Case Report: Treatment for a patient with a history of TMJ disorder

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Abstract: Establishing a knowledge-based protocol for the treatment of orthodontic patients who report a history of temporomandibular dysfunction can alert the practitioner to potential treatment pitfalls before they happen. While the joints can be extremely adaptive, some individuals are subject to painful and/or limited function. Others have acquired condylar positions that, if not recognized, could lead to serious alterations in the original treatment plan. Combining a thorough diagnostic protocol with a therapeutic regimen that seeks to establish a stable condylar and occlusal position- prior to initiating treatment- is essential.

Key Words: TMJ diagnostic protocol, Muscle splinting, Deprogramming splint

A perplexing diagnostic situation exists when a patient presents with historical information suggesting some form of temporomandibular complex disorder. The patient's report may be somewhat unclear and even confusing. So how does the clinician sort out the information necessary to make an accurate diagnosis, and thereby formulate a rational treatment approach?

Developing a complete history that focuses on the patient's chief complaint, present illness, and personal medical and dental history is an important first step. Combined with a thorough extra- and intraoral examination, this process should lead to the development of a differential diagnosis or clinical impression.

If information from the initial evaluation suggests a clear diagnosis, a rational treatment approach can be generated. However, if more information is needed, the practitioner must design a diagnostic plan. The therapeutic diagnosis is a list of specific and sensitive tests that support and possibly validate the provisional diagnosis obtained from the initial examination. Response to medications and/or physical therapy, diagnostic and/or splint therapy, imaging, and soft tissue cytology or biopsy are some of tests or minor treatments that may be needed to confirm an initial diagnosis.

In making a definitive diagnosis and defining a rational treatment approach, one cannot dismiss the patient's age or emotional state. Assessing the latter can consist of evaluating the patient's attitude toward treatment or referring the patient to a psychological health care provider for additional testing and possibly therapy. A patient's emotional state can greatly impact the treatment outcome, so it must be considered in developing the treatment sequence.

The following case report will demonstrate a protocol suggested for evaluating and treating those patients with overlying dysfunction to the masticatory apparatus.

Case report

A 24-year-old female patient presented with the chief complaint of "wanting my teeth aligned and having a beautiful smile, since I am in the entertainment business." Another practitioner had previously evaluated the patient and suggested treatment, including orthodontic appliance placement, tooth alignment, and interproximal reduction of upper and lower anterior teeth to account for the minimal arch length discrepancies.

Review of the past medical and dental history in combination with extra- and intraoral examination revealed the following:

- maxillary and mandibular crowding
- minimal overbite
- mild overjet
- 2 mm mandibular Bolton excess
- vertical maxillary excess

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Figure 1A

Pretreatment facial photographs

Figure 1B

Figure 2

Pretreatment headfilm

Figure 3A

Figure 3B

Pretreatment intraoral photos. Note occlusion prior to deprogramming splint therapy.

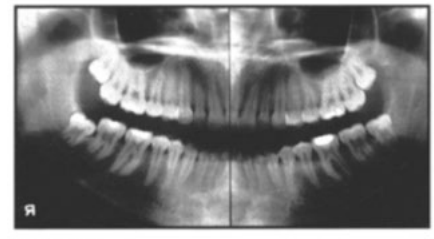

Figure 4

Pretreatment panorex

TMJ/TMD clinical evaluation revealed:

- bilateral myofascial tenderness in the masseter and temporalis areas
- history of grinding teeth at night
- "jaws tired in the morning"
- CR/CO coincidental but mandible difficult to manipulate

Tomography suggested anterior condylar positions on both sides.

Concern about the possibility of habitual anterior repositioning of the mandible due to muscle *splinting* along with the suggestive history and clinical findings created doubt about CR/CO being coincident (dual or Sunday bite). Reasonable convention suggested the use of a flatplane deprogramming splint with periodic adjustments as necessary to maintain patient comfort. The necessary disclosures were made so that after splint therapy her occlusal relationship might be irreversibly altered.

