Management of TMD during orthodontic treatment: disc displacements

Dr. Harold F. Menchel discusses how to proceed when a patient develops TMD symptoms during treatment

Every orthodontist dreads the emergency call from the parents of an adolescent in active treatment. “My daughter woke up this morning with jaw pain, and she can’t open her mouth!” Most TMD orthodontic emergencies involve young female adolescents with disc displacements. It has been my experience as a graduate instructor in dental programs that many orthodontists are not familiar with diagnosis or management of these patients. This article will give you the essentials to manage this common occurrence.

Introduction

TMD disorders occur primarily in the female population (85%). Disc displacements occur most often in young postpubertal females. This makes them common in the orthodontic population.

- Hormonal influence (estrogen metabolism) has been suggested as a possible etiologic factor, but the exact mechanism is unknown.
- Hypermobile patients have a higher incidence of disc displacement.
- There is weak evidence that Angle Class II patients are more prone to this pathology, especially Division II.
- The majority of these patients exhibit parafunction (particularly clenching).
- In most patients, this pathology is preceded by biochemical changes in the synovium and is not strictly a mechanical joint problem.
- Disc displacements without reduction have a higher incidence of arthritic joints as the patient ages, but this does not always occur.

Disc displacements

TMJ disc displacements occur when the disc is mobilized when the infratemporal fossa ligaments are stretched and the disc assumes a position anterior, lateral, medial, or posterior to its normal position. These can occur from macrotrauma or microtrauma over time. The most typical displacement is anterior-medial.

Subjective history

The most common presentation of these patients is a history of increasing clicking and popping progressing to occasional locking, and then typically, the patient wakes with a limited opening or suddenly locks while eating chewy food. Many of these patients are habitual gum chewers and nail biters. There are several reasons for the jaws locking, including acute contraction of the masseter and temporalis muscles, the squeezing out of the joint the synovial fluid that provides lubrication for the joint, and a displaced disc.

Prevention

The best prevention for TMD problems is a thorough TMD examination prior to starting orthodontic treatment in every patient. The following procedures should always be included for every new patient.

- Palpation of joints and muscles for pain
- Measure initial range of motion (normal opening 45 mm-55 mm)
- Documentation of joint noises
- Documentation of deviation on opening and protrusion
- Measurement of excursive movements to see if they are normal and symmetrical
- Patients with disc displacements will often deviate initially to the side of the

Figure 1: The posterior band of the disc

Figure 2: Routine palpation of masseter muscles

Educational aims and objectives

This article aims to discuss how proceed when a patient develops TMD symptoms during treatment.

Expected outcomes

Orthodontic Practice US subscribers can answer the CE questions on page XX to earn 2 hours of CE from reading this article. Correctly answering the questions will demonstrate the reader can:

- Identify some reasons for TMD disorders to occur.
- Identify some common reasons for TMJ disc displacements.
- Realize some possible prevention methods for TMD problems.
- Recognize some differentiations between disc displacements and other TMD diagnoses.
- Discuss management of patients who develop locking during treatment.
disc displacement, and then when it reduces (clicks), they will come back to center with an “S”-shaped opening.

- Panorex radiographs

Diagnosis of disc displacement with reduction

Disc displacements have to be differentiated from other TMD diagnoses: myospasm, arthritis, or post-injection trismus.\(^\text{15}\)

- History of painful clicking and popping and occasional locking with increasing symptoms
- Limited opening (usually 25 mm-35 mm) with a “hard” end feel. (The patient has a consistent opening measurement with no “give”)
- Deviation to the side of the disc displacement on opening and protrusion
- Limitation of movement to the contralateral side
- Disappearance of joint sounds with locking
- Tenderness over the TMJ lateral pole
- Decrease of pain with placement of separator on the side of the disc displacement; increase in pain with placement on the contralateral side (Mahan’s sign).\(^\text{16}\)

Management of orthodontic patients with disc displacements

Reducing Displacements

- Painless clicking and popping with no dysfunction (locking) can be treated normally, but with caution if the patient develops symptoms!
- Patients who have painful clicking and locking should have conservative TMD therapy until there is no pain or dysfunction and then proceed with orthodontics with coordination of treatment as necessary with an orofacial pain dentist.
- Asymptomatic clicking and popping during treatment should be noted, but treatment may continue.
- Judicious use of anterior repositioning appliances during therapy should be considered.

