The roots were then first irradiated at output power from 0.5 W, with 20% air and water level, and 30% in a slow speed contra-angle handpiece.

The canals were prepared to a #70 K file and enlarged with Gates-Glidden burs.

INTRODUCTION:

Panavia 21 (Sun Medical Co., Ltd., Japan) showed 96% for coronal, 100% for middle and 95% for apical adhesive failures, and Xeno-treated surfaces are shown in Table 2. When bond strengths of all the resin cements were measured for cervical, middle and apical thirds of radicular dentin, it was found that the smear layer hinders impregnation of the dentin with the adhesive agent and thus prevents adequate adhesion.

The excellent sealing ability of contemporary adhesive resins makes them useful both as secondary restorative materials and as core buildup materials. It is generally believed that the smear layer is predominantly composed of organic and mineral debris, and that the smear layer may be best removed by laser irradiation. The laser has also been used to promote dental bonding by removing the smear layer. A laser beam was used to dry cavities and canals (Widerstrom et al. 1996, Khan et al. 1998).

Effect of Er,Cr:YSGG Laser Treatment on Bond Strengths of Four Resin Cements to Root Canal Dentin

Table 1: Manufacturer’s instructions for the restorative materials evaluated

Table 2: Regional bond strengths of adhesive resins to root canal dentin (Fig. 1). Shear bond strengths (MPa) of different resin cements to root canal dentin are given in Table 3. The filled root was sticky-waxed to a plexiglass block to permit 1 mm thick serial cross-sections. The filled root was then irradiated and the irradiated surface demonstrated successful removal of the smear layer and debris, opened dentinal tubules and allowed for adequate adhesion of adhesive resins.

Effect of Er:YAG laser treatment on bond strengths of four resin cements to root canal dentin.

Table 3: Failure modes of the materials to the root canal regions

Fig. 1: Schematic drawing showing the developed root canal system of a premolar tooth.

Bond testing:

- The filled root was then irradiated and the irradiated surface demonstrated successful removal of the smear layer and debris, opened dentinal tubules and allowed for adequate adhesion of adhesive resins.

- The laser beam was used to dry cavities and canals, and the smear layer hinders impregnation of the dentin with the adhesive agent and thus prevents adequate adhesion.

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