

Neurogenic Temporomandibular Joint
Dislocations treated with Botulinum
Toxin Injections: Case ReportCarolina Falcão^{1*}, Isabel Amorim¹, Sofia Proença² and Jorge Jacinto³¹PM&R Resident²PM&R Consultant³PM&R Senior Consultant and Head of Department

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Abstract

Temporomandibular joint (TMJ) dislocations, which occur as a result of an excess of muscle activity/spasticity in the protractor masticatory muscles, were defined as neurogenic dislocations of the TMJ. We report a case of a 36-year-old woman with sequelae of haemorrhagic stroke, which developed recurrent episodes of TMJ dislocation, interfering with the rehabilitation program and her well-being/quality of life. Conservative measures were implemented but 2 months later, TMJ dislocation episodes continued (2-3 daily). Then, type A botulinum toxin (BTX-A) injections were applied to both lateral pterygoid muscles, and these episodes ceased to happen for more than seven months. While conservative treatment is often not sufficient, surgical procedures are invasive and involve more risk, BTX-A injections, were an effective treatment option during for a longer than expected period of time.

Introduction

Temporomandibular joint (TMJ) dislocations occurring as a result of muscle over activity in the protractor masticatory muscles were recently defined as neurogenic dislocations of the TMJ [1].

Some neurologic disorders, such as multiple sclerosis, Parkinson's disease, traumatic brain injury, cerebral palsy and stroke, mostly those occurring with spasticity oromandibular dystonia, are accompanied by repeated TMJ dislocation [2].

Dislocation of the TMJ is generally of unknown origin. In addition to neurogenic muscular hyperactivity, it is known that there is a genetic predisposition, including disorders of collagen metabolism, such as ligamentous hyperlaxity and Ehler-Danlos syndrome, and risk factors, like extreme mouth opening during yawning, trauma, dental and ENT treatments, and a side effect of some medications used in psychiatric conditions [3].

Recurrent dislocation of the mandibular condyle places a hard problem for patients. It produces pain, anxiety and eating difficulties. Dislocations become more frequent and more difficult to control or prevent [4].

Since 1995, botulinum BTX-A injections have been used in the treatment of recurrent dislocation of TMJ, being the Lateral Pterygoid (LP) the most commonly injected muscle [1]. This muscle is mainly active in horizontal movements of the condyle and generates contra lateral and protrusive force. It also stabilizes the disc-condyle complex [4].

The superior and medial fibres of the upper head of the LP muscle insert into the medial half of the capsule and the meniscus [5]. The excess muscle activity in muscle bundles of the upper head and the superior part of the lower head of the LP could lead to unstable movements and disc/meniscus damage [4]. 63% of the patients with degenerative changes on the TMJ are related with over activity of the LP and its action in the anterior displacement of the auricular meniscus [6]. The injection of BTX-A in LP, produces a dose dependent temporary decrease of muscle activity, without systemic effects, interrupting the cascade of events. The severity influences the doses needed/used. The dose of BTX-A (Botox®) used per LP, per side, ranges between 50U and 100U - the 50U doses were given as repeated injections and the 100U were used only in severe cases, with several dislocations per week [7]. The LP is usually scarce of major side effects compared to other muscles, involved in jaw opening (mylohyoid, anterior belly of the digastric, geniohyoid), for which dysphagia, dysarthria, or aspiration may be an issue, due to the possible diffusion of the toxin into the masticatory muscles [3].

The most serious adverse event is transient dysphagia, occurring in 8% of the treated patients. Other adverse events, in rare cases, are nasal speech (1.2% of patients), painful chewing (0.5%), nasal regurgitation (0.5%) and dysarthria (0.5%) [8]. All adverse events usually subside within 2-4 weeks [9]. Therapy with BTX-A is contraindicated in diseases affecting neuromuscular transmission, like myasthenia gravis or the Lambert Eaton syndrome, when amino glycoside antibiotics or

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spectinomycin are or will be administered, or when there are signs of inflammation or infection at the injection site [9].

Although targeting accuracy and procedure safety are higher when a guided injection technique is used, the treatment can be performed simply and safely without electromyography, electrical stimulation or imaging control, by an experienced specialist, who masters the anatomy of the region [10]. Before the injection with BTX-A, conservative measures should be applied. However, these measures are sometimes insufficient to prevent further neurogenic dislocations of the TMJ [7].

Case report

A 36 years-old female, admitted at a rehabilitation centre, 2 months post-haemorrhagic stroke (right intra parenchymal haemorrhage) that led to quadriplegia (left side no visible contraction; right side whit active movement, full range of motion with gravity eliminated), moderate cognitive deficit, dysarthria and incontinence.

The patient was treated with sertraline for emotional lability. The sertraline dose was increased due to a clinical worsening. Therefore, oro mandibular dystonia episodes were observed, leading to a painful and disabling recurrent TMJ dislocation. These episodes required frequent use of diazepam to facilitate TMJ replacement manoeuvres and it interfered with the rehabilitation program and the patient's quality of life. We discontinued sertraline administration at that time and after this no other oromandibular dystonia episodes were observed. Inter maxillary fixation screws were placed for mandibular block and conservative measures were implemented. An orthosis for chin restraint was custom designed and produced for immobilization. The patient remained asymptomatic for 3 months, during this period she was submitted to a reconstruction cranioplasty, returning to the rehabilitation centre 2 months later.

During the second inpatient stay, at the rehabilitation centre, she started to present repeated dislocations at an increased frequency. Maxillofacial surgeons refuted surgery as an option, because it would carry major risks. During one month, TMJ dislocation episodes increased to a number of 2-3 times per day.

In order to treat the patient, BTX-A injection was applied to both lateral pterygoid muscles, with a dose of 100U of on a botulinum toxin (Botox®) per side. The injection was made via an intraoral route without anaesthesia, and using anatomical references only.

Following chemical neuro-muscular block of the pterygoid muscles, no further dislocations occurred until the date of writing this paper (7 months). There were no adverse events. On the positive side, there was a significant improvement of the patient's speech quality, head posture, mastication, mood and motivation to participate in the rehabilitation program.

Conclusion

The bilateral neuromuscular block of the LP muscle restricts the angle of mouth opening, thus helping to prevent dislocation. A limitation of movement in the medial-lateral direction may reduce the corresponding tractional forces produced during jaw function and perhaps favour regenerative processes [4].

The effects of the BTX-A treatment are typically seen within 3 to 10 days after the injection, and they generally last 3 to 6 months. The muscle recovers over several months as the nerve terminal regains function [3]. However, the precise mechanisms behind the favourable treatment outcomes are unclear to date. Intramuscular injections of BTX-A are safe and reliable as a treatment with minimal side effects for recurrent neurogenic TMJ dislocations [9].

Due to BTX-A treatment, our patient became more capable to participate in the overall rehabilitation program.

Intramuscular injections with BTX-A represent an effective and safe therapeutic option for recurrent TMJ dislocation, especially when other conservative measures fail and for patients to whom surgery would carry major risks [7]. This procedure could be an alternative to surgery and maybe considered as an initial approach in moderate to severe cases [3].

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