

Success of pulp capping in maxillary molars in adult patients- a retrospective study in an institutional setup.

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Abstract

Aim: of this retrospective study was to evaluate the success rate of pulp-capping in maxillary molars in adult patients.

Materials and Methods: Over a period of two years a total of 207 adult patients underwent pulp capping in the maxillary molars. Data was collected from dental college patient management software, it was tabulated in excel and then imported to SPSS software for statistical analysis and chi-square test was done to check for statistical significance.

Results: It was that there was a statistically significant association between success of pulp capping and age (p value=0.000) and the tooth number (p value=0.003). There was no significant association between gender and success rate of pulp capping (p value=0.683) and also no significant association was found between the type of pulp capping and the success rate (p value=0.655).

Conclusion: Patients with <45 yrs showed successful results for pulp capping procedures. Permanent molars showed promising results for both the pulp capping techniques (Direct and indirect pulp capping) in both the genders.

Keywords: Adult patients, Direct Pulp capping, Indirect Pulp capping, Molars, Permanent teeth.

Introduction

Pulp capping is a procedure in which a medicament, dressing, or dental material is placed directly over exposed dental pulp (direct pulp capping) or over very thin remaining dentin (indirect pulp capping) to preserve its vitality [1]. Treatment options in this situation include direct pulp capping, pulpotomy, or pulpectomy [2]. conventionally direct pulp capping therapies were performed on young permanent teeth with pulp exposures. Many pulp capping materials have been used [3]. Removal of caries is one of the most basic aspects of conservative dentistry. Leave the remaining caries in place and return the tooth with a cavity sealer or liner and restore it, it is called an indirect pulp cap [4]. The main aim of pulp capping is to induce reparative tertiary dentin formation by pulp cells [5]. For many years, calcium hydroxide was the material of choice among the various available pulp-capping agents. Although calcium hydroxide has been the material of choice for many years, it presents some disadvantages, poor bonding to dentin, dissolution over time, and tunnel defects in the newly formed dentin bridges and poor sealing [6,7]. An alternative gold standard, mineral trioxide aggregate (MTA), is available as a direct pulp-capping material [8]. Other pulp capping agents such as biodentine are also widely used nowadays. In this retrospective study which is done in an institutional setup we will see the success of pulp capping

in maxillary molars in adult patients. Our team has extensive knowledge and research experience that has translate into high quality publications [9-28].

Materials and Methods

The present study is a retrospective study, which was conducted in a university set up. The advantages for undertaking a study in a university setting are easy retrieval of records; the available data is from the same ethnicity of people. The disadvantages being the study are limited to one geographical location, limited population, same ethnicity. The university ethical committee approval was taken. The present study is a retrospective cross sectional study; the sampling is done between March 2020 to August 2021. 2166 cases were reviewed in this study in the above time span. Data of 207 patients was collected and analysed, all data of the adult patients who have undergone pulp capping in maxillary molars have been tabulated in a chronological order, data from excel was imported to SPSS software by IBM for statistical analysis, the variables was defined in SPSS.

The statistical test employed was the chi-square test. Independent variables being age group, sex and socio economic status. Dependent variables being type of pulp capping agents, success of pulp capping or not. The type of analysis done is correlation and association by descriptive data analysis.

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Results

In this retrospective study, we found that there is no significant statistical association between success of pulp capping and gender, type of pulp capping and tooth number. there was a statistically significant association between success of pulp

capping and age (p value=0.000) (Figure 1) There was no significant association between gender and success rate of pulp capping (p value=0.683) (Figure 2), and the tooth number (p value=0.003) (Figure 3), and also no significant association was found between the type of pulp capping and the success rate (p value=0.655) (Figure 4) respectively.

