



The Bonding Performance between Metal and Ceramic: A Clinical and Experimental Report

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Recently, the number of adult patients in need of orthodontic treatment with zirconia restorations has gradually increased. Clinically, based on the unsatisfactory bond strength between a metal bracket and ceramic restoration, the patient is required to replace the ceramic crown with resin material in order to ensure that the treatment plan could be carried out. As a result, there is an additional economic cost and time consumption, which are unavoidable.

Zirconia ceramic is considered as one of the most promising dental restorative materials due to its prominent mechanical properties, stable chemical properties, excellent aesthetics and good biocompatibility, which was widely used in clinical treatment. However, zirconia itself has strong chemical inertness, how to keep zirconia stable bonding with metal is still challenging in both clinical treatment and laboratory study. In this presentation, the actual effect of bonding agents between metal and zirconia was evaluated in both clinical treatment and vitro study.

Based on the 31 months follow-up observation of a metal maryland bridge on zirconia and natural tooth, the conclusions of clinical case can be summarized:

1. Bond strength between metal and zirconia is weaker than that between metal and enamel.
2. Resin cement and universal adhesive could offer 8 to 14 months functionally stable bonding performance between zirconia and metal.
3. Proper pre-treatment on bonding surface is crucial to achieve the ideal bonding performance between zirconia and metal.

Based on the data obtained in laboratory, the conclusions of vitro study can be summarized:

1. The bonding performance of luting agents between metal bracket and zirconia was materials-depended.
2. The resin cement used for prosthodontic treatment could offer sufficient bond strength between metal brackets and zirconia at least for 3 months.
3. The design of metal brackets can affect the bond strength to zirconia.

The bond strength between orthodontic metal bracket and zirconia restorations poses a considerable challenge for dental clinicians. If bonding durability between a restoration and metal bracket can be improved, ceramic crown(s) might qualify for short-term orthodontic treatment.

<Curriculum Vitae>

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