[Curr Pain Headache Rep.](http://www.ncbi.nlm.nih.gov/pubmed/23250793" \o "Current pain and headache reports.) 2013 Jan;17(1):308. doi: 10.1007/s11916-012-0308-5.

**Interventional procedures for facial pain.**

[Vorenkamp KE](http://www.ncbi.nlm.nih.gov/pubmed?term=Vorenkamp%20KE%5BAuthor%5D&cauthor=true&cauthor_uid=23250793).

**Source**

Department of Anesthesiology & Pain Medicine, Virginia Mason Medical Center, Seattle, WA 98101, USA. Kevin.Vorenkamp@vmmc.org

**Abstract**

Interventional pain procedures are critical in the diagnosis and management of a variety of facial pain conditions. Trigeminal neuralgia (TN) is the most frequent diagnosis for facial pain, with a reported prevalence 10 times greater than persistent idiopathic facial pain (PIFP). Although pharmacological treatments and psychological interventions benefit many patients with these diagnoses, the pain remains disabling for a significant portion of others. Percutaneous interventions targeting the gasserian ganglion and its branches have proven effective in the management of TN, while there is also supportive evidence for treating the sphenopalatine ganglion in PIFP.

[Cochrane Database Syst Rev.](http://www.ncbi.nlm.nih.gov/pubmed/21901707) 2011 Sep 7;(9):CD007312. doi: 10.1002/14651858.CD007312.pub2.

# Neurosurgical interventions for the treatment of classical trigeminal neuralgia.

[Zakrzewska JM](http://www.ncbi.nlm.nih.gov/pubmed?term=Zakrzewska%20JM%5BAuthor%5D&cauthor=true&cauthor_uid=21901707), [Akram H](http://www.ncbi.nlm.nih.gov/pubmed?term=Akram%20H%5BAuthor%5D&cauthor=true&cauthor_uid=21901707).

### Source

Oral Medicine, Eastman Dental Institute, 256 Gray's Inn Road, London, UK, WC1X 8LD.

### Abstract

#### BACKGROUND:

Surgical interventions are used for trigeminal neuralgia when drug treatment fails. Surgical treatments divide into two main categories, ablative (destructive) or non-ablative. These treatments can be done at three different sites: peripherally, at the Gasserian ganglion level, and within the posterior fossa of the skull.

#### OBJECTIVES:

To assess the efficacy of neurosurgical interventions for classical trigeminal neuralgia in terms of pain relief, quality of life and any harms. To determine if there are defined subgroups of patients more likely to benefit.

#### SEARCH STRATEGY:

We searched the Cochrane Neuromuscular Disease Group Specialized Register, (13 May 2010), CENTRAL (issue 2, 2010 part of the Cochrane Library), Health Technology Assessment (HTA) Database, NHS Economic Evaluation Database (NHSEED) and Database of Abstracts of Reviews of Effects (DARE) (issue 4, 2010 (HTA, NHSEED and DARE are part of the Cochrane Library)), MEDLINE (January 1966 to May 2010) and EMBASE (January 1980 to May 2010) with no language exclusion.

#### SELECTION CRITERIA:

Randomised controlled trials and quasi-randomised controlled trials of neurosurgical interventions used in the treatment of classical trigeminal neuralgia.

#### DATA COLLECTION AND ANALYSIS:

Two authors independently assessed trial quality and extracted data. We contacted authors for clarification and missing information whenever possible.

#### MAIN RESULTS:

Eleven studies involving 496 participants met some of the inclusion criteria stated in the protocol. One hundred and eighty patients in five studies had peripheral interventions, 229 patients in five studies had percutaneous interventions applied to the Gasserian ganglion, and 87 patients in one study underwent two modalities of stereotactic radiosurgery (Gamma Knife) treatment. No studies addressing microvascular decompression (which is the only non-ablative procedure) met the inclusion criteria. All but two of the identified studies had a high to medium risk of bias because of either missing data or methodological inconsistency. It was not possible to undertake meta-analysis because of differences in the intervention modalities and variable outcome measures. Three studies had sufficient outcome data for analysis. One trial, which involved 40 participants, compared two techniques of radiofrequency thermocoagulation (RFT) of the Gasserian ganglion at six months. Pulsed RFT resulted in return of pain in all participants by three months. When this group were converted to conventional (continuous) treatment these participants achievedpain control comparable to the group that had received conventional treatment from the outset. Sensory changes were common in the continuous treatment group. In another trial, of 87 participants, investigators compared radiation treatment to the trigeminal nerve at one or two isocentres in the posterior fossa. There were insufficient data to determine if one technique was superior to another. Two isocentres increased the incidence of sensory loss. Increased age and prior surgery were predictors for poorer pain relief. Relapses were nonsignificantly reduced with two isocentres (risk ratio (RR) 0.72, 95% confidence intervaI (CI) 0.30 to 1.71). A third study compared two techniques for RFT in 54 participants for 10 to 54 months. Both techniques produced pain relief (not significantly in favour of neuronavigation (RR 0.70, 95% CI 0.46 to 1.04) but relief was more sustained and side effects fewer if a neuronavigation system was used. The remaining eight studies did not report outcomes as predetermined in our protocol.

#### AUTHORS' CONCLUSIONS:

There is very low quality evidence for the efficacy of most neurosurgical procedures for trigeminal neuralgia because of the poor quality of the trials. All procedures produced variable pain relief, but many resulted in sensory side effects. There were no studies of microvascular decompression which observational data suggests gives the longest pain relief. There is little evidence to help comparative decision making about the best surgical procedure. Well designed studies are urgently needed

[Cochrane Database Syst Rev.](http://www.ncbi.nlm.nih.gov/pubmed/21901707) 2011 Sep 7;(9):CD007312. doi: 10.1002/14651858.CD007312.pub2.

# Neurosurgical interventions for the treatment of classical trigeminal neuralgia.

[Zakrzewska JM](http://www.ncbi.nlm.nih.gov/pubmed?term=Zakrzewska%20JM%5BAuthor%5D&cauthor=true&cauthor_uid=21901707), [Akram H](http://www.ncbi.nlm.nih.gov/pubmed?term=Akram%20H%5BAuthor%5D&cauthor=true&cauthor_uid=21901707).

### Source

Oral Medicine, Eastman Dental Institute, 256 Gray's Inn Road, London, UK, WC1X 8LD.

### Abstract

#### BACKGROUND:

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To assess the efficacy of neurosurgical interventions for classical trigeminal neuralgia in terms of pain relief, quality of life and any harms. To determine if there are defined subgroups of patients more likely to benefit.

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PMID:

[Cochrane Database Syst Rev.](http://www.ncbi.nlm.nih.gov/pubmed/23235637) 2012 Dec 12;12:CD006968. doi: 10.1002/14651858.CD006968.pub2.

# Local interventions for the management of alveolar osteitis (dry socket).

[Daly B](http://www.ncbi.nlm.nih.gov/pubmed?term=Daly%20B%5BAuthor%5D&cauthor=true&cauthor_uid=23235637), [Sharif MO](http://www.ncbi.nlm.nih.gov/pubmed?term=Sharif%20MO%5BAuthor%5D&cauthor=true&cauthor_uid=23235637), [Newton T](http://www.ncbi.nlm.nih.gov/pubmed?term=Newton%20T%5BAuthor%5D&cauthor=true&cauthor_uid=23235637), [Jones K](http://www.ncbi.nlm.nih.gov/pubmed?term=Jones%20K%5BAuthor%5D&cauthor=true&cauthor_uid=23235637), [Worthington HV](http://www.ncbi.nlm.nih.gov/pubmed?term=Worthington%20HV%5BAuthor%5D&cauthor=true&cauthor_uid=23235637).

### Source

Dental Practice & Policy, King’s College London Dental Institute, London, UK. blanaid.daly@kcl.ac.uk.

### Abstract

#### BACKGROUND:

Alveolar osteitis (dry socket) is a complication of dental extractions and occurs more commonly in extractions involving mandibular molar teeth. It is associated with severe pain developing 2 to 3 days postoperatively, a socket that may be partially or totally devoid of blood clot and in some patients there may be a complaint of halitosis. It can result in an increase in postoperative visits.

#### OBJECTIVES:

To assess the effects of local interventions for the prevention and treatment of alveolar osteitis (dry socket) following tooth extraction.

#### SEARCH METHODS:

The following electronic databases were searched: the Cochrane Oral Health Group Trials Register (to 29 October 2012), the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2012, Issue 10), MEDLINE via OVID (1946 to 29 October 2012) and EMBASE via OVID (1980 to 29 October 2012). There were no restrictions regarding language or date of publication. We also searched the reference lists of articles and contacted experts and organisations to identify any further studies.

#### SELECTION CRITERIA:

We included randomised controlled trials of adults over 18 years of age who were having permanent teeth extracted or who had developed dry socket post-extraction. We included studies with any type of local intervention used for the prevention or treatment of dry socket, compared to a different local intervention, placebo or no treatment. We excluded studies reporting on systemic use of antibiotics or the use of surgical techniques for the management of dry socket because these interventions are evaluated in separate Cochrane reviews.

