OI-3
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 cearmic 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 × 0.7 × 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 respectivley. The fracture toughness of zirconia/alumina composite ceramic specimens(9.2MPam$^{1/2}$) showed almost three times greater than alumina(3.1MPam$^{1/2}$).

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

OI-4
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± 5.7:elderly group) and twelve young(mean age 24.6±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 normailzed 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

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distances of elderly group decreased between both muscles on working side and the masseter muscle on non-working side. We concluded that activity patterns of masseter muscles on non-working side in the elderly without tooth loss came to be similar to masseter and anterior temporal muscles on working side.

Modern Development in Denture Labeling

Wan Mohdazhar Ibrahim*, Booi C. Ling
Faculty of Dentistry, University of Malaya, Malaysia

Contents : Denture labeling is an important tool in the identification for deceased bodies in the events of war, crime, air crash, civil commotion and other traffic accidents. Present denture labeling technique use characters of a larger font size which prevent more detailed vitals information to be included in the label. This can lead to the delay in the processes of identifying the deceased bodies. This paper presents a method of overcoming the problem by using micro-label.

Two micro-labeling techniques developed in the Faculty of Dentistry, University of Malaya were presented. These are the graphical image micro labeling and the computer-print micro-labeling techniques. Both techniques are easy to carry out that requires only material and equipment which can be found in most institutions and laboratories.

Experimental Study on Dimensional Changes of Three Kinds of Gypsum in Different Impression Materials

Qiaomei Yan*, F. J. Ouyang, J. Z. Zhang
School of Stomotology, Shanghai Second Medical University, China

Objective : To study the effect of impression material on the precision of working models.

Methods : Three kinds of model materials(general stone, hard stone and superhard stone) were poured into four kinds of impressions respectively and their dimensional changes were tested. Dimensional change rates were calculated and analyzed to predict the precision of working models.

Result : General stone shrank in the metal die while expanded extensively in the silicone rubber, alginate and agar die. The setting expansion rate of general stone in different model dies differs significantly and was unstable, which is not suitable as working modes. Setting dimensional change rate of hard stone in all the four dies were less than 0.15%, especially low in metal and alginate dies, which is stable and suitable for making general working cast. While showing an apparent expansion trend in metal die and an obvious shrinking behavior in agar die, setting dimensional change rate of superhard stone in sillicone and alginate dies were stable and less than 0.10% which can be used for precision casts.

Surface fineness of casts formed in agar impressions by hard and superhard stone were not as good as expected which can not be used into cast duplication. General stone has the highest expansion rate as well as good surface fineness, so it can be improved to be appropriate duplication materials.

Conclusion : This study indicated that the dimesional change rates of stone are related with the corre-