

# Neuropathic dental pain

Dental [pain](#) may have another origin than [teeth](#). It may be caused by [myofascial](#), neurovascular, cardiac, neurological, sinusal or psychological factors.

## Trigeminal neuralgia

A high percentage of patients that are surgically treated for trigeminal neuralgia consult their dentist first and receive possibly unjustified dental treatment. Differential diagnoses include odontogenic pain syndromes as well as atypical orofacial pain. The present literature acknowledges difficulties in correctly diagnosing trigeminal neuralgia, but seems to underestimate the extent <sup>1)</sup>.

## Treatment

It is notoriously difficult to treat. To date, there are no [deep brain stimulation](#) (DBS) studies on this specific [pain](#) condition and no optimal target or “[sweet spot](#)” has ever been defined.

To determine the optimal thalamic target for improving this condition by utilizing the steering abilities of a directional [DBS](#) electrode ([Vercise Cartesia](#)™ Model DB-2202-45, [Boston Scientific](#)).

A [literature search](#) and [review](#) of the [database](#) identified 3 potential thalamic [targets](#). A directional [lead](#) was implanted in a patient with NDP and its current steering used to test the effects in each [nucleus](#). The patient reported her pain after 2 wk of stimulation in a prospective randomized [blinded clinical trial](#) of one. [Quality of life](#) measurements were performed before and after 3 mo on their best setting.

They identified 3 potential nuclei: the [Centromedian nucleus](#) (CM), [Ventral posteromedial nucleus](#) (VPM), and [Anterior pulvinar nucleus](#). The best results were during VPM stimulation (>90% reduction in pain) and CM stimulation (50% reduction). Following 3 mo of VPM-DBS in combination of lateral CM stimulation, their pain disability index dropped (from 25 to 0) and short form 36 improved (from 67.5 to 90).

[VPM](#) stimulation in combination with CM stimulation is a promising target for NDP. DBS electrode directionality can be used to test multiple targets and select a patient specific “sweet spot” for NDP treatment <sup>2)</sup>.

## Case reports

Imholz et al. discuss 2 rare cases of patients who presented with a [cerebellopontine angle tumor](#), who initially manifested with symptoms of dental pain.

The first patient, male, 44 years of age presented to his dentist with toothache (47), which led to its extraction. Five months later, a second painful episode, more characteristic, revealed the presence of a vestibular schwannoma, which was successfully treated and led to the disappearance of the pain.

The second case, a 43-year-old female presented to her dentist with toothache (46), which lead the dentist perform a root filling. Two years later, with a 3rd episode of dental pain, more relevant of a trigeminal neuralgia, a epidermoid cyst of the right cerebellopontine angle was identified and successfully treated leading to the disappearance of the pain.

Cerebellopontine angle tumors of this type may lead, in exceptional cases to symptoms of dental pain. Therefore, in face of atypical tooth or facial pain, both a detailed medical history and a detailed examination are necessary, in order to investigate any neurological signs and symptoms, before undertaking any non-essential dental treatment, which may be detrimental for the patients <sup>3)</sup>.

<sup>1)</sup>

von Eckardstein KL, Keil M, Rohde V. Unnecessary dental procedures as a consequence of trigeminal neuralgia. *Neurosurg Rev*. 2015 Apr;38(2):355-60; discussion 360. doi: 10.1007/s10143-014-0591-1. Epub 2014 Nov 25. PubMed PMID: 25418511.

<sup>2)</sup>

Krüger MT, Avecillas-Chasin JM, Heran MKS, Naseri Y, Sandhu MK, Polyhronopoulos NE, Sarai N, Honey CR. Directional Deep Brain Stimulation Can Target the Thalamic “Sweet Spot” for Improving Neuropathic Dental Pain. *Oper Neurosurg (Hagerstown)*. 2021 May 6:opab136. doi: 10.1093/ons/opab136. Epub ahead of print. PMID: 33956987.

<sup>3)</sup>

Imholz B, Lombardi T, Scolozzi P. [Toothache: At what point has a pontocerebellar angle tumor to be evoked?]. *Rev Stomatol Chir Maxillofac Chir Orale*. 2015 May 19. pii: S2213-6533(15)00068-3. doi: 10.1016/j.revsto.2015.04.002. [Epub ahead of print] French. PubMed PMID: 26001346.

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