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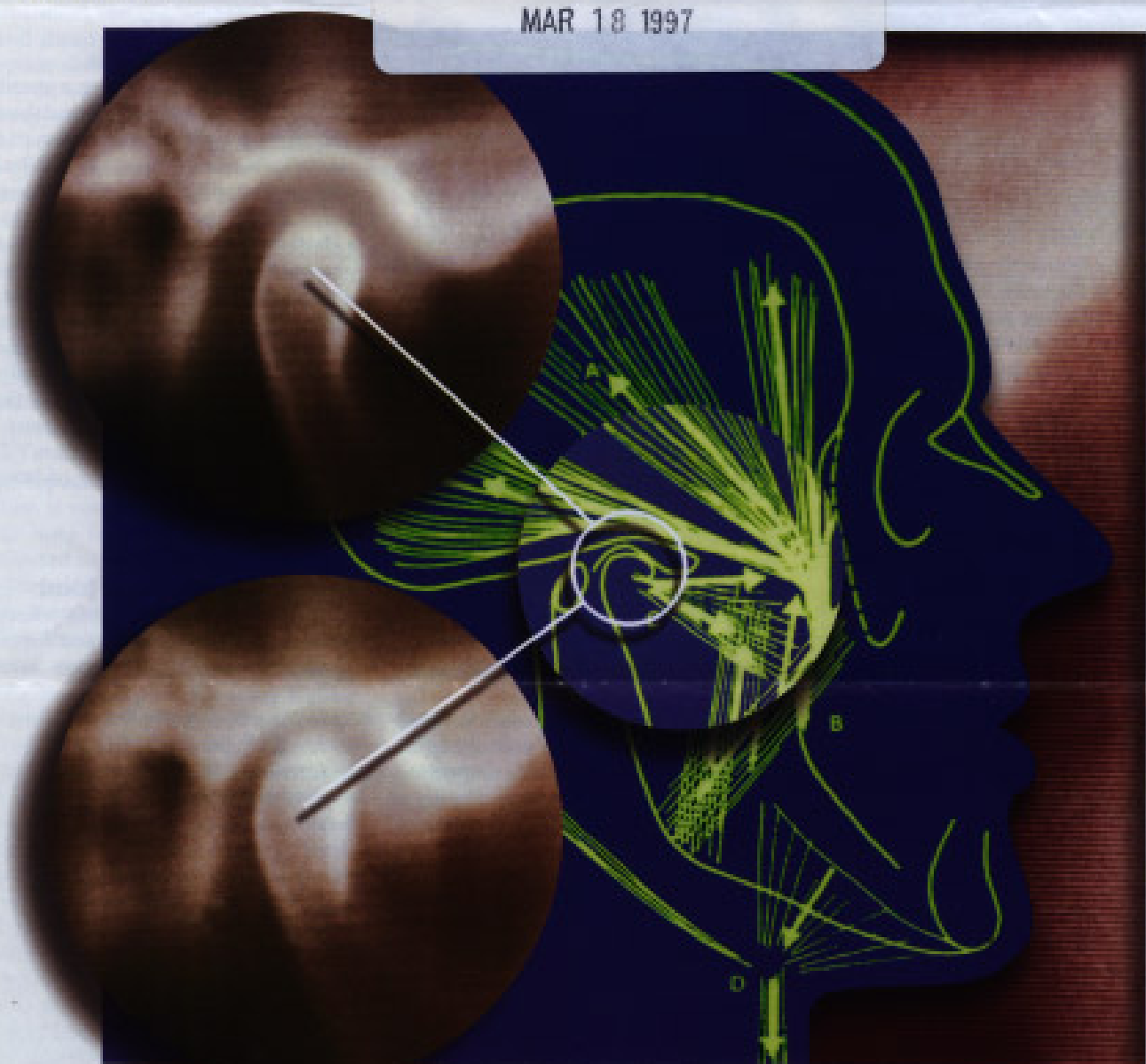
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**Current Concepts in the Orthodontic Management
of Patients with TM Disorders**

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Current Concepts in the Orthodontic Management of Patients with TM Disorders *By Anoop Sandhi, D.D.S., M.S.*

Patients with certain temporomandibular disorders may benefit significantly from orthodontic mechanotherapy. Conversely, patients presenting for routine orthodontic treatment may have underlying temporomandibular disorders that will affect the clinician's choice of treatment options and informed consent procedures. Consequently, it is recommended that every patient presenting for orthodontic treatment be given a thorough screening examination. Simply obtaining a history related to joint symptoms—joint sounds and pain—may not be adequate.

