



INTRODUCTION

The primary stability (PS) of dental implants is influenced by bone quality and implant macro-design.

OBJECTIVE

The purpose of this study was to compare the PS of narrow dental implants in artificial soft bone with varying lengths.

METHODS

Implants with 3.3 mm diameter and hybrid, tapered macro design (Implant Swiss™) were split into three groups based on lengths (Group A: 10mm, Group B: 12mm and Group C: 14mm). Each group of implants was placed in artificial bone blocks simulating soft (type IV) bone (Figs. 1-3). Fifteen implants in each group were placed. PS was measured with insertion torque (IT values in Ncm) and resonance frequency analysis (RFA, ISQ values, Osstell). A repeated ANOVA test was conducted for statistical comparison (Figs. 4, 5).

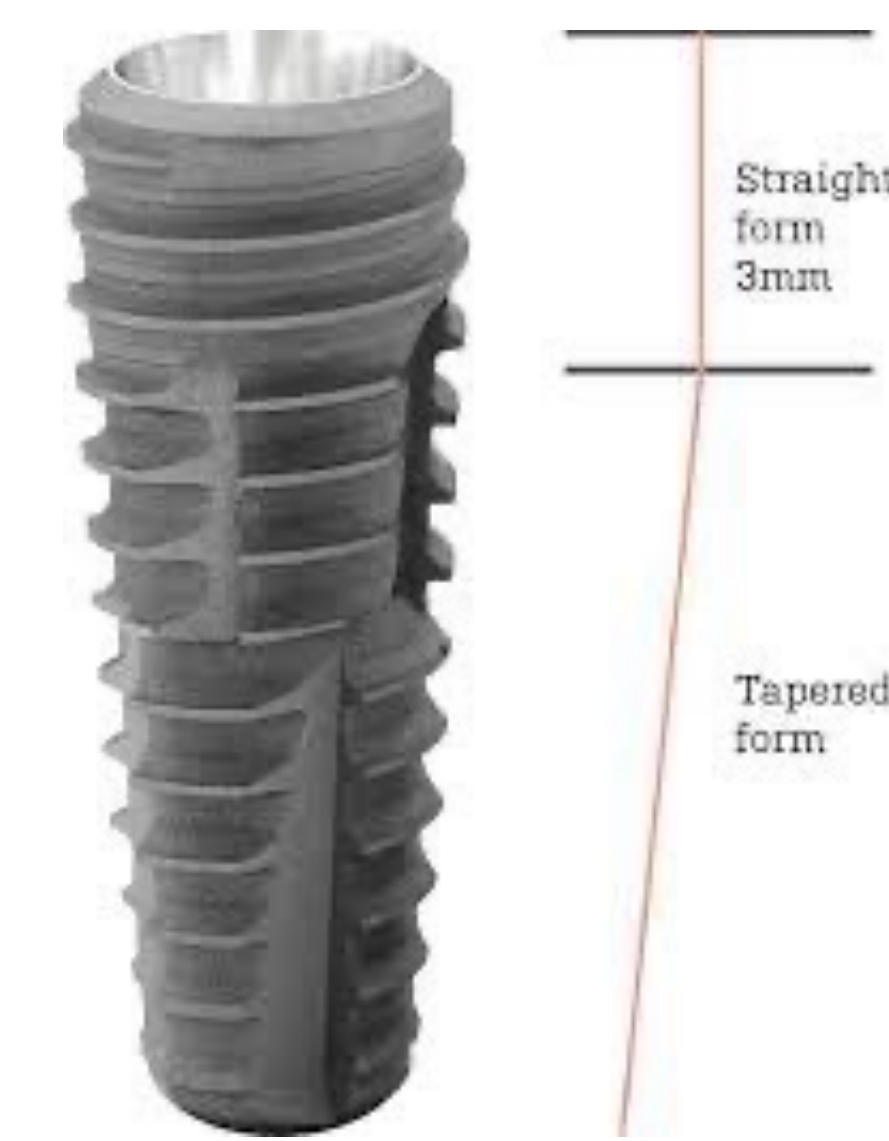


Figure 1: Implant system (Implant Swiss™)



Figure 3: Implant placement in artificial, polyurethane, soft (type IV) bone



Figure 4: Implant with SmartPeg insert placed for implant stability measurement



Figure 2: Implant distribution for the study

3.3 mm x 10 mm implant
3.3 mm x 12 mm implant
3.3 mm x 14 mm implant



Figure 5: Osstell device for resonance frequency analysis (RFA)

RESULTS

All implants were mechanically stable. The mean values ($\pm$ SD) for IT and ISQ values were as follows, respectively. Group A: (10 ± 0 ; 62.8 ± 1.36), Group B (10 ± 0 ; 64.2 ± 1.60), and Group C (10.3 ± 1.2 ; 66.4 ± 1.05). The statistical comparison for IT showed no significant difference between the groups; however, the RFA showed a statistically significant difference between the implant lengths ($p < 0.05$).

