

# Temporomandibular Joint Dislocation Reduction Technique

## *A New External Method vs. the Traditional*

Mojtaba Mohamadi Ardehali, MD,\* Ali Kouhi, MD,\* Ali Meighani, MD,\* Farshid Mahboubi Rad, MD,\*  
and Hamed Emami, MD\*

**Abstract:** The traditional intraoral approach for temporomandibular joint dislocations reduction, although effective, has some disadvantages. Here, a new extraoral approach is described. This study was performed to evaluate this new method's success rate.

Patients visiting an emergency room were randomly allocated to 2 groups; one group was reduced with the extraoral approach and the other with the intraoral method. Among 29 attempts with the conventional method, 25 were successful (86.2%; 95% confidence interval: 73–100) and among 29 attempts with the external method, 16 were successful (55.2%; 95% confidence interval: 39–79). This difference was statistically significant.

Because of the benefits of the external approach, such as avoiding hand bites and disease transfer, it can be a reasonable choice to reduce a dislocated temporomandibular joint.

**Key Words:** temporomandibular joint, reduction, extraoral approach, TMJ dislocation

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The most common type of temporomandibular joint (TMJ) dislocation is acute episodes of anterior dislocation, although dislocations may occur in any direction with various associated fractures.<sup>1</sup> Dislocations are usually spontaneous and may result from excess mouth opening in case of yawning, laughing, taking a large bite, seizure, or intraoral procedures such as tooth extraction or orotracheal intubation.

Treatment depends on patient status and varies from simple reduction to surgical intervention. The latter is usually necessary only for chronic recurrent and chronic persistent dislocations<sup>2</sup> and in acute forms nearly all cases are managed by hand reduction.

The traditional intraoral reduction method, although effective, has some disadvantages: it requires a great effort, especially in patients with strong mastication musculatures<sup>1</sup>; local or systemic analgesics and muscle relaxants or sedatives are necessary occasionally; risks of bite injury regarding hepatitis, AIDS, syphilis, or other transmittable diseases; and patient discomfort regarding the physicians hand in his/her mouth. Therefore, another method using an extraoral approach always has been a concern.<sup>3,4</sup> The external method introduced by Chen et al is supposed to be an easy and effective way to reduce TMJ dislocation, as they stated.<sup>3</sup> Therefore, we performed this study to evaluate the success rate of this new method in comparison to that of the traditional method.

## METHODS

Amir-A'lam General Hospital is a tertiary center for otolaryngology diseases in Iran. Patients referring to the emergency room (ER) were included consecutively in this prospective trial in an 8-month period (January–August 2007). Procedures were performed by second-year otolaryngology residents with a good level of experience in both techniques, who had performed a large number of under-observation reductions before the study.

Block randomization was used for allocating patients into 2 different modality groups. ER reception was provided with a list of random blocks of 2. Every patient, before entry to the clinic and visited by ER physicians, was coded to enter to one of the treatment groups. Therefore, both the patients and the reducing physician were not aware of patient allocation.

A thorough history was taken regarding demographic information, past history of general ligament laxity, past history of TMJ dislocation, underlying disorders, trauma, prior use of muscle relaxing agents, and time delay between dislocation and reduction. Mandible fractures especially those involving the condylar and subcondylar region were ruled out by physical examination and proper x-rays when needed.

To reduce TMJ dislocation, the patient was put in either a sitting or supine position and the operator sat or stood in front of the patient. An attempt was made to reduce the dislocation using the randomly chosen method. The success rate was calculated regarding successful patient treatment for each method on the first try. As the salvage for the unsuccessful cases if the first method failed, the other method was attempted and if that too was not successful, a muscle relaxant (10 mg diazepam) was administered and the TMJ dislocation was reduced. To avoid patient cross over between groups these second reductions were not included in the analysis.

## Conventional Method

The physician, applying bimanual intraoral force on the mandibular molars of the patient in an inferior and then posterior direction, will reduce the dislocated condyle back into the glenoid fossa.

## New Method<sup>3</sup>

The physician places one hand on each of the patient's cheeks. On one side, the thumb is placed just above the anteriorly displaced coronoid process, and the fingers are placed behind the mastoid process to provide a counteracting force. On the other side, the fingers hold the mandible angle and the thumb is placed over the malar eminence. To reduce the dislocated jaw, one side of the mandible angle is pulled anteriorly by the fingers, with the thumb over the malar eminence acting as a fulcrum. While the mandible angle is pulled anteriorly, steady pressure is applied on the coronoid process of the other side, with the fingers behind the mastoid process providing counteracting force. The mandible is rotated by this maneuver and the dislocated TMJ is usually reduced on one side. Once one side of the dislocation is reduced, the other side will usually go back spontaneously (Fig. 1).

