

## Safety

*in vitro study\**

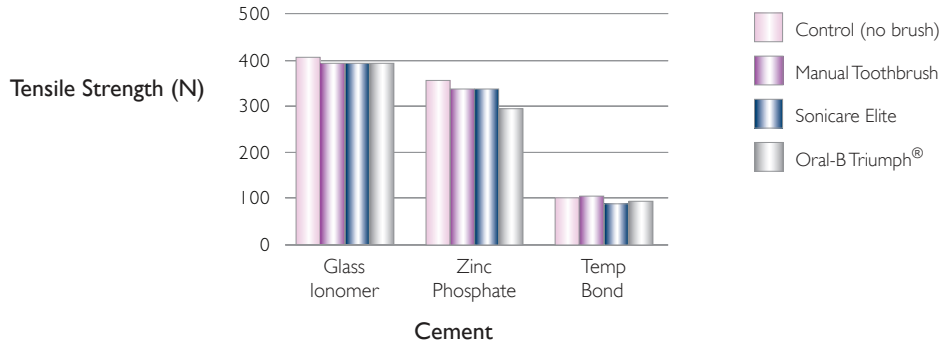
### Effect of power toothbrushes on retention strength of implant crowns and abutments under simulated clinical conditions

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Objective	To evaluate in vitro the effect of various modes of brushing on the tensile bond strength of cement retain implant supported crowns and screw loosening of screw retain implant abutment and coping.
Methodology	Two series of experiments were conducted to investigate whether the vibration produced by the brush heads of power toothbrushes might weaken the tensile bond strength of (temporary) cements of implant crowns, or induce screw loosening in the implant abutment assembly. The experiments evaluated the effect of brushing on 1) tensile strength needed to loosen gold copings bonded with three types of cements on implant abutments, and 2) the de-torque needed to loosen three screw retain implant abutments and one coping. Cements investigated included: Resin Modified Glass Ionomer; Temp Bond NE, Zinc Phosphate. Abutments included were Solid abutment, SynOcta 1 Piece abutment, SynOcta 2 Piece abutment and SynOcta 2 Piece Coping. Each abutment and the coping were fastened with the manufacturer recommended pre-torque. After thermocycling for an equivalent of two years, three groups were brushed with either a manual toothbrush (Oral-B P-35®, 250g brushing load), a rotating/oscillating toothbrush (Oral-B Triumph®, 150g load), or a sonic toothbrush (Sonicare Elite, 100g load) using a toothpaste slurry while simulating two years of typical use. A fourth group was used as control and not brushed. At conclusion, tensile force (N) to loosen the crowns and de-torque (Ncm) to loosen the abutments and coping were measured.
Results	Overall, no to minor significant differences between treatments and the control were noted in forces or torques needed to loosen the crown and abutments, respectively, indicating that a simulated two years of brushing did not negatively affect implant retention.
Conclusion	This study demonstrated that the use of Sonicare Elite or other power toothbrushes does not affect implant retention strength in vitro for up to two years of simulated clinical brushing with toothpaste. This suggests that the exerted vibration from using a power toothbrush has no effect on implant longevity, hence corroborating that power toothbrushes are safe to use with dental implants.

*\*Results will vary with actual use*

Debonding force by cement and treatment



Loosening torque by abutment and treatment

