

# **Interactions between Poly-lactic Acid Bone Plates/ Screws and a Bone Fracture Interface During the Healing Process**

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## **Abstract**

The purpose of this study was to investigate interactions between a fracture and a fixation bone plate during bone healing. Male adult New Zealand rabbits were used as in this in vivo experiment, and the operation site was located in the mid-portion of the right mandible. A combination of a micro-saw and an ultra-thin osteotome was used to create a fracture gap vertical to the body of the mandible. Both a non-resorbable titanium plate/screw and a resorbable PLA plate/screw were implanted and evaluated under a standardized model of mandibular fracture and repair. Animals were sacrificed at the designated periods of 0, 1, 4, 8, 12, 16, and 26 weeks. The tissue histology around the fracture gap and the physicochemical changes of the PLLA fixation devices were evaluated. The interface of screw insertion and performance of the fracture gap of PLLA/tissue and titanium/tissue were evaluated by histological observations. Physical properties, which changed at different time intervals, including the weight loss, 3-point bending strength retention, crystallinity, and molecular weight, were investigated during in vivo degradation.