B-1. Effects of Electrical Stimulation on the normal Periodontium

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The earliest reports of the use of electrical energy to directly stimulate bone healing seem to be in 1853 from England, the techniques involved the introduction of direct current into the non-united fracture site percutaneously via metallic needles, with subsequent healing of the defect.

One endpoint of the periodontal therapy is to generate structure lost by periodontal diseases. Several procedural advances may support regeneration of attachment, however, regeneration of alveolar bone does not occur consistently. Therefore, factors which stimulate bone repair are areas for research in periodontal reconstructive therapy. Effects of cytokines or growth factors on bone repair are examples of such areas. Another one is electrical current which occurs in bone naturally, so that such bone may be particularly susceptible to electrical therapy.

The purposes of this study were to observe the effects of electrical stimulation on the normal periodontium, to determine whether the electricity is the useful means for periodontal regeneration or not. Forty rats weighted about 100 gram were used and divided into 4 groups, the first group, there was no electrical stimulation with the connection of electrodes only. In the second group, there was stimulated by the 10 ㎃ during 10 minutes per a day, in the third group was stimulated by the 25 ㎃ , and the fourth by the 50 ㎃. At 3, 5, 10 and 15 days post-appliance , two rats in each group were serially sacrificed. and the maxillae and the mandible processed to paraffin, and the specimens were prepared with Hematoxylin-Eosin stain for the light microscopic evaluation.

The results of this study were as follows :

1. There was the distinct reversal line on the lingual alveolar crest, whereas a little changes in the labial alveolar crest to the duration and amount of currents.
2. In 50 ㎃ group, the cells were highly concentrated at the apex of anterior teeth, and was observed the necrotic tissue. In posterior root apex, the hypercementosis was appeared, and newly formed cementum layer has been increased continuously with the time.
3. The periodontal ligament fiber and Sharpey's fiber were arranged in order, and the bone trabeculae were increased as the experiment proceeded by, relatively the bone marrows were decreased.
4. In the pulp tissue, the blood vessels were increased with blood congestion in the experimetal specimens remarkably, and the dentinal tubules were obstructed .
5. The osteoblasts in alveolar bone proper had been showed highly activity, and also observed the formation of bone trabeculea.

In the conclusion, it was suggested that the electrical stimulation has influence on the periodontium and the pulp tissue. However, there might be the injurious effects.