P-BR-102

BASIC RESEARCH

Removal Force of Conometric Caps and Abutments
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Abstract

The retention of a conometric connection was loaded with 200 N, 400 N and 600 N to simulate maximum biting forces. Subsequently, the conometric caps were pulled off to measure the retention to the conometric abutments. The removal force increased with increasing pre-load, but flattened out at higher loads (400 N – 600 N). This supports the assumption that even at higher chewing forces the retention of the conometric caps is maintained.

Methods and Materials

Conometric caps (Ankylos Ø 3.3 mm, Dentsply Sirona Implants) were assembled on conometric abutments (Acuris, Dentsply Sirona Implants) that were screwed in embedded implants. A spherical loading cap was plugged on and the samples were loaded axially (0°) with 200 N, 400 N and 600 N respectively. Subsequently, the caps were pulled off to measure the retention of the conometric cap to the conometric abutment.

Results

The retention of a single tooth restoration with conometric connection is dependent on the cone angle, coefficient of friction and push-in force. The biting force defines the push-in force. Studies have measured the maximum bite force, with a large variation in the results in the range of 500-1000 N [1-6] for molars and 100-500 N [3-5] for incisors. This study was set up to evaluate the retention of a conical connection between cap and abutment.

Boxplot of retention over axial pre-load

The release force of the conical connection increased with increasing axial force, but flattened out at higher loads. A statistical difference in removal force was seen after preload with 200 N compared to the removal force after preload with 400 N or 600 N. However, there was no statistically significant difference seen between the removal force after preload with 400 N and 600 N. There is sufficient evidence to assume that the data is normally distributed (probability plot p >= 0.05).

Conclusion

The test has shown that the retention of conometric caps (Ankylos, Ø 3.3 mm) to conometric abutments (Acuris) subjected to 400 N or 600 N is comparable whereas the retention of conometric caps pre-loaded with 200 N is significantly lower. This leads to the conclusion that the release force of the conical connection increased with increasing axial force, but flattened out at higher loads.

References