



Analysis of Comparison of Prognosis of Endodontic Treatment and Dental Implants in Treatment of Periodontitis

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KEYWORDS

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ABSTRACT:

Background: This study was conducted to evaluate the comparison of success rates of endodontic treatment and dental implants in treatment of periodontitis.

Material and methods: The study included overall 120 subjects with periodontitis. The subjects were divided into 2 groups based on severity of periodontitis. Both the groups consisted of 60 subjects each. The subjects in group 1 had mild to moderate periodontitis. The subjects in the other group had severe periodontitis and had poor prognosis. The subjects with severe periodontitis underwent extraction for the purpose of dental implant treatment. Statistical analysis was carried out using SPSS software.

Results: 2 subjects from group 1 showed continuous pain whereas infection, furcal perforation and crown fracture was evident in 3,2 and 1 subjects, respectively. 3 subjects from the second group showed peri-implantitis whereas implant mobility and nerve damage were seen in 1 subject each. The success rate of dental implants was higher as compared to RCT followed by crown placement for the treatment of periodontitis.

Conclusion: Dental implants showed higher success rate as compared to RCT followed by crown placement for the treatment of periodontitis.

Introduction

Approximately 700 species of microorganisms colonize the human oral cavity.¹ These bacteria inhabiting the

human oral cavity are mainly commensals along with a sparse population of pathogenic bacteria.² Periodontitis is one of the most common ailments affecting the teeth, leading to the destruction of the supporting and



surrounding tooth structure.³ The term "periodontitis" is build up of two words, i.e., "periodont-" meaning "structure surrounding the teeth" and "itis" means "inflammation." Periodontitis is originally a disease originating from the gingival tissue which if left untreated results in penetration of inflammation to the deeper tissues, altering the bone homeostasis causing tooth loss.³ Periodontal disease has a multifactorial origin.⁴ The main culprit identified in periodontitis is the bacterial biofilm growing on the tooth surfaces.^{5,6} Endodontic treatment also known as endodontic therapy or root canal treatment (RCT) involves the removal of diseased pulpal tissue to prevent and intercept pulpal/periradicular pathosis and protection of the disinfected tooth from future entrenchment by microorganisms. RCT not only prevents severance of periodontal fibers that help in proprioception for occlusal feedback and efficient chewing but also aids in the retention of infected teeth that otherwise might have been extracted.⁷⁻⁹ The use of dental implants to rehabilitate the loss of teeth has increased in the last 30 years.¹⁰ Before dental implants, dentures and bridges were used, but dental implants have become a very popular solution due to the high success rate and predictability of the procedure, as well as its relatively few complications.^{11,12}

Hence, this study was conducted to evaluate the comparison of success rates of endodontic treatment and dental implants in treatment of periodontitis.

Material and methods

The study included overall 120 subjects with periodontitis. The subjects were divided into 2 groups based on severity of periodontitis. Both the groups consisted of 60 subjects each. The subjects in group 1 had mild to moderate periodontitis. The subjects in the other group had severe periodontitis and had poor prognosis. The subjects with severe periodontitis underwent extraction for the purpose of dental implant treatment. Statistical analysis was carried out using SPSS software.

Results

Table 1: Group-wise distribution of subjects.

Groups	Number of subjects	Percentage
Group 1 (Mild-Moderate periodontitis)	50	50%
Group 2 (Severe periodontitis)	50	50%
Total	100	100%

Gender	Number of subjects	Percentage
Males	66	55%
Females	54	45%
Total	120	100%

Both the groups consisted of 50 subjects each.

Table 2: Gender-wise distribution of subjects

Complications	Number of subjects
Continuous pain	02
Infection	01
Furcal perforation	01
Crown fracture	01
Total	06

There were total 65 males and 55 females in this study. For group 1 subjects with mild to moderate periodontitis, Root Canal Treatment followed by crown was planned. Whereas, for the subjects of group 2 with severe periodontitis, dental implants was chosen as treatment modality.

Table 3: Complications of RCT in group 1 subjects.

