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Surgical management of recurrent dislocation of the temporomandibular joint: a new treatment protocol

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Abstract

Recurrent dislocation of the temporomandibular joint (TMJ) is rare. It is distinct from acute or chronic dislocation and is associated with considerable morbidity and deterioration in quality of life. To formulate a practical surgical treatment algorithm, we retrospectively reviewed the management and long-term outcomes of 14 patients who presented to a single hospital department over a period of six years (2010–2016), and collected data on demographics, clinical features, operation, and outcome. Patients were followed up for a minimum of 12 months and a maximum of seven years. Results showed effective long-term resolution of symptoms after a combination of eminectomy and disc plication (meniscopexy). Patients whose symptoms had resulted from dystonia of the lateral pterygoid muscle also benefitted from additional lateral pterygoid myotomy. A combination of eminectomy and disc plication (meniscopexy) effectively provides successful long-term outcomes in this group of patients.

Keywords: Temporomandibular Joint; Eminectomy; Disc Plication; Lateral Pterygoid; Surgery; recurrent; dislocation; luxation; subluxation

Introduction

Dysfunction of the temporomandibular joint (TMJ) can result in pain and loss of function, which have a detrimental impact on a patient's quality of life (QoL).[1] Recurrent dislocation of the joint causes additional morbidity, as reduction may be needed, and each dislocation can further stretch the ligaments and capsule.[2]

Dislocation may be acute as a result of trauma or parafunction, or may be chronic.[3] Chronic cases result from prolonged dislocation that can be caused by a lax joint capsule because of age-related degeneration of the joint, anatomical variation of the articular components, or even the extrapyramidal side effects of anti-psychotic drugs such as haloperidol. Recurrent dislocation is defined as repeated acute dislocation of the joint that occurs sporadically over an extended time from many months to years, resulting in a functional deterioration. Between episodes, the condylar head is located in its normal position in the glenoid fossa. This is not the case in patients with a chronic condition.

Dislocation of the condylar head is usually in an anteromedial direction because of the pull from the lateral pterygoid muscle.[2] This luxation of the condyle anterior to the articular eminence can cause considerable damage to the joint capsule and ligaments.[4] Stretching of these ligaments outside their normal physiological range of motion activates the golgi tendon organs and muscle spindle cells,[4] and causes a

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reflex muscle contraction and pain.[5] This further prevents the downward and backward movement that is required for the joint to return to its normal position.[6]

Dislocation can be caused by wide opening, in which the condylar head translates anteriorly to the eminence, or can be spontaneous as a result of aberrant pull from the lateral pterygoid muscle. A diagnosis of dystonia of the lateral pterygoid muscle may be suggested by a neuromuscular medical disorder, or by the nature of the episodes of dislocation, but currently, we know of no conclusive diagnostic test. Patients are often able to describe the cause of their dislocation (wide opening, spontaneous dislocation, or both), and often avoid behaviours that lead to it. This in turn can result in anxiety, which affects their quality of life.

Current treatments for recurrent dislocation include minimally invasive techniques such as injection of autologous blood[7] or botulinum toxin.[8] Surgical treatment, such as arthroscopic reshaping of the articular eminence with a diamond bur, has also been described (but currently is not widely used),[9] as have eminectomy or eminoplasty.[10] In general, surgical methods are considered superior to minimally invasive techniques, which rely largely on the induction of joint fibrosis through the use of blood or sclerosing agents.[9] All these methods have limitations and, according to Pogrel,[6] no gold standard treatment has been identified.

The aim of the present study was to assess the long-term outcomes after surgical treatment for recurrent dislocation of the TMJ using a combination of eminectomy and disc plication (meniscopexy). We also describe myotomy of the lateral pterygoid muscle attachment as an additional treatment in cases of dystonia.

Methods

We used the hospital's database, consultants' records, and registrars' logbooks, to identify patients who had surgical treatment for recurrent dislocation of the TMJ. Patients were treated by one oral and maxillofacial surgery (OMFS) consultant surgeon (GD), either in a private hospital (Epworth Freemasons, Melbourne), or a public hospital (St Vincent's Hospital, Melbourne). Those seen in the public health care system were treated in conjunction with an OMFS surgical registrar under the direct supervision of the consultant.

Patients treated between March 2010 and March 2016 (six years) with a follow-up period of at least 12 months, were included. They were all at least 18 years of age at diagnosis, and had had at least six episodes of dislocation requiring medical attention over a 12-month period.

We analysed the patients' characteristics, the presentation and nature of the dislocations, type of operation, and outcome, as well as the functional and psychological impact. All patients completed a standardised and validated TMJ quality of life (QoL) survey.[1]

Ethics approval was granted by the Human Research and Ethics Committee, St Vincent's Hospital, Melbourne. All data were collected retrospectively, and were anonymised.

