

OCCURRENCE RATE OF DIFFERENT KIND OF PERFORATION IN POSTERIOR TOOTH

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Abstract

Perforation is an artificial communication between the root canal system and supporting tissues of the teeth. Root perforation complicates the treatment and deprives the prognosis if not properly managed. Classification of root perforations, proposed by Fuss & Trope Coronal perforation–coronal to the level of crestal bone and epithelial attachment with minimal damage to the supporting tissues and easy access, Good Prognosis. Crestal perforation–at the level of the epithelial attachment into the crestal bone, Questionable Prognosis. Apical perforation–apical to the crestal bone and the epithelial attachment, Good Prognosis. The study was conducted in a university setting, by reviewing data of patients who visited college for root canal treatment who were advised to have perforation repair treatment. The most common type of root perforation was the crown perforation followed by furcal perforation which was followed by root perforation. Perforation repair is a frustrating problem to the dentist. So the idea regarding its restorability is essential which includes knowledge of site, size, time of perforation and various materials used.

Keywords: endodontic failure, perforation repair, furcal perforation, apical perforation, root perforation.

Introduction

A root perforation is any pathological communication between the root canal system and the surrounding periodontium (1) . Perforations can be a result of internal or external root resorption, invasive dental caries or an iatrogenic accident occurring during a root canal treatment or post space preparation (2) . Perforations negatively affect the prognosis of root canal-treated teeth (3) . It is estimated that up to 10% of root canal treatment failures are caused by perforations, which are the second most common cause of failure associated with endodontic

treatment (4,5). When bacterial infection and/or irritative restorative material are compounded on top of a traumatic perforation, healing does not occur (6). Once an infectious process has begun at a perforation site that may have gone undetected, the prognosis for treatment is precarious and complications may be severe enough to result in an extraction (7). Strip and apical perforations can be especially difficult to manage as gaining access to the perforation site could pose a significant risk of collateral damage or treatment failure, and retreatment may not be an option (8). According to Farzaneh et al. (9), there was a significantly increased risk of disease in patients requiring retreatment, who also presented with preoperative perforation. Preoperative perforations were also found to be significant predictors of 4- to 6-year retreatment outcomes ($P < 0.05$)(10). Additionally, the observed healing rate in teeth with a perforation was significantly lower (by 31%) than in teeth without a perforation, emphasizing that perforations should be avoided in the first place. Cases referred to endodontic specialists have become more challenging as a result of the increased numbers of dentists with varying skill sets and levels of training who are providing endodontic treatment. In contrast to other causes of perforations, such as resorption or caries, which are pathological in nature, iatrogenic perforations are mostly avoidable. As such, prevention remains the most effective clinical approach to perforations (11). Classic literature often cited in reference to the frequency of perforations spans a time period ranging from 1961 to 1979, (12–14).

As a result of the advancements in technology now employed during endodontic treatment, such as the use of microscopes, nickel titanium (NiTi) rotary files, limited field-of-view cone beam computed tomography (CBCT) and new-generation electronic apex locators, these estimates might have become outdated. To the best of our knowledge, no cohesive, evidence-based literature review has been published that evaluates the occurrence of root perforations and possible risk factors to date. Hence the aim of our study was to evaluate the occurrence rate of different kinds of root perforations in the posterior tooth. Our team has extensive knowledge and research experience that has translated into high quality publications(15–24),(25–28),(29–33)(34). The aim of the study was to find the occurrence rate of different types of perforations in patients attending a private dental college.

Materials and Methods

The study was conducted in a university setting, by reviewing data of patients who visited college for root canal treatment and two reviewers were included in the study. The advantages of the study was the data belongs to the people of similar ethnicity and the limitations of the study was the trends in other locations were not assessed. The study included all the patients who have been advised for perforation repair in the university. A total of forty nine entries were finalized. The data was tabulated by using Microsoft Excel software and exported to SPSS for statistical analysis. The statistical analysis was conducted by Chi- square test.

