

## Study of Bioabsorbability and Biocompatibility of PLLA Implant in Dogs

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Bioabsorbable devices have been utilized and experimented in many aspects of orthopaedic surgery. Depending upon their constituent polymers, these materials can be tailored to provide sufficient rigidity to allow bone healing, retain mechanical strength for a period of time, and then eventually begin to undergo degradation.

The objective of this study is to estimate extent in which PLLA implants have bio-absorbability and biocompatibility with bone and soft tissue in dogs and also to develop bio-absorbable, biocompatible materials with the appropriate strength and degradation characteristics to allow for regular clinical use for treating orthopedic problems in humans as well as animals.

Eighteen dogs were used as experimental animals and were divided into two groups. In group I, PLLA rods inserted into subcutaneous tissue of back or the abdomen wall. And the rods were tested for material properties including viscosity, molecular weight, melting point, melting temperature, crystallinity, flexural strength, flexural modulus over time.

In group II, PLLA screws inserted through cortical bone into bone marrow in the femur of the dogs. In control group, stainless steel screw inserted the same femur. Radiographs were taken after surgery to observe locations of screw. Histological variations including cortical bone response, muscular response, bone marrow response were analyzed over time for 62weeks.

In Group I, The physical properties of PLLA rods are delicate balances between mechanical, thermal, and viscoelastic factors. And in Group II, PLLA screws did not induce any harmful effects and clinical complications on bone and soft tissue for degradation period.

PLLA implants are considered suitable and as security instruments on clinical application

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