بسم الله الرحمن الرحيم

" وَقُل رَّبِّ زِدْنِي عِلْماً"

صدق الله العظيم

سورة طه (١١٣)

Effect of Post Head Surface Treatment and Dentin Bonding on Retention Between Two Selected Non Metallic Posts and Composite Core

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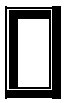

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INTRODUCTION

Posts are frequently inserted into the root canals of endodontically treated teeth to provide retention for the core in the restorative treatment of these teeth. Several studies had investigated the failure of teeth restored with post and core systems which mostly occur due to loss of retention or fracture of either root, post or core [14,48,122].

The retentive failure of posts have been reported to be the most frequent type of failure which may occur at either the post-tooth interface or the post head-core interface [6]. The long term clinical success of post and core retention depends on retention of both the post to the tooth and the post-head to the core material [8].

First, it is critical to establish durable bond between core materials and the smooth surface of post-head, as in all non metallic ready made posts, to obtain maximum retention. This includes an effective surface treatment of post-head which may fall within three categories;

1) Treatment results in roughening the post surface either by sandblasting or etching with chemical acids [34].

2) Treatment intends to create chemical bonding between core and post materials [63,133,162].

3) Combination of the two above mentioned treatments [51,52,56].

Secondary, it is necessary to obtain an adequate bond at core-dentin junction where the majority of failures occur. A variety of new generations of dentin-bonding agents have been developed to improve the adhesion to dentin either by removing or modifying the smear layer. Further development of these bonding agents was the

production of adhesive systems which were capable of bonding physiochemically to various substrates such as enamel, dentin, amalgam and composite resin [26].

Numerous types of prefabricated metallic and nonmetallic posts have been marketed. Although, the metallic posts met most of the requirements of post-core systems, they produced esthetic problems with metallic shadow in anterior region when all ceramic restoration is the treatment of choice [1]. Recent trends towards non metallic (tooth colored) posts have been developed for fabrication of posts with greater translucency and highly esthetic properties.

The adhesive systems promote the use of preparation that preserves tooth structure [15]. The optimum retention which is one of the main requirements for a successful restoration is definitely one of the serious problems facing the dentists, especially when minimal amount of tooth structure is left.

There are two groups of tooth colored prefabricated posts. The first group includes fiber material such as carbon, glass or silicon embedded in an epoxy resin matrix. The second group is zirconium dioxide ceramic post which provides high esthetic foundation with ceramic restoration. The highly esthetic appearance of such posts is due to the dentin like translucency of zirconium ceramic material [27,70].

Core build up materials should have sufficient strength to sustain high force of mastication as well as they must bond well to both the post and the remaining tooth structure. Recently an introduced hybrid composite core material seems to fulfill the previously mentioned properties, especially with fiber post.

Review of literature

The functional and esthetic restoration of mutilated endodontically treated teeth is a major challenge facing the practitioner daily in the dental clinic. Structure of these teeth become weaker and more prone to fracture as a result of loss of large amount of tooth during access cavity and root canal preparation [28].

The endodontically treated teeth are restored to their original function with the post-core systems. However, with these systems, catastrophic failures are mainly induced by fracture or bending of posts, loss of retention [149,152,157], core or root fracture [18,59] and corrosion of metallic posts [11,68,81].

Retention of a post and stability of a core restoration in endodontically treated teeth are important factors in preventing restorative failures [7]. The retentive failure of the post-core systems is much more problematic for dentists in the restorative treatment which may occur at either the post-tooth interface or post head-core material interface [7,16].

In spite of, the steady evolution of post and core techniques, post retained crowns produced higher failure rates than conventionally retained crowns [59,81,126]. To overcome this problem, adequate bond at post-core interface and core-dentin junction should be achieved with consequent adequate support for the post-core systems [6].