Screening Examination

It is neither appropriate nor possible in this brief article to discuss a detailed examination of temporomandibular joint function. An adequate screening examination should, however, be a part of the orthodontic examination prior to initiating any treatment, and an appropriate screening examination may consist of the following:

- I. A measurement of any occlusal slide from a retruded contact position to a position of maximum intercuspation. The literature has revealed that significant occlusal slides may be related to myofascial pain and to intracapsular disorders.¹
- II. A measurement of the protrusive excursion, any posterior interferences, and any deflection or deviation on protrusion. Any clicking or pain associated during these excursions should be noted.
- III. A measurement of lateral excursions, the teeth involved in providing working guidance, and the presence of any balancing interferences. Any clicking or pain associated during these excursions should also be noted.
- IV. A measurement of maximum mandibular opening, both with and without any pain. Any deflection or deviation should be noted. If the patient identifies pain on maximum opening, the location and distribution of this pain should be carefully identified.

As an example, there are significant clinical differences between a patient who reports pain in the preauricular area on extended opening, as opposed to pain at the insertion of the masseter muscle.

- V. Auscultation of the temporomandibular joints is also useful. It is not necessary to use a Doppler device for this; auscultation with a stethoscope should be adequate. Any clicking, crepitus, condylar subluxation, etc., should be noted.
- VI. The major muscles of mastication should be palpated. If palpation of the major muscles of mastication is negative, it is not generally necessary for a screening examination to include other extraneous muscles.
- VII. The temporomandibular joints should be palpated from the lateral aspect, in the open and closed positions. This should be supplemented with intrameatal palpation.

The literature¹ supports the contention that a patient who does not provide positive findings to any of the screening procedures described above does not present any clinical evidence of a temporomandibular disorder. As a general rule, it is further accepted that if the findings in the above screening examination are negative, no imaging of the temporomandibular joints is indicated prior to initiating orthodontic treatment. If any of these findings are positive, it is recommended that the clinician proceed with a more detailed clinical analysis, with radiographic imaging, if indicated. It is important that a thorough differential diagnosis be established in the presence of any positive findings.

The clinician may have detected a temporomandibular disorder that does not require any specific clinical intervention at that point, but an informed consent burden is now placed on the orthodontist. If it is the orthodontist's opinion that the temporomandibular disorder requires further investigation prior to beginning orthodontic treatment, we recommend that the patient be classified as a TMD patient until the diagnostic work-up is complete. Once

a differential diagnosis has been established, this can be explained to the patient, and appropriate treatment can be instituted.

It is still possible that no specific therapeutic intervention is required, and that the patient merely needs to understand the nature of the disorder, with the provision that further diagnostic evaluation and treatment may be needed in the event that the disorder becomes progressively worse.

Classification and Differential Diagnosis

Patients can experience a number of different temporomandibular disorders. A complete discussion of the classification of temporomandibular disorders would clearly not be possible here. The process for establishing a differential diagnosis for patients presenting with temporomandibular disorders can be involved, and the reader is referred to the classifications, as well as the excellent diagnostic criteria, published in the "Guidelines for Classification, Assessment, and Management of Temporomandibular Disorders."² The reader is further referred to additional reading on this subject.^{3,4}

Biomechanics of the Temporomandibular Joint

There is considerable current research into the anatomy and function of the temporomandibular joints. Certain gnathological principles, which have long been accepted in dentistry, have not been confirmed by clinical research. The terms "centric occlusion" or "centric relation" do not provide any meaningful information, particularly in the presence of an intracapsular disorder. Recent definitions of these terms have been modified to include an assessment of disc position in the temporomandibular joints. While articulated study casts may provide an opportunity to take a detailed look at the occlusion, articulators are not capable of mimicking temporomandibular joint function accurately, and their use for the purpose of diagnosing the effect of mandibular movements on condylar position is discouraged.²

Case Selection

Not every patient who responds favorably to orthotic therapy in the management of a disc-interference disorder is necessarily a good candidate for orthodontic treatment. Since orthodontic treatment frequently produces significant changes, it is important that the treatment be instituted only when necessary and when dictated by the best interests of the patient.^{1,24} Therefore, patients should be given the available treatment choices, and the advantages and disadvantages of each treatment option should be discussed with them.

