International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 24s, 2025
https://theaspd.com/index.php

Efficacy Of Endodontically Treated Teeth With And Without Periodontal Surgical Intervention: A Clinical Study

Dr. Sananda Chowdhury[1], Dr. Shalini Gupta[2], Dr. Tarun Nagpal[3], Dr. Pallavi Shyam Ghodpage[4], Dr. Amrita[5], Dr. Ankita Devrani[6]

[1]BDS. MDS (Periodontics), Postgraduate: Department of Periodontics. Seema Dental College & Hospital, Rishikesh. Hemwati nandan bahuguna uttarakhand medical education university, Dehradun, India.

[2]BDS. MDS (Periodontics), Professor & Head: Department of Periodontics. Seema Dental College & Hospital, Rishikesh. Hemwati nandan bahuguna uttarakhand medical education university, Dehradun, India.

[3]BDS. MDS (Oral &Maxillofacial surgery), Senior lecturer. Department of Oral &Maxillofacial surgery. Maharana Pratap Dental College & Research Centre, Madhyapradesh medical science university, India.

[4]BDS. MDS (Periodontics) Assistant Professor institution- AIIMS Guwahati, India.

[5]BDS. MDS (Periodontics), Reader, Department of Periodontics, Teerthanker Mahaveer Dental College and Research Centre, Moradabad, UP, India.

[6]BDS. MDS (Periodontics), Reader, Department of Periodontics, Yamuna Institution of Dental Sciences, B.D. Sharma University of Health Science, Rohtak, India.

Abstract:

Objective: *To evaluate whether the addition of periodontal surgical intervention following root canal treatment (RCT) reduces periodontal contamination by endodontic pathogens, as measured by Plaque Index (PI), Gingival Index (GI), Probing Depth (PD), and Clinical Attachment Level (CAL).*

Methods: *Ten teeth in each of two groups (Group A: RCT only; Group B: RCT + periodontal surgery) were enrolled. Clinical parameters—PI, GI, PD, CAL—were recorded at baseline, 1 month, 3 months, and 6 months. Data were analyzed using repeated-measures ANOVA and independent t-tests.*

Results: *Both groups improved over time, but Group B showed significantly greater reduction in PD and gain in CAL at 3- and 6-month follow-ups ($p < 0.05$). No significant between-group differences for PI and GI.*

Conclusion: *Periodontal flap surgery one month post-RCT enhances PD reduction and CAL gain, suggesting improved periodontal healing in endodontically involved teeth.*

Key Words: *Endodontic treatment, Root canal treatment, Combined endo-perio lesions.*

INTRODUCTION:

Dental pulp and periodontium are closely related in health as well as in disease. The pulp originates from the dental papilla and the periodontal ligament derives from dental follicle, only separated by Hertwig's root sheath. As the tooth matures and the root develops, communications are created between them by dentinal tubules, lateral and accessory canals and apical foramina. If an area of infection is formed combining these two compartments, it is called a combined Endo-Perio lesion.[1]

Based on its origin, such a combined infection may be 1) a primary endodontic disease with secondary periodontal involvement, 2) a primary periodontal disease with secondary endodontic involvement or 3) a true combined disease.[2]Periodontal-endodontic lesions often complicate dental treatment due to the dual involvement of pulpal and periodontal tissues.[3]

Root canal therapy (RCT) aims to eliminate endodontic pathogens, yet periodontal contamination may persist. Surgical periodontal intervention might enhance healing by accessing and debriding periodontal defects and eliminating reservoirs of infection.[4]

Objective: To assess whether periodontal flap surgery following RCT results in better clinical periodontal outcomes—specifically lower PI, GI, PD and improved CAL—compared with RCT alone.

MATERIALS AND METHODS:

Study Design & Sample

- **Type**: Prospective, parallel-group clinical study.
- **Sample size**: 10 endodontically treated teeth in Group A (RCT only) and 10 in Group B (RCT followed by periodontal surgery), totaling 20 teeth from suitable patients.

Inclusion Criteria:

1. Age between 16 and 55 years, both genders.
2. Probing depth ≥ 5 mm.
3. Radiographic evidence of alveolar bone destruction with apical or lateral radiolucency.

