สำนักงานวิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

CHAPTER I

INTRODUCTION

Prefabricated fibre reinforced posts have been increasingly used in restoring endodontically treated teeth because of their modulus of elasticity closed to that of dentin (1). Moreover, the previous studies (2, 3, 4) showed that the occurrence of root fractures was rare with the use of fibre reinforced posts. However, the restoration using fibre reinforced post often failed by debonding of the post from root canal dentin (5). The failures occurred at the luting cement-dentin interface more than at the post-luting cement interface (6). Many factors influenced the bonding to the root canal dentin, such as smear layer remnants, intraradicular dentin variations, unfavorable geometry of the root canal and the compatibility of luting cements with dentin adhesives (7, 8, 9). The clinicians should select the proper bonding system in order to ensure the optimal bonding performance to intraradicular dentin. Currently, many types of luting cement system which can be used for bonding fibre reinforced post to intraradicular dentin are available in the markets. There are three major categories of luting cements commonly used according to the bonding substrate preparation. The first is "etch and rinse" system which utilizes acid to dissolve the smear layer and create a zone of demineralized dentin, followed by the penetration of hydrophobic resin (10, 11, 12, 13). However, this system requires many steps and is considered technical sensitivity. The second system called the "self-etch" system has been developed to reduce clinical steps and creates a reliable bonding. This system uses adhesives containing high concentration of acidic resin monomers to simultaneously demineralize and infiltrate the smear layer without removing it. Many studies revealed low bond strength of this system (14, 15). Third is the "self-adhesive" system which does not require any pre-treatments of tooth substrates. Some studies (16, 17, 18) showed that the etch and rinse system was superior compared to the self-etch and self-adhesive cements in terms of bond strength, while Bitter et al (19, 20) demonstrated that the self-adhesive cement provided a higher bond strength than the others. Unlike enamel and coronal dentin, the intraradicular dentin is different in characteristics (21). The bonding effectiveness of luting cements to the intraradicular

dentin is still a controversial issue. The studies regarding bonded fibre reinforced post to intraradicular dentin using different luting cements were still inconclusive (17, 20, 22). Clinically, the failure of prosthodontic work occured after many years in service, not because of one impact load but from the cyclic loading (23). Some study revealed that cyclic loading had no effect on the bond strength between fiber reinforced post and root canal dentin (24). Not many studies have addressed the possible effects of mechanical cyclic loading on the bond strength between root dentin and fibre reinforced post, simulating 5 years of clinical function.

To achieve a successful endodontic therapy, the most important criteria is the well adaptation of the filling material to root dentin wall which prevents microleakage apically and coronally. Polymerization shrinkage of resin has been often mentioned as being one of the most significant factors responsible for the failure of luting cements especially the interface between luting cement and root canal dentin. Therefore, the aim of this study was to evaluate effect of cyclic loading on bond strength and microleakage of fibre reinforced post bonded to intraradicular dentin using various luting cements. The null hypothesis of study was that cyclic loading has no significant effect on both bond strength and microleakage of fibre reinforced post bonded to intraradicular dentin among various luting cements.