

IADR/AADR/CADR 87th General Session and Exhibition (April 1-4, 2009): Flexural Strength of YPTZirconia Sintered Using Conventional and Microwave Sintering



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2971 Flexural Strength of YPTZirconia Sintered Using Conventional and Microwave Sintering

Location: A202 (Miami Beach Convention Center)

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Objectives: Yttria partially stabilized tetragonal zirconia is in widespread use as an all-ceramic framework material. Conventional sintering requires a 6 – 8 hour cycle. Microwave sintering may reduce sintering time to about 1 hour and reportedly improves mechanical properties. The purpose of this study is to measure the flexural strength of this zirconia materials sintered in a conventional and in a microwave furnace.

Methods: Sectioning of zirconia blocks was accomplished using a Buehler Isomet diamond saw. Blocks of the Vita YZ 40 zirconia were cut into bars and sintered to produce bars approximately 4mm x 2mm x 25mm. Discs of Lava were sectioned and sintered to produce discs approximately 1.2 mm thick x 15 mm in diameter. Specimens were randomly divided into two groups for each zirconia: One sintered in a conventional furnace according to the manufacturer's recommendations; Vita Zyrcomat and Lava Therm respectively. The other sintered in the Sintermat 1600 microwave furnace. Bars were then tested using a three-point bend test, span 15mm, with an Instron machine at a crosshead speed of 0.5 mm/min. Lava discs were tested using a biaxial strength test, pin on ring, three balls supporting the specimen with a center load applied using a stainless steel ball. Statistical analysis was conducted using ANOVA and Tukey post hoc test at p= 0.05.

Results:

Flexural Strength Analysis of Microwave and Conventionally Sintered Zirconia

Group	Strength (MPa)	Significant Difference
Lava Conventional	960.5 ± 100.8	A
YZ Conventional	950.2 ± 109.2	A
Lava Microwave	750.2 ± 120.8	B
YZ Microwave	762.3 ± 108.3	B

N= 12. Groups with the same letter are not significantly different.

Conclusions: There are significant differences between microwave sintering and conventional sintering. Microwave sintering of zirconia using this set of conditions produced significantly lower flexural

strength.

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