

Isovolemic degradation of polycaprolactone particles and calculation of their original size from human biopsy

JongSeo Kim

Kim-Jongseo Plastic Surgery Clinic, Korea



Abstract

Background: Polycaprolactone (PCL) implants show isovolemic degradation during phase-1 degradation; they maintain their volume as their molecular weight decreases. Phase-2 begins with PLC volume being reduced by bulk degradation with autocatalysis. Isovolemic degradation of PCL particles during phase 1 and their longevity should be established in humans. PCL particle size can be mathematically calculated through cross-sectioned PCL particles in biopsy slides.

Methods: Biopsy specimens were obtained from humans after giving them a subdermal injection for 4 years to measure crosssection diameters of PCL particles. In all (160) biopsy slides, all cross-sections of PCL particles were measured in size in microscopic photographs, and the real size of PCL particles was calculated through equation of a circle (Equationcircle) and mean value theorem for integrals (Integral Theorem). Diameters of Ellanse particles were measured with particle size analyzer

Results: On average, the calculated PCL particle size using Integral Theorem was 42.83 (immediately), then 43.18(1), 42.62(2), 40.90(3), and 34.46 μm (4 years), respectively. These results were similar to the diameters calculated using the Equation circle. PCL size remained unchanged until 3 years, which began to decrease from the fourth year, making the transition point in between. In particle size analyzer, the mean diameter was 42.42 μm . Conclusions: PCL particle size was mathematically calculated for 4 years in an in vivo biopsy study. Until 3 years after the injection, PCL particle diameter remained at 95.47% and showed phase-1 isovolemic degradation. From 4 years after the injection, particles decreased in size, showing phase-2 bulk degradation. PCL particles were smooth and circular for 3 years, and from the fourth year, the surface became very rough. The Ellanse-M longevity was longer than 4 years.

Biography

JongSeo Kim serves as clinical associate professor for the department of plastic surgery. He is also the Director for KIM-JongSeo plastic surgery clinic in Gang-Nam (Seoul, South Korea), which is "the best Clinic of facial bone contouring surgery" selected by "Health Department of Korean Government".

3rd World Congress on Dermatology and Aesthetic Medicine | Webinar; March 26, 2021

Citation: JongSeo Kim, *Isovolemic degradation of polycaprolactone particles and calculation of their original size from human biopsy*, 3rd World Congress on Dermatology and Aesthetic Medicine; Webinar; March 26, 2021