

SUCCESS OF DENTAL AMALGAM AS A RETROGRADE FILLING MATERIAL — A COMPARATIVE OBSERVATIONAL STUDY

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ABSTRACT

The objective of the present study was to evaluate the efficiency of dental amalgam as retrograde filling material compared to gutta-percha. A prospective and comparative observational study was carried out on 30 patients at Khyber College of Dentistry, Peshawar from October 2004 to October 2009 with or without retrograde amalgam filling and the success was determined at the end of the year both radio-graphically and clinically. The radio graphic success rate was 86.6% and the clinical success rate was 73.3% where amalgam was used as retrograde filling material.

Key words: Apicoectomy, Dental Amalgam, Gutta-percha, Retrograde Filling.

INTRODUCTION

Apicoectomy or apical root resection with retrograde filling is a standard surgical treatment to salvage the periapically infected teeth in which root canal therapy has failed to resolve the problem. The properly obturated root canal treated teeth mostly suffice but in some instances periapical infection persists in chronic form with intermittent acute flare ups. These failures are mostly designated to the presence of accessory canals in the periapical delta and constant release of bacterial by products and their toxins from the necrotic pulp.^{1,2} With the advancement in surgical techniques, apical resection procedure is now standardized and is the last resort to salvage such teeth.^{1,2,3}

Since long different retrograde filling materials are in use to provide apical seal including amalgam, gutta-percha, ZnO cement, gold foil pellets, bio-bond glass-ionomer, Ketac-silver, EBA cement and MTA.⁴ The search for an ideal retrograde filling material is still going on but the newer materials introduced are controversial as most of the claims are from in vitro or animal studies.

The dental amalgam is the most commonly used retro grade filling material, as it is easy to manipulate,

seals cut apical orifice with acceptability due to slight expansion on complete setting, though it has few disadvantages of amalgam “cloud”, reaction of mercury to tissues and corrosion. Different types of dental amalgams (including Zn free or high Copper amalgams) are available but vary in their properties regarding corrosion and cytotoxicity.⁵

The Gutta-percha is malleable to a certain degree and thus adaptable to irregular cavity walls. It is inert, inexpensive and does not corrode but heat sealed gutta-percha has shown significant marginal defects, pull-away, and is heat blistering.⁶

METHODOLOGY

A prospective and comparative observational study was carried out from October 2004 to October 2009 at Khyber College of Dentistry, Peshawar with recruitment of 30 patients in whom apicoectomy was done on single maxillary anterior tooth which were previously treated endodontically but had persistent periapical radiolucency with discomfort, pain or chronic sinus formation. A strict inclusion criterion was used, where periapical radiolucency was within the limits of 5mm involving only apical one third of root and intact labial cortical plate (confirmed clinically). The apicoectomy was done using standard technique and either reverse

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filling was placed with amalgam or only remaining orthograde gutta-percha was hot burnished. The dental amalgam used was high copper dispersion alloy, encapsulated and mechanically mixed as per requirement. Preoperative radiographs were taken using parallel technique. Angle and position of X-ray tube was noted in patients record and same technique was used in follow-ups. The patients were divided into two groups i.e. with or without amalgam retrograde filling. Evaluated both clinically and radio-graphically after one month, three months and at the end of the year.

The success was determined at the end of the year both radio-graphically and clinically. Absence of symptoms and decreasing or complete resolution (complete healing) of periapical radiolucency was considered as successful. More over symptom less stationary radiolucency was also considered as successful and were placed for further follow-up.

RESULTS

The females out numbered the males (Fig 1). The age range of the patients was from 10 to 40 years with

