



De-Escalating the Pain Pathway: A Narrative Review on Homeopathic Approaches to Post-Endodontic Neuralgia

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ABSTRACT

Post-endodontic neuralgia is a term used in this review to describe pain that is not odontogenic in nature but persists following endodontic treatment. Such pain may overlap with post-traumatic trigeminal neuropathy, idiopathic dentoalveolar pain and post-endodontic pain. The aim of this narrative review is to explore the epidemiology, clinical features, diagnosis, complications and possible role of homeopathy in the management of patients with post-endodontic neuralgia. A literature review was performed on PubMed, Google Scholar, dental literature, Indian endodontic studies, the Journal of Integrated Standardized Homoeopathy, the Indian Journal of Research in Homoeopathy and classical homoeopathic texts. Continuing tooth pain after endodontic treatment is not rare, with systematic reviews showing that the prevalence of continuing tooth pain is around 5.3%. Non-odontogenic pain is a minority of the cases of continuing tooth pain. Indian clinical studies also show that post-obturation pain is a common problem following endodontic treatment. The diagnosis of post-endodontic neuralgia requires the exclusion of other causes of pain, such as missed canals, periapical disease, vertical root fracture, periodontal disease and referred pain from the orofacial region. Homeopathy treats the individual patient according to their individualisation, causation, pain character, modalities, concomitants, mental state and general constitution. Medicines such as *Hypericum perforatum*, *Arnica montana*, *Chamomilla*, *Magnesia phosphorica*, *Spigelia anthelmia*, *Kalmia latifolia*, *Mezereum*, *Staphysagria* and *Causticum* may be considered for the treatment of post-endodontic neuralgia only if the symptoms of the patient correspond to the totality of the symptoms of the medicine. There is no direct evidence for the use of homeopathy in the treatment of post-endodontic neuralgia but there is indirect evidence from studies of patients with trigeminal neuralgia, post-herpetic neuralgia, post-extraction pain and postoperative pain. Therefore, homeopathy may be explored as an treatment of patients with post-endodontic neuralgia but should not replace dental, endodontic, neurological or pain-specialist care.

Keywords: Post-endodontic neuralgia; post-endodontic pain; persistent dentoalveolar pain; homeopathy; neuropathic pain

1. INTRODUCTION

Endodontic therapy aims to eliminate the infection from the root canals and preserve the natural tooth. Despite successful endodontic treatments, some patients experience continuing pain that does not resolve over time. The acute phase of pain typically subsides within a few days following the procedure. However, a small percentage of patients experience chronic pain that does not correlate to the symptoms of the treated tooth.

The term post-endodontic neuralgia is utilized within this article to describe the various types of pain that can develop following endodontic treatments. More specifically, the types of pain that are often encountered by patients with sensitized neural systems, those with post-traumatic trigeminal neuropathy, those with continuing idiopathic dentoalveolar pain or those with pain related to other non-odontogenic orofacial pain syndromes. The International Classification of Orofacial Pain (2020) does recognize conditions related to these types of pain [1].

This clinical problem is important due to the potential consequences of ineffective treatment. The pain may require further retreatments, extraction of the tooth, use of excessive analgesics and even impact the trust that patients have in their dentists. Also, long-term outcome studies have demonstrated that some patients will experience continuing pain despite successful treatment of their teeth [2-5]. Therefore, a de-escalation approach is required to treat these patients; treat any dental problems but avoid treating patients with neuropathic pain.

Homeopathy is based on individualisation of each patient according to their unique characteristics and symptoms. For patients with post-endodontic neuralgia, the dentist and homoeopathic practitioner will need to take into consideration the causes of the neuralgia, the type of nerve irritation, the modalities of the pain experienced by the patient and any other symptoms they may have. The aim of this article is to discuss homeopathy as an adjunct treatment modality, not as a replacement for conventional treatments for neuralgia.

