3325 Development of Artificial Root of Gomphosis and Ankylosis by Biomechanical Stimuli.

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Dental implants of Ankylosis or osseointegration are in vogue now. However, these binding systems to the bone are quite similar to those of reptile tooth and destruction of the bone attaching to the root is inevitable after a certain period of occlusal function. This research aims to verify how gomphotic or ankylotic root can be induced by biomechanical stimuli. For this purpose, artificial roots of same configuration are implanted into mammalian jaws with or without occlusal functions. The authors developed Artificial root of corrugated cone shape using sintered compact hydroxyapatite (HA), which could be induced to be gomphotic as well as ankylotic binding system depending on biomechanical stimuli of occlusal function or complete rest of implanted root after operation. Artificial roots with a corrugated configuration made of sintered hydroxyapatite were implanted into the jawbone of dogs and Japanese monkeys. These animals were separated into two groups during the experiment. The first group was fed with a soft diet. The second group was fed with a solid diet. After a fixed period specimen were taken out and recovered histopathological observation by light microscopy as well as by SEM was carried out. Specimens with a mirror surface were prepared for element analysis using microanalyzer Kevex 8000. Following results are obtained: 1) Gomphotic artificial roots with cementum were developed by biomechanical stimuli in the solid diet group. 2) Ankylotic artificial roots were obtained in complete rest roots by the soft diet group. In conclusion, differentiation of mesenchymal cells was proved to be controlled by biomechanical stimuli. This differentiation coincides with the development of gomphotic tooth by biomechanical stimuli at the cellular level through mammalian jawbone evolution. Supported by M.E, S.C. J grant No.09309003.