ONLINE ISSN : 1881-1361
PRINT ISSN : 0287-4547

Dental Materials Journal
Vol. 29 (2010) , No. 3 p.253-261

[PDF (1237K)] [References]

Mechanical properties of a resin-modified glass ionomer cement for luting: effect of adding spherical silica filler

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(Received October 8, 2009)
(Accepted December 15, 2009)

Abstract:
This study investigated the effects of spherical silica filler (SSF) on the workability and mechanical properties of resin-modified glass ionomer cements for luting (RMGICL). Varying powder/liquid ratios (P/L=2.0, 2.2, 2.4, and 2.6) of a commercially available glass ionomer cement (Fuji Lute, GC Corp.) were mixed with SSF at different weight percentages (5, 7.5, and 10%). On film thickness, statistically significant effects of SSF addition were noted at 2.5 minutes after mixing started, notably at P/L=2.4 and 2.6 when 7.5 and 10 wt% of SSF were added. The same result was also obtained for consistency evaluation. On mechanical and bonding strengths to the tooth substrate, no statistically significant differences were observed among all the SSF weight percentages within each P/L ratio. SSF-added RMGICL at a higher powder/liquid ratio exhibited increased mechanical and bonding strengths when compared to a control without SSF addition, but nonetheless maintained the film thickness with no further increase.

Key words:
Resin-modified glass-ionomer cement, Silica filler, Mechanical property

To cite this article:

Lihua E, Masao IRIE, Noriyuki NAGAOKA, Takashi YAMASHIRO and Kazuomi SUZUKI. Mechanical properties of a resin-modified glass ionomer cement for luting: effect of adding spherical silica filler . Dent. Mater. J. 2010; 29: 253-261 .

doi:10.4012/dmj.2009-092

JOI JST.JSTAGE/dmj/2009-092