2. REVIEW METHODOLOGY

This narrative review was prepared by searching and reviewing literature on post-endodontic pain, continuing tooth pain, non-odontogenic pain after root canal therapy, painful post-traumatic trigeminal neuropathy, continuing idiopathic dentoalveolar pain, dental neuralgia and homoeopathic therapeutics. The databases that were consulted included PubMed, Google Scholar, PubMed Central, Indian dental journals, Journal of Integrated Standardized Homoeopathy, Indian Journal of Research in Homoeopathy and classical homoeopathic texts.

The search was limited to systematic reviews, clinical practice-relevant classifications, Indian studies in the field of endodontics, randomised trials and peer-reviewed literature on homoeopathy. The search terms included post-endodontic pain, pain following root canal treatment, nonodontogenic pain following endodontic treatment, trigeminal neuropathic pain, continuing dentoalveolar pain, homoeopathy, neuralgia, Hypericum perforatum, Arnica montana and dental pain. A narrative synthesis of the findings was performed due to the heterogeneity of the studies and the absence of randomised trials investigating the use of homoeopathy in cases of post-endodontic neuralgia.

3. EPIDEMIOLOGY

The incidence of postoperative endodontic pain is variable due to differences in the studies published on this topic. **Pak and White (2011)** performed a review of the literature regarding pain before, during and after root canal treatment. The authors found that pain typically decreases with time after the root canal treatment is performed [6]. **AlRahabi (2017)** performed a review of the literature regarding postoperative pain following root canal treatment. The author found that various factors can influence the incidence of postoperative pain, including the preoperative pain, the periapical status of the tooth and various operative variables [7]. More recent overviews and systematic reviews of the literature also support the idea that the incidence of postoperative pain is influenced by factors related to the case selection, medication used and the single-visit or multiple-visit protocols used during the root canal treatment [8,9].

Tooth pain that is continuing in nature is less common than tooth pain that is experienced during the period immediately following dental treatment. The prevalence of continuing tooth pain following endodontic treatment has been estimated to be as low as 5.3% according to **Nixdorf et al. (2010)** but studies of higher quality have found the prevalence of such tooth pain to be above 7% [3]. Also, **Nixdorf et al. (2010)** performed a review of the existing literature on the topic of continuing tooth pain following endodontic treatment and found that the prevalence of non-odontogenic tooth pain following such treatment to be 3.4% [4].

Studies from India have also provided useful information regarding the topic. **Ali et al. (2012)** conducted a study to determine the level of post-obturation pain following single-visit root canal treatments in patients from India. The results of the study indicated that the pain decreased rapidly over the 48-hour period [10]. **Gupta et al. (2021)** performed a study that compared single-visit and multiple-visit root canal treatments and reported mostly mild levels of postoperative pain in each group [11]. **Singh et al. (2020)** performed a study that evaluated the flare-ups that occurred in paediatric permanent teeth that had received either single-visit or multiple-visit endodontic treatments [12]. Other studies have investigated the relationship between the number of visits to the dentist, the use of intracanal medications and the use of analgesics prior to the treatment of root canals [13-16]. While these studies have provided information regarding the level of pain that may happen following endodontic treatments, there are few studies that have investigated the presence of post-endodontic neuralgia in India.

4. CLINICAL FEATURES

Post-endodontic neuralgia may present as burning, shooting, electric shock-like, stabbing, tingling, crawling, numb or aching pain in the tooth, gingiva, jaw or facial region. The pain may be spontaneous or triggered by various activities such as chewing, brushing, touching the gingiva, cold air, speaking or emotional stress. Patients may report allodynia, hyperalgesia or pain that is disproportionate to the findings of the teeth. The pain is associated with the pulp and the trigeminal nerve [17,18].

The main feature of this type of toothache is the mismatch between the intensity of the pain experienced by the patient and the findings of the treated tooth. The treated tooth may appear radiographically to be in good health, may have minimal or inconsistent percussion tenderness and the adjacent teeth may test normal. However, other conditions that can cause pain in the same region of the tooth must be excluded before the pain can be labelled as neuralgic or non-odontogenic.