#### DATA COLLECTION AND ANALYSIS:

Two review authors independently undertook risk of bias assessment and data extraction in duplicate for included studies using pre-designed proformas. Any reports of adverse events were recorded and summarised into a table when these were available. We contacted trial authors for further details where these were unclear. We followed The Cochrane Collaboration statistical guidelines and reported dichotomous outcomes as risk ratios (RR) and calculated 95% confidence intervals (CI) using random-effects models. For some of the split-mouth studies with sparse data it was not possible to calculate RR so we calculated the exact odds ratio instead. We used the GRADE tool to assess the quality of the body of evidence.

#### MAIN RESULTS:

Twenty-one trials with 2570 participants met the inclusion criteria; 18 trials with 2376 participants for the prevention of dry socket and three studies with 194 participants for the treatment of dry socket. The risk of bias assessment identified six studies at high risk of bias, 14 studies at unclear risk of bias and one studies at low risk of bias. When compared to placebo, rinsing with chlorhexidine mouthrinses (0.12% and 0.2% concentrations) both before and after extraction(s) prevented approximately 42% of dry socket(s) with a RR of 0.58 (95% CI 0.43 to 0.78; P < 0.001) (four trials, 750 participants, moderate quality of evidence). The prevalence of dry socket varied from 1% to 5% in routine dental extractions to upwards of 30% in surgically extracted third molars. The number of patients needed to be treated with (0.12% and 0.2%) chlorhexidine rinse to prevent one patient having dry socket (NNT) was 232 (95% CI 176 to 417), 47 (95% CI 35 to 84) and 8 (95% CI 6 to 14) for control prevalences of dry socket of 1%, 5% and 30% respectively.Compared to placebo, placing chlorhexidine gel (0.2%) after extractions prevented approximately 58% of dry socket(s) with a RR of 0.42 (95% CI 0.21 to 0.87; P = 0.02) (two trials, in 133 participants, moderate quality of evidence). The number of patients needed to be treated with chlorhexidine gel to prevent one patient having dry socket (NNT) was 173 (95% CI 127 to 770), 35 (95% CI 25 to 154) and 6 (95% CI 5 to 26) for control prevalences of dry socket of 1%, 5% and 30% respectively.A further 10 intrasocket interventions to prevent dry socket were each evaluated in single studies, and therefore there is insufficient evidence to determine their effects. Five interventions for the treatment of dry socket were evaluated in a total of three studies providing insufficient evidence to determine their effects.

#### AUTHORS' CONCLUSIONS:

Most tooth extractions are undertaken by dentists for a variety of reasons, however, all but three studies included in the present review included participants undergoing extraction of third molars, most of which were undertaken by oral surgeons. There is some evidence that rinsing with chlorhexidine (0.12% and 0.2%) or placing chlorhexidine gel (0.2%) in the sockets of extracted teeth, provides a benefit in preventing dry socket. There was insufficient evidence to determine the effects of the other 10 preventative interventions each evaluated in single studies. There was insufficient evidence to determine the effects of any of the interventions to treat dry socket. The present review found some evidence for the association of minor adverse reactions with use of 0.12%, 0.2% and 2% chlorhexidine mouthrinses, though most studies were not designed to detect the presence of hypersensitivity reactions to mouthwash as part of the study protocol. No adverse events were reported in relation to the use of 0.2% chlorhexidine gel placed directly into a socket (though previous allergy to chlorhexidine was an exclusion criterion in these trials). In view of recent reports in the UK of two cases of serious adverse events associated with irrigation of dry socket with chlorhexidine mouthrinse, it is recommended that all members of the dental team prescribing chlorhexidine products are aware of the potential for both minor and serious adverse side effects.

PMID:

23

[J Orofac Pain.](http://www.ncbi.nlm.nih.gov/pubmed/22292141) 2012 Winter;26(1):59-64.

# Effects of radiofrequency thermocoagulation of the sphenopalatine ganglion on headache and facial pain: correlation with diagnosis.

[Oomen KP](http://www.ncbi.nlm.nih.gov/pubmed?term=Oomen%20KP%5BAuthor%5D&cauthor=true&cauthor_uid=22292141), [van Wijck AJ](http://www.ncbi.nlm.nih.gov/pubmed?term=van%20Wijck%20AJ%5BAuthor%5D&cauthor=true&cauthor_uid=22292141), [Hordijk GJ](http://www.ncbi.nlm.nih.gov/pubmed?term=Hordijk%20GJ%5BAuthor%5D&cauthor=true&cauthor_uid=22292141), [de Ru JA](http://www.ncbi.nlm.nih.gov/pubmed?term=de%20Ru%20JA%5BAuthor%5D&cauthor=true&cauthor_uid=22292141).

### Source

Department of Otorhinolaryngology, University Medical Center, Utrecht, the Netherlands. oomenkarin@hotmail.com

### Abstract

#### AIMS:

To study the effect of radiofrequency thermocoagulation (RFT) of the sphenopalatine ganglion (SPG) on headache and facial pain conditions following critical reevaluation of the original diagnosis.

#### METHODS:

This was a retrospective study of clinical records gathered over 4 consecutive years of all 15 facial pain or headache patients who underwent RFT of the SPG at a tertiary pain clinic; diagnoses were reevaluated, after which the effect of RFT on facial pain was assessed.

#### RESULTS:

After application of new criteria for Sluder's neuralgia (SN) and strict criteria for cluster headache (CH), seven patients out of the 15 turned out to have been diagnosed correctly. Nine of the 15 patients showed considerable pain relief after RFT of the SPG. Positive results were most frequent among patients with Sluder's neuropathy, atypical facial pain, and CH. However, repeated RFT procedures were needed in most patients.

#### CONCLUSION:

Correct headache and facial pain diagnosis is vital to assess the outcome of different treatment strategies. Even in a tertiary center, headache and facial pain can be misdiagnosed. RFT of the SPG may be effective in patients with facial pain, but repeated procedures are often needed.

PMID:

22292141

[PubMed

[Cephalalgia.](http://www.ncbi.nlm.nih.gov/pubmed/21960648) 2011 Nov;31(15):1542-8. doi: 10.1177/0333102411424619. Epub 2011 Sep 29.

# Prevalence of trigeminal neuralgia and persistent idiopathic facial pain: a population-based study.

[Mueller D](http://www.ncbi.nlm.nih.gov/pubmed?term=Mueller%20D%5BAuthor%5D&cauthor=true&cauthor_uid=21960648), [Obermann M](http://www.ncbi.nlm.nih.gov/pubmed?term=Obermann%20M%5BAuthor%5D&cauthor=true&cauthor_uid=21960648), [Yoon MS](http://www.ncbi.nlm.nih.gov/pubmed?term=Yoon%20MS%5BAuthor%5D&cauthor=true&cauthor_uid=21960648), [Poitz F](http://www.ncbi.nlm.nih.gov/pubmed?term=Poitz%20F%5BAuthor%5D&cauthor=true&cauthor_uid=21960648), [Hansen N](http://www.ncbi.nlm.nih.gov/pubmed?term=Hansen%20N%5BAuthor%5D&cauthor=true&cauthor_uid=21960648), [Slomke MA](http://www.ncbi.nlm.nih.gov/pubmed?term=Slomke%20MA%5BAuthor%5D&cauthor=true&cauthor_uid=21960648), [Dommes P](http://www.ncbi.nlm.nih.gov/pubmed?term=Dommes%20P%5BAuthor%5D&cauthor=true&cauthor_uid=21960648), [Gizewski E](http://www.ncbi.nlm.nih.gov/pubmed?term=Gizewski%20E%5BAuthor%5D&cauthor=true&cauthor_uid=21960648), [Diener HC](http://www.ncbi.nlm.nih.gov/pubmed?term=Diener%20HC%5BAuthor%5D&cauthor=true&cauthor_uid=21960648), [Katsarava Z](http://www.ncbi.nlm.nih.gov/pubmed?term=Katsarava%20Z%5BAuthor%5D&cauthor=true&cauthor_uid=21960648).

### Source

University of Duisburg-Essen, Germany. daniel.mueller@uni-due.de

### Abstract

#### OBJECTIVE:

To estimate the lifetime prevalence of trigeminal neuralgia (TN) and persistent idiopathic facial pain (PIFP) in a population-based sample in Germany.

#### METHODS:

A total of 3336 responders of 6000 contacted inhabitants of the city of Essen in Germany were screened using a self-assessment questionnaire. 327 individuals, who reported recurrent facial pain and randomly selected 150 (5% of 3009) screening negative subjects, received a phone interview by one of six neurologists and if necessary a face-to-face examination. Those with suspected TN or PIFP following the phone interview underwent neurological examination by two neurologists who were unaware of the presumed diagnosis. A random group of 25 (10% of 247) phone interview negative subjects was examined face-to-face. All suspected cases of PIFP received otorhinolaryngological examination and diagnostic cranial magnetic resonance imaging (MRI). In TN patients the number of vessel-nerve contacts was determined by thin-slice cranial MRI.

