

# Management of Lateral Pterygoid Myalgia with Diagnostic Local Anesthetic Injection: A Report of 2 Cases

Yeong-Gwan Im, D.D.S.,Ph.D\*, Byung-Gook Kim, D.D.S.,Ph.D†

\*Department of Oral Medicine, Chonnam National University Hospital

†Department of Oral Medicine, School of Dentistry, Chonnam National University

The lateral pterygoid muscle is one of the masticatory muscles basic to jaw function. Because of its deep location in the masticatory system, digital palpation of the muscle is usually difficult to perform and unreliable. Therefore, diagnosis of the myalgic disorders involving the lateral pterygoid muscle is a perplexing problem for clinicians. Local anesthetic injection can be a more effective method to examine the lateral pterygoid muscle for the purpose of discriminating the source of pain. Furthermore, immediate elimination of muscle pain facilitates stretching of the muscle in the full range. We report two cases of lateral pterygoid myalgia that were diagnosed and managed successfully through the use of intramuscular local anesthetic injection.

Key words: Intramuscular injection, Lateral pterygoid, Local anesthesia, Muscle disorder

## INTRODUCTION

The lateral pterygoid muscle is one of the masticatory muscles basic to jaw function. It originates on the lateral surface of the sphenoid bone and the maxillary tuberosity of the skull, and inserts on the neck of the mandibular condyle and the TMJ via superior and inferior heads. Both heads are innervated by the lateral pterygoid nerve from the anterior division of the trigeminal nerve.<sup>1)</sup> It is generally recognized that the lateral pterygoid muscle is involved in three functional movements:

(1) to produce lateral movements by unilateral muscle action, (2) to move the disc and condyle in a forward direction by bilateral muscle action, and (3) to stabilize the disc-condyle complex.<sup>2)</sup>

A widely accepted method of evaluating muscle tenderness and pain is by digital palpation. Evoked pain response upon palpation of the masticatory muscles is commonly used for the purpose of assessing TMD patients. The diagnostic value of palpation techniques has been based on the inference that pain or tenderness results from physiological alterations in structures such as muscle or bone.<sup>3)</sup> Palpation by an experienced clinician may be a sufficiently reliable method for screening painful areas, and therefore may be able to reveal the site of the pain.<sup>4)</sup>

The lateral pterygoid muscle can be palpated intraorally or extraorally. For intraoral examination, asking a patient to open their mouth and move their jaw to the side that is being examined can help gain space for access by a palpating finger. The

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Corresponding Author : Byung-Gook Kim  
Department of Oral Medicine  
School of Dentistry, Chonnam National University  
77 Yongbong-ro, Buk-gu, Gwangju, 500-757, South Korea  
TEL: 82-62-530-5574  
FAX: 82-62-530-5679  
E-mail: bkkim@chonnam.ac.kr

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index finger is placed on the lateral side of the alveolar ridge above the maxillary molars, and is moved distally, upward, and medial to palpate.<sup>5)</sup> However, intraoral palpation examines only the anterior part of the inferior head of the muscle. The posterior part of the lateral pterygoid muscle is accessible to extraoral palpation at the neck of the mandibular condyle but with less reliability. A posterior portion of the inferior and superior head may be palpated extraorally through masseter fibers and can be reached through the opening between the mandibular notch and the zygomatic arch with the jaw opened about 3 cm.<sup>6)</sup>

Because the lateral pterygoid muscle is one of the deep structures of the masticatory system, it is, in general, not readily accessible for direct palpation. As a result, the reliability of the palpable examination of the lateral pterygoid muscle has been questioned by many authors.<sup>7-9)</sup>

Considering the difficulty of digital palpation of the lateral pterygoid muscle, diagnosis of the myalgic disorders of the lateral pterygoid is a challenging task for a clinician. We report two cases of lateral pterygoid myalgia that were diagnosed and managed successfully with local anesthetic injection into the muscle.