Exclusion Criteria:

1. Previous root filling; unrestorable tooth.
2. Fractured root or file in canal.
3. Internal or external root resorption.

Treatment Protocol:

- **Group A (RCT only)**:
  - Vitality testing → local anesthesia → access with #8 diamond bur → irrigation with 1:1 sodium hypochlorite → canal negotiation (#10/#15 K-files) → pulp extirpation → working length via RVG → antibiotics and analgesics for 5 days.
  - Visit 2: Biomechanical preparation (BMP) with endo-motor + intermittent saline irrigation; intracanal calcium hydroxide; temporary restoration.
  - Visit 3: Master cone radiograph → drying → obturation → temporary restoration.
- **Group B (RCT + Periodontal Surgery)**:
  - Same RCT protocol as Group A.
  - At 1month, periodontal flap surgery: sulcular incisions, full-thickness flap elevation, debridement, root planing, trimming, suturing with 3-0 silk.

Clinical Parameters and Timing:

- **Baseline**: prior to any treatment.
- **Follow-ups**: 1 month (just prior to surgery for Group B), 3 months, and 6 months post-RCT.
- **Parameters**:
  - **Plaque Index (PI)** – Silness&Löe.
  - **Gingival Index (GI)** – Löe&Silness.
  - **Probing Depth (PD)** – mm.
  - **Clinical Attachment Level (CAL)** – mm.

Statistical Analysis:

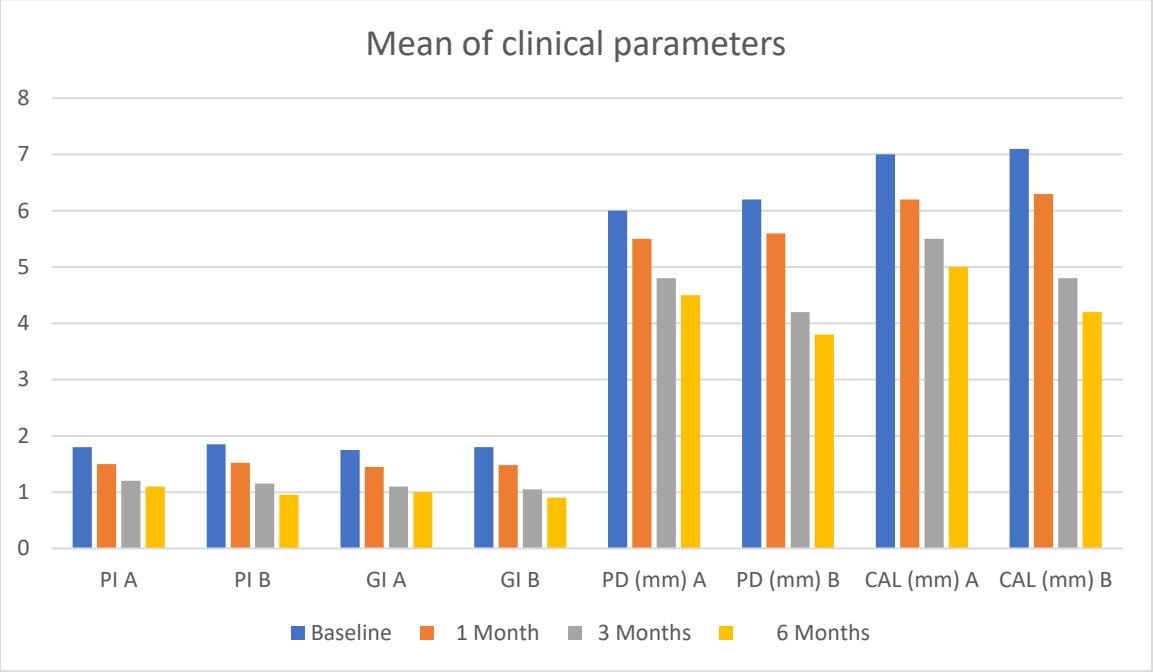
- Data expressed as means ± standard deviation (SD).
- **Within-group analysis**: Repeated-measures ANOVA to test changes over time.
- **Between-group comparisons**: Independent-samples t-tests at each time point.
- Significance threshold: $p < 0.05$.
- Software: SPSS v25 (or equivalent).

