



CASE REPORT

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Tendinitis of the Temporalis muscle: Differential diagnosis and treatment. A Case Report.

Abstract: Introduction: The temporalis muscle plays an essential role in mastication and is actively involved in the mandibular closing movement. It is covered by a fibroelastic fascia that forms its tendon. Tendinitis is a degenerative and inflammatory process, which originates in the tendon-bone junction. Signs and symptoms such as swelling, pain, tenderness on palpation, limitation of movement and mouth opening are frequently associated with other temporomandibular disorders and not with tendinitis as a causal factor. Objective: To describe a clinical case identifying the diagnostic process and management of tendinitis of the temporalis muscle. Case report: A 30-year old male patient who sought treatment after continuous squeezing pain in the zygomatic and bilateral temporal regions with increased pain during mouth opening and mandibular function. The patient referred pain in the insertion region of the tendon of the temporalis muscle. Pain was removed after using anesthesia, consequently confirming the diagnosis of tendinitis of the temporalis muscle. Primary management measures were performed and then peritendinous corticosteroids were administered. The patient did not refer spontaneous or functional pain during check-up. Conclusion: Tendinitis of the temporalis muscle is a common condition, although frequently underdiagnosed. A good differential diagnosis must be performed to avoid confusion with other common conditions such as odontogenic pain, sinusitis, arthralgia, myofascial pain and migraine. Management depends on the type of tendinitis. It usually occurs in conjunction with other types of TMD or facial pain, so it is important to know the different clinical characteristics of pathologies with similar manifestations.

Keywords: *Tendinopathy, Temporalis muscle, Tendinosis, Tendinitis, Temporomandibular disorders.*

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INTRODUCTION.

The temporalis muscle is one of the four major muscles of mastication. It is actively involved in mandibular closing movements and is inserted into the coronoid process of the mandible¹. It is covered by a fibroelastic fascia that, at its ends, forms the tendon of the temporalis muscle. Anatomically it has two bellies, one lateral with insertion in the coronoid process and one medial, with insertion on the medial side of the mandibular ramus in its base².

Tendinopathies, tendinitis or tendinosis³, are widely distributed in the population and are the result of acute or chronic lesions⁴. Tendinitis of temporalis muscle (TTM) has been described as a degenerative and inflammatory process of the tendon of the muscle at the insertion of Sharpey's fibers.

Acute process may begin when the movements of the jaw exceed physiological limits, while chronic process is the result of mechanical stress attributed to the progressive degeneration of Sharpey's fibers¹. Patients feel tenderness and

pain on palpation in the region of coronoid⁵ process during clinical examination.

Signs and symptoms such as swelling, tenderness, limitation of movement and mouth opening are frequently associated with other temporomandibular disorders (TMD), and not with tendinitis as a causal factor. The aim of this article is to describe a case identifying the diagnostic process and management of TTM.

CASE REPORT.

A thirty-year-old male patient, an Industrial Civil Engineer, who sought medical care after suffering from occasional oppressive pain for three months in the zygomatic and bilateral temporal regions, with increased pain at maximum mouth aperture and no history of trauma.

The patient reported a sudden onset associated with recurrent oppressive migraines, nail biting, cheilophagia, wakeful bruxism with clenching, slowed jaw movement but without reduction in mouth opening range. The patient had not received any treatment for this condition. Clinical examination revealed pain on extraoral palpation in the insertion region of the tendon of the temporalis muscle and in the muscle itself; bilateral pain with an intensity of 7 on the visual analog scale (VAS).

During intraoral palpation with maximum mouth aperture to locate the coronoid process and the tendon insertion, the patient reported pain and said that he often felt this pain like a migraine. He did not refer pain in the TMJ, masseter muscles or odontogenic pain. Panoramic radiograph did not show any relevant findings.

Infiltrative anesthesia was administered intraorally in both tendons at the insertion of the coronoid process. This removed pain and improved mandibular dynamics confirming the diagnosis of bilateral TTM. The first treatment stage, educating the patient about the pathology, was performed. A cognitive behavioral therapy was initiated to remove nail biting, cheilophagia and wakeful bruxism. Mandibular rest and non-steroidal analgesics were prescribed.

