



Endodontic Pain: Causes and Management- A Review.

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Submitted: 10-11-2024

Accepted: 20-11-2024

ABSTRACT: Pain is most important reason for visiting dental clinic or hospital. Pain is caused due to endodontic and periodontic causes. Endodontic pain most common cause for visiting dentist. One of the important parts of dental practice is managing endodontic pain. The article aims to review the important causes of the pain and management of the same.

KEYWORDS: Pain, causes, management, pulp, analgesics.

I. INTRODUCTION:

[1] Inflammation of the pulp tissue is the primary cause for pain in the endodontic region, which develops due to dental caries that move further into the tooth. Either permanent or reversible pulpitis causes this discomfort. Unlike irreversible pulpitis, marked by constant, chronic pain, reversible pulpitis is characterized by abrupt agony. Acute pain drives a patient to a dental clinic because it is terrible; therefore, a precise diagnosis and methodical treatment will only make the patient feel better. Making a diagnosis, a thorough analysis of the wide range of possible causes of endodontic discomfort is necessary. [3] Endodontic pain can be characterized before, during, and after the treatment. By analyzing this a systematic plan of pain management is possible for the dentist.

II. ETIOLOGY OF ENDODONTIC PAIN:

[2] Endodontic pain is the pulp tissue reaction to the presence of causative agent, like dental caries, irritants. Pulp tissue may react as a result of dental caries, trauma, or even restorations. Pain progression is influenced by the bacteria in pulp tissue. The pulp tissue in dental caries can interact with various microorganisms and other components to cause a reaction. [3] Numerous research has shown that endodontic pain that occurs in between sessions may be brought on by analgesic prescriptions, damaged roots, retreatment instances, absence of periapical lesions or cysts, and pre-operative pain. An acute worsening of a

chronic infection, a dead tooth, a canal opened previously, overextension of filling compound or material above apex, or a leak in a temporary or permanent filling can potentially cause pain.

2.1. DENTAL CARIES:

[10] Inflammation of pulp is observed during the start of carious lesion. [3] Dentin becomes permeable, allowing bacterial toxins to enter the pulp before the pulp gets exposed and symptoms accompany it. Pulpal tissue inflammation worsens when dental caries progresses. Increased vasodilation brought on by the release of vasoactive mediators, such as histamine, is accompanied by specific vascular and cellular responses. [9] Polymorphonuclear neutrophils (PMNs) and monocytes infiltrate the pulp initially in response to carious exposure, which is followed by an acute inflammation and destruction of tissues, development of microabscesses and foci of necrosis in the pulp. Finally complete pulp necrosis occurs.

2.2. DENTAL TRAUMA:

[1] Trauma is another significant cause of pain in dentistry. Dental trauma is defined as damage to the oral cavity that primarily results from incidents that affect patients of all ages. According to research, men are more likely than women to experience chronic dental injuries, especially to the maxillary central incisor, which can be quite painful. [3] The most common kind of damage was a straightforward fracture of the pulp tissues resulting from a crown break on the permanent maxillary central incisors. Endodontic therapy was required to restore the pulp tissues to their original shape and function.

2.3. INTER APPOINTMENT ENDODONTIC PAIN:

[1, 3] Following endodontic therapy, such as a root canal, severe pain and swelling may arise. This is brought on by, chemical, pathological, mechanical, and/or microbial damage to root canal



system. Iatrogenic causes account for the bulk of chemical and mechanical injuries.[9] However, microbiological injury is the most frequent reason for discomfort in between sessions. Pain between appointments is caused by inflammation.

2.4. MICROBIAL:

[1] Microorganisms have a significant impact on the development of infection and the inflammatory process. Microorganisms might cause discomfort during the period between endodontic treatments because they change the host microbial flora during the intracanal process. [9,3] Numerous studies have shown that pathogenic bacteria such as *Porphyromonas endodontalis*, *Porphyromonas gingivalis*, and *Prevotella* species are primarily responsible for causing pain.

2.5. NON-MICROBIAL:

[9] The periradicular tissue would be damaged chemically and mechanically, followed by an inflammatory reaction that would cause discomfort. How painful anything is will depend on a number of things, including the quantity of tissue damage, the severity of the injury, and the level of inflammation. Overuse of equipment and overextension of filling materials are the main sources of mechanical irritation that result in periradicular inflammation.[3] Chemical irritation is exemplified by the apical ejection of irrigants or intracanal medications. The more material that is overextended, the more damage is done to the periradicular tissues.

2.6. INFLAMMATION:

[3] Acute inflammation in periradicular tissue is always the cause of pain in between appointments. Vasodilatation, increased vascular permeability, and chemotaxis are hallmark processes of inflammation. These reactions are remediated by a variety of substances that are released or triggered by tissue damage.[1] As observed in literature and I quote "Among the chemical mediators of inflammation include vasoactive amines, prostaglandins, leukotrienes, cytokines, neuropeptides, lysosomal enzymes, nitric oxide, oxygen-derived free radicals, and substances obtained from plasma "are the main factors that give rise to symptoms and signs.