Following a 5-month period of splint wear and adjustment, a substantial CR/CO discrepancy was confirmed. Continued splint wear for an additional 3 month period demonstrated no further difference in the maxillo-mandibular relationship. The patient was also pain-free and

Figure 5A

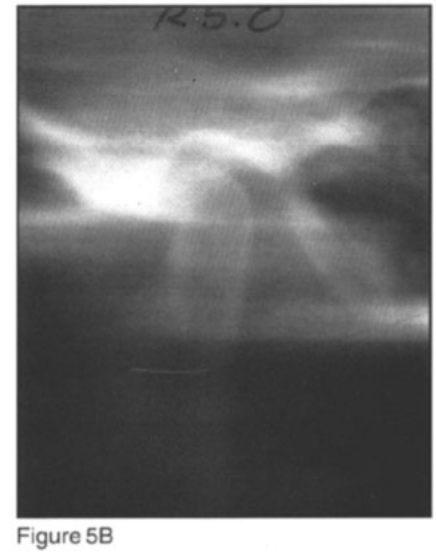

Figure 5B

Pretreatment tomograms. Note occlusion prior to deprogramming splint therapy.

experienced no symptoms of muscle tiredness.

Being reasonably confident of a stable CR/CO endpoint, initial orthodontic therapy was contemplated.

Treatment goals

- Eliminate crowding (remove mandibular Bolton excess through interproximal recontouring)
- Establish a Class I occlusion with anterior coupling and canine protection in functional excursions
- Reduce posterior and anterior vertical maxillary excess
- Correct lip incompetence
- Create esthetic extra- and intraoral appearance
- Coordinate arches
- Eliminate painful myofascial components, if possible

Active treatment

An .022 edgewise appliance was placed and initial alignment was accomplished using nickel titanium wires. Tooth-size discrepancies and

Figure 6
Occlusal position prior to surgery

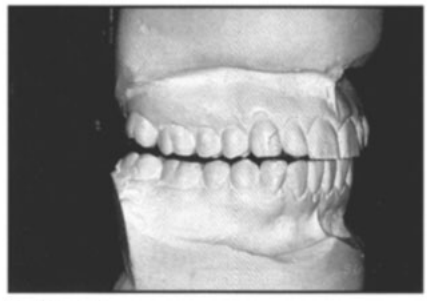

Figure 7A

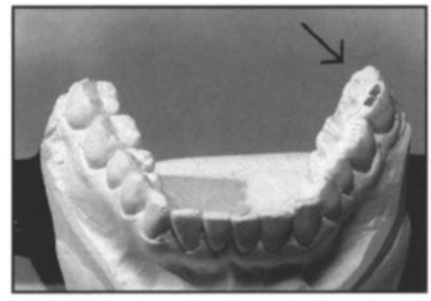

Figure 7B
Occlusion following muscle deprogramming. Note initial occlusal contact point.

Figure 8
Skeletal position prior to surgery

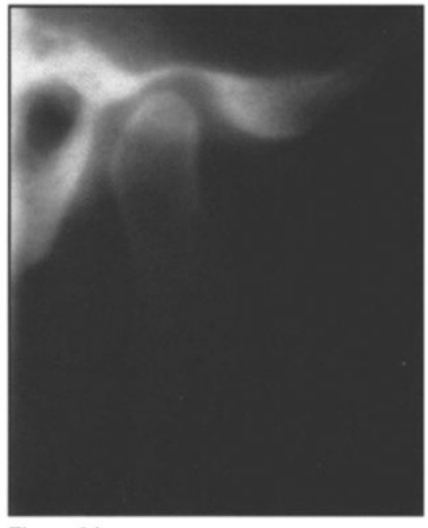

Figure 9A

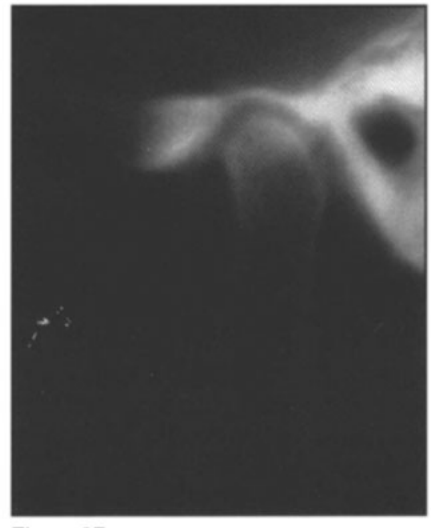

Figure 9B
Tomograms prior to surgery

minor arch deficiencies were resolved by anterior interproximal enamel reduction. Presurgical arch coordination was achieved with .019x.025 stainless steel archwires.

