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Assessment of the prognosis of post and core supported crowns: An observational study

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Abstract--Background: The present study was conducted of assessing the prognosis of post and core supported crowns. Materials & methods: A total of 100 patients who underwent post and core treatment for dental rehabilitation were enrolled. The patients underwent post and core treatment. Radiographic assessment was done on subsequent follow-up. Both clinical and radiographic evaluation of all the patients was done for assessing the prognosis. Results were compiled in Microsoft excel sheet and were analyzed by SPSS software. Results: Out of 100 patients, successful prognosis of post and core treatment was seen in 93 percent of the patients while

failure was seen in 7 percent of the patients. Non-significant results were obtained while assessing the correlation of prognosis with site. Conclusion: When done with adequate precaution, post and core treatment has good prognosis.

Keywords--post, core, crowns, prognosis.

Introduction

Root canal therapy is indicated when there is extensive loss or destruction of tooth structure or irreversible pulpitis. The therapy is performed either to remove the source of infection, provide a means for reconstruction of the coronal component of the tooth, or both. Depending on the amount of remaining coronal tooth structure, a post may be necessary to allow the tooth crown to withstand the intraoral forces during normal function. In the decision process of whether to restore a tooth with a post prior to definitive restoration, the extent of hard-tissue destruction and the number of remaining axial cavity walls plays a critical role. However, laboratory and clinical studies have failed to provide evidence that a post may strengthen endodontically treated teeth or enhance their survival. Thus, the primary purpose of post placement is to retain the core material.¹⁻³

Whether to use a custom cast post-and-core or a prefabricated post is controversial among clinicians. A cast post-and-core can be made using gold alloy, silver-palladium alloy, or a base metal alloy such as nickel-chromium (Ni-Cr). A cast post-and-core is not indicated in teeth that cannot accommodate additional root preparation resulting from inadequate root dimensions or unsuitable internal morphology such as mandibular incisors. In situations where the angle of the core must be altered in relation to the root, a cast post-and-core is the optimal choice. Despite a long history of success with cast post-and-cores, clinicians are using prefabricated posts more because of their ease of use, reduced chair time, decreased cost, and improved esthetics. Prefabricated posts are presently available in a variety of materials, ranging from metallic.⁴⁻⁶ Hence; the present study was conducted of assessing the prognosis of post and core supported crowns.

Materials and Methods

The present study was conducted for assessing the prognosis of post and core supported crowns. A total of 100 patients who underwent post and core treatment for dental rehabilitation were enrolled. Complete demographic and clinical details of all the patients was obtained. Clinical examination of all the patients was carried out using mouth mirror, probe and tweezers. All the patients underwent post and core treatment. Radiographic assessment was done on subsequent follow-up. Both clinical and radiographic evaluation of all the patients was done for assessing the prognosis. Results were compiled in Microsoft excel sheet and were analyzed by SPSS software.

Results

A total of 100 patients were analyzed who underwent post and core treatment. Mean age of the patients was 43.5 years. Out of 100 patients, 63 patients were males while the remaining 37 were female. Out of 100 patients, successful prognosis of post and core treatment was seen in 93 percent of the patients while failure was seen in 7 percent of the patients. Non-significant results were obtained while assessing the correlation of prognosis with site.

Table 1
Prognosis according to site

Site	Prognosis		p- value
	Success	Failure	
Maxillary anterior region	23	2	0.558
Maxillary posterior region	22	2	
Mandibular anterior region	25	2	
Mandibular posterior region	23	1	
Overall	93	7	

Discussion

Several bio-mechanical failures can occur with fixed partial dentures (FPD): debonding, where the FPD separates from the abutment/s due to cement failure, such that the abutment/s are left completely intact intra-orally; root fracture of the underlying abutment/s; or fracture of the abutment/s at a fracture plane that is located approximately and theoretically at the level of the FPD margin (here, the FPD separates from the abutment/s such that the supra-ferrule-margin aspect of the abutment/s is still cemented inside the FPD). A core or a post improves the bio-mechanical stability of an abutment or FPD if it can prevent either of these failures. A post is to help prevent the tooth/core/post complex, on which a ferrule is cemented, from separating from the abutment root at a fracture plane that is located approximately and theoretically at the level of the crown or ferrule margin. Specifically, the bond strength, at the cross sectional area of the post, existing at the interface between the sub-ferrule-margin post structure and the supra-ferrule-margin post structure, contributes to the overall bond strength of the cross sectional area of tooth/core/post complex material existing at the projected level of the crown margin, thereby preventing such abutment fracture.^{6- 9}Hence; the present study was conducted of assessing the prognosis of post and core supported crowns.

A total of 100 patients were analyzed who underwent post and core treatment. Mean age of the patients was 43.5 years. Out of 100 patients, 63 patients were males while the remaining 37 were female. Makade CS et al compared the fracture resistance and the mode of failure of endodontically treated teeth restored with different post-core systems. Root canal treatment was performed on 40 maxillary incisors and the samples were divided into four groups of 10 each. For three experimental groups post space preparation was done and teeth were restored with cast post-core (Group B), stainless steel post with composite core (Group C) and glass fiber post with composite core using adhesive resin cement

(Group D). Control group (A) samples were selected with intact coronal structure. All the samples were prepared for ideal abutment preparation. All the samples were subjected to a load of 0.5 mm/min at 130° until fracture occurred using the universal testing machine. The fracture resistance was measured and the data were analyzed statistically. The fracture above the embedded resin was considered to be favorable and the fracture below the level was considered as unfavorable. For experimental group Vs control group the fracture resistance values showed significant differences ($P < .05$). For the mode of failure the chi-square value is 16.1610, which means highly significant ($P = .0009$) statistically. Endodontically treated teeth without post core system showed the least fracture resistance demonstrating the need to reinforce the tooth.¹⁰

Out of 100 patients, successful prognosis of post and core treatment was seen in 93 percent of the patients while failure was seen in 7 percent of the patients. Non-significant results were obtained while assessing the correlation of prognosis with site. Balkenhol M et al evaluated the survival time of cast post and cores: a 10-year retrospective study. The files of 565 patients, who had been fitted with a total of 802 custom-fabricated, cast post and cores using a standardised technique, were analysed. The following parameters were used in the evaluation: age of the post and cores, fabrication technique (direct, indirect), type of prosthetic restoration, location (upper, lower jaw), type of tooth (anterior, premolar, molar), number of root posts, luting material, post and core alloy and cause of failure. The average survival time of the post and cores was 7.3 years. The cumulative failure rate was 11.2%. The most common complication was loss of retention of the post and cores. High-gold-content posts had a lower risk of failure than posts made from semi-precious alloy. The type of restoration fitted had a significant influence on the survival probability. Post and cores custom-fabricated using a standardised fabrication technique have a good long-term prognosis.¹¹

Conclusion

When done with adequate precaution, post and core treatment has good prognosis.

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