is an even distribution of the sexes in those who suffer from TMJPDS.

The painful symptoms from which patients with TMJPDS suffer can be fitted quite well into the concept of a sprain acting as the original cause, for when a joint is injured its associated muscles function to limit its movement and protect it from painful function and further injury. Trismus is a good example of how local pain via a reflex arc mechanism can produce muscle spasm and a limitation of mandibular movement. If such a problem occurs with an ankle it is clear to the owner that function is painful and has to be minimised. This allows the injured joint to recover and normal function returns. But not so with a sprain of a temporomandibular joint which is involved in very complex functional and psychological activity, including that from mastication, deglutition, speech, yawning, facial expressions and parafunctional habits. As full function continues in a sprained joint further injury is likely to occur, muscle spasm increases and a painful situation is established which can only worsen.

SYMPTOMS OF TMJPDS

The symptoms of a TMJPDS are confusingly complex; perhaps it is the most complex of all painful problems. As with any painful problem the symptoms are of primary importance in coming to a diagnosis. The symptoms derive from two sources — temporomandibular joints and the many muscles of head, neck, shoulders, arms and back. During normal function the muscles of these parts have complex inter-relationships to retain posture and allow normal function. A problem of muscle function in a system of muscles e.g. the masticatory system, can disturb function in inter-related systems. Symptoms such as tinnitus, vertigo, hyper- or hypo-acousia, blurred vision, husky voice and dysaesthesia become easier to comprehend if the part that changed muscle function has to play in producing these symptoms is understood. Table I provides a summary of the variety of symptoms that can occur in TMJPDS. It is unusual for any one patient to suffer from all of these symptoms.

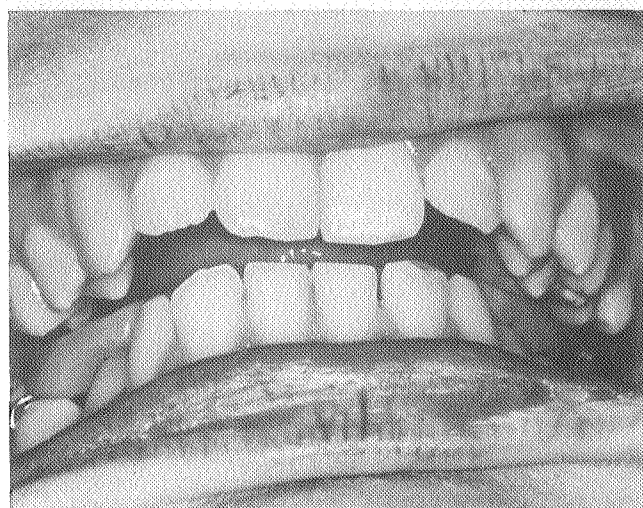
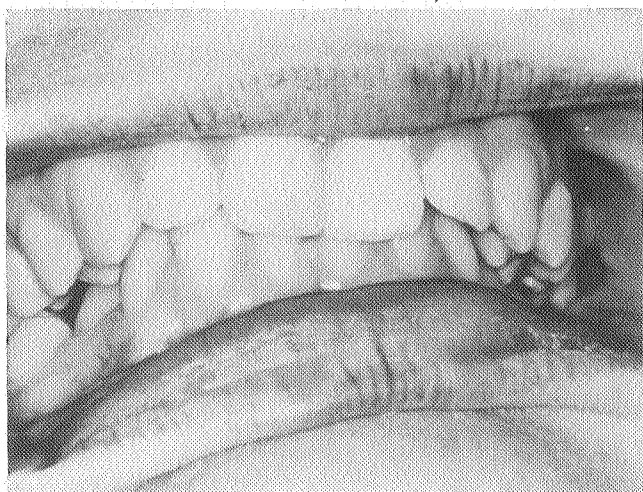


Figure 2(a,b)

