

# DIGITAL ANALYSIS OF LABIAL ALVEOLAR CHANGES AFTER SOCKET SHIELDING WITH A ROOT SECTIONING GUIDE: A CLINICAL TRIAL

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## INTRODUCTION

Socket shield is technique sensitive but is reported to yield superior esthetic outcomes.

The objective of this study is to digitally evaluate the dimensional changes of the labial alveolar ridge after socket shielding with computer guided root sectioning.

## METHODOLOGY

Ten hopeless teeth in the esthetic zone were included.

A computer designed, 3D printed surgical guide was used to section the root, leaving the coronal 2/3 of its labial part attached to the socket. An implant was then placed palatal to the root fragment.

Preoperative and Postoperative (5 months later) intraoral scans were superimposed with a digital software to assess the dimensional changes of the labial alveolar ridge.

Linear dimensional changes at 1,3 and 5 mm apical to the gingival margin were measured, as well as mean linear changes in a specified Area Of Interest (5×5 mm) apical to the gingival margin (AOI).

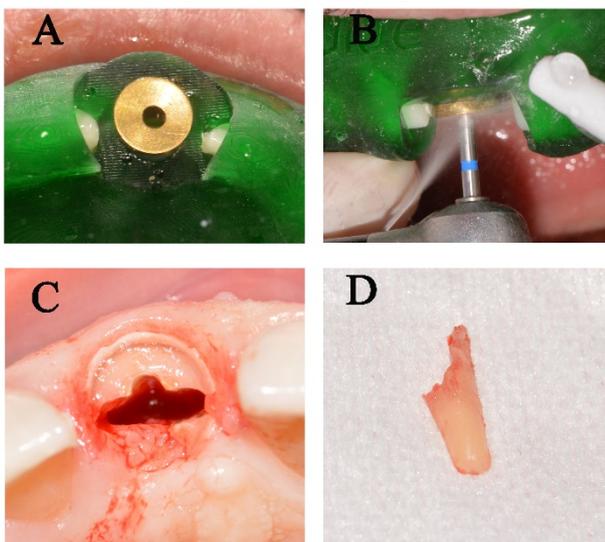
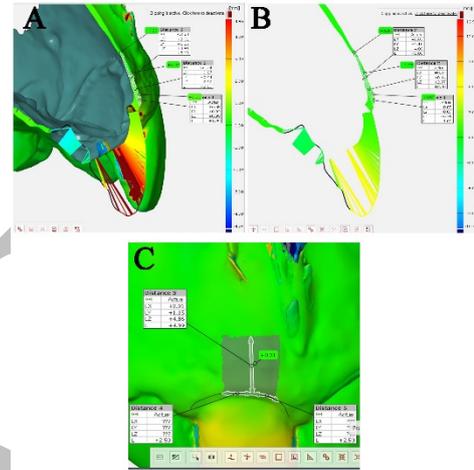


Figure (1): A. Intraoral verification of the guide. B. Drill advancement through the guide sleeve. C. Mesiodistal extension of the drilled hole. D. Extracted palatal fragment with apex.

## RESULTS AND DISCUSSION

The accuracy of the sectioning guide was confirmed with periapical radiographs taken after the surgical drill was advanced through the guide sleeve. The tip of the drill was found to be superimposed on the radiographic apex. The extracted palatal fragment was always associated with the root apex which ensured total removal of the apex and any residual inflammatory tissues.

Mean preoperative thickness of the labial plates of bone was  $0.99 \pm 0.65$  mm. In 6 cases, the labial plate of bone was



thinner than 1 mm ( $0.54 \pm 0.27$  mm). 4 cases had apical perforations and 1 case had a crestal dehiscence.

Mean linear change in AOI was  $-0.44 \pm 0.23$  mm. Mean linear change at 1,3 and 5 mm apical to the gingival margin was  $-0.64 \pm 0.32$  mm,  $-0.33 \pm 0.19$  mm and  $-0.23 \pm 0.18$  mm respectively. When compared with studies evaluating conventional immediate implants placement with bone and soft tissue grafting(1), these results have shown less labial alveolar collapse.

Table (1): 5 months post-operative dimensional analysis in mm.

## CONCLUSION

The socket shield technique is associated with minimal dimensional reduction of the labial alveolar contour even in the presence of apical perforations, crestal dehiscences and

Tooth	Mean linear changes in the AOI	Linear changes at 1 mm	Linear changes at 3 mm	Linear changes at 5 mm
1st premolar	-0.8	-1.05	-0.49	-0.21
Lateral incisor	-0.49	-0.68	-0.44	-0.47
Central incisor	-0.31	-0.52	-0.22	-0.2
1st premolar	-0.61	-0.89	-0.49	-0.2
Lateral incisor	-0.32	-0.54	-0.26	-0.18
2nd premolar	-0.1	-0.31	-0.07	0.09
Canine	-0.49	-0.96	-0.15	-0.01
Central incisor	-0.75	-0.95	-0.62	-0.47
Central incisor	-0.38	-0.33	-0.46	-0.36
Canine	-0.19	-0.15	-0.11	-0.35
Mean ± SD	$-0.44 \pm 0.23$	$-0.64 \pm 0.32$	$-0.33 \pm 0.19$	$-0.24 \pm 0.18$

thin labial bony plates.

Guided root sectioning is a potential solution to the technique sensitivity of the socket shield.

## REFERENCES

1. van Nimwegen WG, Raghoobar GM, Zuiderveld EG, Jung RE, Meijer HJ, Mühlemann S. Immediate placement and provisionalization of implants in the aesthetic zone with or without a connective tissue graft: A 1-year randomized controlled trial and volumetric study. Clin Oral Implants Res. 2018;29:671-8