In addition to the fact that the temporomandibular joint patient must be periodontally stable, and otherwise a good candidate for orthodontic treatment, it is important that changes in condylar position be documented tomographically prior to finalizing a treatment plan. This is an additional concern in view of the wide-spread use of anterior repositioning orthotic appliances, which can sometimes displace the condyle all the way down the articular eminence. Such condylar repositioning is obviously not realistic, and it is our experience that total condylar repositioning in excess of 2mm to 3mm is neither possible nor stable over the long term. Once the patient has selected orthodontic treatment as the preferred treatment modality, appropriate steps can be taken in the transition from the orthotic appliance into orthodontic correction of the malocclusion.

As an example, the patient illustrated demonstrates the total three dimensional repositioning of the mandible that takes place during the initial phase of the opening movement, and the terminal phase of the closing movement. In figure 1, the patient is shown in maximum intercuspation. Figure 2 demonstrates the same patient with a maxillary full coverage orthotic that is designed to open the mandible 4mm as measured at the incisors. It is important to emphasize that the orthotic did not possess any repositioning ramps, and that the effort was simply to achieve a vertical opening of the mandible. Figures 3 and 4 reflect the fact that the change in position was not merely vertical, but had a strong



FIGURE 1



FIGURE 2

anteroposterior component as well. The effect of this movement demonstrates the total change in condylar position as a consequence of the opening movement affected by the splint. Indeed, documentation of condylar response to such displacement is an important ingredient in deciding the appropriate treatment strategies, and in orthotic construction.

Orthodontic Management: Transitioning from Phase I to Phase II Treatment

The literature clearly identifies certain occlusal features that have been correlated with a higher incidence of temporomandibular disorders.¹ Once a careful differential diagnosis has been completed, and the temporomandibular disorder stabilized, careful thought should be given to the advisability of orthodontic treatment in the overall management of the patient's treatment. If the decision is made to proceed with orthodontic treatment, it is appropriate that the patient be given adequate informed consent information prior to initiating orthodontic treatment.

Orthodontic treatment has been identified as a specific treatment option in the management of occlusal discrepancies in patients with



FIGURE 3



FIGURE 4

temporomandibular disorders.^{1,24} As a general rule, whenever possible, we minimize the placement of orthodontic bands on posterior teeth, since it is undesirable to risk traumatizing the temporomandibular joint with the use of band seating appliances. However, in the presence of crowns, anomalous teeth, or other clinical variables, it may become necessary to fit bands or bond attachments to the teeth. In either event, the orthotic is generally modified at this point to allow the eruption of posterior teeth, while the anterior teeth in the maxillary arch are simultaneously given lingual root torque to reduce any anterior interferences. The patient continues to wear the modified splint until posterior vertical stops are established, at which time the orthotic can be discontinued. It is our experience that once the posterior contacts are established, the patient generally preserves the modified condylar position, and that orthodontic finishing can then be completed in a routine fashion.

Orthodontic Finishing

Prior to completing orthodontic treatment, a deband checklist is used. This allows us to review our original treatment objectives, and to demonstrate and document that all necessary

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finishing details have been completed. We also examine joint function very carefully and demonstrate to the patient that the original treatment objectives have been satisfied. Any specific details relevant to post orthodontic restorations, or other special instructions, are noted at this time. The patient is then asked to review the result with a member of the staff, and is asked to acknowledge that the treatment result is satisfactory to them. This serves to reinforce the value of the treatment, in addition to documenting successful completion of the case to the satisfaction of the patient and the doctor.

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