

Comparison of Clinical Outcome of Periapical Surgery in Endodontic and Oral Surgery Units of a Teaching Dental Hospital

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Outcome of
Periapical
Surgery in
Endodontic
and Oral
Surgery

ABSTRACT

Objective: To compare the outcome and factor affecting the periapical surgery performed in endodontic and in oral surgery units of a teaching dental hospital.

Study Design: Randomized control trial study.

Place and Duration of Study: This study was conducted at the Bibi Aseefa Dental College, Larkana from January 2019 to January 2021 in two year duration.

Materials and Methods: Study was conducted on 120 patients, half of them 60 patients were operated by endodontist and half 60 patients were operated by oral surgeon. Success rate and failure of radiographic and clinical outcomes were main outcomes. SPSS version 23 was used for data analysis. Tests of significance (t-test and chi square test) were applied. P value ≤ 0.05 was considered as significant

Results: Good periapical surgery was noted as 61.5% and 70.2% in successful and unsuccessful patients, respectively. Good coronal seal noted in 84.6% and 87.2% in successful and unsuccessful patients, respectively. Post was observed in 50.0% successful patients. No difference was statistically significant

Conclusion: There is no significant difference regarding radiographic and clinical success and failure between periapical surgery in endodontic and oral surgery units. Quality of filling and filling material are two main contributing factors of periapical surgery.

Key Words: Periapical surgery, Endodontist, oral surgeon, Periapical lesion treatment

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INTRODUCTION

Apical periodontitis (AP) or periapical periodontitis is an inflammatory lesion around the apex of a tooth root usually caused by invasion of microorganisms (Bacteria) in tooth pulp¹. Some dentists thought that periapical disease can be managed with root canal method because of its high success rate about 98%². But in cases in which root canal fails incidence of failure must be kept in mind before start of further management strategy. Causes of failure include resistant intracanal infection, coronal leakage, extra radicular infection, cyst, by residual intracanal infection and foreign body reaction³.

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Sometime lesions present in mandible or maxillary bone or around its several roots which may destroy the support of tooth and cause infection and moderate to severe pain⁴. Size of lesion vary from small (< centimeter) that may be treated with root canal of the tooth by a senior odontostomatologist⁵. In most of cases root canal solve the problem of patients but not all cases. In some cases when root canal doesn't resolve the lesion repeat of root canal is suggested⁶. Periapical surgery will be indicated if second attempt of root canal is failed. These lesions are called granulomas and periapical cysts and its origin it's in a chronic dental infection⁷.

Surgical extraction of tooth root is the main part of periapical surgery which removes the lesion thoroughly⁸. This procedure usually accompanied by preparation of root cutting of tooth or sealing off with special cement or amalgam⁹. If periapical lesion is not removed properly or treated aggressively it can cause multiple infections or increase in lesion size, infection of adjuvant teeth and destruction of bone¹⁰.

Only two options are alternatives if periapical lesion hasn't respond to root canal procedure¹¹. One is periapical surgery and 2nd is exodontias of tooth. Other than periapical surgery exodontias have advantage of early healing and disadvantage of tooth losing which may be restored with prosthetic later on. On other hand

periapical surgery have advantage of tooth keeping and disadvantage of slow and lesser healing rate¹¹.

Conservative treatment always appreciated and regarded as best treatment choice¹². But a case in which further treatment with conservative method is not possible periapical surgery is an ideal alternative treatment¹³. Periapical surgery may be treatment of choice if conservative treatment gives poor outcomes. Success rate of periapical surgery is about 95% that varies case to case and depends upon treatment procedure, case selection, statistical analysis, evaluation period and most likely criteria of success evaluation¹⁴.

Many studies have been conducted to evaluate the effect of different variables on outcomes of periapical surgery and all authors develop consensus that sex, age, tooth type preoperative signs statistically affect the surgical healing after operative procedure and other influencing factors are contradictory¹⁵. It was also reported that presence of periapical radiolucency before surgery affects the surgical outcomes after periapical surgery. Quality and composition of root canal filling is a climacteric factor but some controversial studies also found. Some authors support material in place of amalgam¹⁶.

Oral surgeons and endodontists both perform surgery of periapical region but their clinical skill, approaches, culture, philosophies, training pathway and attitudes are different that may affect outcomes significantly¹.

MATERIALS AND METHODS

Patients who had periapical surgery at Bibi Aseefa Dental College, Larkana were enrolled in study. Study was started after ethical approval from hospital ethical board. Informed written consent was obtained from patients and they were ensured about their confidentiality. Non probability consecutive sampling technique was used.