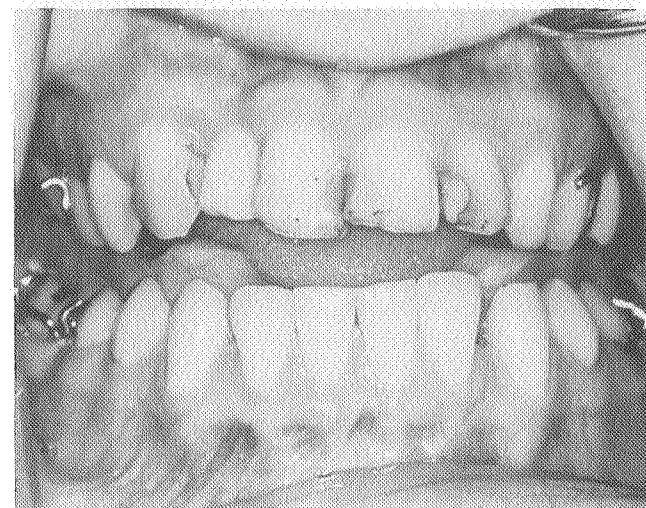
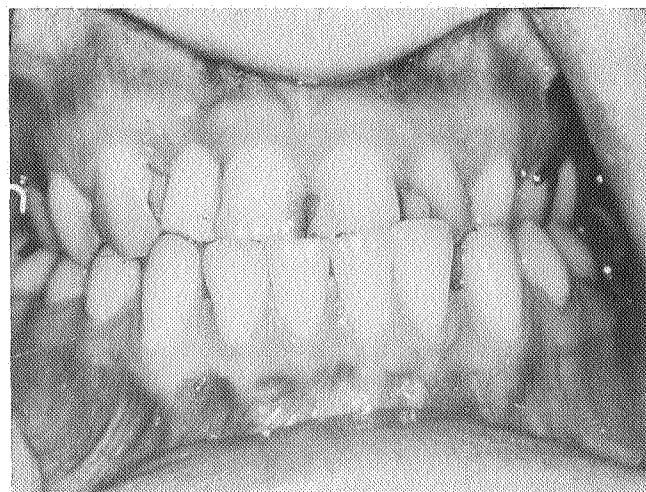


Figure 2(c,d).

SIGNS OF TMJPDS

The signs of a TMJPDS should be used to provide confirmation of a diagnosis based on the symptoms. Signs such as mandibular dysfunction, painful muscles in the head and neck region and obvious features which could act as maintaining factors might be observed. The signs of a TMJPDS are summarised in Table 2 — not all of these signs need be present to support a diagnosis.

NATURAL HISTORY AND RESPONSE TO THERAPY OF TMJPDS

It is fairly clear that following a temporomandibular joint sprain, resolution sometimes occurs, as with a sprained ankle, following a period of limited function, but it is also clear that on occasions the problem continues to worsen as a TMJPDS, sometimes to the point of a psychological crisis caused by an unrelenting pain.

The question then is why do some temporomandibular joint sprains persist rather than resolve? It seems that this is where the dental occlusion and occlusion-related mandibular movements have a part to play in maintaining or amplifying a TMJPDS. If rest from extremes of function is required to assist in the management of a sprained joint then the excesses of some parafunctional mandibular habits by themselves or combined with occlusal factors provide functional loads which inhibit resolution of the sprain and may worsen it. We have described these factors as "maintaining factors". Maintaining factors such as deep overbite, loss of molar support, and displacing contacts, perhaps associated with parafunctional habits such as protrusive over-extension, clenching and bruxing can be accommodated by a normal temporomandibular joint but not so readily by a joint which has been sprained.

Help in supporting the proposition of a two-stage development i.e. initiation and maintenance of a TMJPDS comes from understanding two fundamentally important

aspects of the TMJPDS problem. Firstly, many patients have managed for years, often with grossly inadequate occlusion, before the painful problem begins, and, secondly many patients after successful treatment can return to their preexisting unchanged occlusion. These are important observations that those clinicians who permanently change occlusions, as a part of their therapy, are not able to make.

