

# Stability of the marginal soft tissues after early and conventional healing periods. A pilot study

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## BACKGROUND and AIM

- Early and conventional loading protocols are current state of the art. When 1-stage protocols are implemented, 3 months of soft and hard tissue healing in the mandible and maxilla are considered as conventional healing time; 6-8 weeks are regarded as early healing times for early loading. Soft tissue cicatrisation and maturation after surgery with flap elevation requires time; information is scarce on the stability of the marginal soft tissues when impression is to be taken by the end of the early vs. conventional healing times.
- Aim of this pilot study was to compare the position of the marginal gingiva on the buccal, lingual/palatal, mesial and distal sides of the healing abutment measured successively after 6-8 and 12-14 weeks following flap surgery in the mandible and the maxilla.

## METHODS and MATERIALS

Implant therapy was implemented in the posterior area of the mandible and maxilla following a 1-stage protocol. Intra-oral scans (IOS) were performed with the abutments in place after 6-8 weeks (IOS#1, T1) and then repeated after 12-14 weeks (IOS#2, T2). The two IOSs and the STL of the healing abutments were digitally merged on the MSoft and Exocad software. Variation over time (T2-T1) of the level of the marginal soft tissue on the buccal ( $\Delta GH_{buc}$ ), lingual ( $\Delta GH_{lin}$ ), palatal ( $\Delta GH_{pal}$ ), mesial ( $\Delta GH_{mes}$ ), and distal ( $\Delta GH_{dis}$ ) sides of the healing abutments were measured. The mean, standard deviation and median of the variations were calculated as well as the frequencies of identical (ID), more apical (AP) and more coronal (COR) positioning. Hypothesis of a stability of the marginal levels of the gingiva over time was set.

## RESULTS

Twenty seven  $\varnothing$  4.2 mm implants (SEVEN, MIS) were placed in the mandible (n=14) and maxilla (n=13) of 14 patients.

- In the mandible,  $\Delta GH_{buc}$  was  $0.0 \pm 0.40$  mm (p=0.98); ID, AP, COR were 41.7%, 33.3% and 25.0%.  $\Delta GH_{lin}$  was  $-0.07 \pm 0.17$  mm (p=0.17); ID, AP, COR were 83.3%, 16.7% and 0%.  $\Delta GH_{mes}$  was  $0.07 \pm 0.28$  mm (p=0.44); ID, AP, COR were 58.4%, 33.3% and 8.33%.  $\Delta GH_{dis}$  was  $-0.16 \pm 0.42$  mm (p=0.21); ID, AP, COR were 58.4%, 33.3% and 8.33%, respectively. All medians were 0.0 mm.
- In the maxilla,  $\Delta GH_{buc}$  was  $-0.09 \pm 0.16$  mm (p=0.10); ID, AP; COR were 72.7%, 23.7% and 0%.  $\Delta GH_{pal}$  was  $-0.07 \pm 0.17$  mm (p=0.22); ID, AP and COR were 90.9%, 9.1% and 0%. Median of both variables was 0.0 mm.  $\Delta GH_{mes}$  was  $-0.15 \pm 0.29$  mm (p=0.44); ID, AP; COR were 27.3%, 63.6% and 9.1%; median was 0.18 mm.  $\Delta GH_{dis}$  was  $-0.21 \pm 0.26$  mm (p=0.03); ID, AP, COR were 40.0%, 60.0% and 0.0%; median was -0.17 mm. *In the mandible and the maxilla, hypothesis of stability of the marginal levels was supported for all sides except for the maxillary distal side.*

## CONCLUSION and CLINICAL IMPLICATIONS

Fluctuation of the marginal levels of the gingiva over time between early (6-8 weeks) and conventional (12-14 weeks) healing periods was limited; they might be considered negligible except on the distal side of the maxilla where apical migration was  $-0.21 \pm 0.26$  mm. Nevertheless, one should bear in mind that soft tissue stability on the buccal side was more consistent in the posterior maxilla (72.7%) than in the posterior mandible (41.7%). Replication of this methodology on a larger number of sites and patients are warranted, to better understand the soft tissue parameters involved in apical migration and stability over time, and to assess the present clinical conclusion.

## TABLES and FIGURES

	<i>buccal</i>	<i>oral</i>	<i>mesial</i>	<i>distal</i>
<i>Max</i>	$+ 0.09 \pm 0.16$ NS	$+ 0.07 \pm 0.17$ NS	$- 0.15 \pm 0.29$ NS	$- 0.21 \pm 0.26$ S
<i>Mand</i>	$+ 0.0 \pm 0.40$ NS	$+ 0.07 \pm 0.17$ NS	$- 0.07 \pm 0.28$ NS	$+ 0.16 \pm 0.42$ NS

Table I: Soft tissue changes between T1 and T2 measured on all implants sides. NS=non significant, S=significant.