A total of 120 patients was included in study and divided into two groups (Group A and B) 60 patients in each group. Patients in group A were operated by endodontist and in group B were operated by oral surgeon. All types of tooth were included. All patients were assessed in endodontic unit before periapical surgery. Prerequisite of surgery were coronal restoration and satisfactory root filling. High speed hand pieces, ultrasonic retro tips amalgam was used in all cases. During surgical procedure radiographs were taken to check the status and placement of material in periradicular tissues. Postoperative analgesics, antibiotics and mouthwash were advised. After one week sutures were removed and patients were followed up till 2 years biannually.

Treatment protocol in oral surgery department was not different but Operative procedure was done by using slow speed hand piece, tungsten carbide burs and amalgam was used. Intraoperative radiographs and post-operative analgesics, antibiotics and mouth wash

were advised. Sutures removed after 14 days. Two years follow up was completed.

Outcomes measures were assessed radiographically and clinically and recorded on a predesigned performa. Data analysis was done by using SPSS version 23, mean and SD were calculated and presented for numerical data and frequency percentages were calculated for categorical data. Test of significance (t-test and chi square test) were applied. P value less than or equal to 0.05 was taken as significance.

RESULTS

One hundred and twenty patients were included in this study, both genders in which n=26 (21.7%) patients were successful and n=94 (78.3%) patients were unsuccessful. The mean age of successful patients was 46.26±8.39 years. There were n=11 (42.3%) males and n=15 (57.7%) females. Incisors/canines, premolars and molars was observed in n=9 (34.6%), n=8 (30.8%) and n=9 (34.6%) successful patients, respectively. While, the mean age of unsuccessful patients was 44.82±7.63 years. There were n=53 (56.4%) males and n=41 (43.6%) females. Incisors/canines, premolars and molars was observed in n=53 (56.4%), n=25 (26.6%) and n=16 (17.0%) patients, respectively. No difference was statistically significant. (Table. I).

Table. No.1: Demographic characteristics of successful and unsuccessful patients

| Variable | Successful n=26 (21.7%) | Unsuccessful n=94 (78.3%) | P- value |
|----------------------|-------------------------------|------------------------------|-------------|
| Age (years) | 46.26±8.39 | 44.82±7.63 | 0.403 |
| Gender | | | |
| Male | n=11 (42.3%) | n=53 (56.4%) | 0.203 |
| Female | n=15 (57.7%) | n=41 (43.6%) | |
| Incisors/ canines | n=9 (34.6%) | n=53 (56.4%) | 0.081 |
| Premolars | n=8 (30.8%) | n=25 (26.6%) | |
| Molars | n=9 (34.6%) | n=16 (17.0%) | |

Preoperative pain, sinus and root filling were noted in n=7 (26.9%), n=17 (65.4%) and n=20 (76.9%) successful patients, respectively. Good root filling density and preoperative nonsurgical retreatment was noted in n=16 (61.5%) and n=20 (76.9%) successful patients, respectively. While, preoperative pain, preoperative sinus and preoperative root filling were noted in n=40 (42.6%), n=37 (39.4%) and n=66 (70.2%) unsuccessful patients, respectively. Good root filling density and preoperative nonsurgical retreatment was noted in n=53 (56.4%) and n=35 (37.2%) unsuccessful patients, respectively. Preoperative periapical lesion in successful and unsuccessful patients

was observed as n=23 (88.5%) and n=77 (81.9%), respectively. No difference was statistically significant. (Table. 2).

Table No.2: Frequency of successful outcomes

| Variable | Successful n=26 (21.7%) | Unsuccessful n=94 (78.3%) | P- value |
|--|-------------------------------|------------------------------|-------------|
| Preoperative pain | n=7 (26.9%) | n=40 (42.6%) | 0.148 |
| Preoperative sinus | n=17 (65.4%) | n=37 (39.4%) | 0.018 |
| Preoperative root filling | n=20 (76.9%) | n=66 (70.2%) | 0.502 |
| Good root filling density | n=16 (61.5%) | n=53 (56.4%) | 0.638 |
| Preoperative non-surgical re-treatment | n=20 (76.9%) | n=35 (37.2%) | 0.638 |
| Preoperative periapical lesion | n=23 (88.5%) | n=77 (81.9%) | 0.428 |