Non-reducing displacements

Most patients with disc displacements do not develop significant occlusal changes.\(^\text{17}\)

It is conjectured that the posterior occlusion should be heavy on the side of the displacement with an anterior open bite, but this is not consistently seen in practice.

The reason for this is unknown.

Patients with limited opening and pain prior should have no orthodontic treatment until pain is managed and the ROM is normal!

- These patients can be treated “off the disc” after ROM is normal. Pain

management with conservative TMD therapy.
- Some patients may require either arthroscopic lysis and lavage or discopexy (disc repositioning) prior to orthodontic treatment. In my practice, this is less than 10% of the patients with disc displacements without reduction.\(^\text{1}\)
- If surgery is performed, it is recommended that orthodontic treatment be delayed 3-6 months for healing and for occlusal changes to stabilize.

Management of patients who develop locking during treatment

Management of these patients is always easier the later in treatment the disc displacement occurs. The use of anterior repositioning appliances in these patients is questionable. In cases of non-reducing joints or in the later stages of internal derangement of the TMJ, it is not possible to achieve a normal disc-condyle relationship using protrusive splints.\(^\text{18}\)

The main reason is that non-reducing disc displacement cannot occur without the loss of disc contour, which has the responsibility of providing the anatomic basis for normal disc position. However, this change is gradual. The acute stretching of the ligaments and concomitant joint laxity as well as normal traction of the lateral pterygoid muscle now being pathologic are responsible for difficulty establishing a normal condyle-disc relationship.

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Figure 3: Measuring range of motion (ROM) with TMJ Trimeasure (Pankey Institute) Normal range 45 mm-55 mm

Figure 4: Deviation on opening to the right. This patient has a disc displacement in the right condyle. He is also limited in left lateral excursions

Figure 5: Disc displacements with and without reduction. On the top you can see the condyle closed (on the right with disc anterior to the condyle). This reduces or repositions into normal position on top of the condyle when the patient opens and the condyle translates. This is a “clicking” joint. On the bottom, the disc is far anteriorly displaced so that it does not reduce to its normal positioning and blocks the opening.
• Mechanical tooth movement should be stopped until symptoms are reduced and opening is normal.
• There are three ways to treat disc displacements without reduction during orthodontic treatment without removing the appliances:
  1. Use bonded anterior bite stops or bite turbos to prevent any further posterior positioning of the condyle in the infratemporal fossa of the mandible and to act as a temporary splint.
  2. Have the orofacial pain dentist place the splint over the appliances on one arch. He will request that you remove the arch wires and take alginate for him. When the patient is comfortable, turbos can be placed and the treatment finished.
  3. “Flip splints.” This is the most time-consuming method but sometimes has to be done in severe cases. Move the teeth opposing the splint until you are finished, and then “flip” the splint to the other arch now finishing your orthodontic movement on the arch with previous splint.

Retention of cases with disc displacements or general bruxism
Splints are usually required for retention especially where bruxism is evident.

The simplest configuration is an upper flat plane splint against a lower bonded retainer or lower labial bow retainer. Essix retainers are contra-indicated because the occlusion cannot be adjusted. Invisalign® retainers present the same limitation.

Conclusions
Disc displacements sometimes appear in the orthodontic population. The best way to manage them is with a TMD examination prior to treatment and then TMD treatment before any orthodontic movement. If the disc displacements occur during treatment management, techniques are discussed in many cases without removing the orthodontic appliances.

REFERENCES