BACKGROUND
Immediate implant placement (IIP) gained popularity due to its shorter treatment time, fewer surgeries, and similar survival rate to delayed placement (Lang et al. 2012). In the aesthetic region, a flapless approach is recommended in type I sockets, since it is considered to be less invasive, provides better soft tissue healing and patient comfort, and most importantly reduces bone resorption (Mazzocco et al. 2017). However, recession of the buccal soft/hard tissue in IIP is still a common occurrence that could be caused from the facial malposition of implants (Chen & Buser 2009; Cuyt et al. 2012). Implants with a buccally-positioned shoulder showed 3 times more recession than those with a lingually-positioned shoulder (Evans & Chen 2008). Therefore, the benefits of flapless IIP surgery could possibly turn into an aesthetic disaster.

In the process of IIP in the anterior maxilla, due to the morphology of the socket, drills and implants are more likely to follow the pathway with the least resistance, which results in more buccal deviation (Koticha et al. 2008). Therefore, the benefits of flapless IIP surgery could possibly turn into an aesthetic disaster.

MATERIALS & METHODS

8 cadaver heads 24 implant sites (maxillary incisors)

1. Freehand surgery
2. Guided surgery

Specimen Screening Implant planning & guide printing Tooth extraction & implant placement Validation

OBJECTIVES
1. To assess the accuracy of computer-guided surgery on flapless immediate implant placement in anterior maxilla.
2. To compare the accuracy of computer-guided surgery and freehand surgery in this clinical situation.

RESULTS

In this split mouth design, 24 maxillary incisors in 8 human fresh cadaver heads were included in this study. Before the surgery, CBCT scans and impressions were acquired, and all implants were planned with the software (blue sky Plan3, Blue Sky Bio, Grayslake, IL) and guides were printed by a 3D printer (Form 3 SLA 3D printer). Then, implant sites were randomly divided into 2 groups: freehand group (n=12) and computer-guided group (n=12), and two types of surgeries were performed. To assess any differences in position, the preoperative CBCT was subsequently matched with the postoperative one. For all the implants, the global, angular, depth, and lateral deviations between the virtually planned and the achieved implant positions were measured. The lateral deviation was further subdivided into bucco-lingual and mesio-distal deviations. Besides, perforations of incisive canal or buccal apical bone were checked after immediate implant placement with or without flap elevation.

A significant lower mean angular deviation (3.11±1.55°, range: 0.64–4.95°) as well as the global deviation at both coronal (0.8±0.38 mm, range: 0.42–1.51 mm) and apical level (0.9±0.34 mm, range: 0.64–1.72 mm) were observed in the guided group when compared to the freehand group (6.78±2.31 mm, range: 3.08–14.98 mm, 1.42±0.49 mm, range: 0.65–2.31 mm and 2.20±0.79 mm, range: 1.01–4.01 mm). However, the accuracy of these 2 approaches was similar for the depth parameter (P=0.847). In the bucco-lingual direction, the mean deviations of these two groups showed a general tendency of implants to be positioned facially, occurring more in implants of the freehand group.

CONCLUSION
In flapless immediate implant placement, computer-guided surgery showed superior accuracy than freehand surgery in transferring the virtual implant position to the actual bone site. However, even with the help of a guide, the final fixture position has a tendency to shift towards a facial direction.

REFERENCE

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