#### RESULTS:

Lifetime prevalence of TN was estimated to be 0.3% [10 of 3336; 95% CI 0.1-0.5%], of PIFP 0.03% [1 of 3336; 95% CI < 0.08%]. Thin-slice cranial MRI detected five vessel-nerve contacts and no symptomatic lesions in the 10 TN patients.

#### CONCLUSIONS:

This large population-based study revealed that TN and PIFP are rare facial pain disorder

[Curr Pain Headache Rep.](http://www.ncbi.nlm.nih.gov/pubmed/23250793) 2013 Jan;17(1):308. doi: 10.1007/s11916-012-0308-5.

**Interventional procedures for facial pain.**

[Vorenkamp KE](http://www.ncbi.nlm.nih.gov/pubmed?term=Vorenkamp%20KE%5BAuthor%5D&cauthor=true&cauthor_uid=23250793).

**Source**

Department of Anesthesiology & Pain Medicine, Virginia Mason Medical Center, Seattle, WA 98101, USA. Kevin.Vorenkamp@vmmc.org

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[Oral Surg Oral Med Oral Pathol Oral Radiol.](http://www.ncbi.nlm.nih.gov/pubmed/23036798) 2012 Dec;114(6):749-55. doi: 10.1016/j.oooo.2012.06.017. Epub 2012 Oct 1.

# Patients appearing to dental professionals with orofacial pain arising from intracranial tumors: a literature review.

[Moazzam AA](http://www.ncbi.nlm.nih.gov/pubmed?term=Moazzam%20AA%5BAuthor%5D&cauthor=true&cauthor_uid=23036798), [Habibian M](http://www.ncbi.nlm.nih.gov/pubmed?term=Habibian%20M%5BAuthor%5D&cauthor=true&cauthor_uid=23036798).

### Source

Department of General Surgery, Medical Center, University of California, Davis, Sacramento, California, USA.

### Abstract

#### BACKGROUND:

A small proportion of patients with orofacial pain appearing to dentists and dental specialists will have intracranial tumors as the underlying cause. These patients may undergo unnecessary dental interventions before the correct diagnosis is made.

#### METHOD:

A search of the literature using the PubMed database was performed to identify case reports of this occurrence. Cases were analyzed for common characteristics or presenting features that may aid dentists in identifying patients with intracranial tumors.

#### RESULTS:

Twenty-eight cases were identified. Features consistent with the diagnoses of trigeminal neuralgia, persistent idiopathic facial pain, and temporomandibular disorders were the most common presentations. Fifty-nine percent of patients presented with sensory or motor function loss at their initial diagnosis.

#### CLINICAL IMPLICATIONS:

Patients who present with symptoms that extend beyond the typical presentation of these entities are at highest risk for intracranial tumors and should be further evaluated.

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J Headache Pain. 2012 April; 13(3): 199–213.

Published online 2012 March 3. doi:  [10.1007/s10194-012-0417-x](http://dx.doi.org/10.1007%2Fs10194-012-0417-x)

PMCID: PMC3311831

# Occipital nerve block is effective in craniofacial neuralgias but not in idiopathic persistent facial pain

[T. P. Jürgens](http://www.ncbi.nlm.nih.gov/pubmed/?term=J%26%23x000fc%3Brgens%20TP%5Bauth%5D),1 [P. Müller](http://www.ncbi.nlm.nih.gov/pubmed/?term=M%26%23x000fc%3Bller%20P%5Bauth%5D),1 [H. Seedorf](http://www.ncbi.nlm.nih.gov/pubmed/?term=Seedorf%20H%5Bauth%5D),2 [J. Regelsberger](http://www.ncbi.nlm.nih.gov/pubmed/?term=Regelsberger%20J%5Bauth%5D),3 and [A. May](http://www.ncbi.nlm.nih.gov/pubmed/?term=May%20A%5Bauth%5D)corresponding author1

[Author information ►](javascript:void(0)) [Article notes ►](javascript:void(0)) [Copyright and License information ►](javascript:void(0))

[Go to:](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#ui-ncbiinpagenav-2)

## Abstract

Occipital nerve block (ONB) has been used in several primary headache syndromes with good results. Information on its effects in facial pain is sparse. In this chart review, the efficacy of ONB using lidocaine and dexamethasone was evaluated in 20 patients with craniofacial pain syndromes comprising 8 patients with trigeminal neuralgia, 6 with trigeminal neuropathic pain, 5 with persistent idiopathic facial pain and 1 with occipital neuralgia. Response was defined as an at least 50% reduction of original pain. Mean response rate was 55% with greatest efficacy in trigeminal (75%) and occipital neuralgia (100%) and less efficacy in trigeminal neuropathic pain (50%) and persistent idiopathic facial pain (20%). The effects lasted for an average of 27 days with sustained benefits for 69, 77 and 107 days in three patients. Side effects were reported in 50%, albeit transient and mild in nature. ONBs are effective in trigeminal pain involving the second and third branch and seem to be most effective in craniofacial neuralgias. They should be considered in facial pain before more invasive approaches, such as thermocoagulation or vascular decompression, are performed, given that side effects are mild and the procedure is minimally invasive.

**Keywords:**Trigeminal neuralgia, Facial pain, Trigeminal neuropathic pain, Occipital nerve block, Occipital, Neuralgia

[Go to:](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#ui-ncbiinpagenav-2)

## Introduction

The use of occipital nerve block (ONB) has been propagated in occipital and cervical pain syndromes and dates back into the 1970s [[1](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR1)]. Its use was later established in cervicogenic headache, where pain reduction following occipital nerve block is currently considered part of the diagnostic procedure [[2](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR2)–[5](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR5)]. Subsequently, ONBs were used in other primary headache like migraine [[5](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR5)–[8](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR8)], cluster headache [[9](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR9)–[12](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR12)] and chronic daily headache, respectively, tension-type headache [[9](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR9), [13](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR13)] (for review see [[14](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR14)]). The exact mechanisms by which ONB exerts its effects remain uncertain. In occipital neuralgia, local perineural application of anesthetics and steroids could cause a direct depolarisation and inhibition of neural excitability. However, this would not explain the effect in headaches involving the first trigeminal branch. One potential explanation is the concept of functional connectivity between high nociceptive afferents (C1-3) and trigeminal nociceptive afferents from the first branch with convergence in the trigemino-cervical complex (TCC) [[15](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR15), [16](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR16)]. The ONB is thought to interfere with the subsequent sensitization developing during the event of acute headache attacks, modulating the excitability of second-order neurons receiving input from both trigeminal and cervical afferents upon stimulation of either afferent input [[15](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR15), [16](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR16)]. Recent studies additionally suggest that trigeminal branches innervating the meninges can have extracranial collaterals which could be a direct target for therapeutic interventions such as ONB [[17](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR17)].

Despite the effective application in headaches involving the first trigeminal branch, little is known regarding efficacy of ONB in craniofacial neuralgias (apart from occipital neuralgia), trigeminal neuropathic pain and persistent idiopathic facial pain. More precisely, little is known whether ONB is effective in painful conditions involving the second and third maxillary branch. One report dating back to the 1960s reported complete pain relief in postherpetic neuralgia after alcohol blocks of the greater occipital nerve in all six patients [[18](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR18)]. Three of them had involvement not only of the frontal but also of the mandibular and maxillary branch of the trigeminal nerve. In another case report, one patient with neuropathic facial pain in the first and second trigeminal branch due to progressive facial hemiatrophy had sustained benefit from a single ONB with lidocaine and methylprednisolone for 4 months [[19](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR19)].

Consequently, patients attending our outpatient department were identified who had medically intractable facial pain and received uni- or bilateral occipital nerve blocks. We wanted to elucidate whether:

1. ONB effects were principally confined to the first trigeminal branch or would also extend to the second and third branch.
2. ONB would be clinically meaningful effective in craniofacial neuralgias, neuropathies and persistent idiopathic facial pain
3. Differences in efficacy were syndromal, i.e. more or less efficacious in neuralgias than in persistent facial pain.

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## Patients and methods

### Study design

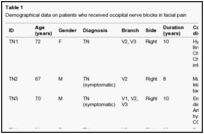
Medical records of patients with facial pain or cranial neuralgias who presented to the facial pain clinic of the University Medical Centre Hamburg-Eppendorf between December 2009 and July 2010 were reviewed. Only patients who received an ONB in these conditions with appropriate clinical documentation were included in this retrospective chart review. Further inclusion criteria were: diagnosis of craniofacial neuralgia, trigeminal neuropathic pain or persistent idiopathic facial pain according to the criteria given below, stable preventative medication during follow-up period and at least 18 years of age. Patients were treated with an ONB due to impairment by acute exacerbations of pain.

