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ORIGINAL RESEARCH

Success or failure of endodontic treatments

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Abstract

Background: To study the success or failure rate of endodontic treatments.

Materials & Methods:A total of 200 subjects were enrolled. The data was collected andsubjects were followed up for 2 years. The results were analysed using SPSS software. The p- value of group was considered significant with value less than 0.05.

Results:. Group 1 was endodontically trated teeth with vital pulp showed success rate of 99% and 1% of failure rate. Group 2 (endodontically treated teeth with necrotic pulp) had 98% success and 2% failure.

Conclusion: A high success rate in the outcomes of treatments and endodontic retreatments can be noticed.

Keywords: Endodontic treatment, vital pulp, success rate.

Introduction

Pulp necrosis denotes the cessation of the metabolic processes of this tissue, with consequent loss of its structure, as well as its natural defenses. In these cases, the recommended endodontic treatment is known as necropulpectomy.[1,2] Endodontic treatment is fairly predictable in nature with reported success rates up to 86–98%. [3] However, there has not been a consensus in the literature upon a consistent definition of "success" criteria of endodontic treatment. Likewise "failure" has variable definitions. It has been defined in some studies as a recurrence of clinical symptoms along with the presence of a periapical radiolucency. [4]An endodontically treated tooth should be evaluated clinically as well as radiographically for its root canal treatment to be deemed successful.Root canal treatment has been shown to be a predictable procedure with a favourable outcome in 86%–98% of cases.[5] Despite the favourable outcomes in prospective studies, large cross-sectional studies have reported that the prevalence of post-treatment disease such as persistent, recurrent or emerging apical periodontitis (AP) can exceed 42% of all root filled teeth suggesting a substantial need for further intervention.[6,7] One of the foremost causes of endodontic failure is persistent microbiological infection. [8] The role of bacteria in periradicular infection has been well established in literature and endodontic treatment will be afflicted with a higher chance of failure if microorganisms persist in the canals at the time of root canal obturation. [9] Bacteria harbored in root canal areas such as isthmuses, dentinal tubules and ramifications may evade disinfectants. [10] A study performed by Lin et al. on 236 cases of endodontic treatment failures found a correlation between the presence of bacterial infection in the canals and periradicular rarefaction in endodontic failures. [11] Bacteria present in the periradicular area will be inaccessible to disinfection procedures. Canals with negative cultures for bacteria are said to have higher success rates as opposed to those canals which test positive. [12] Treatment is more likely to fail in these teeth with pretreatment periradicular rarefactions than those without these radiographic changes. [13] Hence, this study was conducted to analyse the success or failure rate of endodontic treatments.

Materials & Methods

A total of 200 subjects were enrolled. The data was collected andsubjects were followed up for 2 years. They were divided into three groups as group 1 was vital pulp (n= 100), group 2 was necrotic pulp (n= 50) and group 3 was retreatment cases (n=50). The treatment was done and failure or success rate was evaluated. Chi-squared test was done. The results were analysed using SPSS software. The p- value of group was considered significant with value less than 0.05.

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Results

Subjects were classified into 3 groups. Group 1 was endodontically trated teeth with vital pulp showed success rate of 99% and 1% of failure rate. Group 2 (endodontically treated teeth with necrotic pulp) had 98% success and 2% failure, and Group 3 (endodontically treated teeth requiring endodontic retreatment) had 96% success and 4% failure.

Table 1: percentage of success rate

Groups	Percentage of success rate	Failure rate percentage
Group 1	99	1
Group 2	98	2
Group 3	96	4