Results

We identified 14 patients (10 female and 4 male), most of whom (n = 11) were aged between 21 and 30 years. Dislocations occurred on wide opening or spontaneously, or both. In most cases they had occurred more than six times a year over a period of three or more years.

Most patients had bilateral dislocation (n = 10). Of the four in whom only one joint was affected, two were of the right and two on the left. Six patients could sometimes reduce the dislocation themselves, but eight always required medical attention, either with or without sedation. Most cases were not painful (n = 12), and were not associated with an alteration in diet (n = 11). On preoperative evaluation, 10 patients had no reduction in maximum mouth opening, although four reported that they avoided certain behaviours. One patient had a history of myotonic dystrophy, which may have directly contributed to her dislocations. Two had previously had minimally invasive treatment (autologous blood injections) that had not been successful.

All patients had eminectomy and disc plication through a preauricular approach. Preoperative computed tomography (CT) excluded pneumatisation or cranialisation of the articular eminence. Eminectomy was done to a depth of $10 - 15$ mm with osteotomes and the remaining bony bed smoothed with a diamond file.

We placed two to three 4/0 prolene sutures between the posterior disc and the retrodiscal tissues to limit forward translation of the disc during mandibular opening. No discal tissue was excised. In the four patients whose principle problem was spontaneous dislocation, we combined enimectomy (the gold standard for recurrent dislocation), with lateral pterygoid myotomy, as the efficacy of myotomy alone is currently unknown. We did this to further reduce the risk of recurrence rather than to test a new technique, which may have resulted in the need for repeat arthroplasty. These patients did not have increased postoperative pain, but two reported mouth opening of less than 30 mm at 30 days. The additional procedure did not affect the results of the QoL survey.

We followed up the patients for a minimum of 12 months and a maximum of 67 months (5.6 years). None of them reported recurrence, and 11 were free from pain. Of the three who reported pain, two had mild pain that did not require analgesia, and one required non-prescription analgesia. Most patients (n = 12) had a postoperative mouth opening of more than 40 mm, and all were able to tolerate a full diet. Overall, they were satisfied with their treatment (Table 1).

Patients were asked to complete a postoperative questionnaire that was based on a previously validated TMJ-specific QoL survey.[1] Eleven responded, and they all reported no pain

Table 1
Postoperative findings. All patients had no ongoing dislocation or deviation on opening; they could eat a full diet, and were satisfied with their treatment.

Case No.	Pain	Mouth opening (mm)	Follow up (months)
1	No	>40	12
2	No	>25	12
3	No	>40	59
4	Yes	>35	30
5	No	>35	32
6	No	>35	20
7	No	>45	12
8	No	>40	12
9	Yes	>40	45
10	Yes	>30	21
11	No	>45	18
12	No	>30	70
13	No	>45	12
14	No	<20	67
Median (range)		36 (<20 to >45)	27.1

Table 2
Causes of recurrent dislocation of the temporomandibular joint (TMJ).

Age-related laxity of the joint[18]
Acquired joint injury[2]
Wide opening – for example, yawning, vomiting, psychogenic
Parafunction – for example, seizures
Systemic joint laxity
Connective tissue disorders such as Ehlers Danlos syndrome, Marfan syndrome
Medications such as benzodiazepines, muscle relaxants
Anatomical-shallow glenoid fossa/eminence or steep eminence
Inherent anatomical variation
Acquired – for example, loss of vertical dimension, occlusal discrepancies[2]

at the time of the final consultation. There were no preoperative predictors for postoperative pain (for example, age or type of dislocation). All patients could speak normally, and nine could tolerate a full diet. Those with restrictions reported that they avoided only hard foods such as apples and steak. There was no effect on normal daily life or recreational activities, and only one patient reported a mild impact on their overall mood. Two reported mild anxiety about recurrence while others did not fear it at all.

The main issues noted by patients were pain, effect on diet, and anxiety. Eight reported that no problems were uppermost in their mind, and nine that their overall health-related Qol was much improved. This is noteworthy as, preoperatively, two had reported that it had been poor. Importantly, 10 would recommend the treatment to a friend or relative with a similar problem.

Discussion

Recurrent dislocation of the TMJ can be caused by a combination of factors (Table 2),[11] and every episode will further damage the joint. The need for an operation to address both the eminence and laxity of the joint capsule has previously been discussed.[12]

The nature of the dislocation should be directly addressed when formulating a surgical plan, and an operation should be considered only after minimally invasive management, such as injection of autologous blood, has been tried.[13] The operation aims either to remove anything that obstructs the movement of the condyle, or to prevent excessive movement of the condylar head.

