

A new adjunctive tool to aid in the diagnosis of myogenous temporomandibular disorder pain originating from the masseter and temporalis muscles: Twin-block technique

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Abstract

Myogenous temporomandibular disorder (TMD) is the most common type of nonodontogenic pain. The diagnosis is often elusive since diagnosing such conditions often requires a more comprehensive patient assessment. At present, there is no simple one-step diagnostic test to help render a definitive diagnosis of myogenous TMD pain. The twin-block injection can serve as a diagnostic aid to facilitate diagnosis of such myogenous TMD. The twin-block injection blocks the innervation to both the temporalis and masseter muscles, the two most common sources of referred pain to the teeth. This article reviews the twin-block technique along with a case report illustrating its potential role in the diagnosis and management of myogenous TMD pain of masseteric and temporalis origin.

Keywords: Masseter, myogenous temporomandibular disorders, temporalis, twin-block technique

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Received: 16th November, 2017, **Accepted:** 8th February 2018

INTRODUCTION

“In making the diagnosis of the cause of illness in an individual case, calculations of probability have no meaning. The pertinent question is whether the disease is present or not. Whether it is rare or common does not change the odds in a single patient. If the diagnosis can be made by specific criteria, then these criteria are either fulfilled or not fulfilled.”^[1]

As dentists, we are adept at diagnosing and managing odontogenic pain. Having a variety of diagnostic tests such as thermal and electric pulp tests, response to percussion of

the tooth and dental radiographs greatly enhance our ability to diagnose odontogenic pain. However, when it comes to diagnosing nonodontogenic orofacial pain, particularly when it is confounded by muscle pain referral to teeth, our accuracy diminishes.

The reason for this discrepancy is twofold:

1. **Mindset** – As dentists, we “always” maintain the mindset that the source of a toothache is the tooth. This mindset often causes us to overlook our negative diagnostic findings that suggest a nonodontogenic source of pain, and we proceed with our conventional

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How to cite this article: Quek SY, Kalladka M, Kanti V, Subramanian G. A new adjunctive tool to aid in the diagnosis of myogenous temporomandibular disorder pain originating from the masseter and temporalis muscles: Twin-block technique. *J Indian Prosthodont Soc* 2018;18:181-5.

Access this article online	
Quick Response Code:	Website: www.j-ips.org
	DOI: 10.4103/jips.jips_293_17

dentel treatments for odontogenic pain; inevitably, we fail to resolve the patient's pain complaints because of a missed diagnosis

2. Lack of an objective diagnostic test for nonodontogenic pain – Nonodontogenic pain commonly stems from the muscles of mastication (myogenous pain), less often from the temporomandibular joint (TMJ) complex, and rarely from nerve damage and neuropathic pain. Diagnosing these conditions often requires a more comprehensive patient assessment, and presently, there is no simple one-step diagnostic test to help render a definitive diagnosis for each of these categories of pain.

The focus of this topic review is to highlight a new technique: the twin-block injection as an adjunctive aid for the diagnosis of myogenous pain in the orofacial region.

Pain and dysfunction of the muscles of mastication arising from functional and pathological disturbance to the masticatory system are collectively referred to as myogenous temporomandibular disorders (TMDs). The diagnostic criteria/TMD (DC/TMD) classification lists myalgia, tendonitis, myositis, and spasm as subgroup categories of myogenous TMD pain.^[2] Myalgia is further subclassified into three subgroups based on the clinical findings: local myalgia, myofascial pain, and myofascial pain with referrals.^[2] Myofascial pain with referrals has been documented to refer to the dentition, thus mimicking odontogenic pain at these referral locations.^[3-5]

The most common muscles in the head and neck region referring pain to the teeth are the temporalis, masseter, and digastric muscles. The anterior temporalis muscle commonly refers pain to the maxillary anterior teeth, middle temporalis to maxillary premolars, and posterior temporalis muscle to maxillary molars. Similarly, pain from the superficial and deep masseter muscle can refer to the maxillary and mandibular posterior teeth and to the preauricular region of the face, mimicking a TMJ complaint. The anterior belly of digastric muscle can refer pain to the mandibular anterior teeth.^[4]

The traditional approach to making an accurate diagnosis of myogenous TMD pain is with a detailed and exhaustive physical examination, a difficult diagnostic skill to acquire.^[2,6,7] However, as long as a clinician can accurately differentiate between a myogenous pain complaint from odontogenic pain, timely and appropriate management of the pain patient can be facilitated by prompt referral to a dentist trained in the management of nonodontogenic orofacial pain.^[8]