Discussion

Root canal treatment is one of the procedures to treat the infected pulp of a tooth, with the aim of the treatment is to eliminate the infection and to seal the canal from the future microbial invasion apically and coronally. Other than that, root canal treatment also serves as an elective dental treatment in adjunct to other dental treatments. Root canal treatment is a highly successful procedure if the prognosis is correct and other technical aspects are carefully performed. From the conservative dentistry point of view, it is necessary to retain a tooth that would otherwise be extracted. To assess the treatment outcome of the root canal treatment, both clinical and radiographic follow-up reevaluations are essential to determine the success outcome after the endodontic treatment done. The success of the endodontic treatment of the affected teeth is influenced by several factors. Among the factors are age, gender, race, location, and position of the tooth, postendodontic type of restoration and diagnosis at the time of treatment. Esterla in 2017 mentioned that endodontic treatment outcomes are determined by several factors such as the clinical competency of the clinician. [14] The presence or absence of radiographical changes can be detected by using CBCT which is a clinicaly useful tool for diagnosis and treatment plan. [15,16] Hence, this study was conducted to analyse the success or failure rate of endodontic treatments. In the present study, subjects were classified into 3 groups. Group 1 was endodontically trated teeth with vital pulp showed success rate of 99% and 1% of failure rate. A study by Santos- Junior AO et al, studied a total of 1216 endodontic treatments were quantified with a minimum of 2 years of prenatal care at HRAC/USP. The vital pulp group had a success rate of 99.4% (535 treatments) and 0.6% failure (3 treatments), 98.6% of success in the necrotic pulp group (577 treatments) and 1.4% failure (8 treatments), and 95.6% success rate (89 treatments) and 4.4% failure (4 treatments) in the endodontic reintervention group. They concluded that there was a high success rate in the treatments and endodontic retreatments performed in the Endodontics Sector of the HRAC/USP, considering that well-conducted endodontic therapy is extremely important in the oral rehabilitation of individuals with cleft lip and palate.[17] In the present study, Group 2 (endodontically treated teeth with necrotic pulp) had 98% success and 2% failure, and Group 3 (endodontically treated teeth requiring endodontic retreatment) had 96% success and 4% failure. Mustafa NS et al, studied a total of sixty teeth were evaluated clinically and radiographically, the overall success rate was 85% (n = 51). Correlation between the variables showed nonsignificant ($P > 0.05$) in the success rate among age, gender, and race, upper and lower arches and between anterior and posterior teeth at the time of treatment. At postendodontic fixed restorations, the variables showed statistically significant relationship with the success rate ($P < 0.05$). Patients with no signs and symptoms and with no radiographical changes at the the time of clinical examination, showed the highest percentage of success rate (85%) of postendodontic fixed restorations. Age, gender, and race have no significant relations with the success rate of endodontically treated teeth.[18]With regard to the relationship between the success rate and the location and position of teeth either in the upper or lower arch and anteriorly or posteriorly, results showed that there were no significant differences between both arches. However, Imura et al. wrapped up in the study that anterior make known a significantly higher percentage of success measure up to premolars and molars. [19] In 2004, Salehrabi and Rostein in their study concluded that the highest success rate for the endodontically treated teeth was from the anterior teeth, comprising 97.43% compared to premolars (97.32%) and molars (96.89%). [20] Meanwhile, previously, Peak et al. specifically did mention that anterior maxillary teeth have 96% of success rate compared to other teeth types. [21]The success of endodontic treatment is closely related to the condition of the pulp tissue. In the radical treatment of inflamed vital pulp (biopulpectomy), the infection when present is restricted to the pulp chamber and cervical third. The root canal system and the periradicular tissues are not infected. Thus, a high success rate is found for endodontic treatments with vital pulp when compared to the treatments of necrotic pulp and retreatment. [22] This fact was verified in the present study where 99.4% (535 treatments) of success index was obtained and only 0.6% (3 treatments) of cases of failure in the group of teeth treated endodontically with vital pulp (biopulpectomies) (Group 1). In cases of necrotic pulp (necropulpectomy) and in cases of teeth that require endodontic retreatment, the success

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rate is decreased, since the professional must perform a biomechanical preparation with the purpose of eliminating the pathogenic microbiota from the canal system. [23]Numerous bacterial species have been detected in infected root canals and their elimination is not always achieved, culminating in the persistence of endodontic infection, resulting in failure of therapy. [24] In cases of endodontic retreatment, the success rate is even lower, since in addition to eliminating the microorganisms of the root canal system, it is fundamental to remove all existing obturator material and correction of possible-related iatrogenics. [25,26]The failure of endodontic treatment occurs, the the treatment has not been done up to the acceptable standards. [27] The major factors responsible for endodontic treatment failure are the persistent microbial infection in the root canal system and peri-radicular tissue.[28] Underfilling (more than 2 mm short of the radiographic apex) of the root canals often occurs as the result of incomplete chemomechanical preparation, which usually occurs as a result of inaccurate working length measurement and inadequate irrigation of the root canal system, which in turn leads to endodontic failures. It was found by Chugal and colleagues that if there is a loss of 1 mm in working length, it will increase the chance of endodontic treatment failure by 14% in the teeth with pre-existing apical periodontitis. The cause of peri-radicular tissue irritation is the remaining necrotic and infected pulp tissues in the improperly instrumented and incompletely filled canals. [29]

Conclusion

A high success rate in the outcomes of treatments and endodontic retreatments can be noticed.

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