



Introduction of a Novel Technique for Reduction of Temporomandibular Joint Dislocation

Mohammad Hassan Samandari¹, Parisa Soltani²,
Mohammad Moein Kafshdar Goharian³ and Amirhossein Moaddabi^{4*}

¹Department of Oral and Maxillofacial Surgery, Dental Implants Research Center, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran.

²Department of Oral and Maxillofacial Radiology, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran.

³Department of Prosthodontics, School of Dentistry, Mashhad University of Medical Sciences, Mashhad, Iran.

⁴Department of Oral and Maxillofacial Surgery, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran.

Authors' contributions

This work was carried out in collaboration between all authors. Author MHS designed the study, provided the data for the article and critically revised the draft. Author PS managed the literature searches, wrote the initial draft of the manuscript and provided images for the article. Author MMKG performed literature search, provided images for the article and assisted in writing the initial draft of the manuscript and author AM assisted in designing the study, prepared the article protocol and critically revised the draft. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/BJMMR/2017/30583

Editor(s):

(1) James Anthony Giglio, Adjunct Clinical Professor of Oral and Maxillofacial Surgery, School of Dentistry, Virginia Commonwealth University, Virginia, USA.

Reviewers:

(1) Edward Kijak, Pomeranian Medical University, Szczecin, Poland.
(2) Ujwala Shivarama Shetty, A J Institute of Dental Sciences and Hospital, Mangalore, India.
Complete Peer review History: <http://www.sciencedomain.org/review-history/17222>

Method Article

Received 19th November 2016
Accepted 4th December 2016
Published 13th December 2016

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, does not need any equipment or medications, and eliminates the risk of damage to jaw structures.

Keywords: Dislocation; mandibular condyle; reduction; anterior dislocation.

1. 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 (Fig. 1).

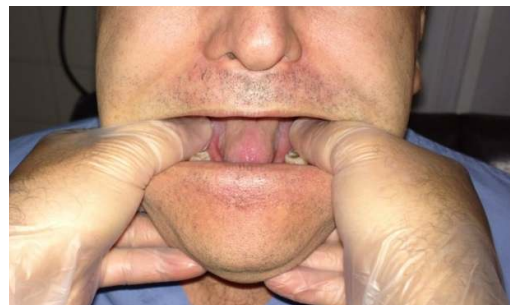


Fig. 1. The standard reduction method

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.

2. 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.

3. 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 (Figs.

2 and 3) 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.

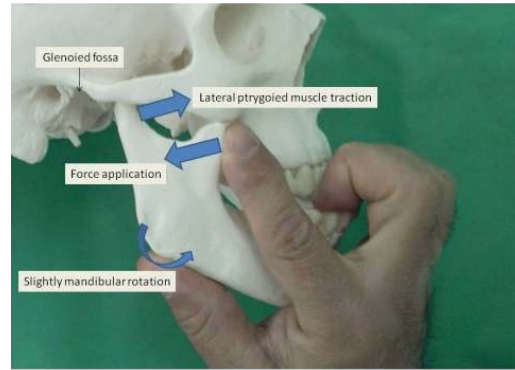


Fig. 2. The mechanism of force application according to the proposed method



Fig. 3. Clinical image demonstrating the proposed method

4. 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 (Table 1).

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

Table 1. The chart of the cured patients

Dislocation duration	Less than 1 hr.	1-6 hr.	6-24 hr.	1-3 days	More than 3 days
Number of patients	18	37	56	17	2
Percentage	14	28.5	43	13	1.5

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.

CONSENT

It is not applicable.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Alema'n Navas RM, Marti'nez Mendoza MG. Inverse temporomandibular joint dislocation. *Int J Oral Maxillofac Surg.* 2011;40:877–879.
2. Debnath SC, Kotrashetti SM, Halli R, Baliga S. Bilateral vertical-oblique osteotomy of ramus (external approach) for treatment of a long-standing dislocation of the temporomandibular joint: A case report. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2006;101:e79–e82.
3. Rowe NL, Killey HC. Traumatic injury of the mandibular joint. In: *Fractures of the facial skeleton.* 2nd Ed. Edinburg and London: Livingstone; 1968.
4. Daif ET. Autologous blood injection as a new treatment modality for chronic recurrent temporomandibular joint dislocation. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2010;109:31-36.
5. Nitzan DW. Temporomandibular joint "open lock" versus condylar dislocation: Signs and symptoms, imaging, treatment, and pathogenesis. *J Oral Maxillofac Surg.* 2002;60:506-511.
6. Bouso OV, González GF, Mommsen J, Grau VG, Fernández JR, Micas MM. Neurogenic temporomandibular joint dislocation treated with botulinum toxin: Report of 4 cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endo.* 2010;109:e33-37.
7. Chin RS, Gropp H, Beirne OR. Long-standing mandibular dislocation: Report of a case. *J Oral Maxillofac Surg.* 1988;46: 693-696.
8. Adekeye EO, Shamia RI, Cove P. Inverted L-shaped ramus osteotomy for prolonged bilateral dislocation of the temporomandibular joint. *J Oral Surg.* 1976;41(5):568- 577.
9. Littler BO. The role of local anesthesia in the reduction of long-standing dislocation of the temporomandibular joint. *Brit J Oral Surg.* 1980;18:81-85.
10. Awang MN. A new approach to the reduction of acute dislocation of the temporomandibular joint: A report of three cases. *Brit J Oral Maxillofac Surg.* 1987; 25:244-249.

© 2017 Samandari et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<http://sciencedomain.org/review-history/17222>