

# Original Article

## Surgical and non-surgical intervention for the management of radicular cyst- A comparative study

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### ABSTRACT:

**Background:** Radicular cysts are the most common cystic lesions which affect the jaw. The natural history begins with a non-vital tooth which remains in situ, long enough to develop chronic periapical pathosis. Thus surgical endodontic treatment is indicated in limited number of cases of persistent periradicular pathosis. Selection between alternative treatments should be based on assessment of individual case. **Aim of the study:** To compare surgical and non-surgical intervention for the management of radicular cyst. **Materials and methods:** The present study was conducted in the Department of Dentistry of the Index Medical College, Hospital & Research Centre. The ethical clearance for the study was approved from the ethical committee of the hospital. For the study, we selected a total of 40 cases with progressively increasing huge swelling between the age groups of 18-40 years. The cases were divided equally and grouped into non-surgical and surgical intervention groups, Surgical group (n=20) and Non-surgical Group (n=20). After 6 months, the patients were recalled for the clinical and radiographic evaluation. **Results:** In the present study, we compared surgical and non-surgical management of radicular cyst. A total of 40 patients were selected for the study. We observed that satisfaction level was more seen in patients with surgical management at 1 month and 6 months. It was seen that at baseline, severe pain was most common followed by very severe pain and mild pain. Zero patients had no pain and slight pain. At one month follow-up, no patient had severe pain and very severe pain in both the groups. **Conclusion:** Within the limitations of the present study, it can be concluded that for the treatment of radicular cyst, endodontic surgery has significantly more favorable results as compared to non-surgical management.

**Keywords:** radicular cyst, periapical cyst, surgical management, non-surgical management

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### Introduction:

Radicular cysts are the most common cystic lesions which affect the jaw. They are most common of all the jaw cysts and comprise about 52% to 68% of all the cysts which affect the human jaw.<sup>1, 2</sup> They arise from epithelial remnants which are stimulated to proliferate, by an inflammatory process which originates from pulpal necrosis of a non-vital tooth. The natural history begins with a non-vital tooth which remains in situ, long enough to develop chronic periapical pathosis.<sup>3</sup> They are most commonly found at the apices of the involved teeth. However, they may also be found on the lateral aspects of the roots in relation to lateral accessory root canals.<sup>4</sup> Oztan and Kalaskar et al. have confirmed that large periapical lesions can respond favorably to nonsurgical treatment using calcium hydroxide paste.<sup>5,6</sup> Cohn proposed periapical surgery as a predictable option when root canal treatment is either not possible or fails.<sup>7</sup> Thus surgical endodontic treatment is indicated in limited number of cases of persistent periradicular pathosis. Selection between

alternative treatments should be based on assessment of individual case. Hence, the present study was conducted to compare surgical and non-surgical intervention for the management of radicular cyst.

### Materials and methods:

The present study was conducted in the Department of Dentistry of the Medical institution. The ethical clearance for the study was approved from the ethical committee of the hospital. For the study, we selected a total of 40 cases with progressively increasing huge swelling between the age groups of 18-40 years. Clinical examination and the radiograph were done for the entire patient to confirm the presence of radicular cyst. An informed written consent was obtained from all the patients after explaining them the protocol, advantages and disadvantages of the study. The cases were divided equally and grouped into non-surgical and surgical intervention groups, Surgical group (n=20) and Non-surgical Group (n=20). For non-surgical management, the canal was irrigated with 2.5% sodium

hypochlorite after the caries part was removed. K-file, 30 number instrument introduced beyond the radiographic apex. At this moment, through the root canal, an abundant serum, purulent, and hemorrhagic exudates flowed. The canal was dried with paper points after the exudates stopped. The whole canal in the periapical region was filled with preformed radiopaque calcium hydroxide paste (Metapex) following which a radiograph was done. Using the lateral condensation technique, the root canal was obturated with gutta-percha cones (Dentsply India) and zinc oxide eugenol (Dentsply India) after 1 month then a definitive restoration was placed. After 6 months, the patients were recalled for the clinical and radiographic evaluation. Radiographs were taken at baseline, 1st month, and 6th months to evaluate the periradicular healing. For surgical Management, local anesthesia was given using lignocaine with 2% adrenaline. Following procedures such as opening the access, pulp extirpation, determination of working length, cleaning, and shaping were done. Intracanal medicament calcium hydroxide was given for a week and later obturated. No. 15 BP blade was used in the surgery in the present study to give vertical incision at the mucoperiosteum between root eminences, to remove granulation tissues, irrigation of the surgical site with saline and deep curettage was done, to stabilize the drain on either side, two interrupted sutures were placed. For irrigation with normal saline and to remove sutures, the patient was recalled after 48 hrs. The patient was asked to self-irrigate the lesion with normal saline and needle after removing the cannula. After 1 month, the drain was removed and patients were advised to continue to irrigate the aperture. Radiographs were taken at

baseline, 1st month, and 6th months to evaluate the periradicular healing.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistically significant.

