

〈자유연제 I 08:00~08:40〉

A Comparative Histologic Study Between the Effects of Nonablative Laser and Thermal Energy on Joint Capsule

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Purpose: To evaluate the histologic effects of nonablative LASER and thermal energy on the knee joint capsule of rabbit.

Materials and Methods: The nonablative LASER and thermal energy were applied to the rabbits(average age 36 weeks, weight 5kg). The rabbit models were divided into 4 groups with 9 rabbits respectively. During the operation, saline solution was introduced into the knee joint of rabbit through 14 gauge needle. The nonablative LASER or thermal energy was applied to the joint capsule using LASER handpiece or Oratec[®] handpiece. Group I received 6 watts of LASER energy, group II received 12 watts of LASER energy, group III received 60 degrees of thermal energy, and group IV received 70 degrees of thermal energy. The histologic studies included Hematoxylin-Eosin stain, Masson's trichrome stain and electron microscopy at one day, 3weeks and 6 weeks after operation.

Results: The histologic findings of postoperative 1 day showed fibrous degeneration of collagen on all groups and the amount of degenerations are closely related to the applied energy level. The histologic findings of postoperative 3 weeks showed fibrosis and this fibrosis related the level of energy. Especially the group received 70 degree of thermal energy showed flattening of capsule and deep fibrosis. The histologic findings of postoperative 6 weeks showed marked recovery of collagen arrangement and capillary proliferation. But the group IV which is received 70 degree of thermal energy did not recovered.

Conclusions: The nonablative LASER energy and direct thermal energy showed the thermal injury pattern, inflammatory change, fibrosis, neovascularization, flattening of synovial membrane and finally contracture of joint capsular collagen. The feature of capsular contraction was prominent in direct thermal energy application.