### Patients

All patients had been seen by headache specialists (AM, TPJ) who established a diagnosis of craniofacial neuralgia including classical trigeminal neuralgia (IHS 13.1.1), symptomatic trigeminal neuralgia (IHS 13.1.2) and occipital neuralgia (IHS 13.8) and persistent idiopathic facial pain (IHS 13.18.4) according to the current ICDH-II criteria [[20](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR20)]. In trigeminal neuralgia, intense and brief pain paroxysms occur in one or more divisions of the trigeminal nerve lasting from less than a second to 2 min. These stereotyped attacks are intense sharp or stabbing. Attacks can be precipitated by trigger factors such as washing, eating, drinking or talking. In addition, contact with trigger areas such as the nasolabial fold or the chin can provoke attacks, which can also occur spontaneously. Symptomatic trigeminal neuralgia is defined by the presence of a structural lesion other than a neurovascular compression. Occipital neuralgia is defined as a paroxysmal stabbing pain in the distribution of the greater, lesser and/or third occipital nerve with tenderness over the affected nerve. ONBs typically ease the pain. Persistent idiopathic facial pain is defined as deep and poorly localized facial pain which is present daily and for the entire or most of the day. It is limited to one side of the face and frequently starts around the nasolabial fold and the chin and is not associated to sensory loss or other physical abnormalities. Clinical diagnostics including radiography of the face and the jaws are unremarkable.

As no diagnostic criteria for trigeminal neuropathic pain are given in the ICHD-II, the criteria by Zakrzewska [[21](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR21)] had to be fulfilled. They define trigeminal neuropathic pain as a continuous dull pain with sharp exacerbations in the trigeminal area that may radiate beyond. It can be provoked by contact with areas of allodynia and by light touch. Subjective or objective sensory loss is typical and vasodilatation and swelling can occur.

Patients had been routinely contacted (by either OF or PM) every 3–7 days after ONB and pain intensity and relevant changes had been noted as part of the outpatient clinics internal standard protocol in the medical files. These outcomes were assessed during telephone contact verbally as indicated by the patient. This routine was implemented to ensure that patients without clinical effects or exacerbation after transient improvement were rapidly seen again to initiate alternative therapy. A total of 20 patients (7 males, 13 females, mean age 58.2 ± 20.4 years, range 21–89 years) were identified who had received a total of 25 ONBs with appropriate documentation. Detailed information on demographical data is given in Table [1](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab1/). One patient had been lost to follow-up after 12 days (TNP4).

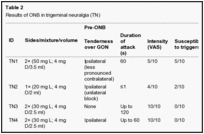
[](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab1/)

[Table 1](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab1/)

Demographical data on patients who received occipital nerve blocks in facial pain

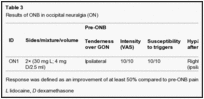
### Experimental design

As this was a chart review, no experimental design was predefined. Due to standard operating procedures and a standardized documentation in our clinic, patients were treated in a uniform manner. However, composition of the local anesthetic and steroid mixture varied in some patients and some received only unilateral blocks (see Tables [2](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab2/), [​,3,3](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab3/), [​,4,4](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab4/), [​,55](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab5/) for details).

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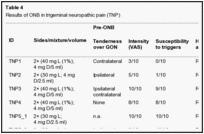
[Table 2](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab2/)

Results of ONB in trigeminal neuralgia (TN)

[](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab3/)

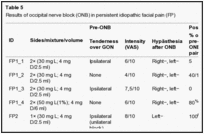
[Table 3](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab3/)

Results of ONB in occipital neuralgia (ON)

[](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab4/)

[Table 4](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab4/)

Results of ONB in trigeminal neuropathic pain (TNP)

[](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab5/)

[Table 5](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab5/)

Results of occipital nerve block (ONB) in persistent idiopathic facial pain (FP)

A positive response to ONB was defined as at least 50% improvement of pain according to the patient’s global rating at the first telephone contact after ONB. If more than one ONB was performed, mean improvement for all blocks was calculated and the patient was classified as responder only if mean improvement was at least 50%. All but 2 patients were contacted 3–5 days thereafter (FP1\_4 and FP 4\_2 on day 6). Data had been collected immediately after the ONB and every 3–7 days thereafter. If the benefit had been less than 50% for more than 2 telephone visits, the subject had been asked to visit the outpatient department again on short notice or advised to take an alternative therapy. Apart from improvement measured in percent of baseline pain, pain intensity on a verbal rating scale (VRS) from 0 (no pain) to 10 (worst imaginable pain) and susceptibility to triggers on a scale from 0 (unsusceptible to triggers) to 10 (highly susceptible to triggers) had been noted. Before ONB, the presence of local tenderness over the greater occipital nerve had been tested bilaterally. After ONB, the patient had been screened for the presence of occipital hypoesthesia and asked whether the procedure was painful. At follow-up, the patients had been routinely asked about the degree of improvement, current pain intensity, susceptibility to triggers, and side effects as part of standard medical care. Additionally, they were asked about any change in medication. As patients were contacted on a regular basis with narrow intervals of 3–7 days, outcome measures were determined solely by personal contact and not by means of a diary.

### Occipital nerve block

All occipital nerve blocks were administered by TPJ to minimize variation. Injections were placed halfway on the nuchal line between the occipital protuberance and the mastoid process and above the occipital ridge [[11](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR11), [13](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR13)]. After the greater occipital nerve was located, local tenderness was evaluated bilaterally. All but 2 patients (FP2, TN2) had received bilateral nerve blocks. Unilateral blocks had been given on request of the patients (known cardiac arrhythmia in TN2, explicit wish by FP2). A mixture of a local anesthetic (Lidocaine-HCl 1 or 2%, B. Braun Melsungen, Melsungen, Germany) and dexamethasone as steroid (Fortecortin injekt 4 mg, Merck Pharma, Germany) had been injected after protruding a 21-G needle until periosteal contact was established and aspiration had been negative. After 15 min, the presence of occipital hypoesthesia had been tested.

### Statistical analysis

Patient data were entered into an Excel 2007 (Microsoft, Redmond, WA, USA) spreadsheet for descriptive statistics. For pairwise comparisons of metric data t tests (paired or unpaired, two-tailed,) were used, categorical data were analyzed using 2 × 2 or 2 × 3 tables for Fisher’s Exact test (SPSS 18.0) with p < 0.05 regarded significant. Graphs were plotted with SigmaPlot2000 (Systat Software, Inc. San Jose, CA, USA).

[Go to:](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#ui-ncbiinpagenav-2)

## Results

A total of 25 ONBs were given to 20 patients with craniofacial neuralgias, trigeminal neuropathic pain and persistent idiopathic facial pain. Among them, 8 patients suffered from trigeminal neuralgia (40%), 6 patients from trigeminal neuropathic pain (30%), 5 patients from persistent idiopathic facial pain (25%) and 1 patient from occipital neuralgia (5%). The male:female ratio was 1:1.9. The affected nerve branches are given in Table [1](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab1/).

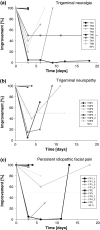
### Response rates

A positive response with a global improvement of at least 50% pain from baseline according to the patient’s statement was found in 11 out of 20 patients (55%; Fig. [1](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/figure/Fig1/)). Response rates were highest in occipital neuralgia (1 patient with complete relief, i.e. 100%; Table [3](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab3/)) and trigeminal neuralgia with positive effects in 6 out of 8 patients (75%; Table [2](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab2/); Fig. [2](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/figure/Fig2/)a). In trigeminal neuropathic pain, 3 out of 6 patients had a positive response into ONBs (50%; Table [4](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab4/); Fig. [2](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/figure/Fig2/)b), in persistent idiopathic facial pain only 1 out of 5 patients responded to ONB (20%; Table [5](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab5/); Fig. [2](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/figure/Fig2/)c). Two patients (TNP2 and FP1) reported improvement to 40% despite unchanged pain intensities. This constellation seemed implausible and consequently their response was rated as being negative. As for patients with multiple ONBs, TNP5 and FP1 were classified as responders, FP4 as non-responder.

[Fig. 1](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/figure/Fig1/)

[Fig. 1](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/figure/Fig1/)

**a** Success rate of ONB among the different diagnoses. The height ofbars indicates total number of patients; the black parts indicate patients with success. **b** Pain intensity ratings on a verbal rating scale (VRS) before and after ONB in various facial **...**

[](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/figure/Fig2/)

[Fig. 2](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/figure/Fig2/)

Individual response to ONBs indicated as remaining pain in percent of the initial pain before an ONB. **a** trigeminal neuralgia, **b**trigeminal neuropathic pain, **c** persistent idiopathic facial pain. In the following patients, response was set to values between **...**

Fisher’s Exact test using a 2 × 3 table with response (yes/no) versus type of facial pain (trigeminal neuralgia, trigeminal neuropathic pain, persistent idiopathic facial pain) yielded no significant result (P = 0.187).

Improvement of baseline pain 3 days after ONB compared between the different subtypes of facial pain yielded no significant results in pairwise comparisons (mean percent of baseline pain: trigeminal neuralgia 43.1 ± 38.8; trigeminal neuropathic pain 66.7 ± 38.8; persistent idiopathic facial pain: 85.3 ± 23.5). Results of unpaired t tests are as follows: trigeminal neuralgia versus trigeminal neuropathic pain: p = 0.283; trigeminal neuralgia versus persistent idiopathic facial pain: p = 0.053; trigeminal neuropathic pain versus persistent idiopathic facial pain: p = 0.375). Notably, the comparison between improvement in patients with trigeminal neuralgia and persistent idiopathic facial pain missed significance by a narrow margin.