Result and Discussion

Three studies statistically evaluated the experience of the provider in relation to the occurrence of perforations ((35)). One study concluded that there was no significant difference between 4th- and 5th-year students in relation to the type or frequency of procedural errors²⁸. A different study concluded that root perforation had a significant association with the stage of education of the student ($P = 0.016$) and that root perforations were more prevalent in procedures carried out by 5th-year students than in those carried out by 4th-year students²³. The authors suggested that the higher occurrence of perforations in 5th-year students might be because those students were more confident and took fewer radiographs, therefore increasing the risk of procedural errors, or because their clinical supervision ratio was less than that of the 4th-year students²³. A third study concluded that 5th-year students created significantly more foramen perforations than 4th-year students, but that 4th-year students created significantly more root perforations than 5th-year students²⁴. Only one study reported perforations during treatments carried out by postgraduate endodontic students,³⁷ and no studies evaluated rates of perforation in general dentists or endodontists

Conclusion

The most common factors associated with perforations included experience of the practitioner, type of tooth and morphology of the tooth. As the experience of the practitioner enhances their ability to avoid perforations, and generally molars and teeth with difficult morphologies have a higher prevalence of perforations, the practitioner might consider referring those cases to an endodontic specialist.

Conflict of interest: None to declare.

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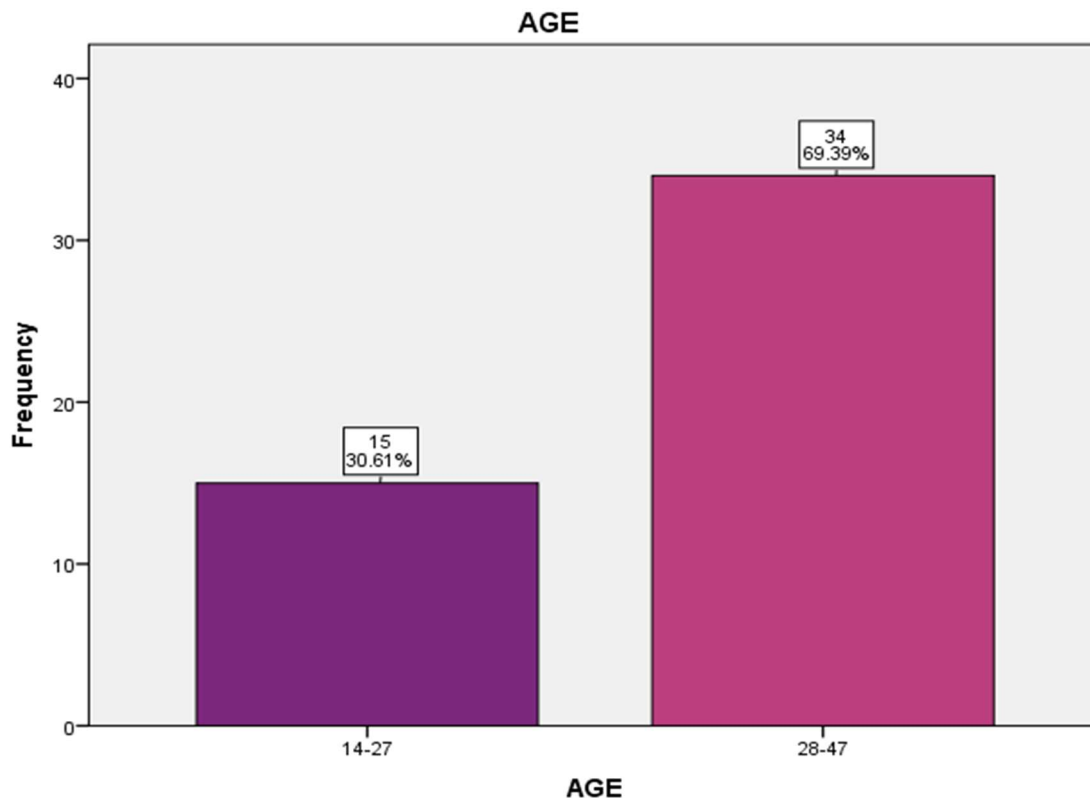


Figure 1: The bar diagram depicts the association of age and frequency of perforation. X axis depicts the age groups and Y axis depicts the frequency of perforation. Maximum number of perforations were reported in the age group of 34 to 47.

