

# Analysis of Elements in the Periosteum on Titanium Plates and Screws for Internal Bone Fixation -5-

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## **Abstract**

To clarify the kinetics of the titanium material solution in the body, we made a comparative study of the titanium elements in the following tissues of Japanese white rabbits by PIXE methods: periosteum on titanium plates and screws for internal bone fixation, normal periosteum, bone attached to a titanium plate or screw, oral mucosa, and skin.

The implanted time length of the titanium materials were 3, 6, 12 and 24 months. The result of our study on the soft tissues showed that there was a trend toward higher concentration values of titanium in the periosteum on the materials than those in the skin, oral mucosa and normal periosteum. Regarding the hard tissues, there was a trend toward higher concentration values of titanium in the attached bone than those in the unattached bone to titanium materials. As to the time course of concentration values of titanium, both in the soft and hard tissues, there were highest values at three months postoperatively. Our analysis suggested that the solution of the titanium material started immediately after its implantation, and the values of titanium in the tissues decreased with implanted time length.