Complications	Number of subjects
Peri-implantitis	01
Implant mobility	01
Nerve damage	01

2 subjects from group 1 showed continuous pain whereas infection, furcal perforation and crown fracture was evident in 1,1 and 1 subjects, respectively.

Table 4: Complications of dental implants in group 2 subjects.

Complications	Number of subjects
Peri-implantitis	01
Implant mobility	01
Nerve damage	01



Infection	01
Total	04

2 subjects from the second group showed peri-implantitis whereas implant mobility and nerve damage were seen in 1 subject each.

Table 5: Success rate of both treatment methods.

Fate of treatment	RCT followed by capping	Dental implants
Success	51 (85%)	55 (91.67%)
Failure	9 (15%)	5 (8.33%)
Total	60 (100%)	60 (100%)

The success rate of dental implants was higher (91.67%) as compared to RCT followed by crown placement (85%) for the treatment of periodontitis.

Discussion

Dental implants are regularly placed in patients suffering from chronic periodontitis. Implant treatment in periodontitis-susceptible individuals is frequently debated. It has been reported that in partially or completely edentulous patients, periodontal pathogens might be transmitted from teeth to implants, implying that periodontal pockets might serve as a reservoir for bacterial colonization.¹⁻³ The microflora similarity of periodontitis and peri-implantitis support the concept that periodontal pathogens might be associated with peri-implantitis and failing implant. The hard and soft tissues of these patients are host-modulated and susceptible to aggravation of disease. There are certain factors which are associated with the susceptibility of these conditions.¹³⁻¹⁷

Today, dental implants are one of the restorative methods to replace missing teeth. Improvements in implant design, surface characteristics, and surgical protocols made implants a secure and highly predictable procedure with a mean survival rate of 91.67% and a mean success rate of 85% after more than 10 years.¹⁸ Hence, this study was conducted to evaluate the comparison of success rates of endodontic treatment and dental implants in treatment of periodontitis. In this study, 2 subjects from group 1 showed continuous pain whereas infection, furcal perforation and crown fracture was evident in 1, 1 and 1 subjects, respectively. 1 subjects

from the second group showed peri-implantitis whereas implant mobility and nerve damage were seen in 1 subject each. The success rate of dental implants was higher (91.67%) as compared to RCT followed by crown placement (85%) for the treatment of periodontitis. Chatzopoulos GS et al¹⁹ conducted a study to assess and compare the survival rates of implant and root canal treatment as well as to investigate the effect of patient and tooth related variables on the treatment outcome in a large-scale population-based study. Dental records of patients who received root canal treatment and implant therapy were retrieved from the electronic records of the University of Minnesota School of Dentistry. Demographic characteristics, dental insurance status, socioeconomic status as well as medical history and tobacco use were recorded. The treatment outcome was included as a binary variable (survival/failure). A total of 13,434 records of patients who had implant (33.6%) or root canal therapy (66.4%) were included. The survival rate analysis and Kaplan-Meier table revealed the majority of the implants were removed within the first year (58.8%), while only 35.2% of the root canal treatments failed in the same time period. The overall survival rate was significantly ($p < 0.001$) higher for implant therapy (98.3%) compared to root canal treatment (72.7%). A statistically significant association was found between treatment ($p < 0.001$), age ($p < 0.001$) and anxiety ($p = 0.004$) with treatment outcome

CONCLUSIONS: Implant therapy exhibited significantly lower failures when compared to root canal treatment, but the selection of either treatment should be based on multiple factors. Higher age and anxiety were also significantly associated with root canal and implant treatment failure. This study demonstrated that both root canal and implant treatments are sound options with high survival rates; however, root canal therapy exhibited a significantly higher failure rate.

Conclusion

Dental implants showed higher success rate as compared to RCT followed by crown placement for the treatment of periodontitis.

References

1. Aas JA, Paster BJ, Stokes LN, Olsen I, Dewhirst FE. Defining the normal bacterial flora of the oral cavity. *J Clin Microbiol.* 2005 Nov;43(11):5721-32.