#### Case 1

A 60-year-old man presented to the Department of Oral Medicine at Chonnam National University Hospital (CNUH) with a history of 20 days of preauricular and infraauricular pain of the left side of his face (Fig. 1). The pain was accentuated by opening his mouth or chewing. He had been to an otolaryngologist a week ago, but was told that his left ear was not subject to any pathology.

The clinical examination revealed a good dentition and occlusion. The maximum unassisted interincisal opening was 40 mm with provoked pain on the left preauricular area. The maximum assisted opening measured 45 mm with the hard endfeel. The right lateral excursion was 11 mm without pain, but the left lateral excursion was 8

mm with left preauricular pain. There was no audible or palpable sound on both TMJs. The palpation of the TMJ, extraoral masticatory muscles and neck muscles failed to disclose any tender or painful site. There was no significant finding in the routine radiographic exam.

The history and examination findings suggested a working diagnosis of arthralgia of the left TMJ. The pain was thought to originate from a deep joint structure such as retrodiscal tissue. Ultrasound therapy was instituted, and medications including Zaltoprofen (NSAID) and Diazepam were prescribed.

The patient returned seven days later reporting significant improvement and almost no pain. The same medications and ultrasound therapy prescribed at the first visit were prescribed again. However, 16 days later the patient visited the clinic again with the recurred complaint. He reported that significant chewing almost always caused pain around his left ear and he even experienced a sense of liquid running out of his ear. At this time, myofascial pain of the left lateral pterygoid and

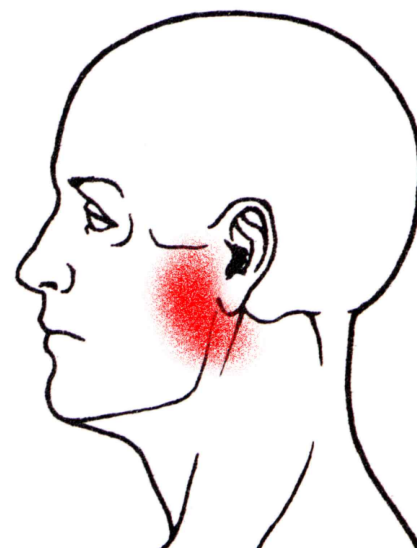


Fig. 1. Pain diagram of Case No.1 depicting preauricular and infraauricular pain of the left side of the face. The pain was accentuated by mouth opening or chewing.



Fig. 2. Photograph of Case No.1 showing the intraoral approach for local anesthetic injection into the left lateral pterygoid muscle. The muscle was injected with 1 mL of 2% lidocaine without epinephrine.

referred sensory symptom of the ipsilateral ear was suspected, and, therefore, a diagnostic local anesthetic block was attempted. The left lateral pterygoid muscle was injected with 1 mL of 2% lidocaine without epinephrine (Fig. 2). Within four minutes, pain during jaw movements and the unusual sensation of the left ear were eliminated. Manual stretching of the left lateral pterygoid was performed. Analgesic and muscle relaxant medication was prescribed. The patient was recalled after one week, reporting significantly less pain and discomfort during chewing. Local anesthetic injection into and stretching of the muscle were repeated. The same medication was prescribed for two weeks. The patient was examined one week later with no history of pain but a few occurrences of the ear symptom.

#### Case 2

A 30-year-old man came to the Department of Oral Medicine at CNUH complaining of right-side jaw pain during chewing and mouth opening (Fig. 3). His history revealed that symptoms had begun shortly after an accident in which his chin had been bumped into a desk inadvertently five days before,

and that his bite had not been comfortable, with premature contact of the right posterior teeth for one or two days. His bite had normalized but pain worsened involving his right jaw, face and head for the following three days.