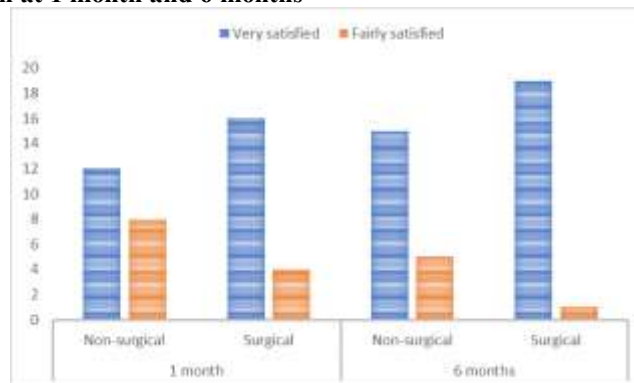
**Results:**

In the present study, we compared surgical and non-surgical management of radicular cyst. A total of 40 patients were selected for the study. Patients were randomly grouped into two groups, surgical group and non-surgical group. Table 1 shows comparison of patient's satisfaction between the groups at 1 month and 6 months. We observed that satisfaction level was more seen in patients with surgical management at 1 month and 6 months. The results on comparison were observed to be statistically non-significant (p>0.05). Table 2 shows comparison of pain level between the groups at different intervals. It was seen that at baseline, severe pain was most common followed by very severe pain and mild pain. Zero patients had no pain and slight pain. At one month follow-up, no patient had severe pain and very severe pain in both the groups. In surgical group, 15 patients had no pain, 4 patients had slight pain and 1 patient had mild pain. In non-surgical group, 8 patients had no pain, 10 patients had slight pain and two patients had mild pain. At 6 month follow up, 18 patients in non-surgical group had no pain and 2 patients had slight pain. In surgical group, 19 patients had no pain and one patient had slight pain. The results were statistically significant at 1 month follow up.

**Table 1: Comparison of patient's satisfaction between the groups at 1 month and 6 months**

Follow up period	Satisfaction grade	Very satisfied	Fairly satisfied	p-value
1 month	Non-surgical (n=20)	12	8	0.23
	Surgical (n=20)	16	4	
6 months	Non-surgical (n=20)	15	5	0.81
	Surgical (n=20)	19	1	

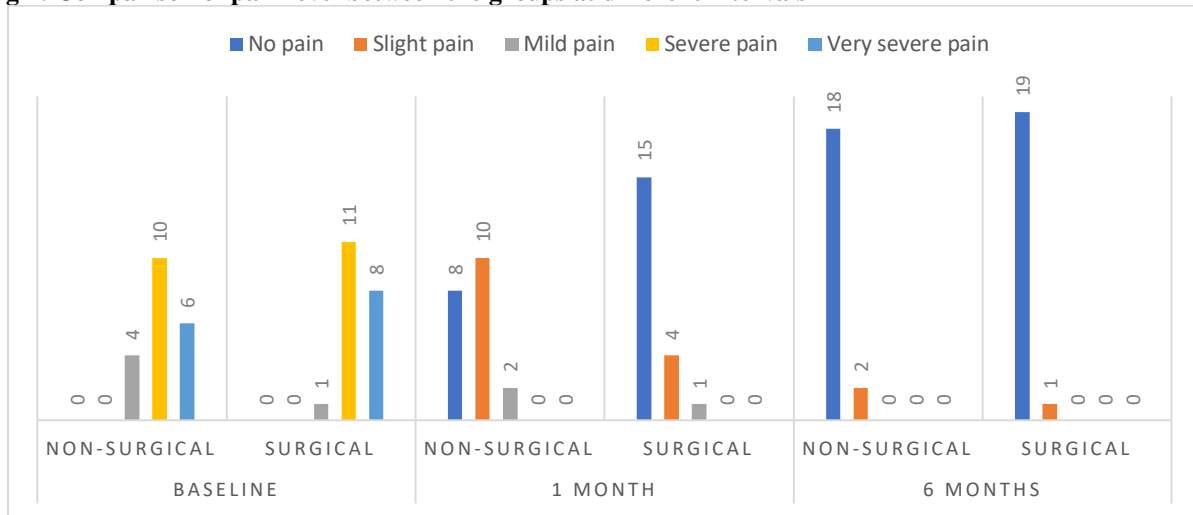
**Fig 1: Patient's satisfaction at 1 month and 6 months**



