



## Locked jaw caused by non-infectious inflammation of the lateral pterygoid muscle after dental treatment

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### ABSTRACT

The author describes the case of a 53-year-old male whose jaw spontaneously locked the day after his dental visit. There was no history of temporomandibular problems. Dental procedure was completed in a routine manner. There was no infective or systemic pathology, or muscle spasm as a cause of trismus. Temporomandibular joint dysfunction was initially suspected, but dynamic ultrasonographic examination and MRI revealed a completely patent articular disc and normal temporomandibular joint. The patient did not have a mechanical restricted movement of the joint, but rather a severe, local pain upon depressing the mandible, which inhibited further opening. Intraoral palpation of the lateral pterygoid muscle (LPM) reproduced his symptoms, and thus suggested a myogenic etiology rather than arthropathy. Probably overstretching and subsequent inflammation of the LPM occurred due to prolonged mandibular depression. The patient was prescribed strengthening exercises for the LPM, which completely resolved his problem within 6 weeks. This case study suggests that overuse with subsequent inflammation of the LPM may cause locking of the jaw, mimicking articulopathy.

**Key words:** Trismus; Temporomandibular disorder; TMD; Lateral pterygoid

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### INTRODUCTION

Locked jaw (trismus) is a relatively common post-procedural sequela in dentistry, usually involving temporomandibular arthropathy or masticatory muscle spasm of the medial pterygoid muscle.<sup>1</sup> Trismus has several known causes, such as infection, trauma, dental treatment, temporomandibular joint disorders (TMD), tumors and oral care, drug use, radio- and chemotherapies, congenital problems and other miscellaneous causes, including psychogenic problems. 'Dental trismus' is usually benign, and virtually always resolves within 48 hours.<sup>1</sup> In this unusual case study, the author describes a patient without serious risk factors or intra-procedural complications, who developed refractory trismus post dental procedures, due to non-infectious inflammation of the lateral pterygoid muscle.

### CASE REPORT

A 53-year-old man presented at the author's private musculoskeletal rehabilitation clinic with refractory trismus. The problem occurred after his last dental visit, where he was required to keep his mouth opened for a long time during the procedures. The session as such, according to the patient, seemed uncomplicated until the next day, when he realized that he could not open his mouth. Initially, the patient's symptoms were attributed to common and benign dental trismus, and he was told by the dentist that it would resolve within two weeks. Two weeks later there was no improvement, and the patient consulted his general practitioner (GP) for advice. His GP took blood samples to rule out infectious and systemic etiologies, but informed the patient that his symptoms were most likely caused by temporomandibular disc displacement,

which might require surgical intervention if it failed to resolve on its own. Laboratory results were within normal limits. Magnetic resonance imaging of the temporomandibular joints (TMJ) was also ordered, but had longer waiting times. Four weeks post onset the patient's condition remained unchanged, and he was now looking for other treatment options before considering invasive options, and in this circumstance contacted author's clinic.

When describing his symptoms, the patient stated that he could not open his mouth properly, and struggled to eat and brush his teeth. Because the patient's description mainly focused on loss of function rather than pain, TMJ pathology was once again suspected, and more specifically, disc displacement without reduction (DDWOR), which is a condition where the articular disc dislocates off the mandibular condyle due to damage to either the disc itself or the retrodiscal tissue holding it, resulting in mechanical locking of the joint.<sup>2,3,4,5</sup> Generally, precipitating factors of DDWOR involve longstanding clicking and joint pain.<sup>6</sup> However, in this case, the patient had no history of TMJ pain nor joint clicking.

The patient had a normal body habitus; six foot and 210 lbs. He also had a normal bite without evidence of maxillary or mandibular prognathism. Upon examination, available mandibular depression was approximately 20 mm. There was no external swelling around the joints nor any tenderness of the mandibular condyle. No evidence of masticatory spasm. Because no previous imaging of the TMJ was available at the time of the visit, a dynamic ultrasonographic examination was performed as it was readily available. Interestingly, the examination revealed completely normal shaped articular disc without signs of focal thickening or deformity, maintaining its proper position during both closing and opening of the mouth. Perplexed by the lack of findings, the patient was asked whether the jaw felt physically restricted or not during opening. He stated that there was no mechanical restriction, but rather, severe, local pain, and that this pain was what inhibited him from further mandibular opening. Thus, in contrast with initial impression, this suggested a problem with one or more of the masticatory muscles rather than the temporomandibular joint.

The main muscles involved in mandibular depression are the suprahyoid group, but also the lateral pterygoid muscles. Elevation of the mandible is caused by the masseter, temporalis and medial pterygoid muscles.<sup>7,8,9</sup> The patient did not have any difficulty with respiration or swallowing, nor did he have any submental symptoms. Provocative palpation of the suprahyoid complex, medial pterygoid, temporalis or masseter muscles did not elicit any noteworthy discomfort. However, intraoral palpation of the lateral pterygoid elicited severe pain, and the patient



**Figure 1: Dynamic ultrasonographic examination revealed completely patent disc tissue, both in opened and closed mandibular position. Abbreviations: AD=Articular disc, C=Condyle, LPM=Lateral pterygoid muscle**

confirmed that this pain was consistent with what he had been experiencing, thus implying non-infectious inflammation of the lateral pterygoid as the cause of his symptoms.

