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Ligaments and tendons are similar in composition but differ in proportion and arrangement. We investigated similarities and differences of the structure of ACL and tendons used as a graft tissue for ACL-reconstruction. In this study, standardised samples of quadriceps, hamstrings (semitendinosus and gracilis) and patellar tendons, and the ACL were harvested from 26 autopsies (average age 36.4) and were investigated using light and electron microscopy, immunohistochemistry and morphometry. The thickness of the collagen fibrils, collagen organization and diameter, the fibril/interstitium ratio, density of fibroblasts and blood vessels, and distribution of the collagen type I, III, V fibrils were analysed.

The semitendinosus showed the highest density of fibroblasts and blood vessels, while the gracilis the highest fibril/interstitium ratio. No differences regarding the thickness of collagen fibrils and distribution of fibrils were found. The ACL had the highest concentration of type III and V collagen fibrils as well as elastic fibers. The histological and ultrastructural appearance of the ACL differs from those of the tendons used as graft, for ACL reconstruction. Its ultrastructure is varied and complex, with its collagen fibers bundles lying in many directions.