Evaluation of the number of effective nerve blocks yielded similar results. The total response rate was 13 out 25 blocks (52%). In trigeminal neuralgia 6 out of 8 blocks (75%) were considered effective, in occipital neuralgia 1 out of 1 block (100%). In trigeminal neuropathic pain, 4 out of 7 blocks were beneficial (57%), in persistent idiopathic facial pain 2 out of 9 blocks were effective (22%).

Seven responders were females and 4 males (male:female = 1:1.8), which is comparable to the entire sample (1:1.9). Hypoesthesia ipsilateral to the pain was present in 10 successful ONBs and 3 unsuccessful ONBs (data on hypoesthesia were missing in TN1), no relevant hypoesthesia was noted in 4 successful and 7 unsuccessful ONBs (2 × 2 table with Fisher’s Exact test: p = 0.095).

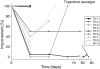
### Pain ratings

Mean pain ratings for all patients (responders and non-responders) were reduced by 50% (VAS ratings pre-ONB 7.2, SD 2.4; post-ONB 3.6, SD 2.2; t test: p = 0.001; Fig. [1](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/figure/Fig1/)). The therapeutic effect was even higher in the subgroup of patients with trigeminal neuralgia with a reduction of 66% (pre-ONB 7.3, SD 2.7; post-ONB 2.5, SD 1.6; t test: p = 0.01). In trigeminal neuropathic pain, a reduction of only 37% was observed (pre-ONB 7.4, SD 2.8; post-ONB 4.7, SD 2.2; t test: p = 0.086). Reduction of pain intensity was lowest in patients with persistent idiopathic facial pain with only 22% (pre-ONB 6.3, SD 1.7; post-ONB 4.9, SD 1.9; t test: p = 0.140).

A comparison of net ONB effects on pain ratings (difference of pain ratings before and after ONB) between the subgroups yielded no significant results in unpaired t tests: trigeminal neuralgia versus trigeminal neuropathic pain p = 0.312; trigeminal neuralgia versus persistent idiopathic facial pain:p = 0.094; trigeminal neuropathic pain versus persistent idiopathic facial pain: p = 0.406).

### Sustained benefit

Mean duration of clinical improvement (considering only patients with at least 50% improvement on day 3) was 27 days (range 3–107, SD 38.1). A sustained benefit (defined as continuous improvement of at least 50%) was obtained in 3 patients who were followed-up for 69, 77 and 107 days (Fig. [3](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/figure/Fig3/)). Thereafter, follow-up was suspended. It is noteworthy that all these patients suffered from craniofacial neuralgias (2 with trigeminal and 1 with occipital neuralgia). One of these patients (TN6) was able to successively reduce all preventative medication over the course of 77 days without recurrence of pain. As follow-up was eventually stopped in patients with long-lasting benefit (TNP4, TN6 and ON1), the number of days without improvement could even be higher (so far none of these patients has contacted our clinic for an appointment due to worsening of the symptoms, although we cannot exclude that the patient seeked further care at another specialized center).

[](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/figure/Fig3/)

[Fig. 3](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/figure/Fig3/)

Individual response to ONBs indicated as remaining pain in percent of the initial pain before an ONB in trigeminal neuralgia including results of patients with sustained relief

### Tenderness over the greater occipital nerve

Neck pain was not reported by any patient. Local tenderness over the greater occipital nerve ipsilateral to the side of pain was present in all but three patients (two patients with trigeminal neuropathic pain, one with trigeminal neuralgia) and not tested in one patient (i.e. present in 83%). Contralateral tenderness was present in eight patients and not tested in one (i.e. present in 44%). A combination of the absent tenderness over the greater occipital nerve and missing hypoesthesia after ONB was found in only 2 unsuccessful blocks.

### Effect of repetitive ONBs

In three patients, repetitive ONBs were performed. However, only one patient (TNP5) reported recurrent benefit after both blocks, while another patient (FP1) experienced beneficial effects after two of four ONBs. In another patient (FP4), a second ONB was performed despite failure of the initial block again without success.

### Duration of attacks

In patients with trigeminal neuralgia, three patients reported shorter attacks, two patients an unchanged duration of attacks and another slightly longer attacks. Due to missing data, effects of ONB on attack duration could not be evaluated in 2 out of 8 patients.

### Susceptibility to triggers

The susceptibility to known triggers was lower in 3 out of 8 (38%) patients with trigeminal neuralgia and in 3 out of 6 patients with trigeminal neuropathic pain (50%) on the third day post-ONB. It was unchanged in two patients with trigeminal neuralgia and two with trigeminal neuropathic pain and increased in 2 patients with trigeminal neuralgia and 1 with trigeminal neuropathic pain. The only patient with occipital neuralgia reported a persistent and complete reduction of trigger factors after ONB with decline from 10/10 to 0/10. Trigger factors were not evaluated in patients with persistent idiopathic facial pain.

### Effect of unilateral blocks

Two patients who received unilateral ONBs did not respond.

### Effect of lidocaine dose

The amount of lidocaine and thus the applied volume varied over the observed period. Initially, 30 mg lidocaine was given routinely. Later, most patients received 40–50 mg. Distribution of response rates among various lidocaine amounts was not dose specific: a positive response was observed in 0 out of 1 ONB with 20 mg (0%), 10 out of 15 ONBs with 30 mg (67%), 3 out of 5 ONBs with 40 mg (60%) and 0 out of 4 ONBs with 50 mg (0%).

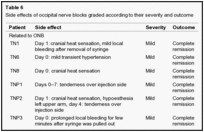
In addition, no relation between the lidocaine dose and the absence of hypoesthesia could be found. In 8 of 15 blocks (53%) with 30 mg lidocaine no hypoesthesia could be found and in 2 of 4 blocks (50%) with 50 mg and missing data in 1 patient. Hypoesthesia could always be found in ONBs with 20 mg (1 block) and 40 mg (5 blocks) lidocaine.

### Effect of affected trigeminal branches

Positive response rates were reported in the only patient with involvement of V1+2 (100%), in 2 out of 3 with involvement of V1–3 and V2+3 (67%), 3 out of 9 with V2 (33%) and 2 out of 3 with V3 (66%), respectively. The only patient with involvement of the greater occipital nerve (C1–3) responded (100%).

### Side effects

The injection procedure was rated painful by 2 out of 8 patients with trigeminal neuralgia (13%) and by one patient each with trigeminal neuropathic pain (17%) and persistent idiopathic facial pain (20%) resulting in a total of 4 out of 20 patients (20%). Transient and only mild ONB-related side effects were observed in 10 of the 20 patients (50%, see Table [6](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab6/)). Cranial flush or heat sensation was the most frequent side effects in 5 patients (25%), followed by a transient and mild bleeding after the syringe was pulled out in 2 patients (15%). All patients recovered completely without sequelae. One patient (FP4) suffered from dizziness and increased sweating on the third day after the first ONB. These were regarded as prodromal symptoms of a gastrointestinal infection, which was reported on the sixth day post-ONB and thus unrelated to ONB. Mean age of patients with side effects was 52 years (range 21–80 years, SD 19.8) and thus younger than the mean age of the entire cohort.

[](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab6/)

[Table 6](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab6/)

Side effects of occipital nerve blocks graded according to their severity and outcome

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## Discussion

In this chart review, the effects of occipital nerve blocks were evaluated in 20 patients with craniofacial neuralgias or neuropathic pain and persistent idiopathic facial pain. All but one (occipital neuralgia) had second and/or third division trigeminal pain. The mean response rate was 55% (defined as at least 50% reduction of original pain reported by the patient) and was most effective in patients with trigeminal neuralgia (75%), although results did not reach statistical significance. ONB was less effective in trigeminal neuropathic pain (50%) and persistent idiopathic facial pain (20%).

Occipital nerve block reduced mean pain ratings significantly in the entire sample by 50% (again with greater effects in neuralgias and less pronounced effects in trigeminal neuropathic pain and persistent idiopathic facial pain). These effects lasted for an average of 27 days with a sustained benefit for up to 107 days in three patients (two with trigeminal neuralgia and one with occipital neuralgia).

Our data have to be seen with caution as our study was retrospective and open labeled. Groups were small and composition of the lidocaine/dexamethasone mixture varied. As such, these data mirror clinical routine and not a controlled study; consequently we decided to report descriptive statistics for most variables only. Despite these limitations, we show striking differences in efficacy of ONB between different entities of facial pain. Patients with idiopathic facial pain responded barely, while those with craniofacial neuralgia showed highest response rates.

