Contribution ID: **64** Type: **Poster**

Bone Regeneration in Alveolar Bone Biopsies as Retained in a Trephine Bur Using Synchrotron Radiation

Objectives: Trephine bur is the most common and effective instrument used in the biopsy of bone tissue to evaluate the results of bone regeneration procedures. Trephine bur can be mounted on the rotating instrument to obtain the regenerated tissue in a cylindrical shape. However, in the process of separating the new bone tissue from the trephine bur after tissue harvest, a physical force may be applied to the new bone tissue, which may result in deformation of the new bone tissue. We have developed a 3D assessment technique using synchrotron radiation X-ray μCT (SR-μCT) that does not require sample ejection from the TB.
Material and methods: Specimens were collected from six participants after 5-28 months of uneventful healing from an alveolar bone regenerative surgery. Specimens were kept in a fixing solution after biopsy and until SR-μCT scan using a 50-keV monochromatic X-ray beam. Edge enhancement by the phase contrast effect of SR-μCT was utilized to improve imaging sensitivity. Images were reconstructed using a phase retrieval algorithm of simultaneous phase-and-amplitude retrieval (SPAR) and segmented for 3D visualization and quantification using the water-shedding algorithm.
Results: We successfully visualized the TB's interior through SRuCT related reconstructed images without removing TB. And we performed histomorphometry about three composition of newly formed bone (NFB), non-mineralized tissues (NMT) and residual bone graft material (RBG). Quantifications for characterizing individual bone regeneration revealed varying degrees of bone regeneration among the specimens tested.
Conclusions: This study could facilitate a study of poor bone regeneration by ensuring a three-dimensional non-destructive examination of the regenerated bone tissue.

Primary authors: Dr KIM, Yong-Gun (School of Dentistry, Kyungpook National University); Dr LIM, Jae-Hong (4 Pohang Accelerator Laboratory, POSTECH, Pohang, Gyeongbuk, Korea)

Presenter: Dr KIM, Yong-Gun (School of Dentistry, Kyungpook National University)