

Placing parallel implants by a universal surgical guide kit to avoid complications

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Background

When implants are placed improperly, *e.g.*, with wrong intervals with neighboring teeth, tilted towards lingual or buccal side, complications related to implant treatments are often encountered. It includes thread damage, fracture, retarded osseointegration, bacterial plaque colonization and even periimplantitis. Also unavoidable are sequential prosthodontic complications, such as hard to handle the gingiva reaction and hygien possibility, and necessary to involve angled abutments.

Aim/Hypothesis

To develop a surgical guide kit for placing implants parallel to avoid unnecessary complications. Such a guide kit is simple, cheaper, and more accurate. It is universal, can be repeatedly used, thus fundamentally differs from the current customized surgical guide designed based on CBCT technique.

Material and Methods

A dental drilling guide kit that enables the preparation of parallel drill holes with high accuracy is developed. Made of zirconia this guide kit is universal, fast and easy to manufacture in a very cost effective manner by avoiding the use of CBCT, thus exposes patients to less X-ray radiation.

The guide kit is flexible and easy to use whilst still providing excellent results. Ten patient cases are reported, with one, two, up to nine implants placed parallel to each other using a neighbouring tooth with occlusal as a reference in both upper and lower jaws. Both conventional bone-level titanium implants and novel one piece zirconia implants are placed. Digital X-ray imaging is take to give a 2D view of the implants and to check their parallelism. Standardized titanium bases are used, upon them another half abutments together with crowns/bridges customized made as one unit of full anatomy contour zirconia abutment-crowns/bridges are retained either by screws or cementation.

Results

Figure 1(a) shows the design of one of such guide kits. The distance between the three holes are predetermined according to the statistics of the tooth distance, the parallelism among the holes are secured by the CAD/CAM technology used for making the kit in zirconia (b). As illustrated by Figure 1 (c), the kit is in use by using the neighbouring tooth 32 with occlusal as a reference. The resulting implant parallelism is viewed by the digital X-ray imaging shown in Figure 1(d).

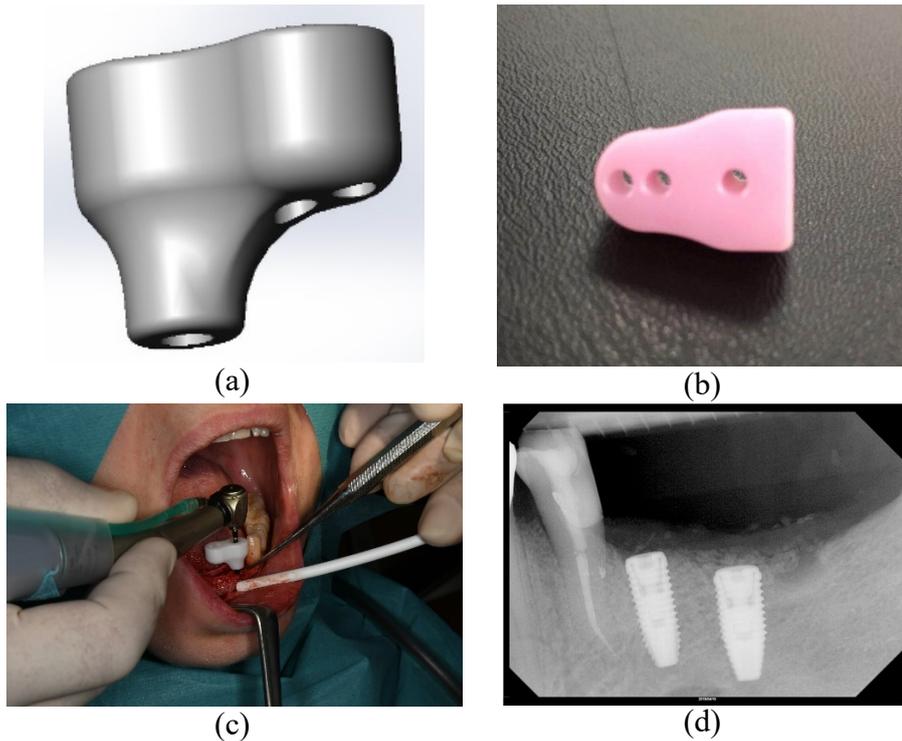


Figure 1. The guide kit and its clinical use for guiding the placement of two implants in parallel. (a) a draw of the design; (b) the kit made of zirconia; (c) the kit in clinical use; (d) two implants placed in parallel by using the neighbouring tooth 32 with occlusal as a reference.

Conclusion and Clinical implications

A surgical drilling guide kit is developed. Made of zirconia this universal it is manufactured with high precision that ensures even improved parallelism of implants placed with the help of surgical guide designed and made based on CBCT images. The former is cost-effective and exposes patients to less X-ray radiation. The clinical implication is obvious of such a guide kit for reducing the complications related to the implant parallelism, particular to the coming one piece zirconia implants.

Keywords: Dental implants, Surgical guide, Parallelism, complications

Topic selection: Clinical Innovation

Type of presentation: Oral Communication