Mean Values of Groups ($\pm$ SD)

	Group A 3.3 x 10mm	Group B 3.3 x 12mm	Group C 3.3 x 14mm
IT (Ncm)	10 (± 0)	10 (± 0)	10.3 (± 1.2)
RFA (ISQ)	62.8 (± 1.36)	64.2 (± 1.60)	66.4 (± 1.05)

CONCLUSION

Within the limitations of this in vitro study, the PS of narrow implants with hybrid design placed in soft artificial bone is dependent on implant length considering RFA values but not IT values. However, all values are clinically acceptable.



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FIGURES

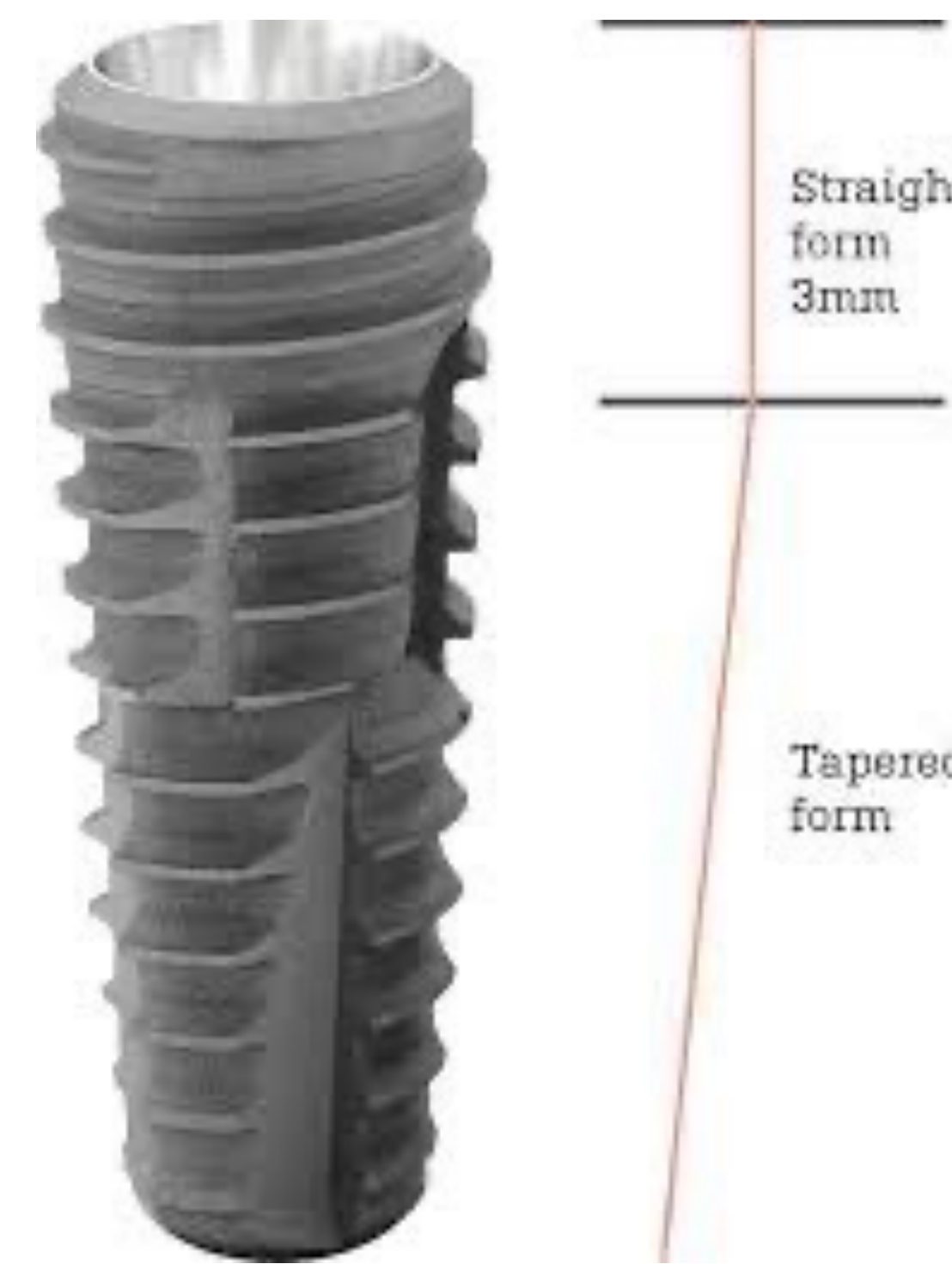


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