Introduction

Pain is one of the most frequent reasons for seeking dental treatment and clinical observations confirm that patients complain of dentinal sensitivity under different conditions and degrees of intensity. This is a very frequent problem after dental restorations with resin composite, even when there is no visible failure in the restoration. There are various causes of postoperative sensitivity in direct resin composite restorations related to failures in diagnosis and indications for treatment and/or cavity preparation, the stages of hybridization of hard dental tissues, insertion of the material, and finishing and polishing the restoration. To avoid or minimize the occurrence of postoperative sensitivity, it is imperative to make a good diagnosis and use the correct technique at all stages of the restorative procedure.

There are various methods to reduce and minimize postoperative sensitivity followed by a composite resin restoration which include reducing dentin permeability or fluid flow by occluding dentinal tubules with potassium oxalate, sodium fluoride, adhesives, desensitizers or by prevention of repolarization of nerves with potassium nitrate.

With the advancements in adhesive dentistry, simplified techniques and improved clinical developments are increasingly being sought. In current times, development of new products is occurring at an unprecedented rate. Dentin adhesives are currently available as three-step, two- step, and single-step systems, depending on how the three cardinal steps of etching, priming and bonding to tooth substrate are accomplished. The newer concepts of self etching primers and adhesives are proving to be good both scientifically and clinically. They reduce the clinical steps, provide

adequate bonding to enamel and dentin but as far as bond strength values are concerned, there is still scope for enhancement when compared with total etch adhesives.

However, a concern may arise whether addition of a dentine desensitizer prior to bonding will affect the shear bond strength values.

Aims and Objectives

The aim of this study was to assess the effect of dentin desensitizer Systemp on shear bond strength of composite resin to dentin and to evaluate the shear bond strength with and without the use of dentin desensitizer Systemp using adhesives Prime and Bond NT, Xeno V^+ and Futurabond DC.

Methodology

Sixty recently extracted human maxillary premolars were used for the study and stored in distilled water .The roots were sectioned off with a diamond disc and the occlusal surface of the crowns were sectioned to expose the superficial dentin surface. Each tooth was then embedded into a rectangular metal mould using self- cure resin such that the exposed occlusal dentin surface faced upwards. The specimens were randomly divided into six groups of ten specimens each. In all the groups the flattened dentin surface was etched with 37% phosphoric acid gel. In Group I, Group II and Group III , two coats of Prime and Bond NT , XenoV^+ and Futurabond DC bonding agent was applied on dentin respectively. The samples were light cured according to the manufacturer's instructions. In Groups IV, V and VI, Systemp desensitizer was applied to dentin for 10s with the help of an applicator brush and was allowed to remain on the tooth surface for 20 s. Then the area was lightly dried with an air

syringe .Prime and Bond NT, Xeno V^+, Futurabond DC was then applied to dentin of Groups IV, V, VI respectively. Following the application of bonding agent/ Systemp desensitizer Filtek Z350 XT composite resin was condensed into the mould using stainless steel bands which were placed on the exposed dentine surface and light cured for 40 s. The stainless steel bands were removed. The test specimens were subjected to shear bond strength testing using the Instron universal testing machine. The shear bond strength (MPa) was calculated by the ratio of the maximum load (Newtons) to the cross‑sectional area of the bonded interface (mm^2). Statistical analysis was done using computer software SPSS (16.0) version. The data was expressed in its mean and standard deviation.

Results and Observations

The analysis of results shows that the mean shear bond strength of Prime and Bond NT increased after application of a dentine desensitizer from 15.07±0.31 to 16.28±2.63 MPa. The mean shear bond strength of Xeno V^+ decreased after application of dentin desensitizer from 14.47±1.31 to 12.31±1.131 MPa. The mean shear bond strength of Futurabond DC decreased after application of dentin desensitizer from 15.47±2.43 to 15.15±0.79 MPa.

Conclusion

In the present study it is well demonstrated that application of dentin desensitizer increased the bond strength of Prime and Bond NT while the bond strength of Xeno V^+ and Futurabond DC reduced after application of a dentin desensitizer.

Clinical significance

Resin based dental composite fillings has increased significantly and it is now a well‑established dental procedure. However, polymerization shrinkage and postoperative sensitivity remain a challenge to practitioners. Clinical studies indicate that up to 30% of the study population report postoperative sensitivity following application of posterior composite resin restorations. Desensitizing agents that occludes dentinal tubules to some extent can significantly reduce fluid filtration across dentin and consequently lower the pain response by formation of firm plugs of protein that seal the tubules. These plugs considerably reduce permeability and the incidence of dentinal sensitivity. Hence, the use of a dentin desensitizer before application of bonding agent and restoration with composite may reduce the postoperative sensitivity that occurs with composite restorations.