

**THE EFFECT OF TEMPERATURE ON SOME  
MECHANICAL PROPERTIES OF ZIRCONIA  
AS AN IMPLANT MATERIAL**

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## **SUMMARY**

This study was performed to evaluate some mechanical properties of new composition of partially stabilized zirconia as an implant material sintered by two different degrees of temperature (1350°C and 1200°C).

### **This properties include:**

- 1- Flexure strength.
- 2- Compressive strength.
- 3- Shear strength.
- 4- Modulus of elasticity.
- 5- Thermal conductivity.

### **Material:**

The material used in this study is a partially stabilize zirconia that composed of 3 powders (zirconium oxide 80%, yttrium oxide 3% and titanium oxide 17%).

### **Tests and Testing Devices:**

For each test in this study, specimens were divided according to sintering temperature into :

- Group A: Sintered at 1200 °C.
- Group B: Sintered at 1350 °C.

### **The Findings:**

There was a statistical significant difference between the mean values of the mechanical properties of specimens sintered at 1350°C and that sintered at 1200°C. The data of flexure,

compressive and shear strength, modulus of elasticity and thermal conductivity of partially stabilized zirconia sintered at 1350°C was greater than that processed at 1200°C.

## **Conclusions:**

*From this study it can be concluded that:*

- Addition of yttrium oxide and titanium oxide in such ratio participated in lowering sintering temperature of partially stabilized zirconia.
- 1350 °C sintering temperature seems to be a suitable degree for gaining favourable mechanical properties than 1200 °C.
- The change in sintering temperature with selected titanium oxide, yttrium oxide and zirconium oxide ratio played an important role in improving partially stabilized zirconia properties.
- Partially stabilized zirconia is a suitable material for the artificial dental root from the viewpoint of material technology and has a sufficient strength in occlusion.