The patient's mandibular opening pattern was nearly straight with a slight right deflection. The mandibular range of movement was severely limited with a maximum unassisted interincisal opening measuring at 20 mm, maximum assisted opening 22 mm, and almost no lateral excursive movements. Extraoral masticatory muscles were negative for tenderness to palpation. Light compression on the right intraoral lateral pterygoid area using the head of a mouth mirror provoked moderate to severe pain. TMJ examination was negative for pain or sounds. Radiographic examination revealed an upright maxillary third molar and horizontally impacted opposing mandibular thirdmolar (Fig. 4). Both TMJs appeared to be within normal limits structurally.

The patient was diagnosed with myospasm of the right lateral pterygoid muscle. The right pterygoid muscle was injected with 0.9 mL of 2% lidocaine

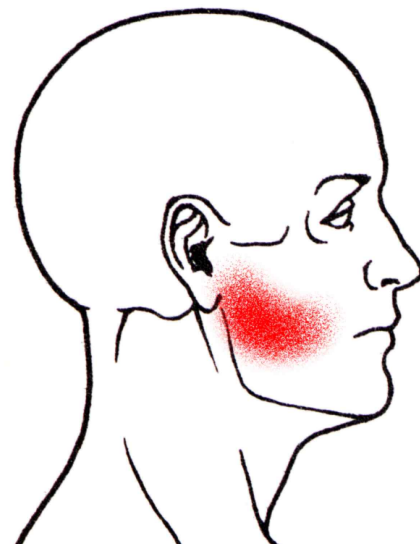


Fig. 3. Pain diagram of Case No.2 portraying right-side jaw pain. Pain was accentuated during chewing and mouth opening.

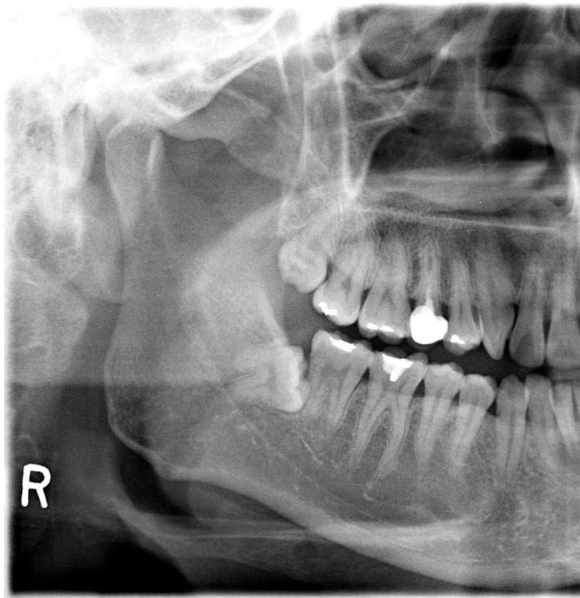


Fig. 4. Panoramic radiograph of Case No.2 showing the upright maxillary third molar and the horizontally impacted opposing mandibular third molar.

without epinephrine. Within 10 minutes the maximum unassisted interincisal opening increased up to 37 mm. Right lateral pterygoid muscle was manually stretched. Analgesic and muscle relaxant medication was prescribed for 3 days. The patient returned two days later reporting improved opening and chewing ability. The maximum assisted opening was measured at 46 mm, right excursion at 12 mm, and left excursion at 6 mm. Careful intraoral examination revealed heavy plaque around the maxillary right third molar, reddish inflamed gingiva around the tooth, and an ulcer of the distal marginal gingiva (Fig. 5). Myospasm of the right lateral pterygoid was suspected to be associated with the infection and pain surrounding the maxillary right third molar.

The plaque was removed using an ultrasonic scaler. Systemic medication including an antibiotic and an analgesic agent with an antimicrobial gargle was prescribed. On the 9-day recall appointment, the patient's symptom had dissipated and condition had returned to normal with maximum unassisted



Fig. 5. Photograph of Case No.2 showing heavy plaque around the maxillary right third molar, and reddish inflamed gingiva around the tooth.

interincisal opening measured at 48 mm. The maxillary right third molar was extracted under right posterior superior alveolar nerve anesthetic block.

