

The Effectiveness of Occlusal Splint for the Treatment of Temporomandibular Joint Dislocation

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Temporomandibular joint (TMJ) dislocation is defined that the disc-condyle complex is positioned anterior to the articular eminence in the open mouth position, and is unable to return to a normal closed mouth position without a manipulative maneuver. TMJ dislocation can recur habitually and result several problems to patients such as discomfort, pain, fear, and anxiety. The only definitive treatment for TMJ dislocation is surgical alteration of the joint itself. In most cases, however, a surgical procedure is far too aggressive for the symptoms experienced by the patient. In addition, the effect of surgical treatment may be insufficient, and the recurrence have been reported. It is also possible to develop several complications after surgical treatment. Therefore much effort should be directed at supportive therapy in an attempt to eliminate the disorder or at least reduce the symptom to tolerable levels. Through this cases the authors present favorable treatment outcome using occlusal splint with the patient of TMJ dislocation. Occlusal splint therapy can be considered as easy, safe, and useful non-invasive modality to treatment of TMJ dislocation.

Key Words: Conservative treatment; Occlusal splints; Temporomandibular joint dislocation; Temporomandibular joint openlock

INTRODUCTION

Temporomandibular joint (TMJ) dislocation is defined that the disc-condyle complex is positioned anterior to the articular eminence in the open mouth position, and is unable to return to a normal closed mouth position without a manipulative maneuver.¹⁾ According to newly revised diagnostic criteria for temporomandibular disorder, when the patient can reduce the dislocation himself/herself, this condition is referred to as subluxation. If the patient needs the assistance of the clinician to reduce the dislocation and normalize jaw movement, this is referred to as luxation, relatively.

The patient with the dislocated joint is unable to close the mouth with or without pain. The classical features are

preauricular depression of the skin, prognathism of the lower jaw, tense, spasmodic masticatory muscles, anterior cross bite and open bite, and excessive salivation.^{2,3)}

The etiology of TMJ dislocation is mainly trauma such as fall, road traffic accident, interpersonal violence, and other possible causes including excessive mouth opening from yawning, laughing, singing, prolonged mouth opening from oral and ENT procedures, and forceful mouth opening from anaesthetic and endoscopic procedures.³⁾

TMJ dislocation is considered to be caused by the morphological problem such as slope of articular eminence, shape of condyle, and the regulation of masticatory muscles and ligaments around TMJ.

TMJ dislocation occurs more frequently in patients with TMJ internal derangement, eminent erosion and flattening,

excessive activity of the lateral pterygoid and infrahyoid muscles, ligamentous and capsular laxity, neurologic disorders, and other problems.⁴⁻⁶⁾

TMJ dislocation occurs when the condyle moves anterior to the articular eminence beyond the normal limits. Some authors revealed that the condyle was located anterior to the anterior band of the disc by arthrographic fluoroscopic examination, and the anterior band mechanically prevented the dislocated condyle from posterior movement into the articular fossa.⁷⁾ The resultant stretching of the ligaments around the joint is associated with severe simultaneous spasm of the mouth opening and closing muscles and joint pain.⁴⁾ The superior retrodiscal lamina cannot retract the disc because of the collapsed anterior disc space. When the elevator muscles contract, spontaneous reduction is further aggravated because this activity increases the interarticular pressure.⁸⁾ Combinations of relatively forward oriented jaw closing muscles and a steep anterior slope caused the condyles to continue traveling anteriorly upon jaw-closing attempts, ending in an open lock position.⁹⁾ The reduction becomes even more unlikely when the lateral pterygoid muscle experiences myospasm, which pull the disc and condyle forward.⁸⁾

The treatment of TMJ dislocation may be organized into alteration of the ligaments, bony anatomy, and the associated musculature.¹⁰⁾ The treatment methods can be divided into conservative and invasive methods.

Several conservative treatment method for TMJ dislocation are introduced including manual reduction with or without local/general anesthesia, elastic traction with intermaxillary fixation, traction with bone hook, mandibular guidance therapy, chemical capsuloraphy using alcohol, autologous blood capsuloraphy, platelet rich plasma capsuloraphy, and muscle injection of botulinum toxin type A.³⁾

In some cases, more conservative methods seems to provide only temporary alleviation of symptoms, and it has been reported that recurrence is common. Thus surgical intervention has generally been considered the more effective definitive treatment.²⁾

Myrhaug¹¹⁾ first reported eminectomy as a treatment for TMJ dislocation in 1951. Removal of eminence will facilitate the return of the condyle without any interference into the glenoid fossa. And painless reduction will be possible

automatically in dislocated joint.

Over the years the vast number of surgical techniques have been proposed including partial or complete myotomy, capsular plication, scarification of the temporalis tendon, open condylotomy, insertion of implants into the articular eminence, down-fracturing of the zygomatic arches, and augmentation of the eminence by allografts.¹²⁻¹⁸⁾ Among the various procedures that are currently used, eminectomy and augmentation of the articular eminence by bone grafts are the most popular.⁵⁾

In several studies, the effectiveness of surgical management of TMJ dislocation was proven, and they showed little recurrence rate after surgery. However, many possible complications have been reported such as pain, muscle tenderness, infection, occlusal disharmony or malocclusion, degenerative changes to the joint, temporary nerve paresis according to procedures relatively.²⁾

The more complex and invasive method of treatment may not necessarily offer the best option and outcome of treatment; therefore, conservative approaches should be utilized appropriately before applying the more invasive surgical techniques.³⁾

