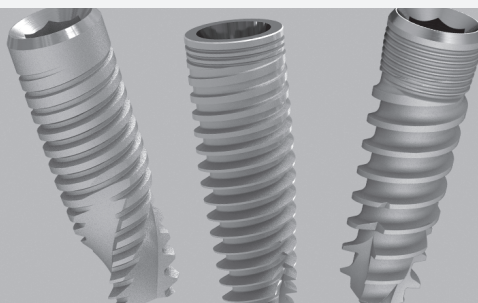


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Biomechanical Evaluation
of Dental Implants with
Three Different Designs:
Removal Torque and
Resonance Frequency
Analysis in Rabbits.



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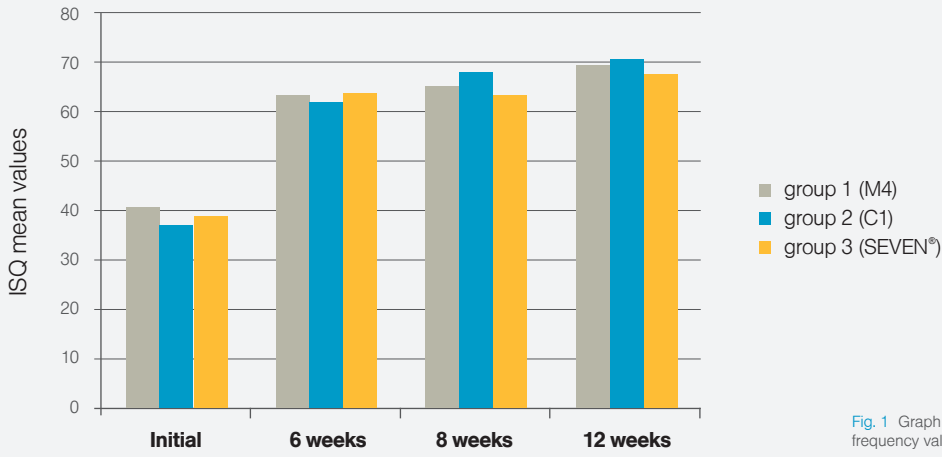


Fig. 1 Graph of the mean resonance frequency values in the groups.

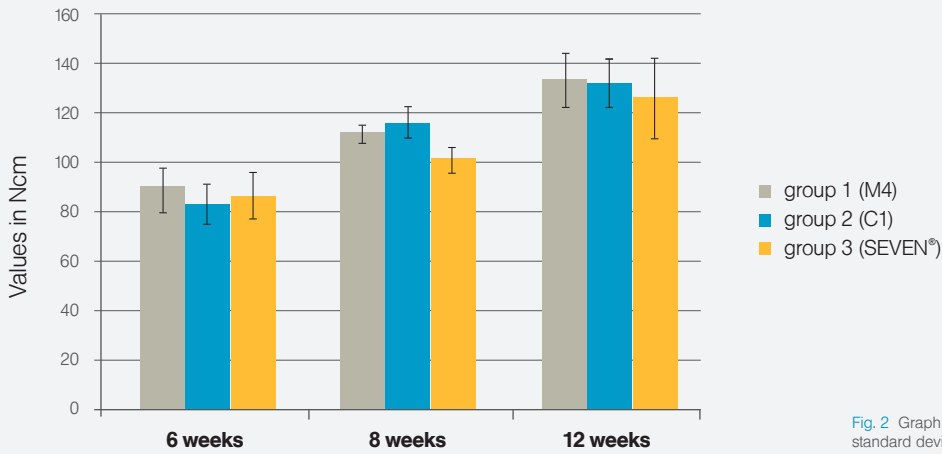


Fig. 2 Graph of the torque removal and standard deviation values in each time.

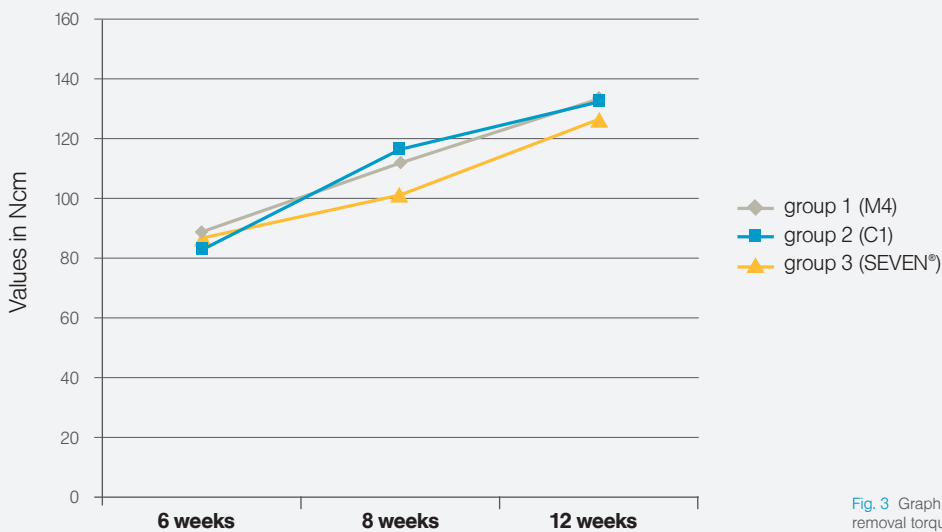


Fig. 3 Graph showing the evolution of the removal torque values.

Biomechanical Evaluation of Dental Implants with Three Different Designs: Removal Torque and Resonance Frequency Analysis in Rabbits.

Sergio Alexandre Gehrke, DDS, PhD

Abstract

The development of different dental implant materials, designs, and treatment techniques has not always produced expected or desired results. Additional studies on optimizing the connection between artificial materials and the body's tissues are needed. Therefore, the purpose of this study was to investigate the effect of variation in the design of dental implants on the stability and removal torque after implantation using a rabbit tibia model.

Materials and methods

Three test groups were prepared using conical implants manufactured by the same company, thus standardizing the type of surface used. The implant models were based on MIS implants (Bar Lev Industrial Park, Israel) and determined the groups: M4 – group 1; C1 – group 2; and SEVEN® – group 3. Nine rabbits received 54 tibia implants. The resonance frequency was analysed four times (0, 6, 8 and 12 weeks), and removal torque values were measured at three time points after the implantations (6, 8 and 12 weeks).

Results

Using a one-way ANOVA test to compare the stability and resistance to reverse torque based on the implant stability quotient at the four time points, the test results were highly significant (Fig. 1), and it was thus concluded that there is an important effect among the

groups, based on significance set at $p < 0.05$. The reverse torque was compared in the groups at the three time points (Figs. 2 and 3) and was shown to be significantly different among the groups ($p < 0.05$).

Conclusion

The implant design appears to increase the stability and removal torque. Under the limitations of this study, however, it is possible that in cases in which there may be low osseointegration response, the implant design should be evaluated.