Operations to obstruct the path of the condyle include LeClerc's glenotemporal osteotomy, in which the zygomatic arch is down-fractured to increase the barrier to anterior translation of the condylar head.[14] Adaptations to this technique include Dautrey's procedure and several other modifications that include interpositional bone grafts or miniplates to further obstruct this movement.[15] When compared with eminectomy, eminoplasty techniques are associated with reduced mouth opening, and any miniplates that have been used risk being fractured.[15–17]

Eminectomy was first described by Myrhaug (1951), who removed the articular eminence of the temporal bone, and by so doing, removed anything that would obstruct the relocation of the condylar head after dislocation.[18] Eminectomy is a mainstay of treatment and its benefits have been widely reported.[19] However, some authors have recorded limitations[16] and, to our knowledge, it has been described only in small case series of no more than three patients.[10] It is designed to remove barriers to the reduction of the condylar head to the glenoid fossa, and is associated with increased postoperative mouth opening when compared with eminoplasty.[17]

Disc plication has also been described in the management of recurrent dislocation, and in a case series of 17 patients, there was no recurrence at 12 months.[20] The benefit of disc plication with eminectomy has been reported, as eminectomy removes barriers to the path of the condyle during function, and disc plication allows smoother movement of the disc postoperatively.[21] Combining these treatments to improve outcomes seems logical, as it reduces the need (in a staged approach) for repeat access to the joint. However, to our knowledge, a combined surgical approach has not previously been published as a cohort study.

We know of no reports of lateral pterygoid myotomy alone for the surgical treatment of recurrent dislocation. Infiltration of botulinum toxin in the lateral pterygoid muscle has a similar effect on function, but may require repeated doses. It is a viable treatment for those who are not suitable for operation.[9,22]

It has been postulated that lateral pterygoid myotomy with eminectomy and disc plication, may be beneficial in patients with spontaneous dislocation, and our results show its effectiveness. Based on our study, we propose a treatment protocol for patients with recurrent dislocation (Fig. 1).

Despite the small sample size, the combination of these two procedures has shown promising long-term results. The

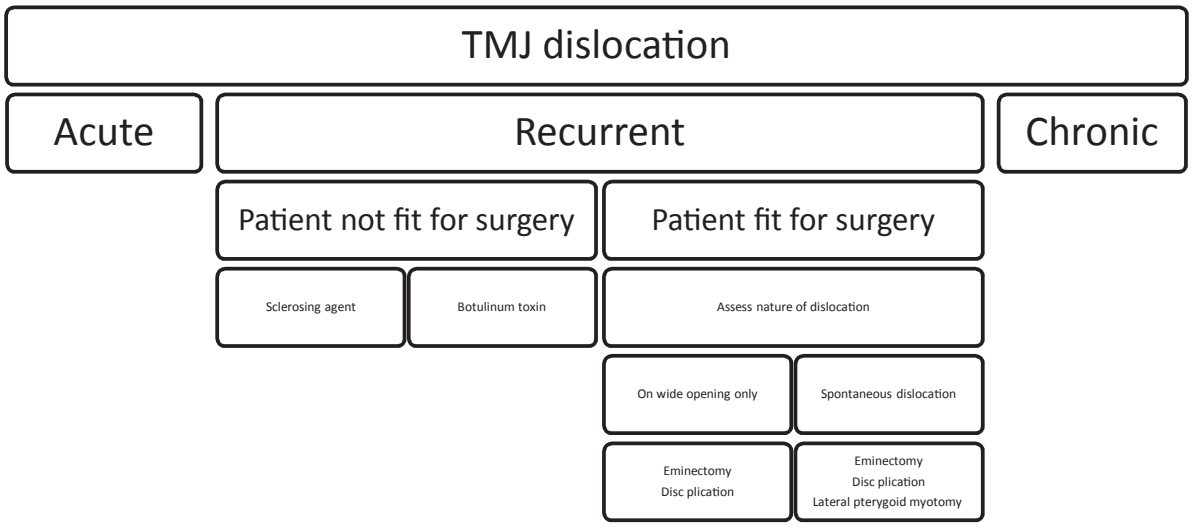

Fig. 1. Proposed treatment protocol for recurrent dislocation of the temporomandibular joint (TMJ).

addition of lateral pterygoid myotomy is a new technique for patients with spontaneous dislocation. A larger multicentre prospective study, which directly compares the different surgical methods separately and in combination, is now needed to find the most appropriate technique for the management of patients with this condition.

Conflict of interest

We have no conflicts of interest.

Ethics statement/confirmation of patients' permission

This research was granted ethics approval from the Research Governance Unit of the St Vincent's Hospital, Melbourne (LNR HREC reference number LNR/17/SVHM/19). Patients' permission not applicable.

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Confirmation of authorship

All authors have viewed and approved of this submission.

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