CASE REPORT

Eight patients underwent occlusal splint therapy to treat TMJ dislocation and were evaluated in this study. They included 2 male patients and 6 female patients and their mean age was 27.8 years. The factors evaluated were sex, age, onset, frequency, the amount of maximal mouth opening, parafunctional habits, and associated symptoms including pain in TMJ or masticatory muscles and TMJ sound. The clinical review was based on eight patients who were

Table 1. Clinical symptoms of the patients with temporomandibular joint dislocation

Cases No.	Age (y)	Sex	First episode (y)	Episodes
1	45	Female	5	5/month
2	23	Female	2	3-4/week
3	36	Male	10	1/year
4	24	Female	2	2-3/year
5	22	Female	3	1/year
6	20	Male	1	3/year
7	25	Female	7	1-2/month
8	27	Female	5	1-2/year

Table 2. Clinical examination of the patients with temporomandibular joint dislocation

Cases No.	Pain	Sound	MO (mm)	Parafunctional habits
1	No	No	50	No
2	Yes	Yes	51	Clenching, gum chewing, forward head posture
3	No	Yes	42	No
4	No	Yes	47	No
5	Yes	Yes	38	Clenching, gum chewing, lip biting, cheek biting, chin leaning, forward head posture
6	No	No	55	No
7	Yes	Yes	40	Side sleep, chin leaning, forward head posture
8	Yes	Yes	45	Bruxism, clenching, side sleep, unilateral chewing

MO, maximum opening.

Table 3. Treatment summary

Cases No.	Type of splint	Follow-up period (mo)	Episodes during treatment period
1	SS	11	2
2	SS	2	0
3	SS	36	3
4	SS	5	0
5	SS	6	0
6	SS	1	0
7	SS	17	1
8	APS	6	0

SS, stabilization splint; APS, anterior positioning splint.

treated with occlusal splint. Table 1 shows clinical characteristics of eight cases of TMJ dislocation. First episode of TMJ dislocation varies from 1 to 10 years and the frequency of recurrence episode was revealed different among patients. In case 2, TMJ dislocation occurred the most frequently (3-4/week).

The result of clinical examination is shown in Table 2. In cases 2, 5, 7, and 8, patient have pain in TMJ or masticatory muscles. In six cases, the click sound was detected. In four cases, the patient reported various parafunctional habits, such as bruxism, clenching, gum chewing, forward head posture, lip biting, cheek biting, chin leaning, side sleep, and unilateral chewing.

Stabilization splint were used for 7 patients, and for one patient who have accompanied disc displacement with intermittent locking of left TMJ, anterior positioning splint was fabricated. Both of splints were made with acrylic resin according to a conventional method and the patients were recommended to use at night time only. Follow-up period were variable from 1 to 36 months, and we confirmed the symptoms of the patients every month during treatment period.

Table 3 shows the treatment outcome briefly. There has been no recurrence of TMJ dislocation in cases 2, 4, 5, 6, and 8; however, in 3 cases some recurrence episodes were reported. In case 1, the dislocation of TMJ occurred 2 times for 11 months and in case 3, 3 times for 36 months, in case 7, only one episode of recurrence was reported for 17 months.

DISCUSSION

TMJ dislocation can recur habitually and result several physical and psychogenic problems, If the dislocation occurs, the patients will not be able to close mouth themselves, and it causes anxiety and fear to the patients as well as discomfort.

However, the exact cause is still unclear, and the optimal treatment methods is not also established. The only definitive treatment for TMJ dislocation is considered as surgical alteration of the joint itself. In most cases, however, a surgical procedure is far too aggressive for the symptoms experienced by the patient. In addition, the effect of surgical treatment may be insufficient, and the recurrence have been reported. It is possible to develop several complications after surgical treatment. Therefore much effort should be directed at supportive therapy in an attempt to eliminate the disorder or at least reduce the symptom to tolerable levels.⁸⁾

The supportive therapy begins by educating the patient. The patient must learn to restrict opening so as not to reach the point of translation that initiates the interferences. On occasion, and intraoral device to restrict movement is used. Wearing the device attempts to develop a myostatic contracture of the elevator muscles, thus limits opening to the point of dislocation.⁸⁾

Kai et al.⁷⁾ reported the effectiveness of occlusal splint for

TMJ dislocation. They applied occlusal splint for relaxation of the masticatory muscles in eight patients who had tenderness to palpation in the masticatory muscles. The dislocation and the tenderness to palpation of muscles were completely disappeared a few weeks after treatment in 2 cases. There has been no recurrence of dislocation for 21 months in case 1 and for 12 months in case 2.

The occlusal splint is widely used in the treatment of various TMD, including myofascial pain, disc displacement disorder, TMJ osteoarthritis, parafunctions such as bruxism, clenching, others.¹⁹⁾ The exact mechanisms of occlusal splint for the treatment of TMD is still unclear. Some possible mechanisms such as change of vertical dimension of occlusion, decrease in the level of muscle activity, repositioning and unloading of TMJ, and cognitive-behavioral theory has been proposed.⁶⁾

One possible cause of the dislocation of TMJ is disturbance of the regulatory mechanism of the masticatory muscles. The effectiveness of conservative treatment with an occlusal splint for recurrent dislocation suggests that dislocation is fundamentally a muscular disturbance.⁷⁾

Through this cases the authors present favorable treatment outcome using occlusal splint with the patient of TMJ dislocation. Occlusal splint therapy can be considered as easy, safe, and useful non-invasive modality to treatment of TMJ dislocation.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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