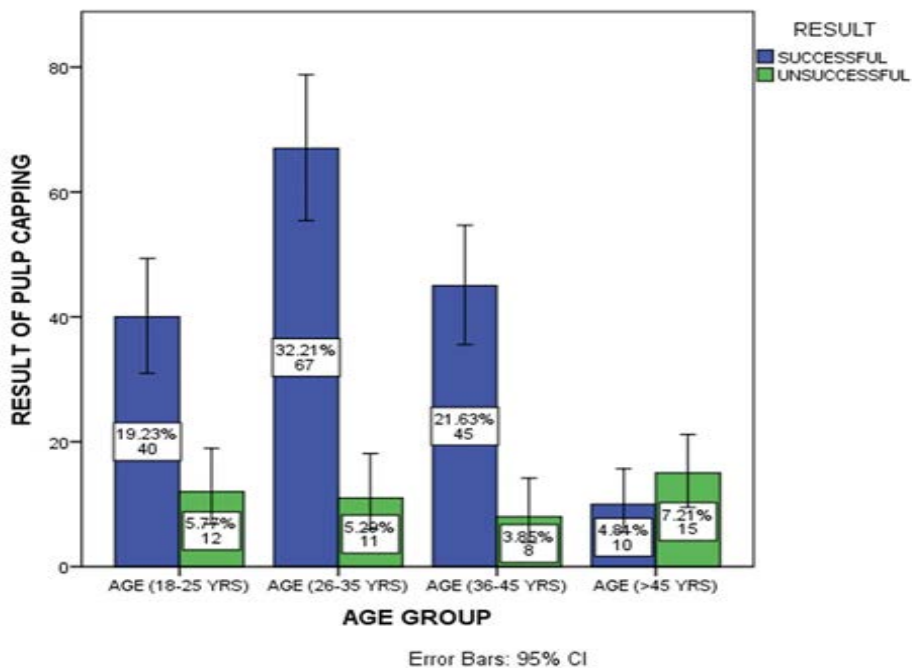


Figure 1. Bar graph represents the association between the age and the success of pulp capping. X-axis represents the age group of the patients and Y-axis represents whether pulp capping were successful or not where blue colour denotes successful and green colour denotes unsuccessful. Chi-square test was done and association was found to be statistically significant (p value=0.000), as the age increases (>45), the success of pulp capping becomes questionable and successful pulp capping is seen <45 yrs of age.

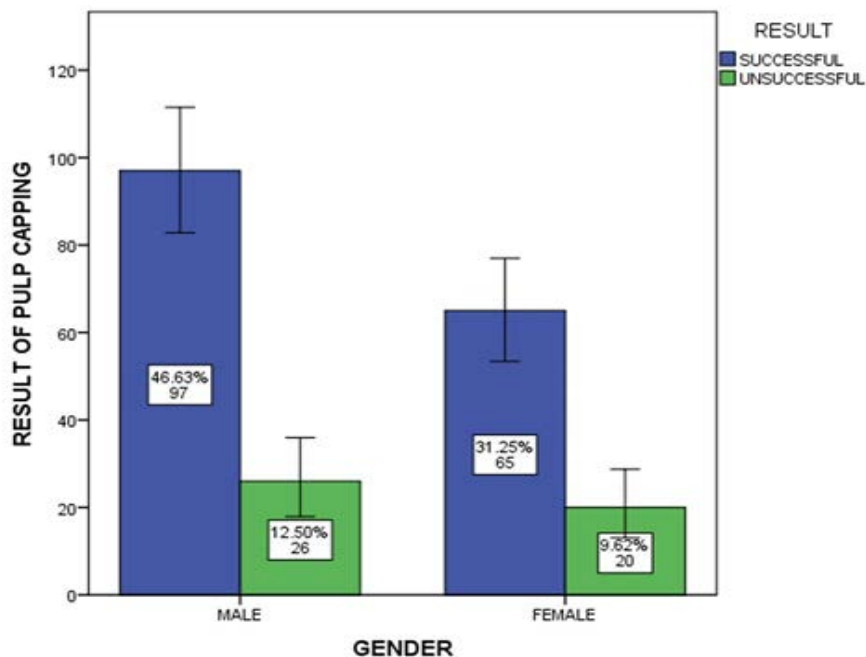


Figure 2. Bar graph represents the association between the gender and the success of pulp capping. X-axis represents the gender of the patients and Y-axis represents whether pulp capping were successful or not where blue colour denotes successful and green colour denotes unsuccessful. Chi-square test was done and association was found to be statistically not significant (p value=0.683), proving that both the gender showed promising results for pulp capping procedures.