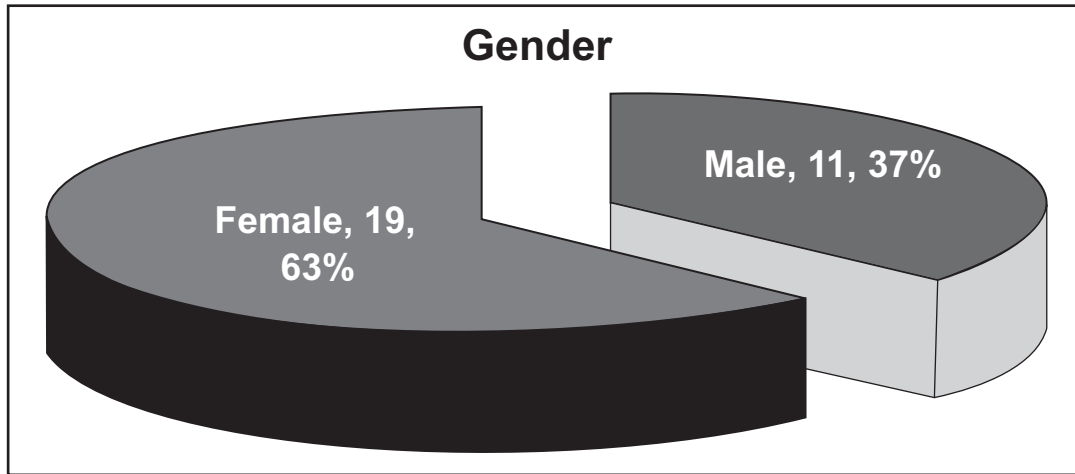


Fig 1: Gender of patients

TABLE 1: RADIOGRAPHIC EVALUATION AFTER 12 MONTHS

| Groups | Radiolucency (Increasing) | Radiolucency (Decreasing/ Complete resolution) | Radiolucency (Stationary) | Total | Success (Complete resolution/ Decreasing/ Stationary Radiolucency) | Percentage |
|------------------------------------------------|---------------------------|------------------------------------------------|---------------------------|-------|--------------------------------------------------------------------|------------|
| Group I (Amalgam Retro filled) | 2 | 9 | 4 | 15 | 13 | 86.6% |
| Group 2 (Gutta-percha hot burnished) | 13 | 1 | 1 | 15 | 2 | 13.3% |

TABLE 2: CLINICAL EVALUATION AFTER 12 MONTHS

| Groups | Discomfort | Pain | Mobility | Sinus formation | Probing defect | Success (No Symptoms) | Total | Percentage |
|------------------------------------------------|------------|------|----------|-----------------|----------------|-----------------------|-------|------------|
| Group I (Amalgam Retro filled) | 1 | 1 | 1 | 1 | 0 | 11 | 15 | 73.3% |
| Group 2 (Gutta-percha hot burnished) | 3 | 4 | 3 | 2 | 1 | 2 | 15 | 13.3% |

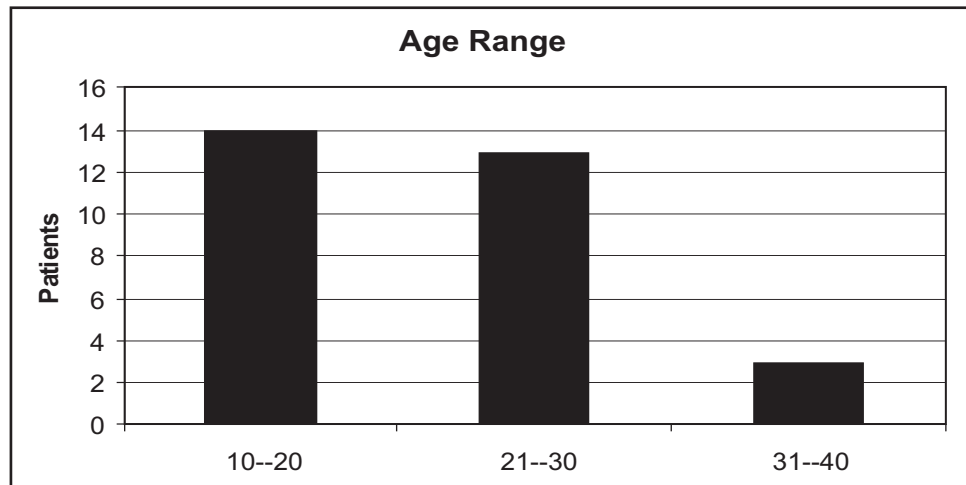


Fig 2: Age range of patients

the majority of patients in the age range of 10 to 20 years (Fig 2).

The radiographic success rate was 86.6% in patients where amalgam retrograde filling was used after apicoectomy (Table 1).

The clinical success rate was 73.3% in patients where amalgam retrograde filling was used after apicoectomy (Table 2).

DISCUSSION

After apicoectomy those materials should be chosen for retrograde filling, which have been biologically, clinically evaluated and have evidence of long term success. The retrograde filling materials should provide a hermetic seal, should be non-toxic, non-carcinogenic, biocompatible and dimensionally stable. On review of literature, it appears that the existing retrograde filling materials till date do not have the ideal characteristics and different materials have been shown to be superior to others. More over a detailed review^{4,7} have revealed that no materials have been proved superior or equivalent to amalgam and are supported only with case reports in vitro studies. There is no strong clinical evidence to recommend alternate retrograde materials to amalgam but further research with controlled trials or clinical studies is required to propose an alternate retro-filling material to amalgam.⁸

The present study proved that the amalgam is superior to gutta-percha in sealing the periapical orifice after apicoectomy with a success rate of 86.6%. This is consistent with the studies of Niederman⁴ and Jesslen.⁸ The high success of amalgam in the present study reflects that amalgam is still the material of

choice as retrograde filling material and a move to the other materials require long term clinical trials; as most of the claims for high success of other materials are only in vitro studies, except few clinical studies. Moreover, amalgam is cost effective, least technique sensitivity, time tested and possess few disadvantages. The hot burnished gutta-percha showed least success in the present study which is consistent with the result of Woo⁶ in vitro study. The study also suggests that periapical orifice after apicoectomy should always be retro-filled with a suitable dental material like amalgam.

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