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KEY WORD : CYANOACRYLATE ADHESIVE / TOXICITY / DENTURE /
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KALLAYA SUPUTTAMONGKOL : *IN VITRO* CYTOTOXICITY AND
TRANSVERSE DEFLECTION TEST OF HEAT-PROCESSED ACRYLIC RESIN
REPAIRED WITH FIVE CYANOACRYLATE ADHESIVES. THESIS ADVISOR :
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This study was performed to evaluate the cytotoxicity and bond strength of five commercially available cyanoacrylate glues used for repairing denture base compared to conventional repair technique. For the first objective, the agar overlay technique was used to evaluate the toxicity of five adhesives according to ISO TR7405 at various polymerization times, such as, one hour, six hours, one day and two days. The extracts of five adhesives at 37°C and 55°C were also tested.

Secondly, the transverse deflection test was performed to investigate the breaking forces obtained from acrylic resin specimens repaired with cyanoacrylate glues and conventional technique according to ISO 1567. Seventy-two acrylic resin specimens fractured by universal testing machine were used as test specimens. The specimens were divided into 6 groups. Five groups were repaired with various brands of cyanoacrylate adhesives namely: Kenji, Loctite, 3M, Alteco and Histoacryl®, by coating fractured specimens with adhesive and then fixing together in the holding device. For the last group, the fractured sites were prepared as round profiles and then repaired with autopolymerized acrylic resin under water at 37°C under the pressure of 30 lb/inch². The repaired specimens were kept in water at 37°C for 7 days before transverse deflection test.

Mean breaking force of conventional technique group (60±2.8MPa) was the highest and significantly different from all adhesive groups (22.2±2.9-40.3±4.7 MPa) as tested by one way ANOVA (P<0.05). For the results of cytotoxicity test, all adhesives except Histoacryl® were found to be toxic at initial polymerization and for up to one day. After that the toxic responses decreased and almost disappeared at two days. Histoacryl® was the least toxic adhesive in this study. It exhibited mildly toxic response at initial set and its toxicity almost vanished after one day. The results of extracts from five adhesives showed no toxic response at 37°C and 55°C in one hour. But one day extracts of Loctite and 3M at 55°C exhibited moderately toxic response.

The results of this study showed that cyanoacrylate adhesives as repairing material were inferior to conventional repairing material because of their lower strength. These adhesives also had toxicity which persisted for one day after use. These negative characteristics have made them improper for use in denture repair procedures.