

Original Research

Assessment of maintenance of apical patency in post-endodontic pain

¹Dr. Pauravi Hegde, ²Dr. Nimmy Elsa Samuel, ³Dr. Ajay Babu Gutti, ⁴Dr. Gururaj Gunjalli, ⁵Dr. Rajiv Kumar Yelisela, ⁶Dr. Srinivas Nayak Lavudya

¹Consultant Endodontist, Mumbai, Maharashtra, India;

²Consultant Endodontist, Tumkuru, Bangalore, Karnataka, India;

³III MDS, Department of Conservative Dentistry and Endodontics, IDST Dental College Kadrabad, Modinagar, Uttar Pradesh, India;

⁴Reader, Department of Pedodontics, Surendra Dental College, Ganganagar, Rajasthan, India;

⁵MDS (Conservative Dentistry and Endodontics), DEIC, RBSK, Government Hospital, Eluru, Andhra Pradesh, India;

⁶Postgraduate student, Department of Conservative Dentistry and Endodontics, Meghna Institute of Dental Sciences, Nizambad, Telangana, India

ABSTRACT:

Background: Pulpal remnants and dentinal chips get clogged in the apical region during instrumentation which is responsible for blockage of root canal, mainly in its apical third. The present study was conducted to assess maintenance of apical patency in post-endodontic pain. **Materials & Methods:** Teeth were randomly divided into two groups: group I was patency and group II was non-patency group. These groups were further subdivided into: Subgroup AI: Apical patency was not maintained in vital teeth, Subgroup AII: Apical patency was not maintained in nonvital teeth. Subgroup BI: Apical patency was maintained in vital teeth and Subgroup BII: Apical patency was maintained in nonvital teeth. **Results:** Subgroup AI had no pain in 60%, mild in 30% and moderate in 10%. Subgroup AII had no pain in 70%, mild pain in 22% and moderate pain in 8%. Subgroup BI had no pain in 82%, mild in 13% and moderate in 5%. Subgroup BII had no pain in 76%, mild in 24% and moderate in 10%. **Conclusion:** Apical patency is not associated with increased risk of postoperative pain.

Key words: Apical patency, Pulpal remnants, Pain

Received: 21 July, 2022

Accepted: 24 August, 2022

Corresponding author: Dr. Pauravi Hegde, Consultant Endodontist, Mumbai, Maharashtra, India

This article may be cited as: Hegde P, Samuel NE, Gutti AB, Gunjalli G, Yelisela RK, Lavudya SN. Assessment of maintenance of apical patency in post-endodontic pain. Int J Res Health Allied Sci 2022; 8(4):80-82.

INTRODUCTION

Pulpal remnants and dentinal chips get clogged in the apical region during instrumentation which is responsible for blockage of root canal, mainly in its apical third. This blockage can be prevented if we maintain patency of the canal before and during instrumentation. Apical patency is a technique in which apical portion of the canal is maintained free of debris by passing a small number file through the apical foramen.

Some authors still advocate that it is possible to establish, by tactile sensibility, the CDJ (cementodentinal junction) limit as the ideal point where root canal preparation should end, it has been demonstrated that this procedure leads to several

errors. Different working lengths have been proposed, but the most widely accepted approach seems to be choosing a working length of 1 mm coronal to the root apex. According to these concepts, the cemental canal should not be instrumented.

There are many advantages of maintaining apical patency, i.e., it prevents many accidents (ledges, apical transportation, and apical perforation), maintains the anatomy of apical portion of the canal, minimizes the risk of loss of length, and eases irrigation in the apical third of the canal. Furthermore, there are various reasons why apical patency is not recommended. One such reason is that it leads to the debris extrusion periapically, which further leads to postoperative pain or discomfort. Some authors do not

recommend the patency concept. They think that if patency files (even the smallest one) are passed repeatedly 1 mm beyond the apical foramen, it leads to inflammation of periapical area which further leads to severe postoperative pain. The present study was conducted to assess maintenance of apical patency in post-endodontic pain.

