

Emergency Management of Restricted Jaw Opening

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“Clinical Showcase” is a series of pictorial essays that focus on the technical art of clinical dentistry. The section features step-by-step case demonstrations of clinical problems encountered in dental practice. If you would like to propose a case or recommend a clinician who could contribute to this section, contact editor-in-chief Dr. John O’Keefe at jokeefe@cda-adc.ca.

A patient who is experiencing difficulty opening the mouth may present for emergency consultation (Fig. 1). Attempts to open the jaw may actually worsen the situation and may be accompanied by intense pain and increasing anxiety.

A detailed case history, close clinical observation and investigation of mandibular movements allow for a precise diagnosis, which should in turn lead to clinical understanding and effective management.

Diagnosis of Restricted Jaw Opening

Initial questioning allows the clinician to evaluate the patient’s psychological state and to eliminate trauma (such as fracture), general pathology or infection as the cause of the trismus. Knowledge of the history of the dysfunction also allows better interpretation of the radiologic examinations.

Limited Jaw Opening of Natural Origin

The physiologic ratio between the maximum extent of lateral movement of the

jaw and maximum opening is 1:4 (Fig. 2).¹ However, some patients have a natural constraint in opening the mouth. They do not experience muscular or articular pain, nor do they have a history of articular clicking at the temporomandibular level.

Contraction of the Masticatory Muscles

Muscular contraction without infection is a symptom of severe bruxism. Signs of dental abrasion and hypertrophy of the masseters, the results of prolonged, habitual clenching of the teeth, may accompany the clinical findings (Figs. 3 and 4).² Palpation of the masticatory muscles reveals increased tonicity.

In these patients, the pain is characterized by twitching of the cheeks or headaches on waking and/or at end of the day. This type of pain increases during prolonged jaw opening.²

On questioning, the patient typically denies any history of articular sounds. Vertical jaw opening is lateralized and is of less-than-normal extent, whereas lateral movements (to the left and right) are equal and almost normal (Figs. 5 and 6).^{1,2} Protrusive movement is possible.



Figure 1: Limited jaw opening.



Figure 2: Normal physiologic amplitude of lateral movement and opening of the jaw (ratio 1:4).



Figure 3: Hypertrophy of the masseters due to hyperfunction (grinding or clenching).



Figure 4: Signs of abrasion, possibly due to hyperfunction.

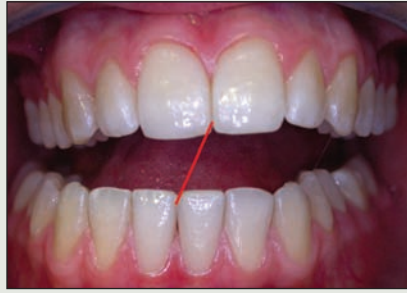


Figure 5: Limited lateralized opening.



Figure 6: In cases of muscular abnormality, lateral movements are possible, but their amplitude is low.

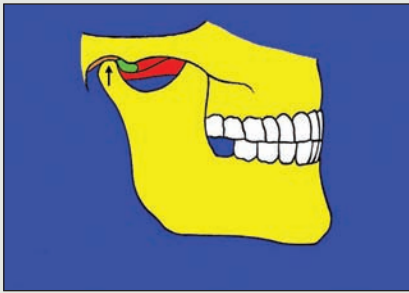


Figure 7: In a patient with acute disk displacement without reduction, the disk is not in its physiologic position and the condyles are raised into the glenoid fossa; this compresses the posterior vascular nerve structures, which causes pain.



Figure 8: In a patient with acute disk displacement without reduction, forced opening of the jaw does not increase the amplitude.



Figure 9: In a patient with acute disk displacement without reduction, lateral movement is reduced on only one side (in this case, the left side).