### Pathophysiological implications

It has been shown in anatomical studies that A-delta and C-fiber afferents from trigeminal and occipital (C1-3) nerve branches terminate in the trigemino-cervical complex (TCC) [[22](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR22)–[24](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR24)] and that painful stimulation of either structure leads to up-regulation of metabolic activity and release of c-fos [[24](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR24), [25](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR25)]. Convergent neurons in the TCC have input not only from ipsi- but also from contralateral cervical afferents [[16](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR16)]. In our cohort, tenderness over the greater occipital nerve contralateral to the side of pain was present in 44% of all patients. As patients suffered from strictly unilateral and side-locked pain, this implies a clinically relevant bilateral connection. Based upon these findings, occipital nerve stimulation (ONS) is usually implanted bilaterally to avoid side changes observed in patients with cluster headache receiving ipsilateral ONS [[26](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR26)]. Therefore, bilateral nerve blocks could have higher efficacy and should be preferred if potential side effects do not preclude this option.

The phenomenon of referred pain in the occipital region upon nociceptive trigeminal activation has been described in patients with primary headaches such as migraine and cluster headache [[27](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR27), [28](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR28)]. The surprisingly high number of patients with tenderness at the greater occipital nerve ipsilateral to but well outside the painful area in our study is noteworthy. It suggests an important role of trigemino-cervical convergence of nociceptive afferents also in syndromes with involvement of the second and third (V2and V3) trigeminal branch and could explain ONB efficacy in these conditions.

However, recent studies imply that ONB effects could be mediated by an additional mechanism. In rodents and human cadavers nociceptive collaterals of the nervus spinosus (meningeal branch of the mandicular nerve, formed by neurons from the maxillary and mandibular part of the Gasserian ganglion) were found to innervate both the dura mater and occipital periost and neck muscles [[29](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR29)]. Based on these observations, at least partial effects of ONBs in craniofacial pain could be conveyed by direct inhibition of extracranial collaterals of the maxillary and mandibular nerve. In addition, these results further corroborate the above-mentioned hypothesis that nociceptive V2 and V3 afferents converge with high cervical nociceptive afferents.

The observation that effects are most pronounced in craniofacial neuralgia and trigeminal neuropathic pain rather than in persistent idiopathic facial pain would argue in favor of different pathophysiological models. While craniofacial neuralgia [[30](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR30)] and trigeminal neuropathic pain [[31](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR31), [32](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR32)] are neuropathic pain syndromes with central components, no coherent construct exists in persistent idiopathic facial pain although one study reported neuropathic changes in patients with facial pain [[31](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR31)]. Interestingly, cortical somatosensory representation of the face was not altered in patients with persistent idiopathic facial pain and modalities of quantitative sensory testing were not affected [[33](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR33)]. It was therefore concluded that persistent idiopathic facial pain has elements of a central pain syndrome not sustained by somatosensory processing from the affected region.

### Technical considerations

#### Definition of response

Response was defined as an at least a 50% decrease in pain after ONB as judged by the patients in percent of baseline pain. Evaluation of interventional procedures based on subjective assessment by the patient is certainly controversial. Facial pain syndromes differ substantially in their temporal profiles (constant versus intermittent pain), pain characteristics (burning versus stabbing or lancinating pain) and other factors like reduced susceptibility to triggers. The above criterion had thus been chosen as standard in a clinical setting to increase comparability between groups and simplify evaluation for the patient. Moreover, reports of pain intensity yielded similar results.

#### Role of hypoesthesia

Occipital hypoesthesia after ONB was present in 76% of the patients. Hypoesthesia was absent in 8 out of 12 unsuccessful ONBs and present in 9 of 13 successful ONBs (which was statistically not significant). One potential explanation for missing hypoesthesia could be that ONBs were misplaced (as ONBs induce conduction blocks with consecutive sensory loss of the innervated area) or due to the varying amount of lidocaine/cortisone. However, there was no obvious correlation between the degree of hypoesthesia and the amount of lidocaine used.

Our data do at present not support a predictive role of hypoesthesia for ONB efficacy. This is in line with a previous study on cluster headache, migraine and new daily persistent headache [[9](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR9)] which found no significant association between occipital hypoesthesia and ONB efficacy.

#### Composition of anesthetic mixture

Lidocaine has been used frequently in ONB studies [[2](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR2)–[6](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR6), [9](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR9), [10](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR10), [12](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR12)]. Despite our positive results, we cannot exclude that results would have been better with bupivacaine [[7](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR7),[34](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/" \l "CR34)]. It not only has a significantly longer half-life than both prilocaine and lidocaine, but also a slower onset of action. However, it is doubtful if the half-life of the local anesthetic is crucial, as the clinical effects, when present, outlasted the local anesthetics’ half-life by far. Likewise, long acting steroids such as triamcinolon could be more advantageous in clinical practice.

Regarding the ideal composition of the injection it is not known whether a local anesthetic or corticosteroid alone or a combination of both is more effective. While some studies used either local anesthetics or corticosteroids alone (see [[14](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR14)] for review), the additional use of a steroid is important for ONB efficacy either by prolonging effects of local anesthetics or by acting independently on nerve activity [[10](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR10), [13](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR13), [35](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR35)]. The additional use of opioids and clonidine has been propagated but would need further studies to fully evaluate their therapeutic potential [[3](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR3), [4](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR4)].

Our limited data do not support dose-dependent effects of lidocaine within the limited range used in our study, which is in line with previous studies [[36](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR36)]. However, methylprednisolone was less effective in higher doses [[37](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR37)].

#### Injection site

Assuming that tenderness over the occipital region suggests vicinity to the greater occipital nerve, ONBs should have been placed correctly in our study in all but four patients. Although the greater occipital nerve is the main target in all published studies, the exact injection site varies substantially among the published studies. In some studies, ONBs were given below the occipital ridge [[10](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR10)], others have used higher and more lateral locations [[9](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR9)]. However, the anatomical course of the greater occipital nerve shows significant inter- and intra-individual differences [[38](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR38)]. In a human post mortem study, the exit point of the greater occipital nerve was located between 3 and 28 mm laterally to the occipital protuberance and 5–18 mm below the intermastoid line. Fixed injection schemes could be too static and may result in reduced efficacy of ONBs. For optimization, the use of nerve stimulators to locate the correct position is one option [[2](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR2)–[4](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR4)], ultrasound-guided techniques [[39](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR39), [40](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR40)] are another. For feasibility, we would suggest locating the exact position by tenderness on palpation (also referred to as TOP) which is a more practical approach (see [[34](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR34)] for review).

### Safety aspects

In our cohort, side effects were generally rare, mild, transient and completely remitting (see Table [6](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/table/Tab6/)). No severe side effects occurred. Accidental intravenous injections of high dose local anesthetics have been reported to cause mild (such as lightheadedness or metallic taste) to severe (such as cardiac arrhythmia or epileptic seizures) adverse effects [[41](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR41)]. It should also be borne in mind that cutaneous atrophy has been reported in 1–14% of the patients receiving steroid injections [[42](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR42)]. Despite these rare side effects, ONB is a safe procedure in the hands of trained physicians.

### Limitations

Due to the design of our study as a retrospective chart review, several methodological shortcomings are inherent. As placebo effects observed in headache management can reach up to 50% in individuals [[43](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR43)] and invasive procedures are likely to have even higher placebo rates, we cannot exclude that our observations are mainly driven by placebo response. Nevertheless, sustained benefits in some patients lasting up to 2 months or more argue against pure placebo-mediated effects. Similar latencies have been observed in a small double-blind trial in patients with cervicogenic headache, who showed significantly prolonged pain-free periods after repeated occipital and supraorbital nerve block [[3](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR3)] and a single case with trigeminal neuropathic pain with substained benefit for 4 months [[19](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR19)]. Likewise, in a double-blind placebo-controlled trial a single suboccipital injection of betamethasone in patients with cluster headache led to prolonged effects with remission periods of up to 26 months [[10](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR10)]. Fluctuations in the natural course (as can be frequently seen in trigeminal neuralgia as an episodic disease) cannot be excluded and would require a controlled design. As only patients with complete datasets were included, this infers the risk of selection bias. In addition, results were not corrected for psychological comorbidity as this would be beyond the scope of a chart review.

### Implications for clinical practice and future perspectives

Treating patients with facial pain is challenging and may involve combining several drugs at higher dosages. Especially in elderly and frail patients preventive medication is often problematic as most of them are already on polypharmacy. In a sample of elderly internal patients in Austria, the mean number of drugs taken on admission was 7.5 per patient [[44](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#CR44)]. Adding more drugs can induce severe side effects and cause unpredictable interactions. Especially anticonvulsants (carbamazepin, oxcarbazepine, phenytoin, and valproate) or tricyclics (amitriptyline) can be hazardous in elderly as they induce or inhibit drug metabolism. Furthermore, most of these routinely used drugs cause side effects particularly problematic in elderly such as ataxia, arrhythmia and cognitive impairment. Thus, ONBs could be beneficial as a well-tolerated add-on therapy to bridge changes in preventive therapy and can lead to sustained effects alone in some individuals. However, it is important that results of this small retrospective trial should be interpreted with caution as subjects were not prospectively enrolled into a randomized placebo-controlled blinded trial.