**Table 2: Comparison of pain level between the groups at different intervals**

Time duration	Groups	No pain	Slight pain	Mild pain	Severe pain	Very severe pain	p-value
Baseline	Non-surgical (n=20)	0	0	4	10	6	0.26
	Surgical (n=20)	0	0	1	11	8	
1 month	Non-surgical (n=20)	8	10	2	0	0	0.002
	Surgical (n=20)	15	4	1	0	0	
6 months	Non-surgical (n=20)	18	2	0	0	0	0.28
	Surgical (n=20)	19	1	0	0	0	

**Fig 2: Comparison of pain level between the groups at different intervals**



**Discussion:**

In the present study, we compared surgical and non-surgical management for radicular cyst. We studied 60 patients. We observed that satisfaction level was more seen in patients with surgical management at 1 month and 6 months. Furthermore, it was observed that at 1 month and 6 months follow-up, the pain satisfaction was more seen in surgical group as compared non-surgical group. The results were statistically significant at 1 month follow up. The results were compared with previous studies and were consistent with the results.

Shah N et al<sup>8</sup> treated endodontically a total of 93 cases comprising 132 teeth with signs and symptoms or radiographic evidence of periapical pathoses and followed up for a period of 2 years. Nonsurgical management was successful in 84.4% of the cases. Histopathologic examination of tissue specimens from cases in which treatment failed revealed that only 35.7% of the cases involved apical cysts, while the remaining 64.3% involved chronic inflammatory tissue. Interestingly, 50% of the failures were observed at or 1 year after completion of treatment, which stresses the need for long-term follow-up of treated endodontic cases. Kocyigit ID et al<sup>9</sup> compared the use of piezosurgery and conventional surgery in radicular cyst enucleation. The study was conducted with 29 patients

who were radiologically and cytologically prediagnosed with radicular cysts in the jaw region. Nineteen patients were treated using piezosurgery, and 10 were treated using conventional surgical procedures. Surgical procedures were evaluated according to the following criteria: hemorrhage, soft-tissue damage, manipulation complexity, major perforation areas on the enucleated cyst tissue, and approximate operation duration. No complications were observed in any of the 20 patients treated using piezosurgery, although the duration of surgery was longer than expected. Of the 10 patients treated using conventional methods, hemorrhaging that affected the operation occurred in 3 cases, perforation of the cyst epithelium and difficulties in enucleation occurred in 5 cases, postoperative hemorrhage occurred in 2 cases, and recurrence was observed in 2 cases.

Varghese LJ et al<sup>10</sup> assessed the surgical and non-surgical intervention for the management of radicular cyst. A total of 28 cases of progressively increasing swelling in the anterior region were included in the study, of which 20 being males and 8 females. At 1st and 6th months, the mean radiographic lesion of non-surgical group was  $1.80 \pm 0.31$  and  $0.67 \pm 0.27$  and surgical group was  $1.55 \pm 0.24$  and  $0.37 \pm 0.29$ . The p values were  $P < 0.027$  and  $P < 0.013$  between two groups which were statistically significant. Satisfaction

level did not show much significance where 11 patients in the surgical group were very satisfied after 1 month and both the groups were very satisfied after 6 months. Torabinejad M et al <sup>11</sup> compared the clinical and radiographic outcomes of nonsurgical retreatment with those of endodontic surgery to determine which modality offers more favorable outcomes. A significantly higher success rate was found for endodontic surgery at 2–4 years compared with nonsurgical retreatment for the same follow-up period. At 4–6 years, however, this relationship was reversed, with nonsurgical retreatment showing a higher success rate of 83.0% compared with 71.8% for endodontic surgery. Insufficient numbers of articles were available to make comparisons after 6 years of follow-up period. Endodontic surgery studies showed a statistically significant decrease in success with each increasing follow-up interval. The weighted success for 2–4 years was 77.8%, which declined at 4–6 years to 71.8% and further declined at 6+ years to 62.9%. Conversely, the nonsurgical retreatment success rates demonstrated a statistically significant increase in weighted success from 2-4 years (70.9%) to 4–6 years. They concluded that endodontic surgery offers more favorable initial success, but nonsurgical retreatment offers a more favorable long-term outcome.

**Conclusion:**

Within the limitations of the present study, it can be concluded that for the treatment of radicular cyst, endodontic surgery has significantly more favorable results as compared to non-surgical management.

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