Medial pterygoid trismus (myospasm) following inferior alveolar nerve block: Case report and literature review

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A patient developed a medial pterygoid trismus (myospasm) the day after receiving three inferior alveolar nerve blocks and a routine restoration. She had a significantly restricted mouth opening and significant medial pterygoid muscle pain when she opened beyond the restriction; however, she had no swelling, lymphadenopathy, or fever.

A medial pterygoid myospasm can occur secondary to an inferior alveolar nerve block. This disorder generally is treated by the application of heat, muscle stretches, analgesic and/or muscle relaxant ingestion, and a physical therapy referral. The severity of the disorder typically dictates the extent of therapy that is needed.

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Providing patients with local anesthesia prior to an otherwise painful dental procedure has become an integral component of dental care. It is conservatively estimated that more than six million dental anesthetic cartridges are administered each week by dentists in the U.S.[1]

Local anesthetics are safe medications with a low incidence of associated complications. The occurrence of a complication does not imply that it was preventable or that the clinician used an inappropriate technique.[2] Complications can occur during an anesthetic procedure or days later.[3]

According to Marien, it is not unusual for several patients a month to return to a practice postoperatively complaining of a restricted mouth opening.[4] This restriction may be secondary to an inferior alveolar nerve block alone. A 2001 study examined 30 subjects who received only an inferior alveolar block of 2% lidocaine with 1:100,000 epinephrine (that is, no subsequent dental treatment was performed) and reported that one subject (3%) had a restricted mouth opening the day of the anesthetic injection, two subjects (7%) had a restricted mouth opening the day after the injection, and no patients experienced a restricted mouth opening after that point.[5]

When the inferior alveolar nerve block is followed by dental treatment, there are additional factors that could cause a restricted mouth opening. These include an acute temporomandibular joint (TMJ) disc displacement without reduction (a close lock), sequelae related to a surgical procedure (for example, removal of a third molar), a hematoma, and an infection.[1,4,6-12]

When a patient returns postoperatively complaining of a restricted opening, the restricting structure generally causes pain when the patient attempts to open beyond the restriction. The origin of the restriction can usually be identified by palpating the masticatory structures and identifying the location that most reproduces this pain.

The practitioner may want to confirm the location of the limiting structure by attempting to force the patient's mouth open into this restricted range. This confirmation can be performed by placing the index finger over the incisal edges of the mandibular incisors, placing the thumb over the incisal edges of the maxillary incisors, and forcing the teeth apart by moving the fingers in a scissor-type motion. The patient will usually feel tightness or pain at the location of the restriction. The patient can point to this location and the practitioner can palpate it to confirm that the previous discomfort can be reproduced.[13]

When a patient who has undergone nonsurgical dental treatment develops a restricted opening after an inferior alveolar nerve block and does not have swelling, lymphadenopathy, or fever, the restricted opening is most commonly related to the nerve block.[2,14] This restricted opening is generally due to a myospasm of the medial pterygoid muscle, a condition commonly referred to as *trismus*.[2,6,13,15,16] According to the literature, it is most likely that the muscle was physically traumatized by the injecting needle and/or that the

anesthetic solution had a deleterious effect on the muscle.[2-4,16-18]

Clinically, the myospasm is more likely to occur after several inferior alveolar nerve blocks.[13,18] Administering more than one inferior alveolar nerve block corresponds to an increased likelihood of the medial pterygoid muscle being traumatized. In addition, higher concentrations of anesthetic solution have been shown to be more harmful to muscle tissue.[19] Clinically, if an initial injection does not provide adequate anesthesia for a patient, supplemental injections generally are necessary.[18]

The medial pterygoid myospasm has been observed on the day of the inferior alveolar nerve block; it can also appear up to as many as several days after the block is administered.[2,13,14,20] There are many other causes for a myospasm or limited opening (for example, central nervous system disorders and multiple sclerosis), but the initial onset of these other conditions is unlikely to coincide temporally with the inferior alveolar nerve block, nor are these conditions likely to be limited to the muscle near the injection site.[21,22] If the myospasm does not resolve following conservative therapies, other possible causes should be considered.

Superficial heat is commonly recommended for a medial pterygoid myospasm.[1,2,6,13,20] Anatomically, it would appear that superficial heat would not help the medial pterygoid muscle, because it is fairly deep and superficially blocked by the ramus; however, the author's clinical experience has confirmed that superficial heat is beneficial for patients with a medial pterygoid muscle disorder.

Another commonly recommended therapy involves stretching the medial pterygoid muscle, using a slow, gentle stretch that goes into the restricted range.[6,10,13,23] The force and duration should be determined by patient tolerance, while ensuring the muscle is not aggravated. The stretch is more beneficial if the patient is able to heat the area first.[6,13]

The opening muscles are relatively weak compared to the closing muscles; if the stretching force is provided by only the opening muscles, they tend to become painful over time.[6,13] As a result, the medial pterygoid muscle should be stretched and held by the index and middle fingers (Fig. 1) 10 times or more per day, for 30–60 seconds each time.