MATERIALS & METHODS

The present study comprised of 40 teeth. Ethical approval was obtained before starting the study. Parameters such as preoperative pain, pulpal status, and group of the teeth (anterior or posterior teeth) was

recorded. Preoperative radiographic examination was performed. Teeth were randomly divided into two groups: group I was patency and group II was non-patency group. These groups were further subdivided into: Subgroup AI: Apical patency was not maintained in vital teeth, Subgroup AII: Apical patency was not maintained in nonvital teeth. Subgroup BI: Apical patency was maintained in vital teeth and Subgroup BII: Apical patency was maintained in nonvital teeth. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of teeth

Groups	Group I (patency) (20)	Group II (non-patency) (20)
Subgroups	Subgroup AI	Subgroup BI
	Subgroup AII	Subgroup BII
Number	10 each	10 each

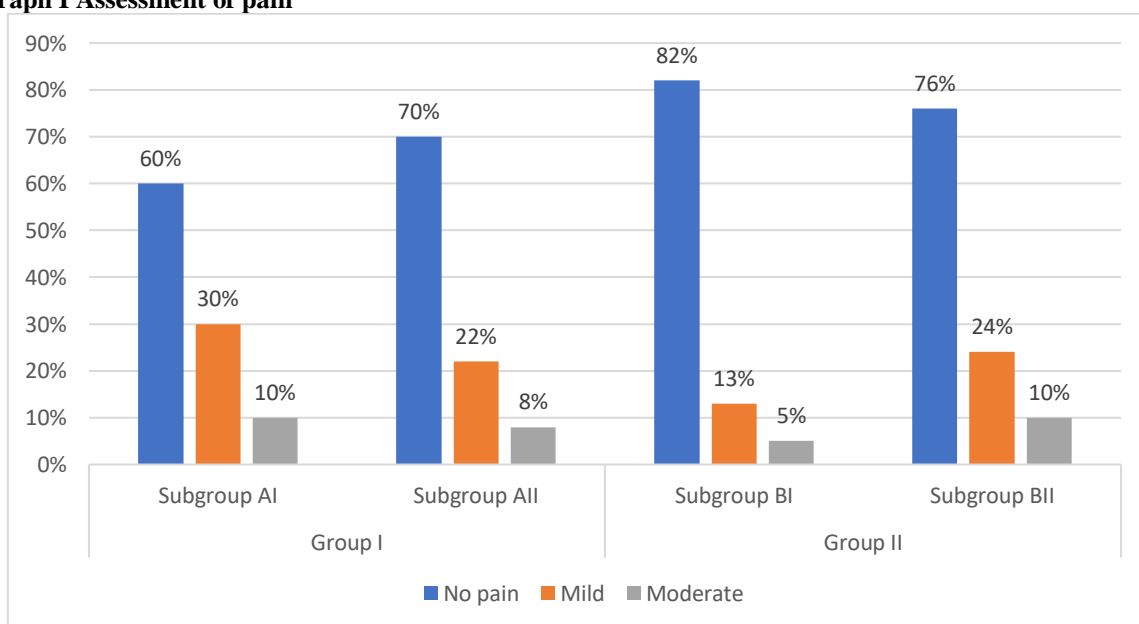
Table I shows distribution of teeth in group I and II.

Table II Assessment of pain

Groups	Group I		Group II	
Subgroup	Subgroup AI	Subgroup AII	Subgroup BI	Subgroup BII
No pain	60%	70%	82%	76%
Mild	30%	22%	13%	24%
Moderate	10%	8%	5%	10%
P value	0.02		0.04	

Table II, graph I shows that subgroup AI had no pain in 60%, mild in 30% and moderate in 10%. Subgroup AII had no pain in 70%, mild pain in 22% and moderate pain in 8%. Subgroup BI had no pain in 82%, mild in 13% and moderate in 5%. Subgroup BII had no pain in 76%, mild in 24% and moderate in 10%. The difference was significant (P< 0.05).

Graph I Assessment of pain



DISCUSSION

The major concern during root canal therapy of teeth with vital pulp has been to preserve the vitality of the pulp stump. For this reason, several authors have

recommended that the working length should be determined 1-2 mm short of the radiographic root apex. In a root canal with pulpal necrosis and periapical lesion, it is known that the cemental canal

is full of bacteria, particularly anaerobic, and apical patency allows maintaining the access to this portion of the canal. Nevertheless, it must be taken into account that the maintenance of apical patency does not clean the foramen; it only avoids apical blockage by entrapment of dentin chips. The apical foramen should be instrumented to be actually cleaned. In other words, a patent foramen is not necessarily clean because apical patency and apical cleaning are two different procedures. The present study was conducted to assess maintenance of apical patency in post-endodontic pain.

