

# Machined abutment screw loosening on internal morse taper-connection implants: A preliminary *in vitro* study.

Medina M, Félix LF, Gómez-Polo C, Ortega R, Del Río Highsmith J, Gómez-Polo M. Prosthesis Department. Complutense University of Madrid.

## Abstract

12 Mozo Grau® were divided into 2 groups of six implants. Each implant assembly was tightened to 20 Ncm. A cyclic load was applied to each implant abutment equal to 1 year simulated function.

Reverse torque values (RTV) were lost in each implant assembly when applied a cyclic load.

Although statistically significance were found, differences when comparing groups A to group B seems to be of minor clinical significance.

## Background and Aim

- Screw loosening has been reported as one of the most frequent complications in implant supported single crowns. Nevertheless, the factors that influence in this mechanism have not been clearly established. Rigorous efforts to reduce the recurrence of abutment screw loosening in single-tooth implant restorations have been developed including changes in implant design, screws and abutments.
- The aim of this preliminary *in vitro* study was to analyze the screw loosening of two types of machined prefabricated abutments for internal morse taper connection implant system when a cyclic loading was applied.

## Methods and Materials

12 Mozo Grau® Internal Implant Connection System® (3, 75 x 11, 5 mm) implants were divided into groups A and B.

Group A consisted of six 0° (4 mm) implant abutments and

Group B consisted of six 15° (4 mm) implant abutments.

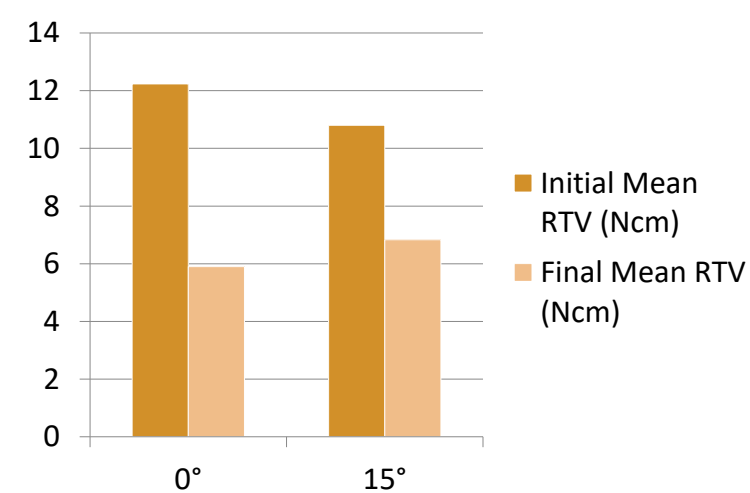
Each implant assembly was tightened using an implant motor (IChiroPro Bien Air®) to 20 Newton centimeters (Ncm) and placed on a custom made implant fixing jig. Cyclic loading was applied simulating masticatory movement (300, 000 cycles / 200N / 2Hz) (equivalent to 1 year of simulated function). Reverse torque was recorded before and after loading. The reverse torque value (RTV) data were analyzed using Wilcoxon signed-rank test ( $p < .05$ ).



## Results

Reverse torque values were lost in each implant assembly when applied a cyclic load. The average RTV before loading for group A was (12,14 ± 1,289 Ncm) and after loading the RTV were (6,30 ± 1,34 Ncm). For group B the average RTV before loading were (10,80 ± 1,26 Ncm) and after loading the RTV were (6,71 ± 0,72).

Statistically significant differences were obtained when group A ( $p < .046$ ) and group B ( $p < .028$ ) was exposed to a cyclic load. Likewise, there were also statistically significant differences in the reverse torque difference values in group A as compared to those of group B ( $p < .003$ ).



## Conclusions

Within the limitations of this preliminary *in vitro* study, it was concluded that:

- (1) Both group showed decreased RTV after cyclic loading of 1 year simulated function.
- (2) Although statistically significance was found, differences when comparing group A to group B seems to be of minor clinical significance.

## References

- Khraisat A, Abu-Hammad O, Dar-Odeh N, Al-Kayed A. Abutment Screw Loosening and Bending Resistance of External Hexagon Implant System after Lateral Cyclic Loading. Clin Implant Dent Relat Res 2004; 6; 157-64.
- Khraisat A, Hashimoto A, Nomura S, Miyakawa O. Effect of lateral cyclic loading on abutment screw loosening of an external hexagon implant system. J Prosthet Dent 2004; 91; 326-34.