A further intriguing question relating to TMJPDS bears upon our knowledge that a variety of therapeutic methods have been reported to be successful in its management. Therapies are widely different as counselling, acupuncture, chiropractic, physiotherapy, occlusal modification, splint therapy, intermaxillary fixation and relaxation have been reported as providing successful treatment for approximately two-thirds or more of patients with a TMJPDS. One must pause to ask, "How can this be?". The most satisfactory answer appears to be found in the explanation that there is some factor common to these therapies; and that this proportion of patients do not need active-intervention-type treatment but respond to a placebo and/or instructional effect dispensed by a caring clinician. The placebo effect in many studies of pain control varies from one third to two thirds of the patients involved in the study.

The understanding that many different therapies have similar successful results is of major importance for at least three reasons. Firstly it should make clinicians careful about accepting the results of trials in which this factor has not been controlled. Secondly it should make a clinician wary of claiming success for a particular form of therapy unless this factor has been taken into account. Thirdly it should help clinicians to sort patients with a TMJPDS into at least two groups for treatment purposes.



Figure 2(e,f)

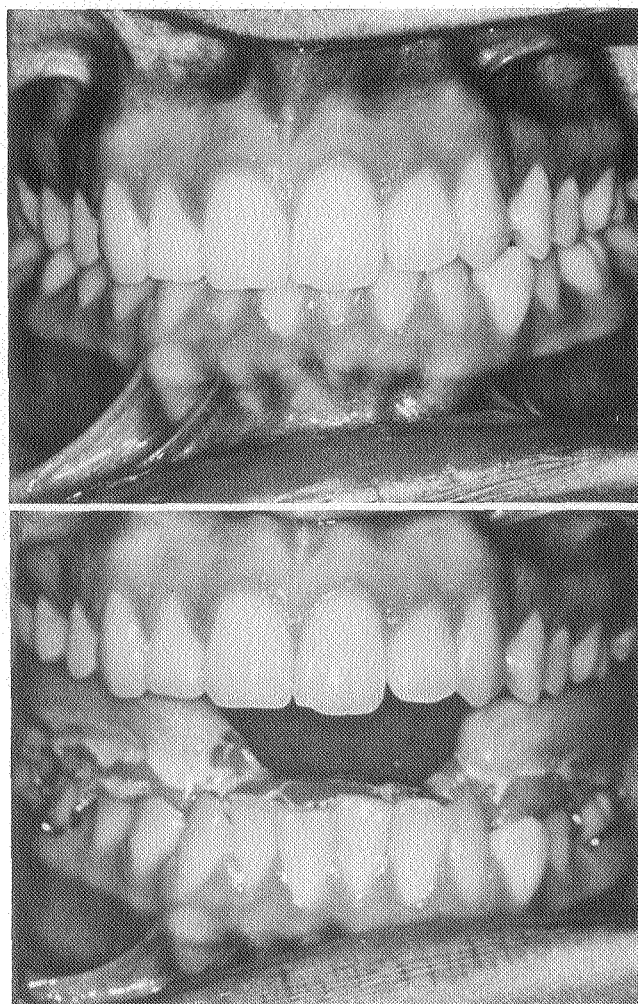


Figure 2.(g,h) A series of pairs of clinical photographs showing cases with teeth in occlusion and with an occlusal splint in place. Note, in particular, the final pair where the vertical dimension of the splint had to be increased to the dimension shown before resolution of the painful problem could be achieved.

THERAPY

For therapeutic purposes we have found it convenient to divide patients into two groups using the criterion of whether or not the painful problem has been previously treated. If the problem has not been previously treated then one can anticipate success with approximately two-thirds of the patients as a result of counselling and the placebo effect. We describe this group as having a minor TMJPDS. On the other hand those patients that have had active treatment which has not produced resolution of a TMJPDS can be placed in a group, designated a major TMJPDS, which require active therapy designed to provide a reduction in functional load on the affected temporomandibular joint or joints. To continue the analogy of the sprained ankle; this group of patients in effect needs a crutch or walking stick to assist with the resolution of the sprain if they are to continue with some level of limited function. The "walking stick" that we use is a particular design of occlusal splint.