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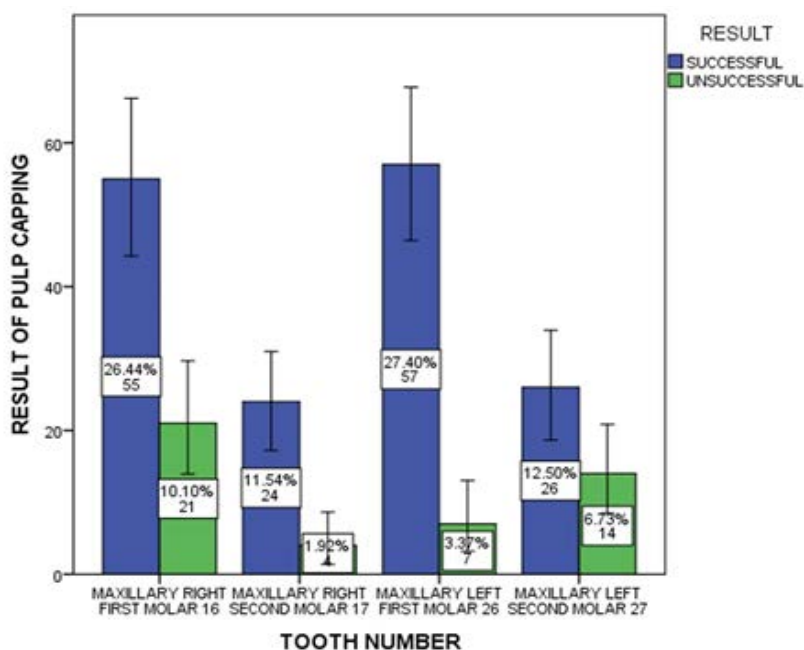


Figure 3. Bar graph represents the association between tooth and the success of pulp capping. X-axis represents the tooth number and Y-axis represents whether pulp capping were successful or not where blue colour denotes successful and green colour denotes unsuccessful. Chi-square test was done and association was found to be statistically significant (p value=0.003), Permanent Molars showed more successful results for pulp capping.