Acute Disk Displacement Without Reduction

Acute displacement of the articular disk without reduction can be caused by trauma such as shock, whiplash or general anesthesia that can result in the articular disk leaving its physiologic position. The mandibular condyle is elevated into the glenoid fossa, which compresses the posterior vascular nerve structures (in the bilaminar zone), causing intense pain (Fig. 7). Complete blockage occurs, and no further movement is possible.

The limited jaw opening can also be the result of bruxism associated with existing anterior disk displacement with reduction. The patient reports characteristics of previous intra-articular abnormalities (e.g., history of clicking or cracking). In some cases, the muscular disorder is associated with the articular disorder.

The limited amplitude of opening is lateralized on the affected side and cannot be increased by artificial manipulation (Fig. 8). In addition, the amplitude of one of the lateral movements is

largely reduced (Fig. 9). The condyle is blocked by the rear edge of the forward-shifted disk, which prevents propulsion.

A good clinical investigation allows the diagnosis to be made without radiography (which is unnecessary for this type of disorder).²

Management

Muscular Contraction

Placement of a tongue depressor between the incisors releases tooth-to-tooth contact in the premolar–molar region (Fig. 10). Propulsive and lateral manipulations on this improvised anterior rest induce the autonomic muscular contractions to stop. After a few minutes, the muscles relax, and jaw opening essentially returns to normal.

In the presence of a severe muscular disorder, a splint with bilateral balanced contacts can be used to reduce these muscular contractions over the long term (Fig. 11). A mandibular splint is pre-



Figure 10: In a patient with muscular contractions, propulsive and lateral movements carried out on an anterior rest cause the autonomic muscular contraction to stop.



Figure 11: After cessation of the muscular spasms, a stabilizing mandibular splint reduces the muscular contractions over the long term.



Figure 12: In a patient with acute disk displacement without reduction, mandibular manipulation with cotton rolls at the level of the most posterior right and left molars allows decompression of the temporomandibular joint with a pivotal effect.

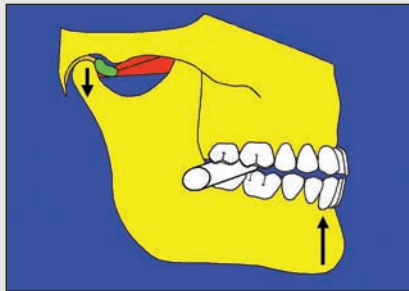


Figure 13: This procedure causes movement of the condyle downward, decompressing the articulation and relieving the muscles that close the mandible.



Figure 14: An occlusal splint with only posterior contacts (pivot splint) maintains decompression during healing of the posterior vascular nerve structures.

ferred because it is better tolerated by the patient in terms of both speech and esthetics.²

Acute Disk Displacement Without Reduction

Numerous techniques for reduction of acute disk displacement have been described in the dental literature (Table 1). Each has disadvantages as well as benefits.

The following technique is inspired by that of Farrar and McCarty.⁴ The procedure should be described to the patient beforehand to avoid any surprise. The practitioner first places cotton rolls at the level of the most posterior right and left molars. The practitioner places the palm of one hand under the patient's chin, supporting the occiput with the other hand. A progressive and relatively strong upward pressure is applied (Fig. 12). It is essential that the cotton be placed on the most posterior parts of the dental arches to ensure effectiveness of the levering movement. The prac-

itioner should be in a comfortable position, so that the manual pressure can be maintained for 5 minutes. This easy manipulation entails no risk of bites and is possible even in cases of very limited opening.