We illustrate here that the twin-block injection could facilitate the accurate differentiation of myogenous TMD complaints emanating from the masseter and/or temporalis muscles from odontogenic pain. The twin-block injection, by its ability to block the innervation to both the temporalis and masseter muscles, can potentially be utilized as an aid to the diagnose of the two most common sources of myogenous pain referring to the dentition.^[9-11]

THE TWIN-BLOCK TECHNIQUE

Armamentarium

- Betadine solution
- Alcohol wipe
- A 27-gauge 1.5-inch needle is appropriate for most patients
- An aspirating syringe
- Local anesthetic: 1.8 mL of 2% lidocaine with 1:100,000 or 1:80 000 epinephrine.

Anatomy

The twin block is an extraoral injection technique that targets both the masseteric and anterior deep temporal nerves as these two branches of the mandibular division (V_3) of the trigeminal nerve emerge from the infratemporal fossa at the infratemporal crest. Upon exiting the infratemporal fossa, the anterior deep temporal nerve immediately turns superiorly to innervate the temporalis muscle while the masseteric nerve traverses the temporal fossa toward the neck of the mandibular condyle, crosses the mandibular notch, and turns inferior-anteriorly to innervate the masseter muscle [Figure 1].

Technique

The area is sterilized with an alcohol wipe and betadine solution.

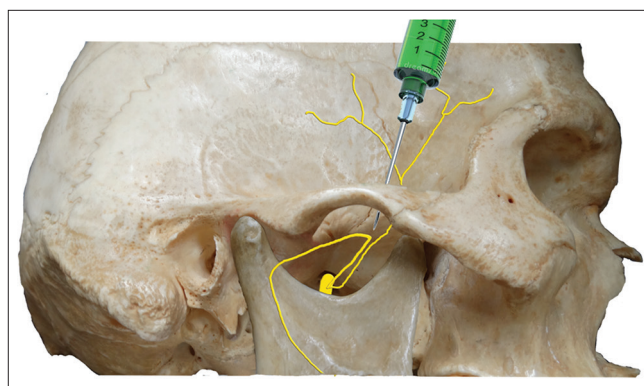


Figure 1: Relationship between the masseteric nerve and the deep temporal nerves to the twin-block injection needle as V_3 exits foramen ovale

The extraoral approach is through the temporal fossa medial to the superior border of the zygomatic process. The needle is directed medially at approximately 30° to the long axis. The surface landmark for the entry point of the syringe needle is the palpable depression overlying the greater wing of the sphenoid and temporalis muscle, located just superior to the zygomatic process, and posterior to the zygomatic process of the frontal bone. The needle is taken to a depth of approximately 1.5 inches before depositing the anesthetic.^[9]

CASE REPORT

A 50-year-old male television mechanic presented with a decade old complaint of pain in the left lower jaw to the center for TMD, orofacial pain, and dental sleep medicine. The patient's presenting pain was 9 on the visual analog scale (VAS). Over the course of 10 years, the patient had consulted a neurologist, numerous physicians, an ENT surgeon, and several dentists without a resolution to his pain complaints. Extraoral palpation of the superficial and deep left masseter and anterior temporalis muscles reproduced the patient's complaints. To confirm that the patient's pain was indeed emanating from the masseter and temporalis muscle, the twin block was administered on the left side [Figure 2]. After the injection, the patient's reported pain was significantly reduced, and palpation of the temporalis and masseter muscles no longer precipitated his pain complaint. Immediately following the injection, the patient reported a VAS of 0 (no pain), and at the recall visit at 1 day and 1 week following the twin-block injection, he reported a VAS of 4. Having confirmed his diagnosis as myogenous TMD face pain, he was provided with a joint stabilization appliance, home care, and postural re-education instructions. At the 3-month follow-up



Figure 2: Photograph depicting the needle insertion during twin-block technique

visit, the patient reported an 80% reduction in pain with inactive trigger points in the deep left masseter and anterior temporalis muscles.

DISCUSSION

Pain due to TMD may be arthrogenous or myogenous.^[12] Myogenous TMD complaint pain conditions can present either as an acute or chronic condition. The management of this condition is contingent upon the identification of the source of the pain.