2. Hajishengallis G, Darveau RP, Curtis MA. The keystone-pathogen hypothesis. *Nat Rev Microbiol*. 2012 Oct;10(10):717-25.
3. Petersen PE, Baehni PC. Periodontal health and global public health. *Periodontol* 2000. 2012 Oct;60(1):7-14.
4. Bartold PM, Van Dyke TE. Periodontitis: a host-mediated disruption of microbial homeostasis. *Unlearning learned concepts. Periodontol* 2000. 2013 Jun;62(1):203-17.
5. Socransky SS, Haffajee AD, Cugini MA, Smith C, Kent RL. Microbial complexes in subgingival plaque. *J Clin Periodontol*. 1998 Feb;25(2):134-44.
6. Darveau RP. Periodontitis: a polymicrobial disruption of host homeostasis. *Nat Rev Microbiol*. 2010 Jul;8(7):481-90.
7. Treatment Standards. American association of Endodontists. 2018. [Last assessed on 2019 Nov 01].
8. Doyle SL, Hodges JS, Pesun IJ, Law AS, Bowles WR. Retrospective cross sectional comparison of initial nonsurgical endodontic treatment and single-tooth implants. *Compend Contin Educ Dent*. 2007;28:296-301.
9. Pak JG, White SN. Pain prevalence and severity before, during, and after root canal treatment: A systemic review. *J Endod*. 2011;37:429-38.
10. Zohrabian VM, Sonick M, Hwang D, Abrahams JJ. Dental implants. *Semin Ultrasound CT MR*. 2015;36:415-426.
11. Jenny G, Jauernik J, Bierbaum S, Bigler M, Gratz KW, Rucker M, Stadlinger B. A systematic review and meta-analysis on the influence of biological implant surface coatings on periimplant bone formation. *J Biomed Mater Res A*. 2016;104:2898-2910.
12. Shemtov-Yona K, Rittel D. An overview of the mechanical integrity of dental implants. *Biomed Res Int*. 2015;2015:547384.
13. Estrela C, Leles CR, Hollanda AC, Moura MS, Pécora JD. Prevalence and risk factors of apical periodontitis in endodontically treated teeth in a selected population of Brazilian adults. *Braz Dent J*. 2008;19:34-9.
14. Estrela C, Holland R, Estrela CR, Alencar AH, Sousa-Neto MD, Pécora JD. Characterization of successful root canal treatment. *Braz Dent J*. 2014;25:3-11.
15. Wu F, Zhu J, Li G, Wang J, Veeraraghavan VP, Krishna Mohan S, et al. Biologically synthesized green gold nanoparticles from Siberian ginseng induce growth-inhibitory effect on melanoma cells (B16) *Artif Cells Nanomed Biotechnol*. 2019;47:3297-305.
16. Orstavik D. *Essential Endodontology: Prevention and Treatment of Apical Periodontitis*. 111 River Street, Hoboken, NJ 07030, USA: John Wiley & Sons Ltd: John Wiley and Sons; 2020.
17. Chen F, Tang Y, Sun Y, Veeraraghavan VP, Mohan SK, Cui C. 6-shogaol, a active constituents of ginger prevents UVB radiation mediated inflammation and oxidative stress through modulating NrF2 signaling in human epidermal keratinocytes (HaCaT cells) *J Photochem Photobiol B*. 2019;197:111518.
18. Moraschini V, Poubel LA, Ferreira VF, Barboza Edos S. Evaluation of survival and success rates of dental implants reported in longitudinal studies with a follow-up period of at least 10 years: a systematic review. *Int J Oral Maxillofac Surg*. 2015;44(3):377-88.
19. Chatzopoulos GS, Koidou VP, Lunos S, Wolff LF. Implant and root canal treatment: Survival rates and factors associated with treatment outcome. *J Dent*. 2018 Apr;71:61-66. doi: 10.1016/j.jdent.2018.02.005. Epub 2018 Feb 27. PMID: 29499242.