The procedure stretches and consequently relaxes the elevator muscles of the mandible. This causes movement of the condyles downward and decompresses the articulations. The manipulation makes it possible to lift the muscles that are in spasm and thus allows a certain amplitude of movement (Fig. 13). Clinical experience shows that disk reduction is possible by manipulation when the procedure is carried out immediately after the dislocation. This manipulation facilitates taking an impression for an occlusal splint with only posterior contacts (Fig. 14) and also maintains articular decompression by a pivotal effect.^{2,10} A nearly normal amplitude of jaw opening will be recovered by uninterrupted use of the splint for

Table 1 Previously reported techniques for reduction of acute disk displacement

Reference	Method	Follow-up	Advantages	Disadvantages
Solberg and Clark ³	Thumbs placed on occlusal surface of inferior molars, with application of firm inferior anterior and medial pressure	Occlusal splint (to reposition the mandible anteriorly)	<ul style="list-style-type: none"> • Straightforward approach • Most common technique used • No external materials required 	<ul style="list-style-type: none"> • Requires significant force • Stressful for both patient and operator • Human bite risk to the operator • Locked jaw makes it difficult for practitioner to place fingers on most posterior inferior molars
Farrar and McCarty ⁴	Retrusion of the mandible, then application of downward force on most posterior tooth during an opening movement	Jaw-repositioning bite plane worn at all times for 10 days, then occlusal equilibration	<ul style="list-style-type: none"> • Same as Solberg and Clark method 	<ul style="list-style-type: none"> • Same as Solberg and Clark method • May be very difficult in some cases
Awang ⁵	Autoreduction via stimulation of soft palate (gag reflex)	Unknown	<ul style="list-style-type: none"> • Simple, fast and safe 	<ul style="list-style-type: none"> • Must be performed immediately after the dislocation (when there is no muscular spasm)
Lowery and others ⁶	With patient under general sedation, thumbs are placed at the chin, with fingers on occlusal surface of inferior molars; cephalad force is applied with caudad pressure and pivoting at the wrists	Unknown	<ul style="list-style-type: none"> • Light force required • Benefit arises from muscular forces and shape of mandible 	<ul style="list-style-type: none"> • Side effects and difficulties associated with general sedation • Human bite risk for the operator
Suarez and Ourique ⁷	Assisted lateral reduction technique associated with intracapsular injection of anesthetic	Unknown	<ul style="list-style-type: none"> • Anesthetic causes muscular relaxation, so less force is needed 	<ul style="list-style-type: none"> • Intracapsular injection may be difficult, and may be associated with side effects
Van Dyke ⁸	Solberg and Clark manipulation under general anesthesia	Unknown	<ul style="list-style-type: none"> • Anesthetic causes muscular relaxation, so less force is needed 	<ul style="list-style-type: none"> • Possible side effects of general anesthesia
Friedman ⁹	Movement of the jaw	Mandibular appliance	<ul style="list-style-type: none"> • Easy • No risk 	<ul style="list-style-type: none"> • Some minimal jaw movement must be present

3 months. During this period, the patient adopts a specific routine, including a soft diet and avoidance of large-amplitude movements. Secondary treatments, such as application of heat compresses, cryotherapy or massage with anti-inflammatory ointments, can also be prescribed.

In cases of articular dysfunction, this manipulation allows for partial relief. Some authors recommend more rigorous manipulation of the mandible^{6,11} under sedation or general anesthesia, which may be accompanied by injection of a local anesthetic or muscle relaxant.^{8,9}

It is important to note that in cases of anterior disk displacement, the use of an anterior rest is contraindicated because it induces an anterior rotation axis which in turn causes posterior mandibular movement. This movement raises the condyle into the glenoid fossa, which increases articular compression and causes unbearable pain.¹²

Conclusion

An accurate diagnosis is essential to ensure appropriate emergency treatment of a patient who presents with difficulty in opening his or her mouth. The fast and easy technique described here is less invasive. It is not painful and articular decompression is often accompanied by pain relief. Injection of local anesthetic or treatment by muscle relaxants, which makes the mandibular manipulation easier, is useful only in cases of particularly severe pain. However, this type of manipulation is not advised for patients with no posterior teeth.

Special attention must be paid to the patient's general stress level, which can be associated with temporomandibular disorders.¹³ If the patient does not realize that bruxism is one of the main causes of the mandibular restriction and does not take steps to manage stress, the condition will tend to recur. ♦

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