The patients may also present with symptoms like sleep disturbances, anxiety, fear of chewing, irritability, reduced concentration and the need for repeated consultations. The pain may be chronic and located in the orofacial region. The pain may be classified as trigeminal neuralgia if it is paroxysmal and electric shock-like in nature with trigger zones or as painful post-traumatic trigeminal neuropathy if the pain is continuous or nearly continuous in nature following an injury or procedure to the trigeminal nerve.

5. DIAGNOSIS

A diagnosis is made by systematically excluding other causes of pain prior to attempting to de-escalate the treatment. Such an investigation would require documenting the patient's symptoms, the processes performed on the tooth, the anaesthesia used, the working length of the tooth, the instruments used, the type of obturation performed, the pain experienced post-treatment and any previous treatments performed on the tooth.

The examination of the patient should include an inspection of the treated tooth as well as adjacent teeth. Percussion, palpation, mobility, periodontal probing, bite test, occlusal analysis and pulp sensibility testing of adjacent teeth should be performed. Also, radiographic evaluation and cone-beam computed tomography can help reveal missed canals, periapical pathology, resorption, fractures or overfilled root canal material. Finally, neurosensory testing of the patient's maxillary and mandibular teeth can help determine if the trigeminal nerve has been damaged during the dental treatment.

Other differential diagnoses for toothache include continuing apical periodontitis, missed canal, cracked tooth, vertical root fracture, periodontal abscess, maxillary sinusitis, temporomandibular disorder, atypical odontalgia, continuing idiopathic dentoalveolar pain, trigeminal neuralgia, painful post-traumatic trigeminal neuropathy, migraine-related orofacial pain and burning mouth syndrome [1,17,18]. If there is severe swelling, fever, spreading cellulitis, trismus, dysphagia, airway symptoms, a neurological deficit or severe uncontrolled pain, refer to an oral surgeon urgently.

A second RCT or extraction of the tooth should not be performed only on the basis of pain symptoms. If there is no odontogenic pathology present, performing a RCT could actually contribute to the development of both peripheral and central sensitisation. A multidisciplinary assessment by an endodontist, oral medicine/orofacial pain specialist, neurologist or pain physician may be required.

6. COMPLICATIONS

Complications of post-endodontic neuralgia include chronic pain, central sensitisation, sleep disturbances, reduced efficiency of chewing, avoidance of food, anxiety, depressive symptoms, dental fear and reduced quality of life. Many patients experience repeated episodes of pain despite various treatments.

Complications may arise from the prolonged use of drugs like NSAIDs, antibiotics, opioids, sedatives or drugs taken for self-medication. The overuse of antibiotics for non-infectious conditions can lead to the development of antibiotic resistance and adverse effects from the medication. The financial burden and frustration that patients may feel can also contribute to their pain. The major risk of treatment for these patients is the escalation of their treatment without a clear diagnosis of their condition.

7. HOMOEOPATHIC APPROACH

Homoeopathic treatment begins only after the patient has undergone a dental assessment. The first duty of the dentist is to determine if the patient's pain is caused by an active dental condition that requires endodontic or surgical treatment. The dentist should never delay in treating the patient's dental condition.

Individualization is central to homeopathy in stable cases. **Hahnemann (2002)** stated that the totality of symptoms is the basis of prescription [19]. **Kent (2004)** discussed the importance of mental generals and constitutional tendencies in treating a patient [20,21]. For a patient with post-endodontic neuralgia, the totality of symptoms should include site, side, sensation, modalities, causation, onset after dental procedure, aggravation from touch or cold air, relief from warmth or pressure, periodicity, sleep disturbance, mental state, fear, irritability, sensitivity, thermal state, thirst, appetite, bowel habit and concomitant symptoms.

The case may be processed using either repertorial or non-repertorial methods depending upon the clarity of the case. Rubrics that relate to neuralgic tooth pain, face pain, nerve injury, the effects of dental operations, touch aggravation, cold air aggravation and sleep disturbance may be considered in the prescription of remedies for this case. The prescription of remedies for this case must be individualized and not based upon the routine use of a single remedy for all cases of post-root canal pain.