As the blood reports were normal, the articular disc was patent, and we were able to reproduce the patient's pain with manual provocative maneuvers, no further investigations were pursued. The most likely cause of the patient's symptoms was overloading of the lateral pterygoid muscle with subsequent inflammatory myopathy. The patient was prescribed gentle exercises for the lateral pterygoid which involved mandibular protraction against resistance by his own hand,<sup>10</sup> two sets until moderate fatigue, two times per week, aiming to increase its work capacity. The patient demonstrated severe weakness of the muscle during initial strength tests. Six weeks later, his pain was fully resolved, and his mouth opening returned to its prior normal state. His TMJ MRI was also normal, so no further follow-up was planned.

## DISCUSSION

To the best of our knowledge, there are no published reports about lateral pterygoid myopathy as a cause of dental trismus in the absence of spasmodic, iatrogenic, infectious or systemic etiology, rendering this case noteworthy. It could, indeed, be rare, but it is also probable that its occurrence is frequent but under-reported and under-appreciated perhaps due to its

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spontaneous resolution without treatment, or due to lack of previous evidence, resulting in the symptoms being rendered as idiopathic or psychogenic.

Dental trismus, i.e. spontaneously occurring lock jaw post dental procedures, is frequently caused by spasm of the medial pterygoid muscle or non-reducing subluxation of the articular disc, where the anteriorly displaced disc does not relocate back onto the condyle during mandibular depression (DDWOR). There are also other known causes, as mentioned earlier.<sup>1</sup> In this case, because the lateral pterygoid helps to protract the mandibular condyle during depression, it seems that the patient's muscle had been overstressed due to prolonged mouth opening during the dental procedures. It is believed that the patient was predisposed due to underlying weakness of the lateral pterygoid muscle.

Dorland's Illustrated Medical Dictionary states that trismus is a motor disturbance of the trigeminal nerve, especially spasm of the masticatory muscles, resulting in difficulty in opening of the mouth.<sup>11</sup> In this case, no myospasm was present. However, because the buccal nerve - a branch of the trigeminal nerve, travels between the two heads of the lateral pterygoid, it could also be that the patient was susceptible to entrapment at this site due to underlying pterygoid dysfunction.<sup>10,12,13</sup> This could be an explanation of the sudden and severe onset of the pain.

The clue, leading to proper diagnosis in our case, was the absence of articular disc displacement or perceived mechanical restriction in tandem with pain incurred by mandibular depression and protraction. But the patient had no history of TMJ problems or other serious risk factors, and his pain was reproducible with palpation of the lateral pterygoids, strongly suggesting a myogenic etiology rather than an arthropathic one.

Palpation of the lateral pterygoid may aid in detecting the problem, but is sometimes difficult due to the mandibular ramus inhibiting its access anteriorly. Palpation access to this muscle may be achieved by depressing and ipsilaterally deviating the patient's jaw, moving the mandibular ramus away from the teeth laterally, so that the examiner's index finger may track the external molar surfaces dorsally. The lateral pterygoid will be noted as a "pocket of muscle" situated posterolateral to the molars.

Strengthening exercises were used as rehabilitative means for the lateral pterygoid muscle, as this is within the scope of the author's practice. NSAID prescription or intramuscular steroid injection to the lateral pterygoid muscle could be used as well, especially as a first-time intervention. For recurrent cases after successful NSAID or injection therapy, chronic pterygoid inadequacy would be suspected and muscle strengthening exercises would be required.

## CONCLUSION

Patients presenting with an apparently locked temporomandibular joint, especially those without a history of TMJ problems and in whom other etiologic factors (e.g. infection) have been excluded, may be evaluated for overstress myopathy of the lateral pterygoid, or one of the other masticatory muscles. Overuse and subsequent inflammation of the lateral pterygoid muscle may occur after prolonged mandibular depression, and may mimic articular disc displacement without reduction. In chronic cases, it can be treated by prescribing gentle mandibular protraction exercises for strengthening of the lateral pterygoid muscles. In acute cases, intramuscular steroid injections or NSAIDs may be valid first interventions.

**Conflict of interest:** Nil

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## WFSA Fresenius Kabi Anaesthesia Innovation Awards 2018

Maziar Mohsen Nourian, a medical student at the University of Utah, School of Medicine and Dr Michael Lipnick, an assistant professor at University of California, San Francisco (UCSF), Anaesthesia Division of Global Health Equity have been awarded the 2018 Innovation Award for the creation of an affordable and context-appropriate capnography device for use in low and middle income countries - **RevoCap: A Revolution in Global Capnography**.

As award winners, Michael and Maziar will receive a grant of \$25,000 to develop, test and refine the RevoCap prototype and will be able to access input, mentorship and feedback from WFSA and Fresenius Kabi specialists. Additionally, they will be offered the opportunity to have a short promotional film made about the innovation and will receive an invitation to attend the World Congress of Anaesthesia (WCA) in Prague 2020 to contribute to the scientific programme.