Hamstrings are common during high speed running (e.g. track, baseball, softball, soccer).

MRI has can be used to assess the severity of initial injury.1

Magnetic Resonance Imaging

- T2-weighted coronal images were used to assess residual edema.
- T1-weighted or IDEAL reconstructed images were used to:
  1. assess the presence of fatty infiltration
  2. quantify hamstring tendon/sac and muscle volumes:
     - biceps femoris long head (BFLH), biceps femoris short head (BFSH)
     - proximal conjoint biceps femoris and semitendinosus tendon (PBFT), proximal semimembranosus tendon (PSMT)

Muscles and tendons were manually outlined on each slice and used to calculate volumes. volume = inter-slice distance x summed cross-sectional area

Magnetic Resonance Imaging Results

Scarring was present adjacent to the site of prior injury (left).

The previously injured limb had significant BFLH atrophy and BFSH hypertrophy (below).

Fatty infiltration was present in two subjects with proximal biceps femoris injuries (left).

Sprint Results

Most subjects showed some degree of asymmetry between limbs during sprinting. However, no consistent or significant differences were observed.

Conclusions

- Scarring along the musculotendon junction likely alters internal muscle mechanics and may contribute to re-injury risk.
- BFLH atrophy with corresponding BFSH strong corresponds to reduced knee flexion following injury.
- Biomechanical measures (e.g. passive stiffness, strength, and sprinting kinematics) revealed no consistent asymmetries between limbs - local morphological changes may not be reflected in joint mechanics

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References