Relationship of The Pes Anserine And the Tibial Physis

W. Duncan Martinson1, Dan Green, MD2, Peter C. Cannamela, BS3, Theodore J. Ganley, MD4, Allen F. Anderson, MD5, John D. Polousky, MD5, Kevin G. Shea, MD3.

1Brown University, Providence, Rhode Island, USA 2Hospital for Special Surgery, New York, New York, USA 3St. Luke’s Sports Medicine, Boise, Idaho, USA 4Children’s Hospital of Philadelphia, Philadelphia, Pennsylvania, USA 5Tennessee Orthopaedic Alliance, Nashville, Tennessee, USA 6Children’s Health Andrews Institute, Plano, TX, USA

OBJECTIVES
ACL injury in children continues to challenge surgeons, especially in younger patients with higher risk of physeal injury and secondary deformity. Recent research has shown very high rates of failure of ACL reconstruction when allograft tissue is used, and access to hamstring autografts is important. Knee surgeons have observed the intimate relationship of the pes anserine and the proximal tibial epiphysis/apophysis region, which has raised concerns about the potential for tibial physeal and apophyseal injury during graft harvest. The purpose of this study was to evaluate the relationship of the gracilis and semitendinosis tendon and the proximal tibial epiphyseal/apophyseal regions on human pediatric knee specimens

RESULTS, continued
• In the sagittal plane, the proximal pes anserine insertions were found to be distal to the proximal tibia epiphysis by a mean of 2.3 cm (range 1.4-3.1 cm).
• The average total distance from the apophysis to the proximal pes anserine origin was 1.35 ± 0.18 cm, 1.32 ± 0.36 cm, and 1.49 ± 0.22 cm, 1.30 ± 0.15 cm for ages 2, 3, 4, and 5, respectively.
• Ages 7, 9, and 11 had an average total distance of 1.85 ± 0.16 cm, 1.58 ± 0.25 cm, and 1.50 ± 0.24 cm from the apophysis to the proximal pes anserine origin, respectively.
• In the axial plane, the average distance from the proximal and distal extents of the pes anserine to the tibial apophysis was 1.43 cm (range 0.96 cm – 1.97 cm).
• No clear trend was observed based on age.

CONCLUSIONS
The distance from the pes anserine insertions is relatively small, especially for the apophyseal region of the tibia. Dissections in this area should consider the intimate relationships of the physeal/apophyseal structures. Techniques that strip the tendons and surrounding periosteum from the insertions may damage the peripheral regions of physeal/apophyseal regions. Graft harvest from the pes anserine (gracilis and semitendinosis) should consider modifications of the surgical technique that avoid direct injury to the vulnerable physeal/apophyseal regions

METHODS, continued
Metallic markers were placed at the proximal and distal extents of the pes anserine in twenty-four pediatric knee specimens (ages 2 to 11 year). CT scans from each specimen were analyzed using Osirix. The distance from the proximal and distal tibial epiphysis and pes anserine insertion (proximal and distal extent) was measured in the sagittal plane. The mediolateral distance from the center of the apophysis to the pes anserine insertion was measured in the axial plane.

RESULTS

- [Diagram showing relationship of the Pes Anserine and Tibial Physis]

References