Bonding Strength between acrylic teeth and different types of acrylic denture base materials

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Abstract

Statement of problem: Fracture of denture teeth from the denture base is a common problem associated with dental prostheses. Studies showed that tooth surfaces treated with chemical agents and mechanical features have the potential to improve bond strength.

Purpose: This study was conducted to evaluate the bond strengths of highly cross linked acrylic denture teeth after various ridge lap surface treatments (Cutting ridge lap; Cutting+ Acrybond; Cutting+ sandblasting and Cutting+ sandblasting+ Acrybond) to different types of denture base resins (conventional heat cured, High Impact heat cured, Castapress self cured), then compare the effect of microwave disinfection on bond strength between acrylic artificial teeth and those types of denture base resin mentioned previously.

Materials and method: 240 Maxillary central incisor (120 right sides, 120 left sides) denture teeth were selected and ground on the ridge-lap portion using a standardized jig. Specimens with groups **1.** Ground surface were used as controls. The experimental groups included: **2.** Ground plus Acrybond (bonding agent) **3.** Ground plus airborne-particle abraded, **4.** Ground plus airborne-particle abraded plus Acrybond. **For conventional heat cured specimens:** 80 artificial teeth (40 Right, 40 Left) were flasked and wax was eliminated with hot water, the resin were packed and cured by water bath. Then specimens were de-flasked and were finished and polished. **For High impact heat cured specimens:** 80 artificial teeth (40 Right, 40 Left) were flasked and wax was eliminated with hot water, the resin were packed and cured by water bath. Then specimens were de-flasked and were finished and polished. **For Castapress (Pour type) self cured specimens:** 80 artificial teeth (40

Right, 40 Left) were placed in a plastic flask and molded by Castasil 21 according to manufacturer instructions, after wax elimination, the resin were poured and cured in curing unit at 55ºC and pressure 2.5 bar for 30 minute then the specimens were finished and polished. All specimens were stored in distilled water at 37ºC in incubator for 7 days. Then 120 specimens were subjected to microwave disinfection in 200ml of distilled water at 700W for 6 minutes to a total of seven cycles of disinfection. Then teeth were held in metal fixture and subjected to compression testing (5 mm/min) at a 135-degree angle. Peak load to dislodgement was recorded and statistically analyzed.

Results: High impact denture base showed significant higher shear bond strength **(SBS)** to cross linked acrylic artificial teeth than conventional heat cured denture base, and the last showed significant higher **(SBS)** than Castapress pour type self cure denture base. Treatment of ridge lap tooth surface by (Cutting+ Acrybond) showed significant improvement in SBS than other type of ridge lap surface treatment. Microwave disinfection had non significant effect on **(SBS)** of artificial acrylic teeth and different denture base materials used in this study (Conventional heat cured, High impact heat cured, Castapress pour type self cure denture base).

Conclusion: The bond strength of cross linked artificial teeth to acrylic denture base affected by the type of denture base, treatment of ridge lap tooth surface, curing technique and thermal stress.

Microwave disinfection at 700W for 6 minutes to a total of seven cycles in 200ml of distilled water can be safely used with those types of denture base used in this study.