

**CLINICAL ASPECTS OF POST-ENDODONTIC PAIN: PROGNOSIS, PREVENTION,
AND TREATMENT**

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Abstract

Post-endodontic pain is one of the most common patient complaints after root canal treatment and represents an important clinical problem in modern dentistry. Despite the high effectiveness of endodontic treatment, the incidence of pain in the early postoperative period remains significant. The aim of this study is to analyze the causes of pain after endodontic treatment, risk factors, prognosis methods, and modern approaches to the prevention and treatment of this condition. This paper examines the main pathogenetic mechanisms, including microbial factors and mechanical and chemical irritation of periapical tissues. Particular attention is paid to the role of medical errors and individual patient characteristics. Based on a literature review, effective measures for the prevention and treatment of post-endodontic pain are proposed.

Keywords

endodontics, postoperative pain, flare-up, periapical inflammation, irrigation, root canal treatment.

Introduction

Endodontic treatment aims to eliminate infection from root canals and prevent further damage to periapical tissues. Despite significant advances in endodontics, including the introduction of modern instruments and irrigation protocols, the problem of post-endodontic pain remains relevant.

According to various studies, the incidence of pain after root canal treatment varies from 3% to 58%, depending on the clinical situation and the techniques used. Particularly pronounced symptoms are observed during the development of a so-called "flare-up"—an acute exacerbation of the inflammatory process after endodontic intervention. The relevance of this topic is driven by the need to improve the quality of treatment, reduce the incidence of complications, and improve patients' quality of life.

Study Objective

To study the causes, mechanisms of development, methods of prediction, prevention, and treatment of pain after endodontic dental treatment.

Study Objectives

Analyze the main causes of post-endodontic pain

Study the pathogenesis of pain syndrome

Identify risk factors and prediction methods

Review modern prevention methods

Evaluate treatment approaches

Materials and Methods

This study analyzed current Russian and international scientific publications on post-endodontic pain. Data from clinical studies, systematic reviews, and meta-analyses on endodontic treatment and its complications were used. The research methods included:

Analytical review of the literature

Comparative analysis of various treatment methods

Summarization of clinical data

Results and discussion

Causes of post-endodontic pain

The main cause of pain after endodontic treatment is an inflammatory reaction in the periapical tissues. Microbial factors play a key role—the penetration of infected material beyond the root canal.

Other causes include:

Extrusion of instruments, medications, or filling material beyond the root apex

Over-widening of the apical foramen

Insufficient root canal preparation

Mechanical tissue trauma

Errors in determining the working length

Pathogenesis of pain

Pain is based on an inflammatory reaction, accompanied by the release of inflammatory mediators (prostaglandins, cytokines). This leads to increased vascular permeability, tissue edema, and irritation of nerve endings. Of particular importance is increased pressure in the periapical region, which causes pain when biting.

Risk Factors

The main risk factors include:

Presence of pain before treatment

Necrotic pulp

Periapical changes

Repeat endodontic treatment

Poor root canal preparation technique

Individual patient characteristics, including pain threshold and immune status, also play a significant role.

Pain Prediction

Prediction is based on an assessment of the clinical situation before treatment. The most unfavorable prognosis is observed in the presence of severe inflammation.

The use of modern diagnostic methods, including radiographic examination, helps reduce the risk of complications. Prevention of Post-Endodontic Pain

Prevention includes a range of measures aimed at minimizing tissue trauma:

Accurate determination of working length

Use of a rubber dam

Adequate irrigation (sodium hypochlorite)

Delicate instrumentation

Preventing material from extending beyond the apex

Occlusion control

Compliance with aseptic and antiseptic principles is a key factor in successful treatment.

Treatment

Treatment of postendodontic pain

Treatment depends on the severity of symptoms:

Drug therapy:

Nonsteroidal anti-inflammatory drugs (ibuprofen)

Analgesics

In case of complications:

Ensuring drainage

Repeated canal treatment

Prescribing antibiotics (in the presence of systemic symptoms)

It is important to note that unnecessary antibiotic prescription is not recommended.

Conclusions

1. Postendodontic pain is a common complication of root canal treatment.
2. The main cause is an inflammatory reaction of the periapical tissues.
3. Microbial and iatrogenic factors play a key role.
4. Prognosis is possible based on the clinical picture before treatment.

5. Adherence to modern treatment protocols significantly reduces the risk of pain.

6. NSAIDs are the mainstay of treatment, with additional interventions available if necessary.

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