An analgesic (for example, 800 mg ibuprofen, three times a day) is often recommended for this disorder.[1,2,13,20] This regimen enables the patient to better tolerate the discomfort and may allow for a better stretch of the muscle. When the disorder is more severe, a muscle relaxant (for example, 5 mg diazepam, one or two tablets, twice a day or at bedtime) is indicated.[1,13] Applying superficial heat, stretching the muscle, and administering analgesics and muscle relaxants are also recommended for myospasms of other muscles within the body.[24,25]

Within a day or two, the patient should experience reduced pain and start to regain the opening. Depending upon the severity of the myospasm and patient compliance, complete recovery can take anywhere from days to many weeks.[1,5,13,20] If the patient does not respond to therapy after two or three days, other causes should be considered, including infection, hematoma, or some other neurological etiology.[1,2,14]

Case report

A 52-year-old woman had a mesial carious lesion in tooth No. 19. Adequate anesthesia was not obtained until she received a third left inferior alveolar nerve block. The next day, she had a severely restricted opening. One week later, the patient returned to her dentist complaining of constant dull pressure and pain. On a scale from 1–10 (with 0 = no pain and 10 = the worst pain imaginable), she rated the pain/pressure in her left medial pterygoid muscle area as a 1; however, whenever she attempted to open beyond her restricted opening (17 mm), she rated the pain in the area as a 5 or 6.

The general dentist reproduced the patient's pain by palpating her medial pterygoid muscle. He provided her with self-management instructions for temporomandibular disorders (including application of heat to the affected area) and prescribed 400 mg ibuprofen, to be taken every six to eight hours as needed for pain. When the patient informed her general dentist five days later that that the condition had not improved, he referred her to a more experienced practitioner to escalate therapy.

Fig. 1. The stretching technique for relieving a medial pterygoid myospasm.

The patient was seen one week after starting the restricted opening therapy and related that the ibuprofen had not been beneficial and she was not sure whether the heat had been beneficial. She now rated the constant dull pressure/pain as a 2 and reported experiencing momentary sharp pain (which she rated as an 8) in the left medial pterygoid muscle region whenever she opened into the restricted range (approximately 10 times a day). The patient had not noticed any swelling or fever and there were no signs of lymphadenopathy.

Clinical examination

The patient's mandibular range of motion was 17 mm opening (including a 2 mm vertical overlap), 5 mm right lateral, 5 mm left lateral, and 5 mm protrusive. Palpation of the patient's masticatory and cervical muscles and her TMJs revealed that tenderness was limited to her left medial pterygoid muscle and that palpation reproduced her pain complaint.

To confirm the location of the restricted opening's limiting structure, slight to moderate force was applied to open the patient's mouth into her restricted range of opening. This reproduced the sharp pain in her left medial pterygoid muscle. The clinical diagnosis was left medial pterygoid myospasm.

Treatment

The patient was instructed to stretch her left medial pterygoid muscle for 30–60 seconds 10 times or more a day and to apply heat before stretching whenever possible. Since the ibuprofen was not beneficial, 5 mg of diazepam (one to two tablets at bedtime as necessary) was prescribed for the myospasm. Approximately two weeks later, the restricted opening and pain had resolved.

Discussion

Occasionally, patients return to their dental practitioners complaining of a restricted opening several days after receiving an inferior alveolar nerve block, even though no surgical treatment was performed and the patient shows no signs of swelling, lymphadenopathy, or fever. Harn and Durham surveyed 9,587 patients after they had received inferior alveolar nerve blocks and found that 0.54% of the patients experienced postoperative complications (defined as lasting more than four hours).[3] Depending on the myospasm's severity, various levels of the care discussed in this article may be implemented.

Had the second level of therapy not improved the patient's condition adequately, she would have been referred to a physical therapist with experience in treating masticatory musculature.[1,6] Had the patient needed additional dental treatment in the mandibular left quadrant, the general dentist would have been requested not to perform another inferior alveolar nerve block until the patient had been symptom-free for at least two weeks.

It is important for dentists to be empathetic with the patient's situation. A survey of 41 patients who had inferior alveolar nerve block complications reported that many patients felt that their dentists displayed a "relative indifference" to the patient's trauma.[3] This perception caused a profound negative psychological impact and caused some of the patients and their families to change dental practitioners.

Summary

Patients can postoperatively develop a restricted opening from a single inferior alveolar nerve block. If treatment was limited to nonsurgical therapy and the patient shows no signs of swelling, lymphadenopathy, or fever, the restricted opening is most likely due to a medial pterygoid myospasm secondary to the inferior alveolar nerve block. The severity of the disorder generally dictates the extent of therapy needed; however, applying heat, stretching the muscle, prescribing analgesics and/or muscle relaxants, and referring the patient to a physical therapist have proven beneficial. If the patient does not respond to therapy after two or three days, the differential diagnosis should be expanded to include infection, hematoma, or other neurological etiologies.

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