

## Measurements of shrinkage stress and reduction of intercuspal distance in maxillary premolars resulting from polymerization of composites and compomers

Soon-Young Lee\*, Sung-Ho Park

Department of Conservative Dentistry, College of Dentistry, Yonsei University, Seoul, Korea

### I. Objectives

The purpose of present study was to evaluate the polymerization shrinkage stress and cuspal deflection in maxillary premolars resulting from polymerization shrinkage of composites and compomers.

### II. Materials and Method

#### 1) Measurements of polymerization shrinkage stress

For measuring of polymerization shrinkage stress, Stress measuring machine(R&B, Daejon, Korea) was used. Composites and compomers which were used in this study were as follows: Dyract AP(Dentsply Detrey, Gumbh, German), Z100(3M Dental Products, St. Paul, USA), Surefil(Dentsply Caulk, Milford, USA), Pyramid(Bisco, Schaumburg, USA), Synergy Compact(Coltene, Altstätten, Switzerland), Heliomolar(Vivadent/Ivoclar, Liechtenstein), Heliomolar HB(Vivadent/Ivoclar, Liechtenstein), and Compoglass F(Vivadent/Ivoclar, Liechtenstein). Samples were light cured for 60s and data was stored in computer for 120s, and 15 measurements were made for each material. One-way ANOVA analysis with Duncan's multiple comparison test were used to determine significant differences between the materials.

#### 2) Inter-cuspal measurements

MOD cavities were prepared in 10 extracted maxillary premolars. The cavities were bonded with Clearfil SE Bond, and filled with composites and compomers which were mentioned above. And reduction of intercuspal distance was measured by strain measuring machine(R&B, Daejon, Korea). The composites and compomers were cured for 3 min and data of reduction of inter-cuspal distance was stored in computer for 10 min. One-way ANOVA analysis with Turkey test were used to determine significant differences between the materials.

### III. Results

#### 1) Polymerization shrinkage stress

Heliomolar, Z100, Pyramid < Synergy Compact Compoglass F < Dyract AP < Heliomolar HB ( $p < 0.05$ )

#### 2) Reduction of Inter-cuspal distance

Z100, Heliomolar, Heliomolar HB, Synergy Compact Surefil < Compoglass F < Pyramid, Dyract AP ( $p < 0.05$ )

### IV. Conclusions

Measurements of polymerization shrinkage stress and those of cuspal deflection of the teeth was different. There is no correlation between polymerization shrinkage stress and cuspal deflection of the teeth.