8. HOMOEOPATHIC THERAPEUTICS

The following medicines are discussed in this article from the perspective of classical materia medica and repertory. These medicines are not routine treatments for endodontic neuralgia. Each patient should be assessed individually before treatment is administered.

Hypericum perforatum is indicated for nerve injuries and shooting pains [22-26].

Arnica montana is indicated for people who experience trauma, surgery, bruised soreness, tenderness and a feeling as if the body part has been beaten. These symptoms are often experienced by people who feel sore after dental processes [22-26].

Chamomilla: This remedy is indicated when patients experience unbearable pain that is accompanied by irritability, anger, oversensitivity and restlessness. Such symptoms are commonly experienced by patients suffering from dental pains [22-26].

Magnesia phosphorica is considered in spasmodic or neuralgic pain that is relieved by warmth, pressure or bending double. Facial or dental neuralgia may be suggested by cramping and shooting pains [22-26].

Spigelia anthelmia is known to be effective in treating patients with left-sided facial neuralgia, stabbing or tearing pains in the face, particularly those that involve the eye, cheek or dental regions of the face [22-26].

Kalmia latifolia: Neuralgic pains that shoot downward from the face accompanied by numbness, tingling or shifting pains show its use [22-26].

Mezereum is indicated for neuralgic tooth or facial pains that are worsened by touch, cold air or during the night [22-26].

Staphysagria is often prescribed for patients who have experienced trauma following surgery or dental processes and are experiencing pain as a result but also exhibit signs of suppressed indignation [22-26].

Aconitum napellus can be used in treating cases of acute neuralgic pain that occurred as a result of fright, shock or panic [22-26].

Causticum is indicated in conditions where there are burning sensations or rawness of the nerves, weakness, numbness or paresis-like sensations in the limbs or when there are chronic states of nerve irritation. It has also been used to treat trigeminal neuralgia [28].

Belladonna, *Mercurius solubilis*, *Hepar sulphuris calcareum* and *Silicea* can be considered for use only if their totality of symptoms corresponds to the patient's presenting condition. A suppurative dental infection should not be treated only with medicines. Dental consultation and treatment as indicated is required.

9. EVIDENCE SUPPORTING HOMOEOPATHY

No direct clinical trials of homoeopathy for post-endodontic neuralgia have been identified. The existing literature on the topic is indirect and should be interpreted with caution.

Mojaver et al. (2007) conducted a study that observed the effects of individualised homoeopathic treatment for patients with trigeminal neuralgia. The results indicated an improvement in the condition of the patients who received the treatment but the study had a small sample size and was not controlled [27]. **Chakravarthy et al. (2024)** published a case report of two people with trigeminal neuralgia who were treated with *Causticum*. While case reports can provide insights into potential treatments, they do not show the efficacy of those treatments [28]. **Parveen and Das (2021)** published a case report of a patient with post-herpetic neuralgia who was treated with homoeopathic medicine. While this case report is related to neuropathic pain, it does not relate specifically to post-endodontic neuralgia [29].

The evidence regarding dental pain is mostly indirect. For example, **Thakur and Katre (2022)** investigated the efficacy of *Arnica montana* versus ibuprofen for treating dental extraction pain in children. Although their study indicated that *Arnica montana* was more effective than ibuprofen for treating dental extraction pain in children, dental extraction pain is different from post-endodontic neuralgia [30]. Another study by **Raak et al. (2022)** investigated the efficacy of homoeopathic *Hypericum perforatum* following spinal surgery. Although their study did not show an important advantage of homoeopathic *Hypericum perforatum* over the control group regarding pain, the condition studied is relevant to the treatment of postoperative nerve pain [31]. Finally, **Gaertner et al. (2021)** conducted a meta-analysis of studies on the efficacy of *Arnica montana* for treating postoperative pain. The results of the meta-analysis indicated that there was only a small overall effect of *Arnica montana* in reducing postoperative pain [32].

