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Clinical Paper
TMJ Disorders

Localized myofascial pain responds better than referring myofascial pain to botulinum toxin injections

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Abstract. Myofascial pain of the muscles of mastication is a common temporomandibular disorder. Patients unresponsive to conservative treatment modalities pose a therapeutic challenge to the treating clinician. The efficacy of intramuscular botulinum toxin injections for recalcitrant cases is still not well established due to mixed results from clinical trials. The Diagnostic Criteria of Temporomandibular Disorders (DC/TMD) classified chronic muscle pain broadly into a localized pattern (when pain is localized to the site of palpation or the muscle palpated) and a referring pattern (when the pain spreads beyond the boundary of the muscle being palpated). The medical records of 25 consecutive patients treated with botulinum were analysed retrospectively. Significant pain reduction was achieved in 69.2% of the patients with localized myofascial pain and 16.7% of the patients with referring myofascial pain ($P = 0.015$). Seventy-seven per cent of the patients with localized myofascial pain reported using less analgesic throughout the follow-up period, whereas only 25% of the patients with referring myofascial pain ($P = 0.017$). The effects of botulinum toxin in responsive patients subsided after a mean of 3.21 months. Patients with localized myofascial pain benefited from botulinum toxin injections, but patients with referring myofascial pain responded poorly to this treatment.

Key words: temporomandibular disorder; myofascial pain; pain referral; botulinum toxin; myalgia.

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Myofascial pain of the muscles of mastication is a common temporomandibular disorder, and its primary feature is myogenous pain, and, to a lesser degree, mandibular dysfunction and limited range of motion[1]. The Diagnostic Criteria for Temporomandibular Disorders (DC/TMD)[2] developed by the International Association for the Study of Pain (IASP) and the International Association of Dental Research (IADR) classified chronic muscle pain broadly into a localized pattern and a referring pattern. In localized myofascial pain, the pain is either localized to the site of palpation or spreads beyond the site of palpation but within the boundary of the muscle. In referring myofascial pain, the patient reports pain spreading to sites beyond the boundary of the muscle being palpated.

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Various therapies are available for treating chronic muscle pain, and no specific therapy has been proved to be uniformly effective. The primary mode of action of conservative therapies lies in reducing the tonicity of muscles and relaxing them, and approximately 80% of patients will gain satisfactory pain relief after undergoing one or more conservative treatment modalities[3]. Botulinum toxin (BTX) was introduced into medicine more than 30 years ago for the treatment of diseases with increased muscle tone and became the first bacterial toxin used as a medicine[3,4]. It causes temporary dose-dependent denervation of skeletal muscle by blocking the release of acetylcholine from nerve endings at the neuromuscular junction, inhibiting muscular contraction. The result is relaxation of the muscle.

Just as several studies showed statistically significant pain relief from BTX injections,[3,5–13] others showed no pain relief compared to placebo saline injections[9,14–22]. Despite numerous clinical trials, the efficacy of BTX in alleviating myofascial pain is still not well established[23]. One of the main reasons for the discrepancy found in the literature in our opinion could be differences in the diagnostic criteria and inclusion criteria used in the different trials. Various diagnostic criteria exist for myofascial pain[24]. Some studies applied inclusion criteria that would have led to the exclusion of their patients from other studies. This may cause the true effect size to be underestimated because of the inclusion of patients who are unlikely to respond to therapy, and could lead to the appearance of a negative trial, when in fact a subgroup may have experienced a genuine benefit[9]. The present study aimed to evaluate the efficacy of BTX in alleviating myofascial pain while differentiating between the two patterns of muscle pain according to the DC/TMD: localized myofascial pain and referring myofascial pain.

Patients and methods

This was a retrospective study evaluating the outcome of the first treatment of BTX intramuscular injections in consecutive patients suffering from chronic myofascial pain treated at our department during a 2-year period (from February 2014 to March 2016). The diagnosis was based on anamnestic and clinical evaluations and patients were categorized according to the DC/TMD guidelines[2] and were divided into local myofascial pain and referring myofascial pain for analysis.