[Go to:](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#ui-ncbiinpagenav-2)

## Conclusion

Occipital nerve block seems to be more effective in trigeminal neuralgia than in trigeminal neuropathic pain and persistent idiopathic facial pain. It seems plausible to use this method not only in patients with headache but also in patients with craniofacial neuralgias. Given that side effects are mild and that the procedure is minimally invasive, we suggest using this method before considering more invasive approaches such as thermocoagulation or vascular decompression. Moreover, it could be helpful for transient prophylactic treatment during dose escalation of first-line drugs (such as carbamazepine). However, as placebo effects are known to be high in chronic pain, results have to be interpreted with caution and randomized controlled studies are mandatory to confirm these preliminary results.

[Go to:](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311831/#ui-ncbiinpagenav-2)

## Acknowledgments

The authors wish to thank Olesja Frick (OF) for technical help.

All authors declare the absence of potential or actual conflicts of interest

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[J Orofac Pain.](http://www.ncbi.nlm.nih.gov/pubmed/22329011) 2011 Fall;25(4):381-90.

# Position paper: appropriate use of pharmacotherapeutic agents by the orofacial pain dentist.

[Heir GM](http://www.ncbi.nlm.nih.gov/pubmed?term=Heir%20GM%5BAuthor%5D&cauthor=true&cauthor_uid=22329011), [Haddox JD](http://www.ncbi.nlm.nih.gov/pubmed?term=Haddox%20JD%5BAuthor%5D&cauthor=true&cauthor_uid=22329011), [Crandall J](http://www.ncbi.nlm.nih.gov/pubmed?term=Crandall%20J%5BAuthor%5D&cauthor=true&cauthor_uid=22329011), [Eliav E](http://www.ncbi.nlm.nih.gov/pubmed?term=Eliav%20E%5BAuthor%5D&cauthor=true&cauthor_uid=22329011), [Radford S](http://www.ncbi.nlm.nih.gov/pubmed?term=Radford%20S%5BAuthor%5D&cauthor=true&cauthor_uid=22329011), [Schwartz A](http://www.ncbi.nlm.nih.gov/pubmed?term=Schwartz%20A%5BAuthor%5D&cauthor=true&cauthor_uid=22329011), [Jaeger B](http://www.ncbi.nlm.nih.gov/pubmed?term=Jaeger%20B%5BAuthor%5D&cauthor=true&cauthor_uid=22329011), [Ganzberg S](http://www.ncbi.nlm.nih.gov/pubmed?term=Ganzberg%20S%5BAuthor%5D&cauthor=true&cauthor_uid=22329011), [Aquino C](http://www.ncbi.nlm.nih.gov/pubmed?term=Aquino%20C%5BAuthor%5D&cauthor=true&cauthor_uid=22329011), [Benoliel R](http://www.ncbi.nlm.nih.gov/pubmed?term=Benoliel%20R%5BAuthor%5D&cauthor=true&cauthor_uid=22329011); [American Academy of Orofacial Pain](http://www.ncbi.nlm.nih.gov/pubmed?term=American%20Academy%20of%20Orofacial%20Pain%5BCorporate%20Author%5D).

### Source

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### Abstract

Orofacial Pain Dentistry is concerned with the prevention, evaluation, diagnosis, treatment, and management of persistent and recurrent orofacial paindisorders. The American Dental Association, through the Commission on Dental Accreditation (CODA), now recognizes Orofacial Pain as an area of advanced education in Dentistry. It is mandated by CODA that postgraduate orofacial pain programs be designed to provide advanced knowledge and skills beyond those of the standard curriculum leading to the DDS or DMD degrees. Postgraduate programs in orofacial pain must include specific curricular content to comply with CODA standards. The intent of CODA standards is to assure that training programs develop specific educational goals and objectives that describe the student/resident’s expected knowledge and skills upon successful completion of the program. A standardized core curriculum, required for accreditation of dental orofacial pain training programs, has now been adopted.Among the various topics mandated in the curriculum are pharmacology and, specifically, pharmacotherapeutics. The American Academy of Orofacial Pain (AAOP) recommends, and the American Board of Orofacial Pain (ABOP) requires, that the minimally competent orofacial pain dentist\* be knowledgeable in the management of orofacial pain conditions using medications when indicated. Basic knowledge of the appropriate use of pharmacotherapeutics is essential for the orofacial pain dentist and, therefore, constitutes part of the examination specifications of the ABOP. The minimally competent orofacial pain clinician must demonstrate knowledge, diagnostic skills, and treatment expertise in many areas, such as musculoskeletal, neurovascular, and neuropathicpain syndromes; sleep disorders related to orofacial pain; orofacial dystonias; and intraoral, intracranial, extracranial, and systemic disorders that cause orofacial pain or dysfunction. The orofacial pain dentist has the responsibility to diagnose and treat patients in pain that is often chronic, multifactorial, and complex. Failure to understand pain mechanisms can lead to inaccurate diagnoses and ineffective, delayed, or harmful treatment. It is the responsibility of the orofacial pain dentist to accurately diagnose the cause(s) of the pain and decide if treatment should be dentally, medically, or psychologically oriented, or if optimal management requires a combination of all three treatment approaches. Management may consist of a number of interdisciplinary modalities including, eg, physical medicine, behavioral medicine, and pharmacology or, in rare instances, surgical interventions. Among the essential armamentarium is the knowledge and proper use of pharmacologic agents

[Expert Rev Neurother.](http://www.ncbi.nlm.nih.gov/pubmed/22014140) 2011 Nov;11(11):1619-29. doi: 10.1586/ern.11.156.

# Trigeminal neuralgia and persistent idiopathic facial pain.

[Obermann M](http://www.ncbi.nlm.nih.gov/pubmed?term=Obermann%20M%5BAuthor%5D&cauthor=true&cauthor_uid=22014140), [Holle D](http://www.ncbi.nlm.nih.gov/pubmed?term=Holle%20D%5BAuthor%5D&cauthor=true&cauthor_uid=22014140), [Katsarava Z](http://www.ncbi.nlm.nih.gov/pubmed?term=Katsarava%20Z%5BAuthor%5D&cauthor=true&cauthor_uid=22014140).

### Source

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### Abstract

Trigeminal neuralgia (TN) and persistent idiopathic facial pain (PIFP) are two of the most puzzling orofacial pain conditions and affected patients are often very difficult to treat. TN is characterized by paroxysms of brief but severe pain followed by asymptomatic periods without pain. In some patients a constant dull background pain may persist. This constant dull pain sometimes makes the distinction from PIFP difficult. PIFP is defined as continuous facial pain, typically localized in a circumscribed area of the face, which is not accompanied by any neurological or other lesion identified by clinical examination or clinical investigations. The pain usually does not stay within the usual anatomic boundaries of the trigeminal nerve distribution and is a diagnosis of exclusion. Epidemiologic evidence on TN, and even more so on PIFP, is quite scarce, but generally both conditions are considered to be rare diseases. The etiology and underlying pathophysiology of TN, and more so PIFP, remain unknown. Treatment is based on only few randomized controlled clinical trials and insufficiently evaluated surgical procedures.

[Photomed Laser Surg.](http://www.ncbi.nlm.nih.gov/pubmed/21905852) 2011 Oct;29(10):707-10. doi: 10.1089/pho.2011.3030. Epub 2011 Sep 9.

# Treatment of persistent idiopathic facial pain (PIFP) with a low-level energy diode laser.

[Yang HW](http://www.ncbi.nlm.nih.gov/pubmed?term=Yang%20HW%5BAuthor%5D&cauthor=true&cauthor_uid=21905852), [Huang YF](http://www.ncbi.nlm.nih.gov/pubmed?term=Huang%20YF%5BAuthor%5D&cauthor=true&cauthor_uid=21905852).

### Source

Oral Medicine Center, Chung Shan Medical University Hospital, 110 Jiang-Guo N. Road, Section 1, Taichung City, Taiwan.

### Abstract

#### OBJECTIVE:

The purpose of this study was to test the therapeutic efficacy of low- level energy diode laser on persistent idiopathic facial pain (PIFP).

#### BACKGROUND DATA:

PIFP has presented a diagnosis and management challenge to clinicians. Many patients were misdiagnosed, which resulted in unnecessary dental procedures. Low-level energy diode laser therapy has been applied to different chronic and acute pain disorders, including neck, back, and myofacial pain; degenerative osteoarthritis; and headache, and it may be an effective alternative treatment for PIFP.

#### METHODS:

A total of 16 patients, who were diagnosed with PIFP, were treated with an 800-nm wavelength diode laser. A straight handpiece having an end size of 0.8 cm in diameter, or an angled handpiece with an end size of 0.5 cm in diameter was used. When laser was applied, the handpiece directly contacted the involved symptomatic region with an energy density of 105 J/cm(2). Overall pain and discomfort was analyzed with a 10-cm visual analogue scale (VAS) before and after treatment.

#### RESULTS:

All patients received diode laser therapy between 1 and 10 times. The average pain score was 7.4 before the treatment (ranging from 2.9 to 9.8), and 4.1 after the treatment. An average pain reduction of 43.87% (ranging from 9.3% to 91.8%) was achieved. The pain remained unchanged at a lower level for up to 12 months.

