

Comparison of Torque Measurements and Clinical Handling of Various Surgical Motors

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Introduction

Implantological units with brushless motors do not only provide a high performance while preparing implant sides in dense bone, they also allow to document the insertion procedure and can be used to fix the prosthetic screws with a definite torque. The aim of the study was to determine the accuracy of the applied torque and to judge the reliability of the different units.

Material and Methods

The following units were evaluated:

- **Chiropro 980**, Bienair, Bienne, Swiss
- **INTRAsurg 300**, **INTRAsurg 500**, KaVo, Biberach, Germany
- **FRIOS Unit E**, DENTSPLY Friadent, Mannheim, Germany
- **Osseocare**, Nobel Biocare, Goteborg, Sweden
- **Elcomed SA-200 C**, W&H Dentalwerk, Buermos, Austria
- **Osseo System**, XO Dentalcare, Horsholm, Danmark

The torque was measured for typical surgical and prosthetic procedures by a special load transfer mechanism for the torque gauge AFT1 (Halmech, Schwenningen, Germany).

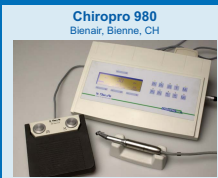


For each program 30 measurements were performed. The statistical analysis was performed with SPSS for Windows. The deviations of the torque from the pre-setting were shown in percentage values of the set-point.

The following units had the possibility for an individual set for the torque for each treatment. FRIOS Unit E, Elcomed SA 200 C. The individual control of the torque (picture nextby) allows the calibration of the actual used handpiece. The units INTRAsurg 300 and INTRAsurg 500 require a yearly calibration with the standard used handpiece. The units Chiropro 980, Osseocare and Osseo System have only a calibration prior to delivery.



Calibration of hand-piece for 10 Ncm for FRIOS Unit E



Chiropro 980
Bienair, Bienne, CH



FRIOS Unit E
DENTSPLY Friadent, Mannheim, D



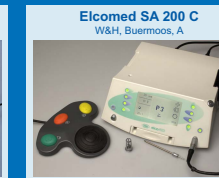
INTRAsurg 300
KaVo, Biberach, D



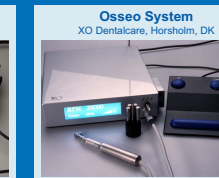
INTRAsurg 500
KaVo, Biberach, D



Osseocare
Nobel Biocare, Göteborg, S

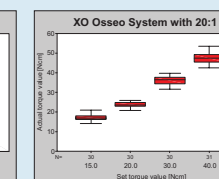
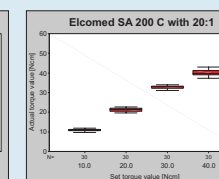
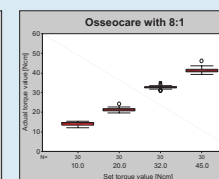
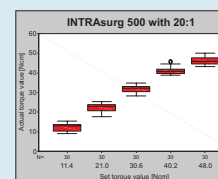
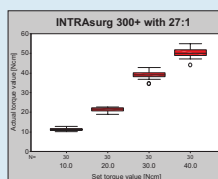
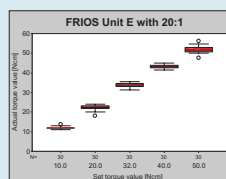
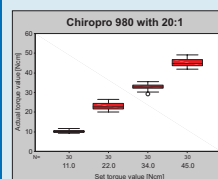


Elcomed SA 200 C
W&H, Buermos, A

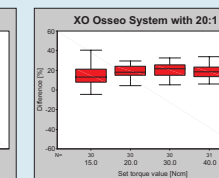
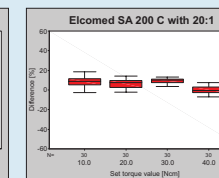
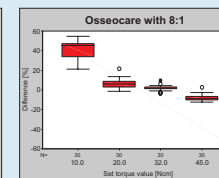
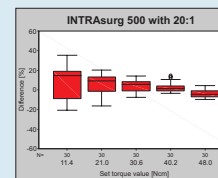
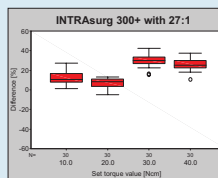
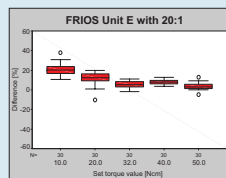
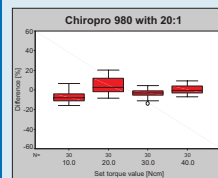


Osseo System
XO Dentalcare, Horsholm, DK

Absolute Difference of Set Torque Value and Actual Torque Value



Percentual Difference of Set Torque Value and Actual Torque Value



Results

Comparing the percentual difference of the units for the implant handpieces 20:1, 27:1 or 8:1 showed with the Bonferroni-adjusted Two-sample test that there is a significant difference between chiropro 980 and INTRAsurg 500 and Elcomed SA 200 C and the group of FRIOS Unit E and Osseocare and the group of XO-

Osseo System and INTRAsurg 300+. While the chiropro 980 showed always to little values the other units showed values higher than the set values. Four units showed a variation of less than 10% and a standard deviation below 10%. The Osseocare system showed the highest standard deviation and the

INTRAsurg 300+ and the XO Osseo System showed a variation of the set value of 18%. The surgical motors showed also different behavior at reaching the maximum torque. Some motors applied the pre setted torque, which can lead to a force which does not allow to release the instruments easily.

Summary

Surgical motors for implant treatment show an acceptable torque measurement in the different working areas for the fixation of prosthetic screws or the torque control during implant insertion. Due to the different handling the optimum choice for one of the units has to be made by the specific needs for each individual office.

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Bridging the Future with Implants

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