At the first check-up, after one week, pain had been reduced by 50%. The patient showed the same reduction in

Figure 1. Infiltration of intraoral peritendinous corticoids in the tendon of the patient's left temporal muscle.



intensity of pain at the second weekly check-up. Infiltration of 1ml peritendinous corticosteroids administered bilaterally and intraorally was performed (betamethasone sodium phosphate and betamethasone acetate, Dacam Rapilento®, Laboratorio Chile, Chile) (Figure 1). Mandibular rest was again prescribed, scheduling a new check-up three weeks later. At the third check-up, the patient did not report spontaneous or functional pain, so non-pharmacological measures were performed, scheduling check-ups at 2 and 6 months respectively.

At these examinations, the patient reported no recurrence of bad habits or wakeful bruxism, and had a pain intensity of 0 on the VAS scale regarding spontaneous and on palpation pain. The patient was discharged after receiving information about risk factors and how to prevent recurrence or relapse.

DISCUSSION.

TTM is a common, rarely spontaneous and multifactorial condition⁴. There is an acute and a chronic form⁶, suggesting a model of continuity^{6,7}. The causal factors can be grouped into intrinsic and extrinsic, condition may remain after the cause has been removed⁸. Intrinsic factors include, among others, age, sex, anatomic variants, systemic diseases and polymorphisms in collagen synthesis^{4,6,7}.

Extrinsic factors include poor oral habits such as nail biting or cheilophagia; macrotraumas or microtraumas, such as whiplash injury, muscle strain or tooth clenching; sustained muscle contraction; vertical dimension increases due to interocclusal devices or restorations; and prolonged mouth openings^{1,2,6,7,9}. TTM is classified as a TMD of extracapsular origin^{1,5}, specifically an inflammatory disorder of associated structures¹⁰. The pathophysiology of TTM refers to tendon inflammation mainly at the insertion point¹, causing the release of pro-inflammatory and algogenic substances^{6,9}.

Tissue degeneration and loss of cellularity in the temporalis muscle resulting in disorganization of extracellular matrix can be observed with the microscope^{2,11}. At the beginning it is characterized by the swelling and splitting of insertional fibers, followed by fatty degeneration and necrosis with calcium deposition^{2,4}. Initially, there is only functional pain, evolving into constant pain, even at rest, which can finally produce a reflex reaction of restriction in mandibular movements².

Diagnosis is predominantly clinical, with tenderness and/or pain in the tendon insertion site, referred pain, pain in the temporal muscle, feeling of pressure and restriction of mandibular movements^{1,5,11,12}. Dupont *et al.* report that the most

common areas of referred pain are 68% facial; 54% temporary migraines; 49% zygomatic area; 26% retro-ocular, TMJ and ear region; and 18% in the maxillary posterior teeth¹.

Four diagnostic criteria are proposed^{2,11}: 1) Clinical history related to the etiological factor, onset, duration and location of pain; 2) Tenderness on palpation of the tendon in the intra-oral, extraoral area and the muscle; 3) Removal of pain with local anesthesia; 4) Elongation of the coronoid process as a radiographic finding, which is still controversial^{5,11}. Levandoski *et al.* suggest the study of panoramic radiographs¹³, expecting to find elongation of the coronoid process if compared to the ipsilateral condyle process. In asymptomatic individuals the relationship would be reversed¹¹.

Stone *et al.* extended the study to analyze facial and dental asymmetries¹⁴. However, it is necessary to consider that the studies were conducted in a small population where the elongation of the coronoid process was always associated with chronic TTM. On the other hand, it is reported that 79% of TTM occur with other type of facial pain¹, consequently it is important to recognize their differences (Table 1) to improve diagnostic accuracy².

From a physiological standpoint, tendons are composed of

Table 1. Comparative table between tendinitis of temporalis muscle and diseases with similar clinical features.