## DISCUSSION

The myofascial pain diagnosis of Case No.1 can be supported by its accompanying ear symptom along with deep preauricular pain. Myofascial pain is pain arising from one or more myofascial trigger points, which are hyperirritable spots in skeletal muscle that are associated with hypersensitive palpable nodules in taut bands. The spots are painful on compression and can give rise to characteristic referred pain, referred tenderness, motor dysfunction, and autonomic phenomena.<sup>6)</sup> Myofascial pain of the lateral pterygoid muscle may be associated with severe pain in the TMJ region, altered occlusion, the autonomic concomitant of excessive secretion from the maxillary sinus, and tinnitus.<sup>6)</sup> Referred pain to the ear was found to be generated frequently from the lateral pterygoid as well as posterior digastric muscles.<sup>10,11)</sup> In Case No.1, the unusual ear sensation was eliminated along with preauricular pain after local anesthetic

injection into the lateral pterygoid muscle, suggesting that the ear symptom was one of the associated referred symptoms of myofascial pain of the lateral pterygoid, and also that the injection technique was accurate in its method.

In Case No.2, pericoronitis of the right maxillary third molar was identified on the second visit when increased opening amount enabled visual inspection of the involved tooth. Restricted jaw movement of opening and left lateral excursion indicated dysfunction of the right lateral pterygoid muscle. Infection around the maxillary third molar can influence the function of the lateral pterygoid muscle in several ways. Protective co-contraction of the masticatory muscles in response to odontogenic pain often limits both opening and closing movements. However, in this situation, passive opening by an examiner usually discloses a full range of opening movement. Spread of inflammatory mediators into the adjacent tissues including lateral pterygoid muscle may cause myositis, a primary inflammation of muscle resulting from infection or trauma. It is characterized by constant acute pain in one or more of the masticatory muscles and is usually accompanied by swelling, redness of the overlying skin, and increased temperature over the affected muscle.<sup>12)</sup> Myositis may precede or be associated with a painful contraction or myospasm in the regional muscles. Myospastic contraction of the lateral pterygoid muscle of one side can displace the mandible to the opposite side, inducing acute malocclusion. In Case No.2, the patient reported the experience of altered sensation of occlusion for a few days, which could be linked to myospasm of one of the masticatory muscles, especially the lateral pterygoid.

Diagnosis of myalgic disorders involving the lateral pterygoid muscle is often difficult because examination with direct palpation of the muscle is nearly impossible owing to its location. In Case No.1, at the first visit, the source of pain was not found and arthralgia of the left TMJ was misdiagnosed. This situation seems to be quite common in clinical practice.

One alternative method to examine the lateral pterygoid muscle is 'functional manipulation'.<sup>13)</sup> It is based on the principle that as a muscle becomes fatigued and symptomatic, further function only elicits pain.<sup>14,15)</sup> The most effective manipulation of the inferior lateral pterygoid is to have the patient protrude against resistance provided by the examiner.<sup>13)</sup> However, if the inferior lateral pterygoid is the source of pain, this action will increase the pain. Thomas<sup>16)</sup> compared the results of direction palpation and functional manipulation of the inferior lateral pterygoid. He showed that 27% of a control group had tenderness to intraoral palpation, but none had pain with functional manipulation, and also that 69% of a group of orofacial pain patients were found to have lateral pterygoid pain with a palpation technique, but only 27% had pain with functional manipulation.

A more reliable method to discriminate the pathology of the lateral pterygoid muscle as the source of the pain is local anesthetic blocking. In principle, local anesthetic blocking of the site of pain does not decrease the pain, since it does not affect the source of the pain. On the contrary, when the true source of pain is anesthetically blocked, the pain is reduced not only at the source but also at the site.<sup>12)</sup> The patient in Case No.1 demonstrated immediate relief from not only pain of the preauricular area related to lateral pterygoid myalgia but also the referred ear symptom following local anesthetic block of the lateral pterygoid muscle.