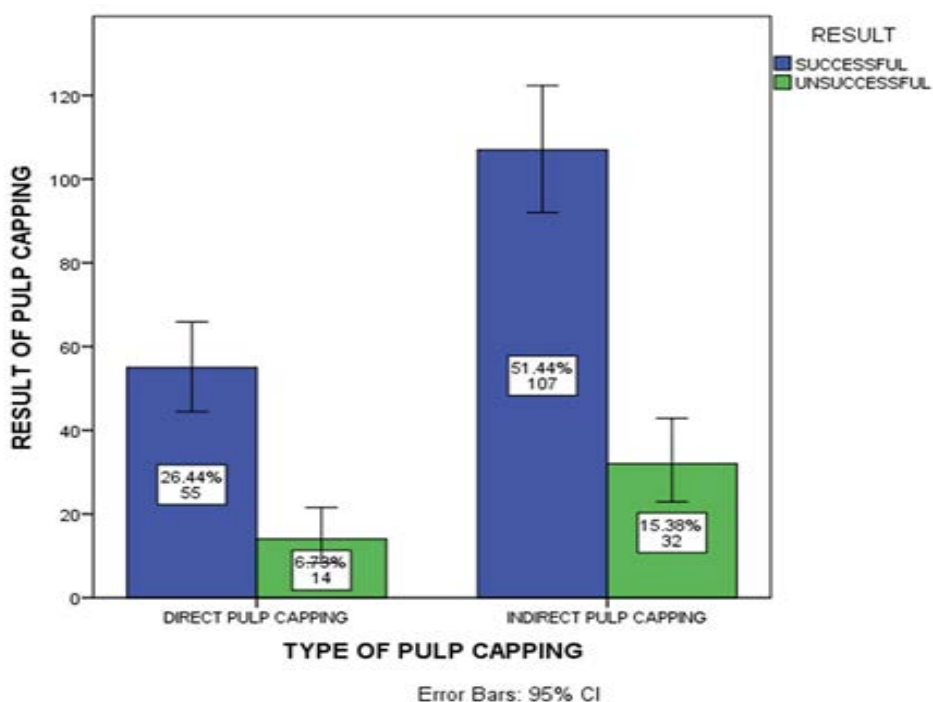


Figure 4. Bar graph represents the association between the type of pulp capping and the success of pulp capping. X-axis represents the type of pulp capping, i.e.; direct or indirect and Y-axis represents whether pulp capping were successful or not where blue colour denotes successful and green colour denotes unsuccessful. Chi-square test was done and association was found to be statistically not significant (p value=0.655), proving that both the pulp capping techniques showed better success rates.

Discussion

Indeed, the success rate of pulp capping as documented in the literature has varied between the short-term and long-term follow-up. When iatrogenic pulpal exposures occurred while caries removal, in most situations, the recommendation was to perform pulpotomy and pulpectomies. There was a significant

statistical association between success of pulp capping and age (Figure 1). This finding is in accordance with [29], who reported that age had significant effects on the success rate of pulp capping. Dammaschke et al. [30, 31] reported significantly lower favorable treatment outcomes for direct pulp capping in the more than 60 years old patients, compared to patients

younger than 40 years old. Another study, [32] found significant differences between the youngest patients (i.e., 10–29 years) and the oldest patients (i.e., 50–79 years). In another study reported by Armstrong and Hoffman [33, 34], the lack of clinical symptomatology after 1.5 years was the criterion for success of the pulp capping. Some studies have shown that younger patients experienced better success with pulp capping [30,31], whereas some studies could not confirm the influence of age on the outcome of direct pulp capping [34–37]. Treatment of pulp exposures by pulp capping still is controversial. Clinicians are well-aware of the immediate and long-term success rates of endodontic therapy but are less certain of the success of pulp capping [38]. Berman [39] stated that pulp capping is the most misused, abused, unpredictable and least successful of the pulp therapy alternatives, with success rates of only 30 to 40 percent. Kakehashi and colleagues [40] showed clearly that exposed pulp heals well in the absence of bacteria, with dentin bridge formation occurring. This difference in result may be because of the different age groups which were analyzed in those studies. Another study also reported that compared with 60-year-old patients, patients younger than 40 years of age had significantly better outcomes [30]. However, some studies could not confirm an influence of age on the success or failure of pulp-capped teeth [36, 41]. The higher success rate for patients younger than 45 years can be explained by the high healing capacity of pulp tissue in young patients. Indirect comparison of the weighted pooled success rate in teeth with an open apex (i.e. higher healing capacity of the pulp tissue) or closed apex showed statistically more successful outcomes in teeth with incomplete root development [42]. However, further clinical studies with a higher number of patients are needed to re-evaluate the age-related influence on treatment outcome after pulp capping with Biodentine.

Conclusion

Within the limitations of the study, we can conclude that patients with <45 yrs showed successful results for pulp capping procedures. Permanent molars showed promising results for both the pulp capping techniques (Direct and indirect pulp capping) in both the genders. As a result one can preserve the tooth by doing pulp capping procedures.

Conflict of Interest

None to declare.

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