RESULTS:

Table 1. Mean ± SD of Clinical Parameters

Parameter	Group	Baseline	1 Month	3 Months	6 Months
PI	A	1.80 ± 0.20	1.50 ± 0.25	1.20 ± 0.30	1.10 ± 0.25
	B	1.85 ± 0.22	1.52 ± 0.28	1.15 ± 0.20	0.95 ± 0.18
GI	A	1.75 ± 0.18	1.45 ± 0.22	1.10 ± 0.25	1.00 ± 0.18
	B	1.80 ± 0.20	1.48 ± 0.24	1.05 ± 0.20	0.90 ± 0.15
PD (mm)	A	6.0 ± 0.5	5.5 ± 0.6	4.8 ± 0.7	4.5 ± 0.6
	B	6.2 ± 0.6	5.6 ± 0.5	4.2 ± 0.5	3.8 ± 0.5
CAL (mm)	A	7.0 ± 0.6	6.2 ± 0.7	5.5 ± 0.8	5.0 ± 0.7

	B	7.1 ± 0.7	6.3 ± 0.6	4.8 ± 0.6	4.2 ± 0.5



Statistical Findings:

- **Within-group (A & B)**: All parameters improved significantly over time ($p < 0.01$ for time effect via repeated-measures ANOVA).
- **Between-group comparisons**:

PI & GI: No significant differences at any time point ($p > 0.05$).**PD**:At 3 months: Group B mean = 4.2 mm vs. Group A = 4.8 mm ($p = 0.03$).At 6 months: B = 3.8 mm vs. A = 4.5 mm ($p = 0.01$).
CAL:At 3 months: B = 4.8 mm vs. A = 5.5 mm ($p = 0.04$).At 6 months: B = 4.2 mm vs. A = 5.0 mm ($p = 0.02$).

DISCUSSION:

This study demonstrates that while both RCT alone (Group A) and RCT plus periodontal surgery (Group B) facilitated periodontal healing over six months, Group B had significantly greater reductions in probing depth and gains in clinical attachment at the 3- and 6-month follow-ups.

- **PI and GI**: Both groups showed improvements, likely due to patient oral hygiene reinforcement; the lack of difference implies that the surgical procedure alone did not influence plaque control or gingival inflammation in a statistically significant way.**Ye Q, et al (2024)**[5]investigated the efficacy and inflammatory responses of treating periodontal-endodontic combined lesions (PECL) with root canal therapy (RCT) Vs RCT combined with periodontal non-surgical treatment (PNST) and concluded that combined RCT and PNST improves clinical efficacy, reduces pain severity and inflammation levels, decreases adverse reactions, and enhances tooth retention in PECL patients.
- **Probing Depth (PD)**: The greater reduction in Group B suggests that flap surgery enabled more thorough debridement of the periodontal defect, facilitating deeper healing and tissue reattachment.**Mediratta S et al (2017)**[6]evaluated and compared 2 treatment approaches for the treatment of primary endodontic lesions with secondary periodontal involvement i.e., root canal treatment (RCT) with RCT and periodontal flap surgery. They concluded that both treatment approaches revealed a significant improvement in the PD reduction and attachment level gain 4 months post operatively. However, test group showed a significant difference in the reduction of PD and gain in attachment level.
- **Clinical Attachment Level (CAL)**: Gains in Group B further support better periodontal regeneration or reattachment when surgical access and root planing are combined with RCT.

Clinical implications: In cases presenting with periodontal involvement adjacent to endodontic lesions, adding periodontal surgery after RCT enhances periodontal healing. This combined approach may reduce future periodontal infection risk originating from endodontic pathogens.

Limitations:

- Small sample size (n = 10 per group) reduces statistical power.
- Short follow-up (6 months); longer-term data would strengthen conclusions.
- No microbiological assessment; hence, pathogen levels were not directly measured.

Future directions:

- Larger randomized controlled trials.
- Microbiological sampling (e.g., bacterial culture or molecular analysis) to corroborate reduction in endodontic pathogens.
- Longer follow-up (12–24 months) to assess stability of periodontal healing.

