



## Review Article

# A literature review of causes and management of pain related to endodontic procedure

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## ARTICLE INFO

### Article history:

Received 01-05-2021

Accepted 29-05-2021

Available online 30-06-2021

### Keywords:

Porphyromonas endodontalis  
Porphyromonas gingivalis  
and Prevotella species revealed by  
different studies

## ABSTRACT

Pain if found to be the prime most factor for most of the patients to visit the dental clinic. Pain can be associated to different reasons, might be due to periodontal reason, due to local infection, due to any oral surgical trauma, due to any peri apical infection, due to impingement of the prostheses to the soft tissue. But most often patient visit to the dental clinic with the pain associated with endodontic reason. So one should have an adequate knowledge to differentiate between the main cause of the endodontic pain and to diagnose the same with a proper treatment plan.

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## 1. Introduction

The pain associated with an endodontic cause mostly occur due to infection of the pulpal tissue which might occur due dental caries progression deep in to the tooth, infection from the adjacent tooth, trauma to the tooth. The pain occur is may be due to two different conditions, could be due to reversible pulpitis or might be due to clinical condition known as irreversible pulpitis. There occur acute as well as sharp type of pain in case of reversible pulpitis condition, where as dull and steady type of pain in case of irreversible pulpitis condition. The treatment plan should be made very precisely according to the nature of the pain, i.e. the pain can arise before the endodontic treatment, the pain may arise at the time of endodontic treatment, and the pain may arise after the completion of the endodontic treatment.

Whenever there will be any external stimuli to the tooth in form of progression of dental caries, infection from the adjacent tooth, trauma to the tooth, there will be response of the pulpal tissue to the external stimuli in the form of

inflammation of the tissue, which ultimately is the reason of the endodontic pain. Bacteria also plays an important role in the progression of the inflammation/infection and which may finally leads to occurrence of pain in the associated tooth. Different studies revealed that pain that occur in between the scheduled appointments may be due to pre operative pain, absence of any peri apical lesion or cyst, due to fractured root fragments and in re treatment cases as well. And in case of pain that occurs after the endodontic treatment is mostly due to sudden removal of chronic infection from the infected tooth, in case of nonvital teeth, over instrumentation in the apical area, or may be due to over extension of the filling material and most commonly due to leakage from the previously done filing in the tooth.<sup>1-3</sup>

### 1.1. Pain due to progression of the dental caries

As the caries start progressing over the tooth surface, there will be changes start occurring in the pulpal health in the form of inflammation. Inflammation of the pulpal tissue occurs due to toxins and endo toxins released from the

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bacterial products reach the pulpal tissue because of the permeability of the dentinal tissue. As the process and progression of the dental caries occur and invade the pulpal tissue, resulting in inflammation of the tissue and with time there will be increase in intra pulpal pressure with in the pulp chamber, which results in pain. Repair of the pulpal tissue is not possible because of thin blood capillaries due to increased in intrapulpal pressure. In layers of carious dentine more amount of endotoxins are present in the superficial infected layer as compared to deep infected layer of the dentine. Studies also revealed that more the amount of endotoxins in the infected dentine more will be the pain threshold. When there will be long term inflammation of the tissue, there occur calcification of the tissue itself and the response from the pulpal tissue stops, becoming the tooth asymptomatic.

### 1.2. Trauma

Dental trauma is one of the commonest as well as important causative factor for pain in the tooth. Trauma to the tooth may occur due to fall of the individual, accident, by biting on the hard object. And the most common type of injury the individual encounter is fracture of maxillary central incisor, that too occur most commonly in the male patient, resulting in exposure of pulpal tissue to the external stimuli and results in pain, and ultimately requires endodontic treatment to get rid of the pain.<sup>4</sup>

### 1.3. Pain during the endodontic procedure

Pain may occur in between the endodontic treatment of the tooth, mostly due to mechanical, chemical or microbial injury to the canal system. Out of all the three types of injury microbial injury is found to be the predominating factor of pain during in procedural time.<sup>5,6</sup>