The International Research DC/TMD Consortium Network and Orofacial Pain Special Interest Group endorse the use of the DC/TMD for diagnosing myogenous TMD pain. The DC/TMD is a complicated and cumbersome diagnostic algorithm assessing the multiple subclasses of myogenous TMD and a psychosocial assessment of distress and chronic pain disability.^[2]

By blocking the innervation to the masseter and temporalis muscles, the twin block can potentially serve as a diagnostic test to differentiate myogenous TMD face pain of masseter and/or anterior temporalis muscles from odontogenic pain.^[11] In the instances of myogenous pain with referral in the masseter and temporalis, it can refer to maxillary teeth and mandibular molar and present a confusing picture to the clinician. Eliciting referral pattern to the teeth often requires specialized training and knowledge of referral patterns. In such instances, when the clinician is in doubt, the twin-block injection may provide a simple solution by asserting the origin of pain. A paradigm for the use of twin block in the diagnosis of myogenous pain of temporalis/masseteric origin is presented in Figure 3. The twin block can be a useful clinical adjunct to Axis I DC-TMD. On ascertaining the patient's site of pain, the treating dentist or an orofacial pain practitioner can move on to the assessment of Axis II or psychosocial assessment to obtain more comprehensive information regarding the patient's pain experience.

A methodical clinical research endeavor is required to validate the twin block as a diagnostic test for myogenous pain. We believe that there is adequate preliminary clinical data to warrant such an effort. Further, the twin block has been demonstrated to have therapeutic benefits comparable to that achieved with trigger point injections at the 6-month follow-up period in patients diagnosed with myofascial pain of masseter or temporalis origin (unpublished results).

A major advantage of this technique is its simple and safe execution. The twin-block technique eliminates the accidental extraneous leakage of anesthetic into the

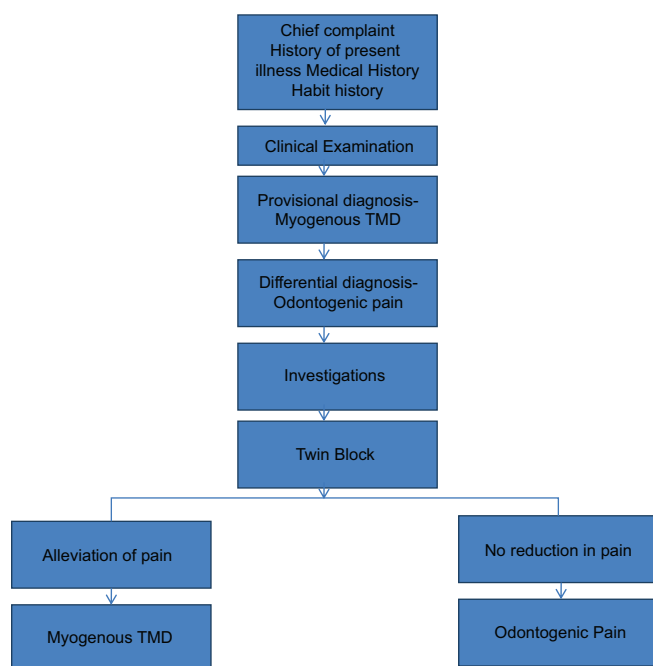


Figure 3: Twin block in the diagnosis of myogenous pain of temporalis/masseteric origin

parotid fascia, with the subsequent temporarily anesthesia of the facial nerve, and orbicularis oculi that result in the temporary loss of the blink reflex on the affected side for the duration of the anesthesia. This technique also obfuscates the need to anesthetize the masseteric and deep temporal nerves with two separate injections to achieve the same result.^[13] Finally, when compared to traditional trigger point injections, the twin-block injection can target multiple trigger points in the masseter and temporalis with a single injection, instead of one injection per trigger point.

Myogenous pain commonly occurs in patients undergoing tedious, time-consuming procedures that require the patient to stay with his/her mouth wide open for long periods of time, such as full mouth rehabilitation with multiple crowns and bridges or during open-tray impressions for multiple implant restorations. The classic presentation is a patient who returns in a few days complaining of pain in the face, generally pointing to the region of the masseter muscle. An astute practitioner may recognize this and advise the patient that this may just be a transient/subacute muscle pain caused by the prolonged and wide mandibular opening during the previous dental procedure. Another differential diagnosis might be an odontogenic problem. In any case, the twin-block injection can potentially provide the answer to the question as to whether the pain was myogenous or odontogenic. If the pain was indeed myogenous, the twin block could help alleviate or even abort the pain. Making an accurate distinction between myogenous pain

and odontogenic pain will particularly be useful in the context of vital teeth that have been prepared to receive restorations such as crowns.

CONCLUSION

The twin-block technique can thus serve as a relatively simple yet valuable diagnostic adjunct for acute/chronic myogenous pain. Furthermore, its therapeutic potential in the management of myogenous pain needs to be explored and validated.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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