Continued clinical assessment and video imaging suggested a LeFort I osteotomy with impaction more posteriorly than anteriorly, mandibular autorotation to close the openbite and eliminate overjet, and an augmentation genioplasty for esthetic considerations. A surgical repositioning splint was constructed from model surgery that simulated the predicted cephalometric movement.

Postsurgical healing, arch coordination, and final occlusal detailing were accomplished. Two teeth were inadvertently devitalized as a result of complications from the LeFort osteotomy and the augmentation genioplasty. The patient subsequently required endodontic treatment of both teeth. Appliances were removed and retention consisted of fixed mandibular canine-to-canine .0195 GAC wildcat wire, a maxillary .036 wraparound removable retainer during the day, and a maxillary flatplane splint at night.

While the immediate posttreatment findings resulted in a coincident CR/CO relationship and the absence of painful myofascial components, a patient with this type of problem will usually experience periodic exacerbations of distress.

The posttreatment management of this individual continues to be problematic. While her occlusion remains stable, she continues to experience periods of myofascial discomfort.

Her posttreatment therapeutic regimen consists of:

- continued splint protection for her parafunctional habits
- nonsteroidal anti-inflammatories as needed
- physical therapy
- continued psychological care
- adjunctive "biofeedback" mechanisms.

Summary

Establishing a stable occlusal reference point prior to initiating orthodontic therapy is the key to preventing undiagnosed skeletal discrepancies. "Uncomplicated" malocclusions with vague myofascial or joint symptomatologies "may not always be what they appear to be." Careful diagnosis and pretreatment planning may help to eliminate unsuspected occlusal relationships that would otherwise result in treatment surprises that require embarrassing alterations of the original treatment plan.

Figure 10A
Posttreatment facial photographs

Figure 10B

Figure 11
Posttreatment headfilm

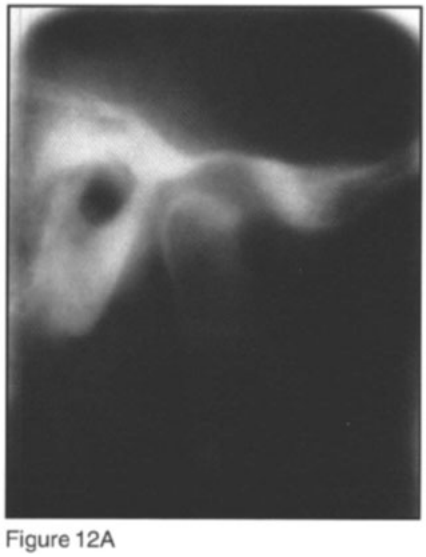

Figure 12A
Posttreatment tomograms with "beaking"

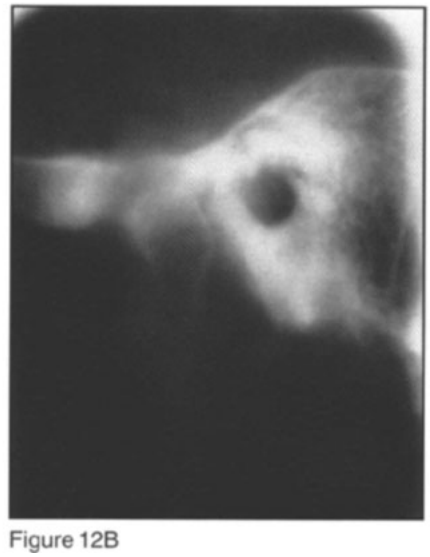

Figure 12B

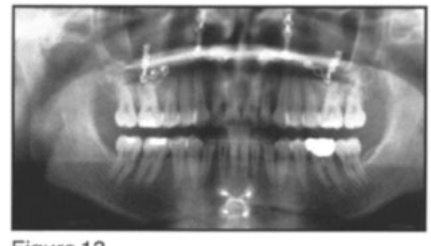

Figure 13
Posttreatment panorex. Note position of fixation screws and plates.

Figure 14A

Figure 14B

Figure 14C

Final intraoral photos. Note occlusal relationship and discolored maxillary left canine and mandibular right lateral incisor