

## A Comparative Study of Mechanical Properties of Alumina versus Zirconia/Alumina Ceramic Abutment

Hyun-Suk Cha, Keun-Bae Kim, Jung-Suk Han, Dae-Joon Kim\*

*Department of Dentistry, Medical College, Ewha Womans University,*

*\*KIST(Korea Institute of Science and Technology) Ceramic Division, Seoul, Korea*

Ceramic applications in restorative dentistry have been highlighted due to its high esthetic qualities. A tooth colored ceramic material with high strength and biocompatibility can be a solution for esthetic demand. The application of alumina for all ceramic crown and implant abutment is good examples for this purpose. A new zirconia/alumina composite ceramic was developed for implant abutment. The purpose of this study was to compare the new material with commercially available alumina abutment in terms of mechanical properties.

Ten bar shaped specimens( $1.0 \times 0.7 \times 9.0$  mm) were prepared from five Ceradapt(Nobel Biocare, Sweden) and cold isostatic pressed zirconia/alumina block respectively. Three point bending test was performed by using universal testing machine under the special jig with cross head speed 0.07 mm/min. Also fracture toughness was measured using indentation methods.

The results of three point flexural strength test for alumina and zirconia/alumina composite showed mean value of 620MPa and 768MPa respectively. The fracture toughness of zirconia/alumina composite ceramic specimens( $9.2 \text{MPam}^{1/2}$ ) showed almost three times greater than alumina( $3.1 \text{MPam}^{1/2}$ ).

Within the limits of this study, the zirconia/alumina composite ceramic showed superior mechanical properties to alumina. This zirconia/alumina composite ceramic might be used for clinical purpose.

## Coordination Patterns of Masticatory Muscles in the Elderly without Tooth Loss

Seiya Tanaka\*, K. Kashiwagi, M. Tanaka, T. Kawazoe

*Department of Fixed Prosthodontics, Osaka Dental University, Osaka, Japan*

The loss of teeth and the decremental change of the masticatory muscle function will occur with age. There were few reports on this change in the elderly without tooth loss. The purpose of this study was to investigate differences in coordination patterns for masticatory muscles between the elderly and young without tooth loss during gum chewing. This study was performed on nine elderly(mean age  $71.6 \pm 5.7$ :elderly group) and twelve young(mean age  $24.6 \pm 2.3$ :young group) dentate volunteers. We used EMG linear envelopes(EMG LEs), normalized with respect to amplitude and stroke, for masticatory muscles. EMG signals were recorded from bilateral masseter and anterior temporal muscles on the preferred chewing side for 90 seconds. The incisal point movement was tracked using the Mandibular Kinesiograph simultaneously. Ten stable strokes were selected by the incisal point movement. Each stroke period was normalized to 300 points. Each stroke was normalized by setting the mean ensemble value over a single stroke to 100%. Ten normalized EMG LEs were averaged. Averaged EMG LEs of four muscles were evaluated by cluster analysis. Dendrograms of four muscles were different between two groups. The squared Euclidean