We found that subgroup A1 had no pain in 60%, mild in 30% and moderate in 10%. Subgroup AII had no pain in 70%, mild pain in 22% and moderate pain in 8%. Subgroup BI had no pain in 82%, mild in 13% and moderate in 5%. Subgroup BII had no pain in 76%, mild in 24% and moderate in 10%. Garg et al¹¹ compared the incidence of postoperative pain in 80 endodontically treated teeth, with and without apical patency, in relation to some diagnostic factors (vitality, presence of preoperative pain, group of treated teeth). Apical patency was maintained during shaping procedures with a #10 K-file in one group (n = 40) and not in the other (n = 40). Root canal treatment was done in single visit. Pain was recorded 1st day, 2nd day and 7th day using VAS scale. There were no statistically significant differences between patency and non-patency groups regarding incidence and degree of postoperative pain. Only preoperative pain has significant effect on postoperative pain.

Shubham et al¹² compared postoperative pain between apical patency and non-patency groups and evaluated the influence of number of visits, vitality of teeth, group of teeth and preoperative pain on post-operative pain. Preselected (n = 178) patients based on group of teeth and status of pulp were randomly divided into 2 groups, apical patency and non-patency which was further treated in either single or multiple visits. After exclusion, 160 patients were included. Each group (n = 80) was subdivided in single visit (n = 40) and multiple visits (n = 40), including vital (n = 20) and non-vital teeth (n = 20) and single-rooted (n = 10) and multiple-rooted teeth (n = 10). Apical patency was maintained with a size 10 K-file during conventional hand filing step-back shaping procedure. Intensity of pain was recorded before treatment and on days 1, 2, and 7 after treatment using Numerical Rating Scale (NRS-11). The primary outcome of this study showed statistically significant difference in postoperative pain scores between patency and non-patency groups with higher pain scores in patency group on 1st, 2nd and 7th day follow up. The secondary outcome showed postoperative pain in patency-maintained group was influenced by status of the pulp and preoperative pain only. Vital teeth of patency-maintained group treated in multiple visits showed statistically significant (p = 0.02) post-operative pain in day 1 follow up. Pre-operative pain showed

positive correlation with postoperative pain with statistically significant difference.

Holland et al¹³ assessed the periapical healing after maintaining apical patency during instrumentation and found that best results of periapical healing were seen when apical patency was not maintained. The limitation the study is small sample size.

CONCLUSION

Authors found that apical patency is not associated with increased risk of postoperative pain.

REFERENCES

1. Cailleteau JG, Mullaney TP. Prevalence of teaching apical patency and various instrumentation and obturation techniques in United States dental schools. *J Endod* 1997;23:394-396.
2. Negishi J, Kawanami M, Ogami E. Risk analysis of failure of root canal treatment for teeth with inaccessible apical constriction. *J Dent* 2005;33:399-404.
3. Holland R, Sant'anna Júnior A, Souza V, Dezan Junior E, Otoboni Filho JA, Bernabé PFE, Nery MJ, Murata SS. Influence of apical patency and filling material on healing process of dogs' teeth with vital pulp after root canal therapy. *Braz Dent J* 2005;16:9-16.
4. Ricucci D. Apical limit of root canal instrumentation and obturation, part 1. Literature review. *Int Endod J* 1998;31:384-393.
5. Ricucci D, Langeland K. Apical limit of root canal instrumentation and obturation, part 2. A histological study. *Int Endod J* 1998;31:394-409.
6. Schaeffer MA, White RR, Walton RE. Determining the optimal obturation length: a meta-analysis of literature. *J Endod* 2005;31:271-274.
7. Vanni JR, Santos R, Limongi O, Guerisoli DMZ, Capelli A, Pécora JD. Influence of cervical preflaring on determination of apical file size in maxillary molars: SEM analysis. *Braz Dent J* 2005;16:181-186.
8. Baumgartner JC, Falkler WA. Bacteria in the apical 5 mm of infected root canals. *J Endod* 1991;17:380-383.
9. Souza RA. The importance of apical patency and cleaning of the apical foramen on root canal preparation. *Braz Dent J* 2006;17:6-9.
10. Sharaan M, Aboul-Enein NM. Relationship between post-preparation pain and apical patency: A randomized clinical trial. *Gulf Med J* 2012;1:96-101.
11. Garg N, Sharma S, Chhabra A, Dogra A, Bhatia R, Thakur S. Clinical evaluation of maintenance of apical patency in postendodontic pain: An in vivo study. *Endodontology* 2017;29:115-9.
12. Shubham S, Nepal M, Mishra R, Dutta K. Influence of maintaining apical patency in post-endodontic pain. *BMC Oral Health*. 2021 Dec;21(1):1-0.
13. Holland R, Sant'Anna Júnior A, Souza VD, Dezan Junior E, Otoboni Filho JA, Bernabé PF, et al. Influence of apical patency and filling material on healing process of dogs' teeth with vital pulp after root canal therapy. *Braz Dent J* 2005;16:9-16.