In fully dentate patients we usually provide a lower occlusal splint with tooth contact in the buccal segments only, and being retained by bilateral Adams crib clasps (Fig. 1). If teeth are missing then a splint or splints are made to provide maximal buccal segment contact. We choose an arbitrary vertical dimension in the first place at 2 to 3 mm beyond the incisal edge-to-edge position and short of tooth contact during speech (Fig. 2). A very careful attempt is made to produce balanced buccal segment contacts over a wide range of lateral and protrusive movements. Because of a considerable muscle function change during the resolution period, which might extend over weeks or months, regular visits are required to keep the occlusion balanced by

adjusting the occluding surface of the splint. We usually arrange for reviews for this purpose at up to monthly intervals.

The splint is worn at night when most tooth-to-tooth contact occurs and it is presumed that during splint-to-tooth contact the mandibular condyles are distracted from their articular fossae to a degree which reduces the functional load on the joints and allows resolution of the tissues injured by the sprain. Pain is thereby reduced and as a consequence the muscle involvement is also reduced and function returns to normal with the resolution of the TMJPDS. In Fig. 2 clinical photographs of cases which illustrate the splints used to provide resolution of a TMJPDS for the patients are shown.

As with any painful problem psychological factors might influence aspects of the management of patients with TMJPDS whether of a minor or a major nature. We subdivide each of these groups into simplex and complex depending on the level of involvement of psychological factors. If it is recognised that disturbing psychological factors are active in a patient with TMJPDS then it is designated "complex" and appropriate psychological therapy is arranged as an integral part of the patient's treatment. We have found such problems best managed in conjunction with a multidisciplinary oro-facial pain clinic.

SUMMARY

An alternative view of the aetiology and treatment of TMJPDS has been presented emphasizing the part that a sprain of the temporomandibular joint(s) plays in initiating the condition and the subsequent influence of preexisting occlusal and other factors in maintaining the painful problem rather than allowing the sprain to resolve spontaneously. Fig. 3 is a flow chart which summarises the essential differences between this approach and the commonly held neuromuscular and psychophysiological approaches. The rationale for the specific occlusal splint therapy described has been briefly discussed.