#### CONCLUSIONS:

Low-level energy diode laser may be an effective treatment for PIFP

[J Oral Rehabil.](http://www.ncbi.nlm.nih.gov/pubmed/21848527) 2012 Mar;39(3):161-9. doi: 10.1111/j.1365-2842.2011.02247.x. Epub 2011 Aug 18.

# Classifying orofacial pains: a new proposal of taxonomy based on ontology.

[Nixdorf DR](http://www.ncbi.nlm.nih.gov/pubmed?term=Nixdorf%20DR%5BAuthor%5D&cauthor=true&cauthor_uid=21848527), [Drangsholt MT](http://www.ncbi.nlm.nih.gov/pubmed?term=Drangsholt%20MT%5BAuthor%5D&cauthor=true&cauthor_uid=21848527), [Ettlin DA](http://www.ncbi.nlm.nih.gov/pubmed?term=Ettlin%20DA%5BAuthor%5D&cauthor=true&cauthor_uid=21848527), [Gaul C](http://www.ncbi.nlm.nih.gov/pubmed?term=Gaul%20C%5BAuthor%5D&cauthor=true&cauthor_uid=21848527), [De Leeuw R](http://www.ncbi.nlm.nih.gov/pubmed?term=De%20Leeuw%20R%5BAuthor%5D&cauthor=true&cauthor_uid=21848527), [Svensson P](http://www.ncbi.nlm.nih.gov/pubmed?term=Svensson%20P%5BAuthor%5D&cauthor=true&cauthor_uid=21848527), [Zakrzewska JM](http://www.ncbi.nlm.nih.gov/pubmed?term=Zakrzewska%20JM%5BAuthor%5D&cauthor=true&cauthor_uid=21848527), [De Laat A](http://www.ncbi.nlm.nih.gov/pubmed?term=De%20Laat%20A%5BAuthor%5D&cauthor=true&cauthor_uid=21848527), [Ceusters W](http://www.ncbi.nlm.nih.gov/pubmed?term=Ceusters%20W%5BAuthor%5D&cauthor=true&cauthor_uid=21848527); [International RDC-TMD Consortium](http://www.ncbi.nlm.nih.gov/pubmed?term=International%20RDC-TMD%20Consortium%5BCorporate%20Author%5D).

### Source

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### Abstract

We propose a new taxonomy model based on ontological principles for disorders that manifest themselves through the symptom of persistentorofacial pain and are commonly seen in clinical practice and difficult to manage. Consensus meeting of eight experts from various geographic areas representing different perspectives (orofacial pain, headache, oral medicine and ontology) as an initial step towards improving the taxonomy. Ontological principles were introduced, reviewed and applied during the consensus building process. Diagnostic criteria for persistent dento-alveolarpain disorder (PDAP) were formulated as an example to be used to model the taxonomical structure of all orofacial pain conditions. These criteria have the advantage of being (i) anatomically defined, (ii) in accordance with other classification systems for the provision of clinical care, (iii) descriptive and succinct, (iv) easy to adapt for applications in varying settings, (v) scalable and (vi) transferable for the description of pain disorders in other orofacial regions of interest. Limitations are that the criteria introduce new terminology, do not have widespread acceptance and have yet to be tested. These results were presented to the greater conference membership and were unanimously accepted. Consensus for the diagnostic criteria of PDAP was established within this working group. This is an initial first step towards developing a coherent taxonomy for orofacial pain disorders, which is needed to improve clinical research and car

[Int Rev Neurobiol.](http://www.ncbi.nlm.nih.gov/pubmed/21708312) 2011;97:207-25. doi: 10.1016/B978-0-12-385198-7.00008-4.

# The role of trigeminal interpolaris-caudalis transition zone in persistent orofacial pain.

[Ren K](http://www.ncbi.nlm.nih.gov/pubmed?term=Ren%20K%5BAuthor%5D&cauthor=true&cauthor_uid=21708312), [Dubner R](http://www.ncbi.nlm.nih.gov/pubmed?term=Dubner%20R%5BAuthor%5D&cauthor=true&cauthor_uid=21708312).

### Source

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### Abstract

Previous studies have established the role of the medullary dorsal horn or the subnucleus caudalis of the spinal trigeminal complex, a homolog of the dorsal horn of the spinal cord, in trigeminal pain processing. In addition to the medullary dorsal horn, recent studies have pointed out increased excitability and sensitization of trigeminal interpolaris and caudalis transition zone (Vi/Vc) following deep orofacial injury, involving neuron-glia-cytokine interactions. The Vi/Vc transition zone accesses rostral brain regions that are important for descending pain modulation, and somatovisceral and somatoautonomic processing and plays a unique role in coordinating trigeminal nocifensive responses.

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[Quintessence Int.](http://www.ncbi.nlm.nih.gov/pubmed/21465014) 2011 Mar;42(3):259-69.

# The prevalence of persistent pain after nonsurgical root canal treatment.

[Klasser GD](http://www.ncbi.nlm.nih.gov/pubmed?term=Klasser%20GD%5BAuthor%5D&cauthor=true&cauthor_uid=21465014), [Kugelmann AM](http://www.ncbi.nlm.nih.gov/pubmed?term=Kugelmann%20AM%5BAuthor%5D&cauthor=true&cauthor_uid=21465014), [Villines D](http://www.ncbi.nlm.nih.gov/pubmed?term=Villines%20D%5BAuthor%5D&cauthor=true&cauthor_uid=21465014), [Johnson BR](http://www.ncbi.nlm.nih.gov/pubmed?term=Johnson%20BR%5BAuthor%5D&cauthor=true&cauthor_uid=21465014).

### Source

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### Abstract

#### OBJECTIVE:

To investigate the prevalence of persistent pain of neuropathic origin after nonsurgical root canal treatment and to determine its characteristics, location, and severity utilizing a self-reported validated postal survey.

#### METHOD AND MATERIALS:

A modified version of the Self-Administered Leeds Assessment of Neuropathic Symptoms and Signs (S-LANSS) survey was mailed to 2,338 adult subjects who received a single-tooth nonsurgical root canal treatment at the University of Illinois at Chicago College of Dentistry Postgraduate Endodontics Clinic over a 4-year period. Two-hundred and fifty (10.7%) completed surveys were returned. Descriptive analysis, Pearson correlation to determine correlations between the S-LANSS scores and variables of interest, and t tests for group comparisons of the S-LANSS score were performed. Statistical significance was determined at P<.05.

#### RESULTS:

The prevalence of persistent pain of neuropathic origin among respondents after receiving single-tooth nonsurgical root canal treatment was 7% with the average pain reported as 7.2 on a visual analogue scale (where 0 is no pain and 10 is pain as severe as it could be). Neuropathicpain was more common in middle-aged (mean 50.6 years of age) individuals with no sex predilection and occurred more frequently in the mandibular arch without any differences attributable to the number of canals treated. Also, the majority of subjects most frequently endorsed their painexperiences as abnormal sensitivity to touch and pain when the area is pressed or rubbed.

#### CONCLUSION:

Dental providers need to recognize and understand the differences between nociceptive and neuropathic pain. Understanding these concepts will assist in preventing inappropriate, irreversible, and unnecessary intervention

[Oral Dis.](http://www.ncbi.nlm.nih.gov/pubmed/21382137) 2011 Apr;17 Suppl 1:23-41. doi: 10.1111/j.1601-0825.2011.01790.x.

# Persistent orofacial muscle pain.

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### Source

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### Abstract

The pathophysiology of persistent orofacial myalgia has been the centre of much controversy. In this article we suggest a novel descriptive term; 'persistent orofacial muscle pain' (POMP) and review current evidence that supports the hypothesis that the induction of POMP involves the interplay between a peripheral nociceptive source in muscle, a faulty central nervous system component and decreased coping ability. In this context it is widely accepted that a complex interaction of variable intrinsic and extrinsic factors act to induce POMP and dysfunction.

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[mplant Dent.](http://www.ncbi.nlm.nih.gov/pubmed/21278523) 2011 Feb;20(1):20-6. doi: 10.1097/ID.0b013e31820968b5.

# Persistent dysesthesia following dental implant placement: a treatment report of 2 cases.

[Wright EF](http://www.ncbi.nlm.nih.gov/pubmed?term=Wright%20EF%5BAuthor%5D&cauthor=true&cauthor_uid=21278523).

### Source

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### Abstract

Occasionally, a patient has persistent dysesthesia symptoms (eg spontaneous or evoked painful or unpleasant sensations) following the placement of a dental implant. This disorder may be sufficiently superficial that an anesthetic and steroid mixture can be infiltrated into the region and satisfactorily treat the disorder. If an anesthetic infiltration can significantly reduce the patient's pain, this therapy may be beneficial. A 50:50 mixture of local anesthetic and steroid are combined in a dental anesthetic carpule and infiltrated into the painful region. If over the following week, the change in pain is greater than one would expect from an anesthetic infiltration, it suggests that this provided some degree of therapeutic response. A series of these infiltrations can be performed until the patient is symptom free or there is no additional improvement from these infiltrations. Two cases are discussed using this therap