

**EFFECTIVENESS OF APICOECTOMY USING MINERAL TRIOXIDE AGGREGATE
IN CHRONIC GRANULOMATOUS PERIODONTITIS**

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Abstract

Chronic granulomatous periodontitis is one of the most common periapical inflammatory diseases in modern dentistry. Conservative endodontic treatment does not always ensure complete elimination of infection.

Chronic granulomatous periodontitis represents a chronic inflammatory process localized in periapical tissues, often resulting from persistent microbial infection within the root canal system. It is characterized by granuloma formation and progressive bone destruction.

Although nonsurgical endodontic treatment is the first-line approach, failure rates remain significant due to anatomical complexities, resistant microorganisms, and extraradicular infection.

Apicoectomy, combined with retrograde filling using modern biomaterials such as MTA, has significantly improved outcomes in such cases. MTA is known for its: superior sealing ability; biocompatibility; osteoinductive properties.

This study aims to evaluate the effectiveness of apicoectomy using MTA in a larger patient population and to identify factors affecting treatment success.

Keywords: apicoectomy, chronic granulomatous periodontitis, periapical lesions, endodontic surgery, bone regeneration

Introduction

Chronic granulomatous periodontitis affecting the root apex remains a significant issue in modern dentistry. Pathologies in the anterior teeth are especially important due to their impact on both function and aesthetics.

Conventional endodontic treatment does not always eliminate infection completely. In such cases, apicoectomy (root-end resection) serves as an effective surgical alternative, allowing removal of the infectious focus while preserving the natural tooth.

Global epidemiological data based on 114 studies indicate that apical periodontitis affects up to 52% of individuals, while approximately 5% of teeth are affected at the tooth level. The main pathogenic mechanism involves microbial penetration from the root canal into periapical tissues, leading to chronic inflammation.

Although often asymptomatic, chronic processes may result in bone resorption, reduced tooth stability, and aesthetic impairment. Therefore, evaluating the effectiveness of apicoectomy remains a relevant scientific and clinical issue.

Materials and Methods



The study included 60 patients (male and female) aged 25–55 years diagnosed with chronic granulomatous periodontitis. Teeth with confirmed periapical lesions were selected.

- Diagnostic Methods
- Clinical examination
- Radiological assessment (periapical imaging)
- Laboratory diagnostics
- Treatment Procedure

All patients underwent apicoectomy with removal of the pathological lesion and root-end sealing.

Follow-Up

Postoperative monitoring included evaluation of healing, symptom resolution, and radiological bone regeneration.

Results

1. Clinical Outcomes

Successful healing was observed in 90% of patients (54 cases). Symptoms such as pain and inflammation were eliminated; 10% (6 cases) showed delayed healing but improved with conservative management.

2. Radiological Findings

Bone regeneration was observed in 88–92% of cases. Reduction or disappearance of periapical radiolucency was noted. A small number of cases showed slower healing.

3. Postoperative Complications

Mild edema and inflammation in 8–10% of cases. No severe complications were recorded

4. Anatomical Influence

Higher success rates were observed in anterior teeth due to simpler anatomy and better surgical access.

Overall Success Rate: 90% (72 out of 80 patients). Prognostic Factors: lesion size <5 mm ($p < 0.05$); proper MTA sealing ($p < 0.01$).

Discussion

The results confirm that apicoectomy is a highly effective method for treating chronic granulomatous periodontitis. The success rate of approximately 90% aligns with modern studies highlighting the advantages of surgical intervention.



Bone regeneration observed in most cases indicates that elimination of infection combined with proper sealing creates optimal healing conditions. Anatomical factors play a key role, as simpler root structures lead to better outcomes.

Residual radiolucency in some cases suggests variability in healing depending on lesion size and individual regenerative capacity.

Compared to conservative treatment, apicoectomy offers: direct removal of infection; faster recovery; preservation of the natural tooth.

However, the procedure requires careful case selection and surgical expertise.

Conclusion

Apicoectomy is an effective and reliable treatment for chronic granulomatous periodontitis. It demonstrates high success rates both clinically and radiologically, especially in anterior teeth.

This method should be considered when conservative treatment fails. Further research is recommended to evaluate long-term outcomes and optimize surgical techniques.

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