SIMPLANT® – accuracy with computer guided implant treatment

SIMPLANT computer guided implant treatment offers a comprehensive 3D option for accurate and predictable implant placement and involves five distinct steps: 1) data acquisition, 2) implant planning and guide selection, 3) drill guide design and manufacturing, 4) surgical intervention and 5) immediate restoration (optional).

The SIMPLANT Guide is a surgical template, custom made for each patient’s clinical situation. The guide provides means for accurate drilling and implant placement and is designed to give greater control and to minimize the risks involved with standard, “free-hand”, implant placement. It is difficult to quantify the accuracy of each individual step in this process, therefore when discussing accuracy it is mainly the overall accuracy that is discussed, which is determined by comparing the pre-operative implant position planning with the actual post-operative implant position.

Accuracy with SIMPLANT guided surgery is clearly higher than for non-guided surgery. However, linear and angular deviations are to be expected also when applying guided surgery, which is reported in experimental as well as clinical studies, thus, underlining the importance of keeping a safety distance also when using guided surgery.

Deviations with guided surgery are multifactorial. Patient specific anatomical features, such as bone density at the implant site affect the accuracy. This is also true for the implant position in the mouth with smaller deviations when placing implants in the anterior region compared to the posterior region as well as placement in the lower jaw compared to the upper jaw. The correct positioning of the guide in the mouth and its stabilization during surgery are main factors for achieving accuracy, where rigid screw fixation of a single guide incorporating metal sleeves and the use of special drill guided surgery instruments can minimize deviations. The tolerance of the drills within the drill guide/ keys, i.e. the sleeve-drill gap, allows for certain degrees of freedom when placing the implants, therefore it is important to keep the drill in a centric position parallel to the cylinder for optimal accuracy, as shown in vitro. Smaller deviations were observed when the sleeve insert became longer. Furthermore, experience of the operators have been suggested to improve the accuracy although not confirmed clinically.

Smoking has been indicated to increase inaccuracy for mucosa-supported guides and short implants have shown lower apical deviations compared with longer implants. Choice of guided support (tooth, bone or mucosa) has also been suggested as a contributing factor when achieving accuracy.

In summary, SIMPLANT computer guided implant treatment results in high accuracy of implant placement leading to predictable clinical outcomes. Recently, a review article reported SIMPLANT being the most used software system for 3D planning in clinical trials.