### 1.4. Bacteria

Microorganisms plays an important role in the process of inflammation and progression of infection. Microorganism can result in pain during in between endodontic treatment as a result of alteration of host microbial flora during the intracanal procedure. Mostly pain is induced by pathogenic bacteria like Porphyromonas endodontalis, Porphyromonas gingivalis, and Prevotella species revealed by different studies.<sup>7–13</sup>

### 1.5. Other cause

Pain may also occur as a result of inflammation of the periapical tissue that may occur due to mechanical or chemical injury. The severity of the pain is totally dependent upon the severity of the injury, amount of tissue damaged, and severity of the inflammatory response. Mechanical injury may be associated with over instrumentation or

over extruded filling from the apical area and chemical injury occurs due to use of intracanal irrigating solution, or solution expelled out from the apical area.

### 1.6. Inflammation

As the injury occurs to the periradicular tissue, there will be development of acute inflammation at the periradicular area, which is found to be the prime most factor in development of acute pain during the inter appointment time. Literature revealed that following the injury to the periradicular tissue, there will be release of chemical mediators of inflammation i.e. vasoactive amines, leukotriene's, prostaglandins, cytokines, lysosomal enzymes.<sup>13</sup>

Pain after the completion of endodontic treatment can be encountered after the completion of endodontic treatment, because of many reasons like acute removal of chronic infection, over instrumentation, extruded filling at the periapical area. Some other factors that are associate with pain after completion of endodontic treatment are position of the apical foramen, remanant of pulpal tissue which can not be removed easily that too with proper care with respect to perforation, missed accessory canals that too with pulpal tissue present with in it and when the working length which is determined is in accurate, if the working length is short of actual length, no proper cleaning of the canal should be done, and there would be remnants of pulpal tissue in the canal that may lead to pain even after the endodontic treatment, and if the working length is more than the actual length, there would be chance of over instrumentation and over filling in the canal, that may lead to pain even after endodontic treatment.

### 1.7. Management

Endodontic pain can be relieved by pharmacological as well as non-pharmacological ways. Before starting the treatment, the patient should be given non steroidal anti inflammatory drugs in case of patient suffering from irreversible pulpitis, to reduce the levels of inflammatory mediators by reducing the pulpal nociceptors sensitization and helps in diminishing prostanoid induced stimulation of TTX resistant activity of sodium channel. This may lead to display relative resistance to lidocaine. Some studies revealed that injectable NSAID like ketorolac tromethamine when administered intraorally or intra muscularly results in production of significant analgesia in patient with severe odontogenic pain.<sup>14–16</sup>

Non pharmacological treatment modalities include re cleaning as well as reshaping of the canal system. One should have to open the tooth again, reshape the canals with prime concern that no pulpal tissue should be remained as a remanant in the canals of the tooth, proper cleaning of the canal should be done along with the use of intra canal irrigants and medicaments. One should make sure that the apical foramen should be constricted and if there is extruded

filling from the apical foramen, it should be removed and the constriction should be maintained.

In non pharmacological measures initially before starting the root canal procedure one can go pulpotomy or pulpectomy procedure also. In the process of pulpotomy, one should remove only the coronal pulp without touching the pulp tissue of the anal system. This procedure can be performed in acute pain cases, the basic principle of relieving pain by the procedure of pulpotomy is by reducing the local tissue pressure, reduce in inflammatory mediators concentration. These all factors helps in relieving the pain in acute pain cases.

## 2. Conclusion

Endodontic pain is one of the commonest condition, the dentist encountered with. So the dentist should have a thorough knowledge of the anatomy of the canal, the medicaments to be used in the canal system, number of canals, with proper knowledge of determining the working length of the canal. These all factors should be considered for a successful endodontic treatment.

## 3. Conflict of Interest

The authors declare that there are no conflicts of interest in this paper.

## 4. Source of Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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**Cite this article:** Jassal S, Fatima A, Gupta AS, Khan F, Jamwal P. A literature review of causes and management of pain related to endodontic procedure. *IP Indian J Conserv Endod* 2021;6(2):82–84.