

## Analysis of keloidal collagen orientation with two-photon microscopy

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**OBJECTIVES:** Keloids are benign fibroproliferative tumors that result from trauma or surgery. The occurrence or deterioration of keloids is thought to involve the abnormal production and disorientation of collagen fibers. However, the underlying pathological process has not yet been elucidated. We observed and analyzed the orientations of keloidal collagen fibers.

**METHODS:** Keloid samples were obtained by surgical resection in Nagoya University Hospital from 2016 to 2018. Patients consented to the analysis. There were six keloid scars (two from the chest, one from the abdomen, and three from the earlobe) and four normal abdominal skin samples. The average age of the patients was 52.4 years. The orientation of the nonfixed collagen fibers in the keloids and normal skin samples was analyzed by two-photon microscopy.

**RESULTS:** The orientation of the collagen fibers in the keloids tended to be less random than the collagen fiber orientation in the normal skin samples. The earlobe keloids tended to show more craniocaudal orientation of collagen fibers than the chest and abdomen keloids.

**CONCLUSIONS:** Since collagen fibers are the main component of the extracellular matrix, the orientation of the collagen fibers affects the mechanical properties of tissues. The present analysis showed that keloidal collagen fiber orientation differed depending on the location of the keloids. This suggests that mechanical stimulation relates to the orientation of keloidal collagen fibers.