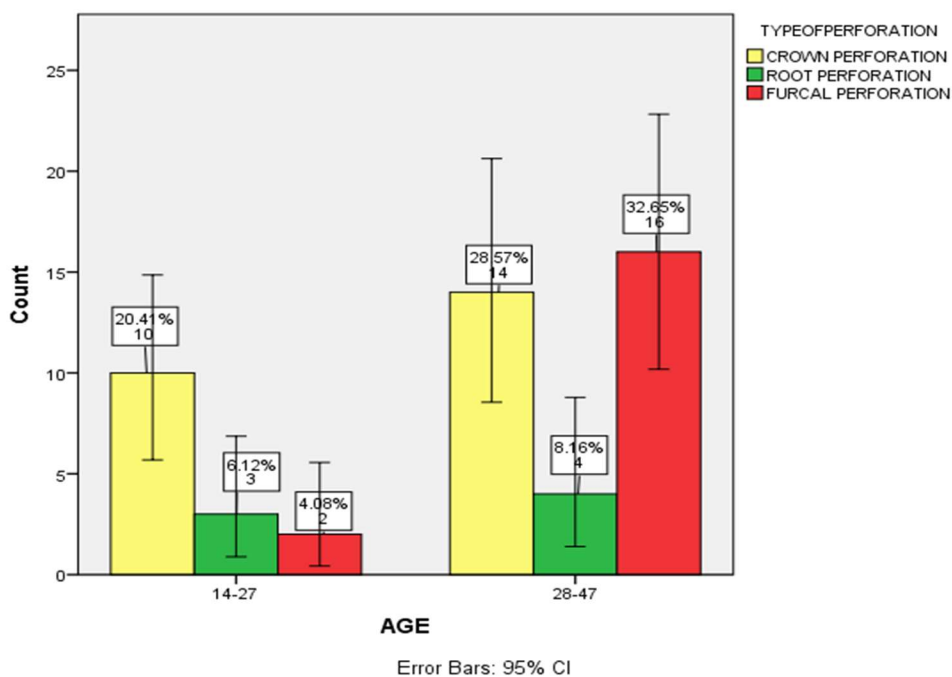


Figure 2: The bar diagram depicts the association between the age groups which was taken for the study and the type of perforation observed in the study. The X axis represents the age group and the Y axis represents the frequency of different types of perforations occurring.

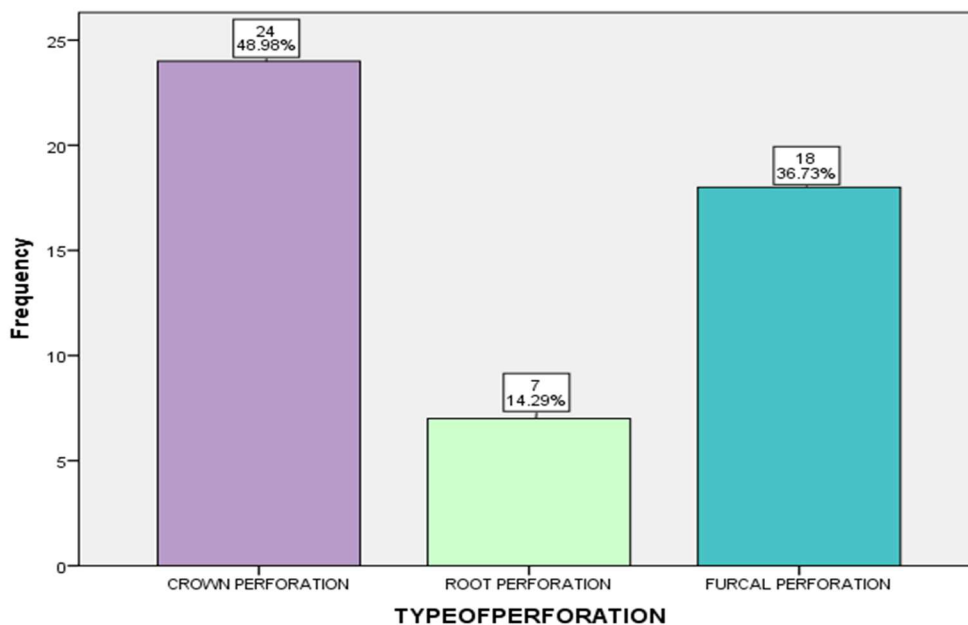


Figure 3: The bar diagram depicts the prevalence of the types of perforation. X axis represents the type of perforation and Y axis represents the frequency of the root perforations. The most common type of root perforation was the crown perforation followed by furcal perforation which was followed by root perforation.