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TABLE 1

THE COMPLEX SYMPTOMS OF TMJPDS

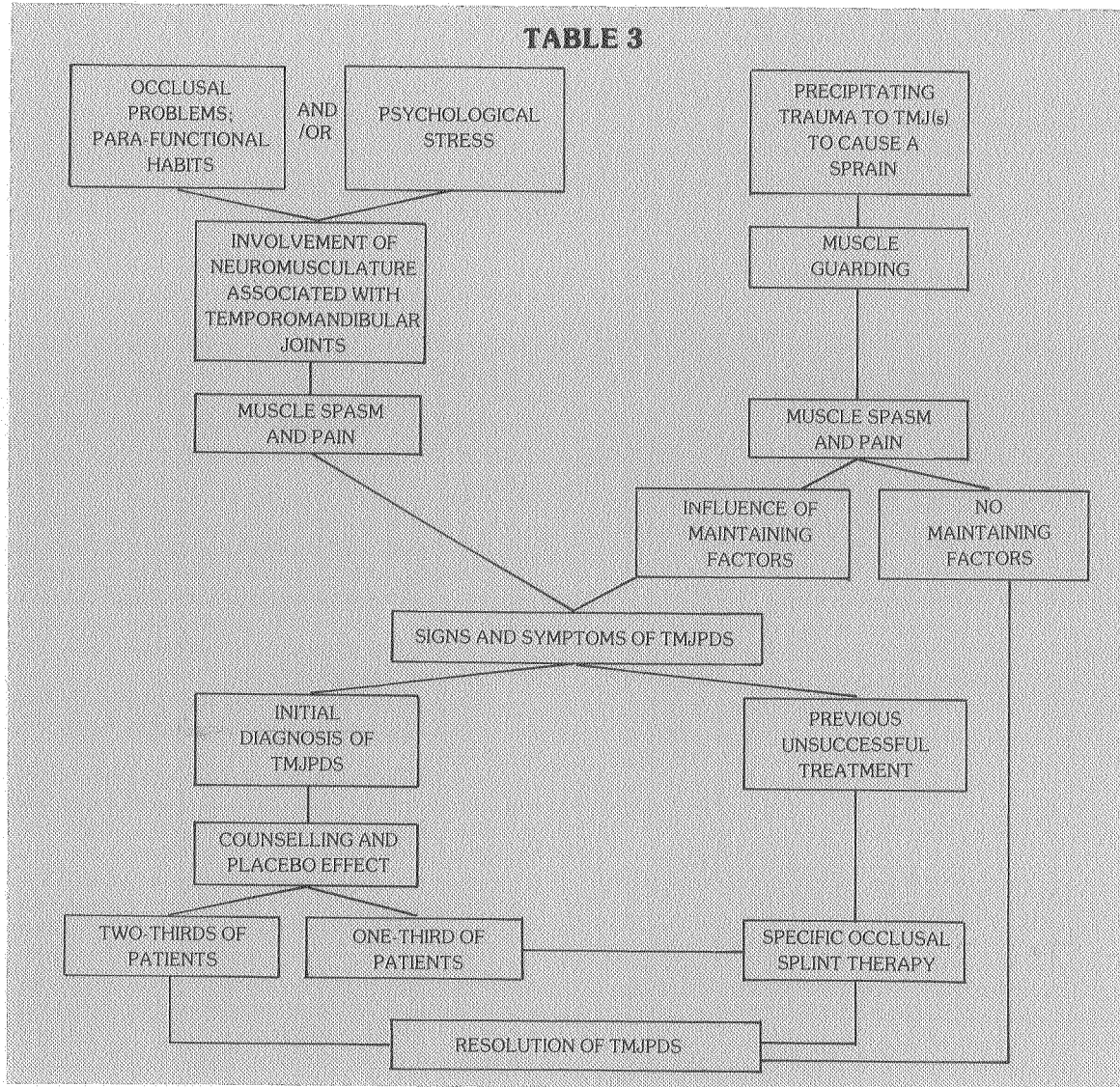
Nature of pain:	acute or chronic, constant or intermittent, sharp or dull, tolerable to severe
Duration:	from days to years, on waking or later in day
Location:	any of the muscles of the head, neck, shoulders and arms (including eyes, ears, tongue, larynx), teeth, temporomandibular joint(s)
Associated phenomena:	crepitus, locking, limited mandibular movement, occlusal changes, stuffy ears, tinnitus, vertigo, hyper or hypo-acousia, nausea, blurred vision, husky voice, dysaesthesia

TABLE 2

THE SIGNS OF TMJPDS

Any age
Either sex, female: male 4:1
Usually pain on palpation of:
— Slightly open temporomandibular joint(s)
— masseter muscle(s)
— superior head of trapezius muscle(s)
— superior head of sternocleidomastoid muscle(s)
— medial pterygoid muscle(s)
Sometimes joint noises
Sometimes mandibular jolting or deviation on opening
Various aspects of malocclusion may be obvious including tooth loss or unsatisfactory dentures
Various parafunctional habits may be noted
Psychological signs may be observed

TABLE 3



**AUSTRALIAN SOCIETY OF
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RESEARCH GRANTS**

The Foundation for Research & Education of the Australian Society of Orthodontists Inc. has available specific funds to assist research projects under the general topic of "research into orthodontics and allied fields".

The Trustees allocate funds on specific research grants from income derived from the invested capital of the Foundation. These Funds are limited and preference normally will be given to assisting projects rather than providing large sums for major research projects.

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