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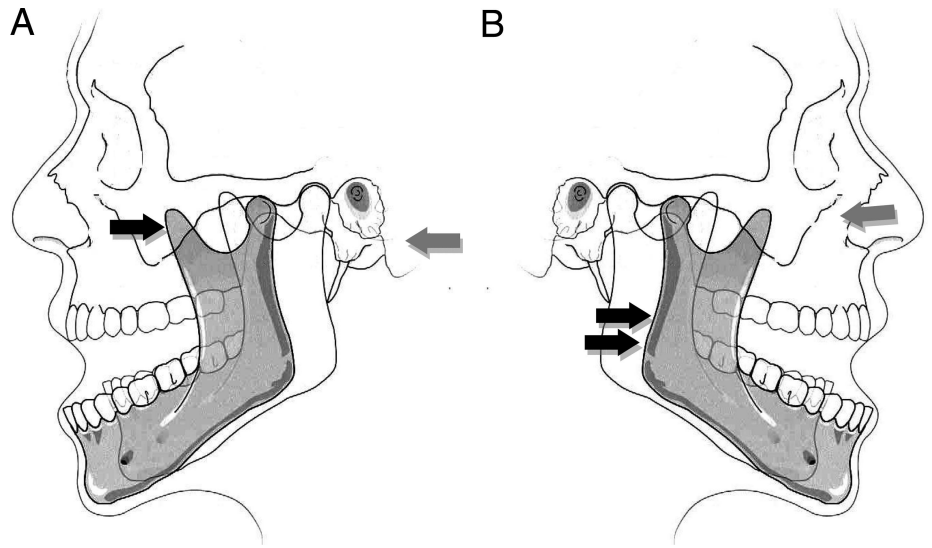
From the \*Otorhinolaryngology Research Center, Amir-A'lam Hospital, Department of Otolaryngology and Head and Neck Surgery, Tehran University of Medical Sciences, Tehran, Iran.

Reprints: Ali Kouhi, MD, P.O. Box 11457-65111, Amir-A'lam hospital, Saouth Saadi Ave, Tehran, Iran. E-mail: akouhi@razi.tums.ac.ir.

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**FIGURE 1.** In the new external method to reduce dislocated TMJ, each joint is reduced separately. Left side reduction is shown here: A, To reduce left side, the thumb is placed just above the anteriorly displaced coronoid process (black arrow), and the fingers are placed behind the mastoid process (gray arrow). B, Simultaneously on the right side, the fingers hold and rotate anteriorly the mandible angle (black arrow) and the thumb is placed over the malar eminence as a fulcrum (gray arrow).

Aftercare for all patients included restriction of wide mouth opening, soft diet, warm packing, and analgesics if necessary. Patients were followed for 1 month. If during the follow-up period dislocation was seen, the patient was revisited.

Statistical Package for Social Sciences (SPSS, version 11.5; SPSS, Chicago, IL) was used for data analysis.

## RESULTS

### Demographic Data

Among our patients, 3 had Schizophrenia and 1 had Parkinsonism, all of whom used drugs with some effects on muscle tonicity; so these patients were excluded from the study. Fifty-five patients were included in the study (29 male, 26 female). However, 2 patients had recurrent reductions; a male had 3 episodes of dislocation and a female patient had 2 episodes. Therefore, 58 reduction attempts were made. The median age was 27 (range: 17–80) years. Twenty-nine attempts were selected for the traditional method and 29 for the external method.

### Reduction Results

Among the 29 attempts with the conventional method, 25 were successful (86.2%; 95% CI: 73–100). For the other 4 cases, only one could be reduced with the new method and the other 3 cases needed a muscle relaxant and afterward were managed with the conventional method. Among the 29 attempts with the external method, 16 were successful (55.2%; 95% CI: 39–79) and for other 13 cases, 10 were reduced with the conventional method and the other 3 cases received a muscle relaxant and then reduced with the new method. So all of our patients (38 patients with the conventional and 20 with the extraoral method) could be treated with the hand maneuver and muscle relaxant and no one needed sedation or general anesthesia. Descriptive data regarding these 2 groups are summarized in Table 1.

Among the 29 conventional attempts, there were 18 patients with positive past history of TMJ dislocation and among these, 4 had multiple episodes (chronic recurrent). There were 18 patients with positive past history among those with the external method and 8 had chronic recurrent dislocation.

