

**Introduction**

Metal Ceramic Restorations are widely used in restorative dentistry with a high degree of success. On occasions, fractures do occur in ceramics due to trauma, flexure of metal or fatigue of ceramic. Fractured porcelains will affect aesthetics & function of prostheses which may warrant patients to seek immediate treatment<sup>1</sup>.

Ceramic fracture may result from trauma, fatigue, occlusal prematurity, para- functional habits, poor abutment preparation, inappropriate coping design and incompatibility of coefficient of thermal expansion between ceramic and the metal structure. One option is to remake the restoration. This is both expensive and timeconsuming. Intra-oral chair side porcelain repair system is a quick, painless and highly patient acceptable procedure, without the removal of restoration or fabrication of new restoration<sup>1</sup>.

Three kinds of fractures have usually been monitored at metal ceramic restorations: simple fractures (formed only within porcelain and metal does not get out of surface), mixed fractures (as well as porcelain fractures, metal gets out of surface), complex fractures (metal completely gets out of surface).Porcelain fractures are the most common cause of removing the prosthesis.

Fractured porcelain affects patients negatively in terms of aesthetic and function and requires to be changed. In this case, two different treatment options come to mind. The primary and ideal treatment option involves

removing the prosthesis that not always applicable and financially costly. An alternative method is repair of fractured area with composite resin intraorally. Intraoral repair method offers some advantages such as, economic cost and time savings. But, the bond between restoration remained in the repaired area and repair material should be strong and resistant to the functional loads. In order to improve the bond between composite and fractured surfaces, many mechanical and chemical bond methods have been developed. To provide the mechanical bond; many surface treatments including roughening with diamond drills, sandblasting with aluminium oxide have been used for both metal and ceramic surfaces<sup>46</sup>.

Intraoral repairs often involve bonding composite to fractured porcelain. Newer adhesive systems, currently referred to as multipurpose systems, include materials with recommended procedures for repair of porcelain<sup>33</sup>. Of the many ceramic repair systems commercially available, Ivoclar ceramic repair system and Shofu ceramic repair system are used for the present study.

### **Aims and Objectives**

The aim this study was to evaluate & compare the shear bond strength of two different Ceramic Repair Systems (Ivoclar & Shofu) with two different surface treatments (Sandblasting & Laser etching) on metal surface. The objectives were to estimate the most efficient ceramic repair system based on the obtained shear bond strength values and to estimate the most efficient surface treatment based on the obtained shear bond strength values.

**Methodology**

Twenty Cobalt Chromium blocks were made and ten such blocks were sandblasted with intra oral sandblaster and the remaining ten blocks were laser etched with ND: YAG laser. Five sandblasted blocks were coated with Ivoclar ceramic repair system and remaining five sandblasted blocks were coated with Shofu ceramic repair system. Five laser etched blocks were coated with coated with Ivoclar ceramic repair system and remaining five laser etched blocks were coated with Shofu ceramic repair system. All the twenty blocks were tested on universal testing machine for evaluating shear bond strength.

**Results**

Group I (Sandblasted cobalt chromium metal surface coated with Ivoclar ceramic repair system) has the highest shear bond strength compared to all other groups.

**Summary and Conclusion**

Within the limits of the present study it can be concluded that:-

- Group I – sandblasted cobalt – chromium metal blocks coated with Ivoclar ceramic repair system showed highest shear bond strength than all other three groups.
- Surface treatment with sandblasting or air abrasion with 50 $\mu$  alumina particles gave better result for shear bond strength assessment.
- For sandblasted groups, Ivoclar ceramic repair system gave the better shear bond strength value.

- For laser etched groups, Shofu ceramic repair system gave the better shear bond strength value.

However further clinical research is suggested in order to prove it as a reliable and successful treatment modality.

**Keywords**

Shear bond strength, Shofu Ceramic Repair System, Ivoclar Ceramic Repair System, Surface treatments, Sandblasting, Laser etching.