There is insufficient evidence to claim that homoeopathy treats post-endodontic neuralgia. However, it can be considered as a treatment option for patients who wish to use it as an adjunct to their current treatment. Further studies are required to validate the effectiveness of homoeopathy for the treatment of post-endodontic neuralgia using established pain scales and diagnostic criteria.

10. DISCUSSION

Post-endodontic neuralgia is a condition that relates to the overlap of dentistry, neurology and chronic pain medicine. The challenge in treating this condition is to determine whether the pain is related to the dental pathology and if so, to treat that condition. If there is no dental pathology, then invasive treatments may only serve to increase the patient's discomfort.

The concept of de-escalating the pain pathway has two meanings. The first is to avoid escalating the pain pathway unnecessarily, such as through the use of instruments or processes that are not required for the treatment of the patient. The second is to address other factors that may be contributing to the patient's pain, such as irritation of peripheral nerves, sensitization of the central nervous system, sleep disturbances, anxiety, fear or pain-related behaviors.

Homoeopathy may be able to provide relief from dental pain through careful case taking and prescription of homoeopathic remedies that match the characteristics of the patient's pain. However, homoeopathic treatment must remain integrated with dental and medical care for the patient. The homoeopathic physician should document the patient's baseline pain levels, use pain scales during follow-up visits, monitor the patient's use of analgesics and refer the patient to a dentist if their symptoms do not improve over time. Also, the homoeopathic physician must clearly communicate to

the patient that the evidence for homoeopathy is limited and that it is used as an adjunct therapy to other forms of dental care, rather than as a means of curing the patient's pain.

Future studies should be performed with well-defined post-endodontic neuralgia populations, adequate exclusion of dental patients, standardized assessment of neuropathic pain, randomized placebo-controlled design, individualized homoeopathic prescriptions, reporting of adverse events and clinically relevant outcomes. These studies could be performed by collaborating between Indian dental colleges and homoeopathic institutions.

11. CONCLUSION

Post-endodontic neuralgia refers to dental or orofacial pain that persists after an endodontic procedure. This type of pain can have neuropathic or non-odontogenic origins. The diagnosis of post-endodontic neuralgia requires the exclusion of any remaining odontogenic pathology or other causes of facial pain. The condition can lead to unnecessary dental processes, chronic sensitisation, sleep disturbances, anxiety and a reduction in the patient's quality of life.

The cardinal principle of homoeopathy is based upon the idea of "similia similibus curentur", which translates to "like cures like" or "the treatment will work for the overall function of the body". So, according to homoeopathic principles, the focus should be upon discovering the cause of the disease in question and applying the appropriate homoeopathic treatment to that condition. The medicines that are prescribed to these patients are based upon the individualisation and totality of their symptoms. Also, the cost-effectiveness of homoeopathic treatments as well as the safety of the medicines used in these treatments makes homoeopathy a particularly attractive option for people who wish to undergo such treatment for the diseases that they have contracted.

Homoeopathy is a system of medicine that offers an individualised approach to treatment based on the totality of the symptoms, their causes, the nature of the pain experienced by the patient, any concomitant symptoms and the patient's constitutional state. Medicines like *Hypericum perforatum*, *Arnica montana*, *Chamomilla*, *Magnesia phosphorica*, *Spigelia anthelmia*, *Kalmia latifolia*, *Mezereum*, *Staphysagria* and *Causticum* are prescribed only when the totality of the symptoms of a patient shows the need for such medicines.

There is now no high-quality evidence to support the use of homoeopathy in the treatment of post-endodontic neuralgia. There is limited indirect evidence to support the use of homoeopathy in other conditions such as trigeminal neuralgia, post-herpetic neuralgia, post-extraction pain and postoperative pain. Therefore, homoeopathy may be considered as an adjunct therapy for stable patients with post-endodontic neuralgia, whilst ensuring that the necessary dental diagnosis, endodontic care, neurological evaluation and evidence-based pain management are provided.

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