Clinically patients complained of pain in the perimandibular area that was often aggravated with jaw function, and was not associated with limited mouth opening. The pain was elicited with palpating the involved muscles, replicating the chief complaint. The diagnosis of local myofascial pain was given to patients when pain was localized to the site of palpation or the muscle palpated. Tender sites were palpated for approximately 5 seconds to ensure the pain did not refer to distant sites. A diagnosis of referring myofascial pain was given to patients experiencing pain spreading beyond the boundary of the muscle being palpated.

Patients to be treated with BTX at our department had to meet the following criteria:

- Failure to achieve satisfactory response to previous conservative therapies consisting of rest, habitual modifications, self exercises, office-based physical therapy program, pharmacologic treatment (a benzodiazepine with or without a non-steroidal anti-inflammatory drug), and either a 3-month period of occlusal splint therapy or a 3-month trial with Tricyclic antidepressants.
- Constant pattern of pain localization and characteristics in at least two different clinical examinations. Undefined pain patterns with poor localization were not candidates for BTX injections.
- Absence of concomitant intra-articular temporomandibular joint disorders.

All conservative therapies were discontinued when the decision to undergo BTX injections was made, which was usually several weeks before the injection appointment. Botox (Allergan pharmaceuticals, Mayo, Ireland), which is a type-A BTX was used in all cases. An ampoule of 100 MU was diluted in 1 mL of normal saline. The injections were given on an individual basis into points of tenderness in painful muscles, and were individualized to each patient depending on the pain location and laterality. Only painful muscles were injected, and as close as possible to the tender points. Patients first identified the areas of pain by pointing with their fingers or hands; then the examiner palpated the tender spot and the surrounding areas, checking for additional tender points and possible referral points. The involved muscle was palpated during clenching and relaxation. BTX was injected directly into or as close as possible to the clinically identifiable tender points in the affected muscles, with two to four injections per tender muscle. In cases of myofascial pain with referral, no attempt was made to inject the distant sites to which the pain referred to, rather the injections were given to the muscle being palpated. The most common areas to which the pain referred to were the eyebrow, forehead, vertex, and occiput. All injections were performed by one surgeon (W.A.) and immediately after dilution of the toxin. Each injection point received 0.1 mL of solution containing 10 MU of BTX. A 23G 30-mm-long needle was used to inject the masseter, anterior portion of temporalis, sternocleidomastoid, and posterior digastric muscles. A 27G 15-mm-long needle was used to inject the middle and posterior areas of the temporalis muscle. A 27G 37-mm audio-amplified electromyographic (EMG) needle was used to inject the medial pterygoid muscle. The antero-inferior portion of the temporalis muscle was injected in two different depths: a superficial injection at the depth of the medial surface of the zygomatic arch, and a deep injection when the needle contacted bone at the outer surface of the lateral orbital wall (Fig. 1). All injections were performed transcutaneously. Patients were asked to clench their teeth and open wide every 10 minutes in the few hours

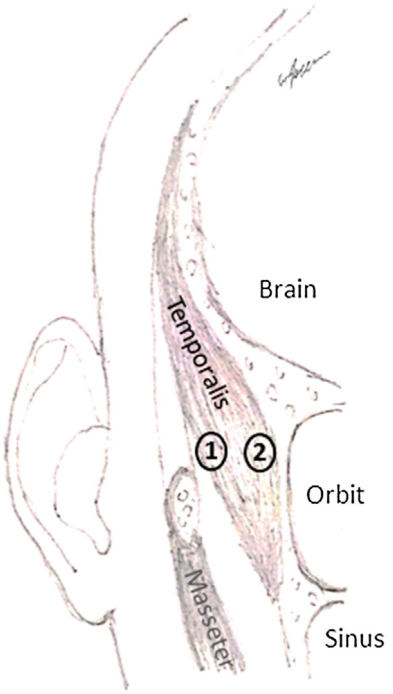

Fig. 1. Coronal section illustrating the two different depths of injection into the antero-inferior portion of the temporalis muscle: 1, superficial injection point at the depth of the medial surface of the zygomatic arch; 2, deep injection point when the needle contacts bone at the outer surface of the lateral orbital wall.

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