# A safe and predictable treatment option for experts and beginners

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## Purpose

The aim of the present prospective study is to compare the virtual planning accuracy and template-related complications between expert and novice users of guided implant placement. The null hypothesis was that there would be no differences between groups.

## Materials & Methods

**Study design : A prospective comparative study.**
**Subjects and Outcomes of the study**
- **Period** : From September 2017 to May 2018.
- **Patients**
  The first group treated by a clinician with expertise in guided implant placement (MT) : 18 patients(13 women, 5 men; mean age, 51.2 years) with 48 implants were treated by the expert clinician The second group treated by clinicians without expertise in guided implant placement (first procedures) : 13 patients (7 women, 6 men; mean age, 49.6 years) with 28 implants were treated by novice clinicians.

- **Outcome measures**
- Failures: The stability of individual implants was assessed during the delivery of the definitive crowns by tightening the abutment screw with a torque of 20 Ncm, and then by percussion testing one year after implant placement.
- Complications: Early surgical and template-related complications (limited access in posterior areas, buccal bone dehiscence due to a mismatched surgical template, insertion of a different implant than planned, and fracture of the surgical template) were recorded.
- Accuracy: Three deviation parameters (horizontal, vertical, angular) were defined and calculated between the planned and placed implant positions. The postoperative STL file, derived from the intraoral scan, was geometrically aligned with the files exported from the planning software by automated image registration (Dental Scan, ver. 6; Open Technologies, Brescia, Italy) (Fig. 11).

## Results

All implants were inserted in healed sites according to the manufacturer°Øs instructions, with insertion torques ranging between 35 and 45 Ncm. By the end of the study, no patients had dropped out, no implants had failed and no complications had occurred.

- Total mean error in angulation
  expert clinicians : 2.96° $\pm$2.28°(range, 0.2°- 6.8°; 95 % CI, 1.46°- 3.94°)
  novice clinicians : 3.61° $\pm$3.0°(range, 0.2°- 11.8°; 95 % CI, 0.97°- 4.23°)
- The mean error in the horizontal (mesiodistal) plane
  expert clinicians : 0.64° $\pm$0.32mm (range, 0.2 - 1.5mm; 95 % CI, 0.43 - 0.77mm)
  novice clinicians : 0.97° $\pm$0.55mm (range, 0.44 - 2.53mm; 95 % CI, 0.59 - 1.19mm)
- The mean error in the vertical (apicocoronal) plane
  expert clinicians : 0.38° $\pm$0.32mm (range, 0.08 - 1.0mm; 95 % CI, 0.13 - 0.47mm)
  novice clinicians : 0.40° $\pm$0.41mm (range, 0.0 - 1.3mm; 95 % CI, 0.0 - 1.44mm)

Subgroup comparison of implant accuracy between expert and novice clinicians revealed no statistically significant differences between both open and closed windows.

## Conclusion

With the limitations of the present study, novice users can achieve similarly successful results to expert clinicians with computer-guided template-assisted implant placement in combination with the newly developed sleeveless templates and dedicated drills.