Table No.3: Frequency of successful outcomes

| Variable | Successful n=26 (21.7%) | Unsuccessful n=94 (78.3%) | P- value |
|------------------------------|-------------------------------|------------------------------|-------------|
| Previous surgery | n=4 (15.4%) | n=25 (26.6%) | 0.237 |
| Root-end resection | n=23 (88.5%) | n=83 (88.3%) | 0.982 |
| Ultrasonic retro-preparation | n=1 (3.8%) | n=15 (16.0%) | 0.108 |
| Root-end filling | n=18 (69.2%) | n=76 (80.9%) | 0.203 |
| Amalgam | n=21 (80.8%) | n=84 (89.4%) | 0.456 |
| Good periapical surgery | n=16 (61.5%) | n=66 (70.2%) | 0.400 |
| Good coronal seal | n=22 (84.6%) | n=82 (87.2%) | 0.728 |
| Post | n=13 (50.0%) | n=52 (55.3%) | 0.630 |

Previous surgery, root-end resection and ultrasonic retro-preparation and root-end filling in successful patients were observed as n=4 (15.4%), n=23 (88.5%), n=1 (3.8%) and n=18 (69.2%) respectively. While, previous surgery, root-end resection and ultrasonic retro-preparation and root-end filling in unsuccessful patients were observed as n=25 (26.6%), n=83 (88.3%), n=15 (16.0%) and n=76 (80.9%) respectively. Amalgam was noted as n=21 (80.8%) and n=84 (89.4%) in successful and unsuccessful patients, respectively. Good periapical surgery was noted as n=16 (61.5%) and n=66 (70.2%)

in successful and unsuccessful patients, respectively. Good coronal seal noted in n=22 (84.6%) and n=82 (87.2%) in successful and unsuccessful patients, respectively. Post was observed in n=13 (50.0%) successful patients. No difference was statistically significant. (Table. 3).

Table No.4: Treatment outcome by clinical and radiographic criteria

| Variable | Endodontic Unit n=58 (21.7%) | Oral Surgery Unit n=62 (51.7%) | P- value |
|------------------------|------------------------------------|--|-------------|
| Clinical success | n=42 (72.4%) | n=40 (64.5%) | 0.353 |
| Radiographic success | n=21 (36.2%) | n=16 (25.8%) | 0.218 |
| Radiographic uncertain | n=24 (41.4%) | n=33 (53.2%) | 0.194 |
| Radiographic failure | n=14 (24.1%) | n=9 (14.5%) | 0.181 |
| Combined success | n=25 (43.1%) | n=33 (53.2%) | 0.267 |
| Combined uncertain | n=14 (24.1%) | n=12 (20.7%) | 0.525 |
| Combined failure | n=12 (20.7%) | n=32 (51.6%) | 0.000 |

DISCUSSION

Periapical surgery for endodontic treatment failure has good outcomes but lack of standardization makes it contradictory. Assessment method, recall period, statistical analysis and comparison of method are contributing methods¹⁷. A study was conducted by Hepworth et al and reported that success rate of 59% after surgery in orthodontic and failure rate was 19% after apical surgery. Outcome measures were assessed by radiographic and clinical method¹⁸.

In our study we used both radiographic and clinical assessment for evaluation of outcomes but in previous studies some authors assessed only radiographic method and some used only clinical assessment. Evaluation of periapical outcomes by only radiographic method is problematic and considered as questionable¹⁹. A study was conducted by Rudet al²⁰ on comparison of conservative re-treatment and periapical surgery and concluded that periapical surgery only useful in cases of conservative failure.

Another study was conducted by Rahbaranet al²¹ in 2001 and reported that outcomes of periapical surgery were dependent on quality of surgery and presence of lesion. Complete healing in this study was 37.45 in endodontic unit and 19.4% in oral surgery unit. Correct placement of filling materials in periapical tissue is also necessary and contributing factor in success rate of surgery²².

Periapical radiolucency is also an important contributing factor on results of surgical outcomes but in contrast Lustmann et al²³ concluded no significant effect on outcomes. Similar findings were reported by Hirsch et al²⁴ that surgical outcomes of periapical surgery may be affected by radiolucency of periapical region. In our study we didn't find any observation of such type.

In our patients we used amalgam as filling material in both groups as many authors demonstrated that composition of filling material influence the outcomes and contribute in success rate and failure²⁵. But this statement is contradictory as some investigators give favor to material other than amalgam. Rapp et al conducted a study and reported that amalgam have equally good results²⁶.

A study was conducted by Elemam et al on comparison of success rate of endodontic treatment and concluded that further research with improved study design are required to compare long term outcomes and success rate²⁷. Results of this study are valid and identical to number of previous researches.

CONCLUSION

There is no significant difference regarding radiographic and clinical success and failure between periapical surgery in endodontic and oral surgery units. Quality of filling and filling material are two main contributing factors of periapical surgery.

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