

Compare the Bone Growth of Additive Manufactured Ti-6Al-4V Pedicle Screw in Pigs of Different Sacrificed Periods through Mechanical Pullout Experiment.

Hsu-Hsuan Chin(秦續軒)¹, Wei Chang (張維)¹, Chun-Chieh Wang (王俊杰)², Ching-Shun Ku (古慶順)², Ching-Yu Chiang (蔣慶有)², Shao-Ju Shih (施劭儒)³, Nien-Ti Tsou (鄒年棣)¹, Pei-Yi Tsai (蔡佩宜)¹, San-Yuan Chen(陳三元)¹, and E-Wen Huang (黃爾文)¹

¹ *Department of Materials Science and Engineering, National Chiao Tung University, 1001 University Road, Hsinchu 30010, Taiwan (R.O.C.)*

² *National Synchrotron Radiation Research Center, Hsinchu 30076, Taiwan (R.O.C.)*

³ *Department of Materials Science and Engineering, National Taiwan University of Science and Technology, Taiwan (R.O.C.)*

Osteoporosis has now had a serious impact on humans, especially among the elder. Often accompanied by some symptoms such as being unable to move around, often hospitalized, and may even die. In order to treat such a disease, the demand for bone implants has increased significantly. Therefore, we must understand how the shape and strength of bones originate from the interactions between mechanical, biological and structural processes elicited by the regulation of periosteal osteoblasts. Thus, this experiment will focus on the comparison of the pullout strength of additive manufacturing Ti-6Al-4V pedicle screw which differs from sacrificed periods through mechanical pullout experiment. Also, we investigate the bone growth by the work of not only pullout strength but the image analysis of Transmission X-ray Microscope (TXM).

Keyword: implant, additive manufacture, Ti-6Al-4V, pullout, Transmission X-ray Microscope(TXM).