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Resonance Frequency Analysis to Assess the Stability of Immediate Implants: A Retrospective Clinical Trial

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ABSTRACT

It is widely documented that the main condition to achieve osseointegration is the presence of adequate primary stability of the implant, which is correlated to the mechanical engagement between implant and bone. Insertion torque (IT) and resonance frequency analysis (RFA) expressed as an implant stability quotient (ISQ), are the most commonly used parameters to determine if implant primary stability is adequate. IT can only be registered at implant insertion, while ISQ can be measured multiple times and might be a reliable technique to monitor implant stability at different time points. Thus, the correlation between IT and ISQ must be investigated. In this single-cohort retrospective study, the Authors aimed to investigate the correlation between ISQ and IT at the time of immediate implant placement and evaluate the possible use of ISQ to assess implant stability over time. Moreover, they evaluated ISQ at different time points up to 1 year in order to examine possible correlations between ISQ and MBL values, evaluating, in the meanwhile, soft tissue changes around immediate implants over time. The study included 23 patients who received in total 32 immediate implants and the peri-implant defects were grafted with corticocancellous porcine bone particles (OsteoBiol® *mp3*®, Tecnoss®, Giaveno, Italy), and a resorbable membrane was placed to stabilize the graft material (OsteoBiol® *Evolution*, Tecnoss®). Then, a standardized healing abutment was placed, and the site was sutured with 4.0 resorbable sutures. IT parameters were recorded at implant insertion, and ISQ values were recorded at insertion and at 2-, 4-, and 12-month follow-ups. The mean IT value was 46.87±9.66 Ncm (range: 25 to 65 Ncm), and the mean ISQ value at implant insertion was 71.45±4.24 (range: 63 to 78); these values showed a statistically significant correlation ($P<0.0001$). No significant correlation was found between MBL and IT or ISQ.

CONCLUSIONS

According to the outcomes of the study, showing a statistically significant and positive correlation between IT and ISQ values, the Authors concluded that *"ISQ may be used to reliably assess implant stability over time and to evaluate the osseointegration stage of immediate implants. Thus, using ISQ and IT to measure implant stability should be implemented in everyday clinical practice, as it is a repeatable and reliable means to assess implant stability up to 1 year"*.

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