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## Influence of implant diameters on the integration of screw implants: experimental study in rabbits



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### Purpose

The purpose of this study was to investigate the influence of implant diameters on the integration of implants in the rabbit femoral condyle and tibial metaphyses.

### Method

Twenty rabbits were used in this study. Two implants 3.75-mm in diameter and 6.0-mm long were inserted through one cortical layer in the left tibial metaphyse and one 3.75-mm implant was inserted in the femoral condyle. 5.0-mm implants were inserted in the right side in the same manner. Total 120 implants are used. After a healing time of 4 and 12 weeks, the peak removal torque value required to shear off the implants was recorded. From the removal torque values(Ncm) obtained, a mean shear stress(N/mm<sup>2</sup>) was calculated. And the percentage direct bone-to-implant contact and the percentage of bone area inside the thread were calculated. Statistical analysis were performed using t-test(p<0.05).

### Results

The results were as follows:

- 1) The biomechanical tests showed a statistically significant increase of removal torque value with increasing implant diameter.
- 2) The difference of shear stress value between 3.75-mm and 5.0-mm diameter implants was not statistically significant (p>0.05).
- 3) The percentage direct bone-to-implant contact had no statistical difference between two groups (p>0.05).
- 4) The percentage of bone area inside the thread had no statistical difference between two groups (p>0.05).

### Conclusion

It is concluded that the degree of osseointegration is not influenced by increasing implant diameter in the rabbit bone.