When a dental syringe is to be used for intramuscular injection, 2% lidocaine without epinephrine supplied as a commercial product is feasible and appropriate. Otherwise, various concentrations of local anesthetic solutions can be prepared as needed in a clinic. Iwama<sup>17)</sup> suggested lidocaine or mepivacaine for the suitable type of local anesthetic, and considered the most effective water-diluted concentration for less injection pain to be 0.2% to 0.25%. The amount of injection for masticatory muscles varies according to situations, but usually a volume of one ampule of 1.8 mL covers two or even three trigger points.



It should be noted that local anesthetic use can result in reversible myotoxicity, characterized by ischemia and necrosis of muscle fibers in the injected region. Experiments have demonstrated that all local anesthetics are myotoxic in clinical concentrations, with a drug-specific and dose-dependent rate of toxicity.<sup>18,19)</sup> These changes are much worse in the presence of vasoconstrictors. Therefore, a vasoconstrictor should not be used for intramuscular injection. In most cases, however, skeletal muscle injuries following local anesthetic procedures are entirely reversible and clinical signs of such injuries remain not evident.<sup>20)</sup>

For accurate and reliable injections of therapeutic solutions into the lateral pterygoid muscle, clinicians can consult the technique described by Salame et al.<sup>21)</sup> The technique was originally introduced as a method of inserting fine-wire electrodes intraorally for recording EMG activity from the inferior lateral pterygoid. According to Salame,<sup>21)</sup> “the trajectory of the insertion should follow a line parallel to the line joining the lateral pole of the condyle with the center of the external auditory meatus in the sagittal plane, and almost parallel to the midsagittal line in the axial plane.”

Stretching of the muscle is often supplemented to local anesthetic trigger point injection to increase therapeutic effects. Immediate elimination of muscle pain facilitates stretching of the muscle in the full range, which is beneficial to the ‘injection and stretch’ technique.<sup>6)</sup> Stretching to the full length of the muscle is known to be effective in the treatment of the muscle involved with myofascial pain or myospasm. Wright<sup>22)</sup> presented a technique of manual stretching of the lateral pterygoid muscle. The clinician should place his or her thumb on the most posterior ipsilateral mandibular teeth, push down with the thumb and pull up on the chin with the rest of the fingers. While distracting the condyle, the clinician slowly pushes the mandible up posteriorly, but maintains his or her hand position on the mandible.<sup>22)</sup>

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국문초록

## 진단적 국소마취 주사를 이용한 가쪽날개근 근육통의 치료 2 증례

전남대학교치과병원 구강내과<sup>1</sup>, 전남대학교 치의학전문대학원 구강내과학교실<sup>2</sup>

임영관<sup>1</sup> · 김병국<sup>2</sup>

가쪽날개근은 턱의 기능을 수행하는데 기본적인 저작근 중의 하나이다. 이 근육은 저작계의 심부에 위치하기 때문에 손가락을 이용한 촉진검사가 어려우며 그 결과도 신뢰할 만하지 못하다. 이러한 이유로 임상에게 가쪽날개근에 이환된 근육통 질환을 진단하는 것은 쉽지 않은 문제이다. 근육내 국소마취 주사는 통증의 근원지를 감별하는 목적으로서 가쪽날개근을 검사하는 효과적인 방법이 될 수 있다. 또한 근육통을 즉각적으로 제거함으로써 근육을 전체 길이만큼 신장하는데 도움을 줄 수 있다. 저자들은 근육내 국소마취 주사를 이용하여 가쪽날개근의 근육통을 성공적으로 진단하고 치료한 두 증례를 보고하고자 한다.

주제어: 근육내주사, 가쪽날개근, 국소마취, 근육장애

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