INTRODUCTION: Aging-related changes in the posterior cruciate ligament (PCL) and their correlation with changes in the articular cartilage and to the anterior cruciate ligament (ACL) are not well characterized. The purpose of this study was to:
1) Identify patterns and severity of a comprehensive set of histological changes in the PCL from human knee joints across the entire adult age spectrum and at all stages of cartilage degradation in donors with no history of prior joint trauma and
2) Determine correlation of changes in PCL with ACL.

MATERIALS AND METHODS: After Institutional Review Board approval, 120 fresh human knee joints from 65 donors were procured by tissue banks and processed within 72 hours postmortem. There were 30 males and 35 females, the average age was 66.1 (range 23–92 years). None of the donors had a documented prior joint trauma.

Tissue grading: Macrosopic grading of all articular surfaces in the tibia, femur and patella was performed using the modified Outerbridge scoring system and ICRS knee map. Macroscopically, all knees had an intact PCL.

For histological analysis, each PCL specimen was cut transversely and longitudinally through the center of the ligament. The PCL sections were stained with hematoxylin and eosin. Both sections were scored on a scale from 0 to 3 for the following criteria: 1) orientation of the collagen fibers, 2) formation of new blood vessels and inflammatory cell infiltration, 3) cystic changes 4) mucinous changes, and 5) chondroid metaplasia (Figure 1). The most severe total PCL score by this grading was 15.

Severities of PCL degeneration was graded into the following groups: normal (0), mild (1–5), moderate (6–10) and severe (10–15). If fiber disorientation, mucoid degeneration or cystic changes were scored 3, then the ligament was considered severely degenerated [1] Two different readers performed the histological scoring of the PCLs and their agreement for total histologic score showed a good inter-observer class coefficient (0.87). The scoring of the PCLs was compared to ACL scoring agreement for total histological score showed a good inter-observer class coefficient (0.87). The scoring of the PCLs was compared to ACL scoring agreement for total histological score showed a good inter-observer class coefficient (0.87). The scoring of the PCLs was compared to ACL scoring agreement for total histological score showed a good inter-observer class coefficient (0.87). The scoring of the PCLs was compared to ACL scoring agreement for total histological score showed a good inter-observer class coefficient (0.87). The scoring of the PCLs was compared to ACL scoring agreement for total histological score showed a good inter-observer class coefficient (0.87). The scoring of the PCLs was compared to ACL scoring agreement for total histological score showed a good inter-observer class coefficient (0.87). The scoring of the PCLs was compared to ACL scoring agreement for total histological score showed a good inter-observer class coefficient (0.87). The scoring of the PCLs was compared to ACL scoring agreement for total histological score showed a good inter-observer class coefficient (0.87). The scoring of the PCLs was compared to ACL scoring agreement for total histological score showed a good inter-observer class coefficient (0.87). The scoring of the PCLs was compared to ACL scoring agreement for total histological score showed a good inter-observer class coefficient (0.87). The scoring of the PCLs was compared to ACL scoring agreement for total histological score showed a good inter-observer class coefficient (0.87).

RESULTS: Relationship between PCL histopathology and aging: There was low correlation between the total histological score of the PCL and aging (R=0.25) while the ACL scores correlated well with age (R=0.45) (Figure 2).

PCL total histopathology scores: The total PCL histological scores were as follows: 2 knees showed a normal PCL (1.5%) most of the knees had mild (71.5%), fewer moderate (19%) and severe (7.5%) degradation. Among the different criteria Fiber disorientation scored the highest (1.27±0.6) followed by mucoid denegation (0.88±0.67), chondroid metaplasia (0.86±0.68), cystic changes (0.6±0.76), and inflammation (0.56±0.68). All criteria showed good correlation to the total PCL score (range r=0.55–0.77), the highest being mucoid degeneration.

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