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Precision of Implant Surgical Guides in Computer-Assisted Dental Surgery

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Objectives In this *in vitro* study, the precision of implant surgical guides and the dependence of the technique was investigated, which is divided into "*guided*" and "*fully guided*". The project was digitally designed and manufactured using 3D printing. A model was designed and the corresponding drill template with associated implants was created using the coDiagnostiX™ planning program.

Methods Three groups were formed. Each group was divided into "*novice*", who had no experience in placing implants, "*advanced*", who had 15 years of experience and "*expert*", who had 30 years of experience. The entire project was digitally designed and manufactured using 3D printing. A model was designed and the corresponding drill template with associated implants was created using the coDiagnostiX™ planning program. The models were produced in a standardized manner. The implants were placed by each operator in five models, three "*guided*" and three "*fully guided*". DVT was made and the planning position could be compared with the achieved position.

Results The results after statistical analysis with the program R Core Team showed that the comparison of the two techniques "*guided*" to "*fully guided*" is statistically significant for all three measured 3D values, apical, basal and angulation. All values refer to the deviation from the planned situation. Median basal values are 0.90mm for "*guided*" and 0.56 mm for "*fully guided*". Apically, the values are 1.13 mm median for "*guided*" and 0.73mm for "*fully guided*". The median values for "*guided*" in relation to "*angulation*" are 2.40 degrees and for "*fully guided*" 2.00 degrees.

Conclusions The null hypothesis based on the data was confirmed here. The practitioner makes no difference in this case. Therefore, experience makes no difference in the use of templates. The initial hypothesis was refuted. In further studies, however, the parameter of time should also be applied; a study already conducted suggests that this provides essential differences between practitioners with different levels of experiences.