Bilateral dislocation was seen in 40 patients whereas 18 were unilateral. There were no significant differences between side of dislocation and the success rate of the 2 methods ( $P = 0.2$ ). The time delay between dislocation and reduction was higher in patients

**TABLE 1.** Descriptive Data for 2 Methods of TMJ Reduction

Parameter	Conventional Method N = 29	New Method N = 29	P Value
Age; median (min-max) y	26 (17–75)	32 (17–80)	0.16
Sex; male/female	17/12	14/15	0.43
Past history of dislocation; mean	65.5%	62.1%	0.79
Success rate;* mean (95% CI)	86.2% (73–100)	55.2% (39–79)	0.009
Recurrence; mean	3.4%	3.4%	0.1
Duration of dislocation before visit hours; median (min-max)	2 (0.8–96)	3 (0.33–168)	0.44

\*Success rate of first attempt without muscle relaxant.

undergoing external reduction (16 vs. 7.1 hours), however, due to very high SD (22.9 for conventional vs. 37.8 for external) we can not assume this difference was statistically significant ( $P = 0.39$ ).

### Follow Up

As noted above, 2 patients had recurrent dislocation: a 70-year-old man and a 75-year-old woman. They both had past history of recurrent disease. Other patients had no recurrence in the follow-up period.

## DISCUSSION

Temporomandibular joint dislocation reduction, although rare,<sup>1</sup> may be sometimes problematic, and even a medical urgency.<sup>5</sup> Although a patient with complaint of TMJ pain and inability to close the mouth is highly suspected for TMJ dislocation, diagnosis can be confusing.<sup>6</sup> It is especially true for tertiary referral centers that have a high number of emergency room visits as a result of this problem. In our hospital, we have nearly 300 ER visits resulting from ENT complaints every day and so we have a lot of TMJ dislocated patients; as here we describe 61 reductions in an 8-month period. The traditional method of TMJ dislocation reduction, although successful, has some disadvantages, including risk of bites (hepatitis, AIDS, syphilis, or other transmittable diseases). Therefore, there

have always been efforts to avoid putting fingers in the patient's mouth.<sup>1,3,4</sup> In this regard, even endoscope-assisted reduction of condylar dislocation has been described.<sup>7</sup>

Previous studies have not shown a proven effective method and are just case reports of fewer than 3 reductions. Chen et al described a new external approach and showed 7 successful reductions.<sup>3</sup> Our data also shows this approach have reasonable success, and is easy to learn. But unsuccessful results are significantly higher than with the traditional method and there are significant numbers of patients that still need the intraoral approach. Our lower success rate of this technique may be due to the physician's lower experience (as this is a new method) or the physics of the method itself; of course, this will be elicited after more widespread use of this technique and performing more studies. Also, administering muscle relaxing drugs may make reduction easier in this group of patients.

The external approach to TMJ dislocation was not something unfamiliar to us, as one of the ER staff of our center used to reduce TMJ dislocation externally by putting his thumb on the coronoid process of the dislocated mandible and push the ramus backward. But, his success rate was low. After introducing the new external method<sup>3</sup> we thought maybe the low success rate of our staff is due to not noticing rotation of the contralateral angle of the mandible, as our data shows is the case.

After performing these reductions, the authors think that patients have greater pain as a result of the external approach. Although we could not test this objectively, when reducing a dislocation by the intraoral approach, the patient seems to be more comfortable. This may be because in the external approach we reduce each side separately and the 2 attempts make the patient feel uncomfortable; but instead by reducing both sides in a single effort you can distract the patient and you have no second step, which reduces voluntary muscle spasm. Again, being new to this technique may be the reason why we do not have enough skill in this method. Another negative point of the external approach is the potential for condyle fracture, because the direction of the reducing force is perpendicular to the anterior tubercle of the glenoid fossa and in cases of prominent protuberance it is possible to make cause problems. Chen et al stated that "Once one side of the dislocation is reduced, the other side will usually go back spontaneously."<sup>3</sup> But according to our experience, this is not always true and in some patients, after reduction of the first side, while trying to reduce the other side, as you rotate the contralateral angle of the mandible, this force can dislocate the reduced side again. In 2 patients, although we

reduced one side with the extraoral approach, it was unsuccessful and for the 2nd side we had to use the intraoral approach. However, by experience we learned that after reducing one side, using some pressure on the coronoid of the reduced side with the second finger (while the first finger is pushing the malar bone and the other fingers are rotating the angle) can help maintain the reduced TMJ in its place.

## CONCLUSION

We think that the new external approach for TMJ dislocation reduction may be a good technique as its potential benefits are mentioned above. Therefore, we suggest including this technique in the educational curriculum of ENT and maxillofacial residents, because it is worth attempting as the first method for these patients and in unsuccessful cases, the conventional method will be the gold standard. Widespread use of this technique will better show its positive and negative points. We suggest more research to be done regarding this technique to better investigate its benefits and complications.

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