

# Stability changes of implants placed with high insertion torque: a prospective clinical trial.

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## Abstract

**Purpose:** To evaluate the changes in implant stability during a 12-week healing period, as

assessed by the resonance frequency analysis (RFA), when implants are placed with high insertion torque.

**Materials and Methods:** From October 2019 to April 2020, 56 implants were included in the study. All implants were placed in healed ridges. Care was taken to properly undersize the osteotomy to obtain a high insertion torque. Using the RFA method, measurements of implant stability quotient (ISQ) were made at implant placement and after 3, 6, 9 and 12 weeks during the non-submerged healing period. Four measurements for each implant at each time interval were recorded, 2 in the bucco-lingual direction and 2 in the mesio-distal direction.

**Results:** Average insertion torque for the 56 implants was  $72.41 \pm 8.89$  Ncm. The average ISQ values were  $74.72 \pm 4.08$ ,  $73.19 \pm 4.91$ ,  $73.51 \pm 4.86$ ,  $74.55 \pm 4.97$ , and  $75.43 \pm 5.14$  at 0, 3, 6, 9 and 12 weeks respectively. The slight average decrease of 1.53 ISQ units at 3 weeks was statistically significant ( $-p\text{-value}=0.036$ ). A significant gradual increase occurred between the 3<sup>rd</sup> and the 12<sup>th</sup> week ( $-p\text{-value}=0.017$ ). No difference was found between baseline and 12 weeks ( $-p\text{-value}=0.361$ ). Not all implants lost ISQ units at 3 weeks. While 36 implants lost an average of 4.64 ISQ units ( $-p\text{-value} < 0.0001$ ) at 3 weeks, 20 implants gained an average of 4.07 units at the same time interval ( $-p\text{-value} < 0.0001$ ).

**Conclusions:** Implant stability was relatively