Abstract

The aim of this study is to evaluate the marginal adaptation at the tooth-restoration interface of Class II- box type restored with direct and semi-direct techniques using two types of composite materials.

Materials and methods: Class II box-shaped cavities were prepared in 28 extracted maxillary premolar teeth which were divided randomly into two experimental groups consisting of 14 samples each. Group I: Direct composite restorations and Groups II: Semi-direct composite restorations. Each group was further subdivided into 2 subgroups (A and B); 7 samples each according to the type of composite materials (Nova Compo C and Estelite Sigma Quick) with their corresponding adhesive system. Then all samples were sectioned longitudinally in a mesiodistal direction to form two halves (buccal and lingual). The marginal adaptation was evaluated by measuring the gaps at the tooth-restoration interface under 40X stereomicroscope, 10X digital camera and a special software. The axial wall and gingival floor were viewed at four points, then the gap in each point was measured. Data were then collected and tabulated, and T-test was used to determine the statistical significance between parameters at ($p<0.05$).

Results: The results indicated that there were no statistically significant differences between the marginal adaptation of the buccal and lingual half of the tooth restored with the same technique. Additionally, the direct composite restorations showed significant differences between the axial wall and gingival floor using Nova Compo C and Estelite Sigma Quick, with P-value (0.002, and 0.04) respectively, with the preference of axial wall. However, the marginal adaptation between the axial wall and gingival floor in the semi-direct technique was not significant. Moreover, the marginal adaptation of the restorative techniques indicates no significant differences along the gingival floor, but there is a highly significant difference ($p>0.001$) along the axial wall, preferring the direct technique. Between the two materials used in the restorative techniques, Estelite Sigma Quick had superior adaptability than Nova CompoC.

Conclusion: The marginal adaptation of the direct composite restorations performed better along the axial wall compared to the gingival floor. Moreover, the results suggest that the direct composite technique is superior to the semi-direct composite technique when it comes to improving the marginal adaptation along the axial wall, but not significant along the gingival floor. The composite resin used had an impact on the marginal adaptation and reduction of gaps formed.