2.7. RESTORATIVE FACTORS:

[10] Microbial microleakage from restorative procedures may be the source of pulpal issues. Microbes that penetrate the pulp and dentin can produce pain, which results in a false diagnosis. To understand the bonding durability and success

of restorations using adhesives additional investigations and research is necessary. Pulpal breakdown may also result from iatrogenic factors in the process of restorative operations, while using insufficient coolants and increased heat generation.

2.8. POST ENDODONTIC PAIN:

[1,9] The most frequent type of pain is post-endodontic. Many preoperative circumstances, such as a periapical abscess, nonvital teeth, previously opened canals, filling material extension or over-instrumentation, and apical leaking in temporary or permanent fillings placed following endodontic treatment, can be the cause. Over-instrumentation may result from the pulp tissue is between two difficult-to-instrument canals, missed canals, and incorrectly determined working lengths. The instrumentation process may cause periapical discomfort because of the extrusion of root canal debris in the periapex.[1] Additionally, obturating procedures such as lateral condensation may cause increased pain in the immediate post-operative period than when compared to procedures done by using the technique of single cone obturation.

III. MANAGEMENT OF ENDODONTIC PAIN:

[6] Accurately identifying the source of endodontic discomfort is vital for its management. An appropriate diagnosis is achieved using several techniques, which includes radiographic examination, periapical testing, and pulp testing. A thorough examination by the clinician especially his/her ability to distinguish between the pain of odontogenic origin and pain of non-odontogenic origin is crucial to managing a patient. Pain is complex and has various options and combinations for management.

3.1. PHARMACOLOGICAL MANAGEMENT:

Analgesics:[5] Pain is commonly managed by using analgesics and is classified into opioids and non-opioids.

Non-opioid analgesics: [5,6,7] NSAIDs is analgesics as well as anti-inflammatory and antipyretic. Most commonly used NSAIDs are [6] Ibuprofen-400mg and Zerodol-P. It should not be given for pregnant patients and patients with bleeding disorders.

Opioid analgesics: [6] It has greater efficiency when compared to non-opioids but it should never be used as 1st choice for dental pain. [6,8] There is a chance of addiction and also withdrawal symptoms so the dose given should be tapered and withdrawn. It should not be given to



pregnant patients since it causes serious birth defects.

NON-PHARMACOLOGICAL MANAGEMENT:

It includes dental treatment like pulpotomy and pulpectomy to relieve pain.

Pulpotomy:[2,8] It is a procedure where the coronal part of pulp is removed without penetrating the pulp in root canal. [2,4] When there is no sufficient time to perform pulpectomy, pulpotomy is performed. For many years Pulpotomy, which includes sealing of sedative and dressings with antibiotics in the pulp chamber has been advocated in emergency situations successfully.

Pulpectomy: [2,8] It is a procedure where the complete pulp tissue is removed till the apex. It is done for patient with symptoms like irreversible pulpitis, necrosis of the pulp and no swelling. If the flow exudate is present then the teeth a cotton pellet is kept and closed dressing is done to prevent contamination. And observed and instrumentation, irrigation, shaping and obturation is done within 3 days.

3.2. MANAGEMENT OF INTERAPOINTMENT ENDODONTIC PAIN:

Re-instrumentation: [5,10] Re-instrumentation, is also known as re-entering the tooth. The most important and a definitive step in the treatment of symptomatic tooth is re-entering/reinstrumentation.. In this the steps involved are 1. Opening the tooth for access, 2. Cleaning, 3. Shaping, 4. Providing drainage, and 5. Performing a copious irrigation for the debridement.

Trephination:[5,10] Cortical trephination is defined and I quote" as the surgical perforation of the alveolar bone attempting to release accumulated periradicular tissue exudates". The effect of cortical trephination to prevent and relieve post-treatment pain has been studied widely by many.

Incision and drainage: [5,10] Is performed to drain the pus, microorganisms with decompression. Treatment with incision and drainage holds good if and when the root canal filling is perfect.

Intracanal medicaments: [5,10] Intracanal medication has neither prevented nor relieved endodontic pain. Intracanal steroids and NSAIDs reduce and prevent pain.

Occlusal reduction:[5,10] Occlusal reduction is done after endodontic treatment to reduce pain. It can also be treated pharmacologically by analgesics.

3.3. MANAGEMENT OF POST ENDODONTIC PAIN:

[1,2] Treatment of post endodontic pain is important because the incidence of returning to dentist due to discomfort can be reduced. More care while performing the endodontic treatment procedure can relieve this type of pain. Post-endodontic pain is often due to missed accessory canals and gets no treatment.

IV. CONCLUSION:

Since endodontic pain treatment is common in clinical practice, establishing an accurate diagnosis is the first step towards efficient pain management. The treatment plan addresses cause and pain management.

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