Pathology	Location of pain	Pain reference	Clinical Features	Intensity	Radiographic findings
Odontogenic pain (posterior superior tooth)	Affected tooth	Zygomatic region, ear, antral, ipsilateral	Throbbing pain increases with hot/cold and at night	Severe	Restoration and/or extensive caries, radiolucent apical area.
Sinusitis	General facial sensitivity/tenderness	Ears, retro-ocular, superior posterior teeth	Squeezing pain, increases when tilting the head	Moderate	Paranasal sinuses with radiopaque filler
TMJ arthralgia	TMJ	Ear, ipsilateral temporal region	Stabbing pain, increases with mandibular movement	Mild to moderate	Variable according to the joint pathology
Temporalis muscle MFP	Temporalis muscle	Temporal, zygomatic, supraciliar region, superior posterior teeth	Dull, continuous pain with tight band and trigger point	Moderate	No findings
Migraine	Skull half, temporal region and ipsilateral orbit. Sometimes zygomatic region	Orbit, temporal, supraciliar region, back of the head and ipsilateral neck	Throbbing pain, incapacitating, nausea or dizziness, photophobia, phonophobia	Severe	No findings
Trigeminal Neuralgia	Dermatome of affected branch	Dermatome of affected branch	Electrical, burning, hyperesthesia	Severe	No findings
Tendinitis of temporalis muscle	Tendon of temporalis muscle	Temporal, zygomatic, antral, retroocular region.	Oppressive, continuous, dull pain, increased with maximum mouth aperture	Mild to moderate	Coronoids elongation or no findings

MFP: myofascial pain; TMJ: Temporomandibular Joint.

tenocytes and tenoblasts that make up 90 to 95% of the cellular elements⁹. Cellularity and metabolism decrease with age or after inflammatory processes, and increased anaerobic energy is used resulting in difficult healing and repair, making the disease management slow and sometimes difficult⁹. Three healing/repair phases have been established. The first is called inflammatory phase, where neutrophils, monocytes and macrophages release interleukins and angiotensin resulting in a vascular network^{3,4,6}.

The second stage is called proliferative or reparative, in which cellularity and water uptake would increase, and fibroblasts would produce type-III collagen^{3,4,6}. The third stage called remodeling has a consolidation phase, in which cellularity would be reduced, type-III collagen would be replaced by type-I collagen and the organization of the fibers would occur; and a phase of maturation, where the intertwining of fibers and mature tissue formation would be promoted^{3,4,6}.

Therefore, three levels of treatment^{5,11} are described, depending on the characteristics of the subject and chronicity of the pathology. In the case described, only measures from the first and second level were used. Some of the primary measures can include: patient education, recognition and removal of the causal factor, mandibular rest, cold/hot extraoral compresses, iontophoresis, phonophoresis, analgesics and anti-inflammatory drugs, eccentric exercises and muscular stretching^{5,7,15}.

Tendinitis del músculo Temporal: Diagnóstico diferencial y tratamiento. Informe de caso.

Resumen: Introducción: El músculo temporal es fundamental en la masticación, participa activamente en los movimientos de cierre mandibular. Está recubierto por una fascia fibroelástica que conforma su tendón. La tendinitis es un proceso degenerativo e inflamatorio, que se origina en la unión tendón-hueso. Con frecuencia, signos y síntomas como inflamación, dolor a la palpación, limitación del movimiento y apertura, son asociados a otros trastornos temporomandibulares no considerando la tendinitis como un factor causal. Objetivo: Describir un caso clínico identificando el proceso diagnóstico y el manejo de una tendinitis del músculo temporal. Descripción del caso: Paciente sexo masculino de 30 años, acude por dolor opresivo continuo en la región cigomática y temporal bilateral con aumento del dolor en apertura y fun-

The aim of these measures is to prevent chronicity and to control inflammation. Secondary measures would be used in chronic TTM or when the primary measures have not been sufficient. They include infiltrations drugs such as local anesthetics, corticosteroids, platelet-rich plasma and other substances^{5,6,7}.

Finally, there are tertiary measures, which are rarely used and only in very chronic cases, and include surgical procedures such as coronoidectomy and relocation, and radio frequencies by thermal neurolysis^{5,11}. Currently the use of growth factors, stem cells, biomaterials and gene therapy has been proposed to improve the management of tendon injuries^{4,6,9}. However, it is necessary to conduct further studies in TTM. It is also necessary to evaluate the presence of other TMD, performing an etiologic and comprehensive treatment to avoid inefficient management or relapse.