CONCLUSION:

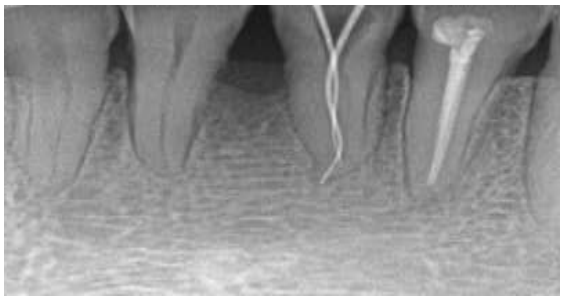
Periodontal flap surgery performed one month after root canal therapy significantly improves probing depth reduction and clinical attachment gain in teeth with endodontic-periodontal lesions compared with RCT alone. This suggests that combining endodontic and periodontal surgical interventions may offer superior clinical outcomes in managing such complex cases.

REFERENCES:

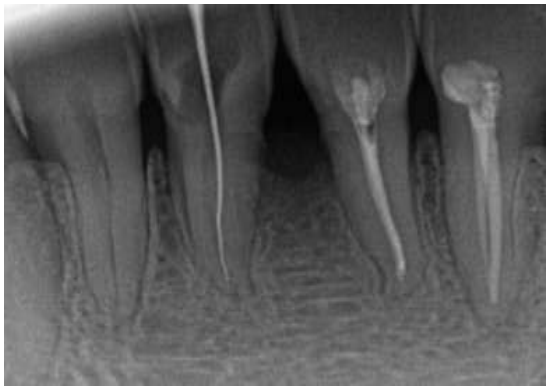
1. Kakehashi S, Stanley HR, Fitzgerald RJ. The effects of surgical exposures of dental pulps in germ-free and conventional laboratory rats. Oral Surg Oral Med Oral Pathol1965;20:340-349.
2. Jansson LE, Ehnevid H, Lindskog SF, Blomlof LB. Radiographic attachment in periodontitis-prone teeth with endodontic infection. J Periodontol1993;64:947-953.
3. JLöe H., Silness**.** Periodontal disease in pregnancy. I. Prevalence and severity. *Acta Odontol Scand.* 1963;21:533–551.
4. Silness J., Löe H**.** Periodontal disease in pregnancy. II. Correlation between oral hygiene and periodontal condition. *Acta Odontol Scand.* 1964;22:121–135.
5. Ye Q, Wei D, Chen Z, Zhang W. Efficacy and inflammatory responses of root canal therapy plus periodontal non-surgical treatment for periodontal-endodontic combined dental lesions. Am J Transl Res 2024;16(8):4190-4199.
6. Mediratta S, Deepa D, Misra S, MedirattaN.Comparative evaluation of root canal treatment alone and in combined with periodontal flap surgery in the treatment of endodontic-periodontal lesions: Randomized control clinical trial. J Interdiscip Dentistry 2017;7:7-14.

PRE-OPERATIVE IMAGE (Fig. 1)

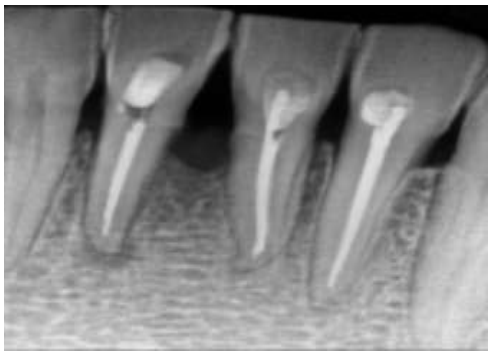
WORKING LENGTH DETERMINATION OF 31 & AFTER OBTURATION OF 32 (Fig.2)



WORKING LENGTH DETERMINATION OF 41 & AFTER OBTURATION OF 31 (Fig. 3)



AFTER OBTURATION OF 41(Fig.4)



AFTER FLAP ELEVATION (Fig. 5)

XENOGRAFT (Fig.6)

SUTURING (Fig.7)

COE-PAK (Fig. 8)