Method Article

Introduction of a novel technique for reduction of temporomandibular joint dislocation

ABSTRACT
Aims: Although the conventional method for reduction of acute mandibular dislocation has been a versatile one, it occasionally fails to relocate the condyle within the glenoid fossa. Application of heavy forces is inevitable in some clinical scenarios which potentially can cause damage to condylar structures. Moreover, the heavy force used in conventional method may be difficult for the patient to tolerate and also it can necessitate the use of adjunctive methods such as medications. The aim of this technical note is to present a novel method for reduction of acute anterior dislocation of mandibular condyle.
Technique: Standing in front of the patient, the clinician should touch the coronoid process of the mandible along the upper vestibule intraorally, slightly rotate the mandible clockwise and apply a mild to moderate backward pressure over the coronoid process. This pressure would bring about the reduction of the condyle.
Conclusion: This maneuver has been applied by the author in 130 cases and it has been successful in all cases of anterior condylar dislocation. It is very effective and simple, comfortable for the patients, and does not need any equipment or medications, and eliminates the risk of damage to jaw structures.

Keywords: Dislocation; Mandibular condyle; Reduction; Anterior dislocation

INTRODUCTION
Temporomandibular joint (TMJ) dislocation is a condition in which the mandibular condyle is displaced beyond the confines of glenoid fossa of the temporal bone. It accounts for 3% of all dislocated joints in the body. TMJ dislocation falls into 4 categories: anterior, posterior, lateral and superior, all of which except the former are rare (1). Anterior dislocation is a common situation (2) and can be unilateral or bilateral. Row and killey classified TMJ dislocation as acute, recurrent and chronic (prolonged) (3). Acute dislocation usually occurs as a result of activities like yawning, wide mouth opening during dental treatment or general anesthesia procedures (4). However, dislocations with more frequency (recurrent) are seen in patients with internal derangement of TMJ, occlusal disturbances, joint laxity, neurologic disorders (5) or disorders of collagen metabolism like Ehler- Danlos syndrome (6).
Acute dislocation requires immediate attention and reduction should be done as quickly as possible. Two major factors that resist the reduction of the dislocation are 1) articular tubercle and 2) spasm in the muscles of mastication. This spasm is the result of retrodiscal tissue injury secondary to the abnormal position of the condyle or may be induced by attempts to reduce the dislocation. Lateral pteryoid muscle is the principal muscle of jaw depressing which attaches directly to the condylar neck and articular disc. Spasm of this muscle is of considerable importance in resisting the reduction procedure. Otherwise, it may lead to severe muscle spasm which makes the procedure more difficult. In protracted dislocations extracapsular ankylosis secondary to myospasm, fibrous adhesions or bone contacts may develop (7) and therefore, surgical interventions would be necessary. Manual reduction is the treatment of choice for acute dislocations. Fordyce described manual reduction to be feasible even after 6 months and Hayward reported that it is possible to reduce a dislocated condyle manually after 16 months (7). Various methods of manual reduction have been introduced and all are based on downward and backward force on the mandible (8). In 1980 Littler suggested a sequential approach for non-surgical reduction of dislocated condyles. Manual reduction alone had been recommended for simple cases. Application of local anesthesia within and around the TMJ, oral or intravenous sedation, general anesthesia and muscle relaxant were the next consecutive steps depending upon the severity of the case (9).

In general, the standard well-known method involves putting both thumbs over the occlusal surface of mandibular molar teeth while engaging all fingers beneath the lower border of the mandible, and pressing the mandible downward and then backward to replace the condyle(s) within the glenoid fossa. (Figure 1)

Although the above-mentioned maneuver is a versatile method, it occasionally fails to reduce the dislocated condyle(s). Patients usually experience severe pain during the procedure. Despite the simplicity of the technique, novice practitioners are afraid of applying proper force especially in complicated cases such as atrophic edentulous mandible, fractured and probably fractured jaw. After reviewing difficulties associated with conventional manual reduction, Awang introduced a new approach for reduction of acutely dislocated condyles (10). According to his method of reduction,
during the gag reflex the sensory information from the stimulated mucosa is relayed to the trigeminal spinal tract nucleus and then conducted to the trigeminal motor nucleus which brings about the contraction of the jaw opening muscles. It allows the mandible to descend further down and thus free the condyle from its entrapment. The descended mandible works as a stimulus for elevating muscles which ultimately close the mandible in normal resting position. Therefore, Awang recommended the gag reflex as a natural means of freeing the condyle from its entrapped position by coordinated neuromuscular activities.

The aim of the present technical note is introducing a novel method to reduce acutely dislocated condyles.

**RATIONALE**
From a biomechanical standpoint, conventional maneuver provides a class 3 lever: the middle finger as the fulcrum (F), the condyle as the resistance (R) and the thumb as the effort (E). According to the mechanical advantage rules, this type of lever reduces the effort force. Thus, the force transmitted to the condyle would be about one fifth to one sixth of the force applied through the clinician’s thumb. This explains why it is occasionally necessary to apply a great amount of force to reduce the condyle manually. Besides, the effort force is not parallel to the lateral pterygoid muscle fibers which means additional reduction of the force against the myospasm.

**TECHNIQUE**
In anterior dislocation of TMJ, the coronoid process moves forward and downward; thus it would be readily palpable lateral to the upper molar teeth. The clinician should touch the soft tissue covering the superior and lateral aspects of the coronoid process by his/her index finger. All one should do then is to slightly rotate the jaw and put mild pressure against the process (Figures 2 and 3) and allowing the condyle to relocate into glenoid fossa. The maneuver should be accomplished on one side first. After reduction of one condyle, the opposite condyle will be easily reduced.
DISCUSSION AND CONCLUSION

This method has been applied by the author for the last seven years in 130 cases and has been successful all cases (Table1).

<table>
<thead>
<tr>
<th>Dislocation duration</th>
<th>Less than 1 hr.</th>
<th>1-6 hr.</th>
<th>6-24 hr.</th>
<th>1-3 days</th>
<th>More than 3 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>18</td>
<td>37</td>
<td>56</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>Percentage</td>
<td>14</td>
<td>28.5</td>
<td>43</td>
<td>13</td>
<td>1.5</td>
</tr>
</tbody>
</table>

The probable mechanism of reduction is due to the pressure on the coronoid process bringing about a force that is totally parallel to the fibers of lateral pterygoid muscle, but opposite to the direction of spasm. Another theory for the mechanism of our method would possibly be similar to the Awang’s mechanism. (10) Pressure on the soft tissues over coronoid process may ignite a painful stimulus that ultimately results in coordinated actions of masticatory muscles. The clinician’s force along with the coordinated muscular actions leads to the reduction of the dislocated condyle.

This new method is a novel approach for reduction of the acutely anteriorly dislocated condyles. Based on our experience, it can be used for reduction of dislocations from a few minutes to several weeks’ duration and without local anesthesia or sedation. The procedure can be well-tolerated by the patient since no heavy pressure is applied and it is a very quick maneuver for reduction of atrophic edentulous mandibles, and fractured or possibly fractured jaws. It is straightforward and safe and can
be easily taught to students, and dental or medical assistants. It does not require any equipment and would be invaluable especially in a rural population or anywhere far from medical facilities. Further use and research will be required to determine the mechanism of action that makes this technique clinically successful.

REFERENCES