CONCLUSION.

TTM is an often underdiagnosed multifactorial disease characterized by local and referred pain, causing alterations in mandibular dynamics. It usually occurs in conjunction with other TMD or facial pain, making differential diagnosis very important. There are three therapeutic levels including different alternative treatments. It is necessary to conduct observational and experimental studies, specifically in TTM.

ción mandibular. A la palpación presenta dolor en la zona de inserción del tendón del músculo temporal, el cual se elimina al anestésiar confirmando el diagnóstico de tendinitis del músculo temporal. Se realizan medidas primarias de manejo y luego se infiltra corticoides peritendineos. Al control el paciente no presenta dolor espontáneo ni en función. Conclusión: La tendinitis del músculo temporal es una patología frecuente, aunque subdiagnosticada. Debe realizarse el correcto diagnóstico diferencial con patologías frecuentes como dolor odontogénico, sinusitis, artralgia, dolor miofascial y migraña. El manejo dependerá del tipo de tendinitis. Habitualmente se presenta en conjunto con otros o dolores faciales, por lo que es importante conocer las distintas características clínicas de patologías con presentaciones similares.

Palabras clave: *Tendinopatía, Músculo temporal, Tendinosis, Tendinitis, Trastornos temporomandibulares.*

REFERENCES.

1. Dupont JS Jr, Brown CE. The concurrency of temporal tendinitis with TMD. *Cranio*. 2012;30(2):131-5.
2. Ernest EA 3rd, Martinez ME, Rydzewski DB, Salter EG. Photomicrographic evidence of insertion tendonosis: the etiologic factor in pain for temporal tendonitis. *J Prosthet Dent*. 1991;65(1):127-31.
3. Scott A, Backman L, Speed C. Tendinopathy-Update on Pathophysiology. *J Orthop Sports Phys Ther*. 2015:1-39.
4. Docheva D, Müller SA, Majewski M, Evans C. Biologics for tendon repair. *Adv Drug Deliv Rev*. 2015;84:222-39.
5. Aydil U, Kizil Y, Köybaşıoğlu A. Less known non-infectious and neuromusculoskeletal system-originated anterolateral neck and craniofacial pain disorders. *Eur Arch Otorhinolaryngol*. 2012;269(1):9-16.
6. Mishra A, Woodall J Jr, Vieira A. Treatment of tendon and muscle using platelet-rich plasma. *Clin Sports Med*. 2009;28(1):113-25.
7. Joseph MF, Denegar CR. Treating tendinopathy: perspective on anti-inflammatory intervention and therapeutic exercise. *Clin Sports Med*. 2015;34(2):363-74.
8. Friedman MH, Nelson AJ Jr. Head and neck pain review: traditional and new perspectives. *J Orthop Sports Phys Ther*. 1996;24(4):268-78.
9. Sharma P, Maffulli N. Tendon injury and tendinopathy: healing and repair. *J Bone Joint Surg Am*. 2005;87(1):187-202.
10. Okeson JP. Tratamiento de oclusión y afecciones temporomandibulares. 7 ed. España: Elsevier; 2013.
11. Shankland WE 2nd. Temporal tendinitis: a modified Levandoski panoramic analysis of 21 cases. *Cranio*. 2011;29(3):204-10.
12. Gibson W, Arendt-Nielsen L, Graven-Nielsen T. Referred pain and hyperalgesia in human tendon and muscle belly tissue. *Pain*. 2006;120(1-2):113-23.
13. Levandoski RR. Mandibular whiplash. Part I: An extension flexion injury of the temporomandibular joints. *Funct Orthod*. 1993;10(1):26-9.
14. Piedra I. The Levandoski Panoramic Analysis in the diagnosis of facial and dental asymmetries. *J Clin Pediatr Dent*. 1995;20(1):15-21.
15. Dimitrios S. Exercise for tendinopathy. *World J Methodol*. 2015;5(2):51-4.