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Flat Midsubstance of Anterior Cruciate Ligament with Tibial C-Shaped Insertion

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Summary:
Flat Anterior Cruciate Ligament with Tibial C-Shaped Insertion but no PL-Bundle

Abstract:
PURPOSE
This anatomical cadaver study was performed to reconfirm the flat appearance of the midsubstance shape of the anterior cruciate ligament (ACL) and its tibial "C-shaped" insertion site.

METHODS
The ACL midsubstance and the tibial ACL insertion were dissected in 20 cadaveric knees (n=6 fresh frozen, n=14 paraffined). Magnifying spectacles were used for all dissections. Morphometric measurements were performed with calipers and on digital photographs.

RESULTS
In all specimen the midsubstance of the ACL was flat with an average width of 11.9 mm, thickness of 3.5 mm and cross sectional area of 37.0 mm2. The „direct" "C"-shaped tibial insertion runs from along the medial tibial spine to the anterior aspect of the lateral meniscus. The average width (length) of the „C" was 12.6 mm, thickness 3.3 mm and area 31.4 mm2. The center of the "C" was the bony attachement of the anterior root of the lateral meniscus overlayed by fat and crossed by the ACL. No posterolateral inserting ACL fibers were found. Together with the larger „indirect" part (area 79.6 mm2) the „direct" one formed a "duck-foot" shaped footprint.

CONCLUSION
The tibial ACL midsubstance and the tibial "C"-shaped insertion are flat and resemble a „ribbon". The center of the "C" is the bony attachement of the anterior root of the lateral meniscus. There are no central or posterolateral inserting ACL fibers. Anatomical ACL reconstruction does require a flat graft and a „C" shaped tibial footprint reconstruction with an anteromedial bone tunnel for Single Bundle and an additional posteromedial bone tunnel for Double Bundle.