Hamstring strain injury in athletes.

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Martin RL, Cibulka MT, Bolgla LA, et al. Hamstring strain injury in athletes. J Orthop Sports Phys Ther. 2022 Mar;52(3):CPG1-CPG44. [111 references] PubMed

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Overview

Guideline Objective

To provide recommendations for sports-related overloading and overstretching injuries to myofascial or musculotendinous structures in any combination of the 3 hamstring muscles

Note: This guideline excludes isolated tendon injuries.

Patient Population

Adult athletes with a hamstring strain injury (HSI)

Recommendations

Recommendation Statements

Reinjury Risk and Return to Play

Clinicians should use the history of a hamstring strain injury (HSI) in return-to-play (RTP) progression, as a previous HSI is a risk factor for a future reinjury. (**Grade of Recommendation: B**)

Clinicians should use caution in RTP decisions for individuals who did not complete an appropriately progressed, comprehensive impairment-based functional exercise program that specifically included eccentric training. (**Grade of Recommendation: B**)

Clinicians should use hamstring strength, pain level at the time of injury, number of days from injury to pain-free walking, and area of tenderness measured on initial evaluation to estimate time to RTP. (**Grade of Recommendation: B**)

Diagnosis/Classification

Clinicians should make a diagnosis of HSI when an individual presents with a sudden onset of posterior thigh pain during activity, with pain reproduced when the hamstring is stretched and/or activated, muscle tenderness with palpation, and loss of function. (**Grade of Recommendation: B**)

Examination

Physical Impairment Measures

Clinicians should quantify knee flexor strength following HSI by using either a handheld or isokinetic dynamometer. (**Grade of Recommendation: A**)

Clinicians should assess hamstring length by measuring the knee extension deficit with the hip flexed to 90°, using an inclinometer. (**Grade of Recommendation: A**)

Clinicians may use the length of muscle tenderness and proximity to the ischial tuberosity to assist in predicting timing of RTP. (**Grade of Recommendation: C**)

Clinicians may assess for abnormal trunk and pelvic posture and control during functional movements. (**Grade of Recommendation: F**)

Activity Limitation and Participation Restriction

Clinicians should include objective measures of an individual's ability to walk, run, and sprint when documenting changes in activity and participation over the course of

treatment. (**Grade of Recommendation: B**)

Outcome Measures

Clinicians should use the Functional Assessment Scale for Acute Hamstring Injuries before and after interventions, intended to alleviate the impairments of body function and structure, activity limitations, and participation restrictions in those diagnosed with an acute HSI. (**Grade of Recommendation: B**)

Interventions

Injury Prevention

Clinicians should include the Nordic hamstring exercise as part of an HSI prevention program, along with other components of warm-up, stretching, stability training, strengthening, and functional movements (sport specific, agility, and high-speed running). (**Grade of Recommendation: A**)

After Injury

Clinicians should use eccentric training to the patient's tolerance, added to stretching, strengthening, stabilization, and progressive running programs, to improve RTP time after an individual sustains an HSI. (**Grade of Recommendation: B**)

Clinicians should use progressive agility and trunk stabilization, added to a comprehensive impairment-based treatment program of stretching, strengthening, and functional exercises, to reduce reinjury rate after an individual sustains an HSI. (**Grade of Recommendation: B**)

Clinicians may perform neural tissue mobilization after injury to reduce adhesions to surrounding tissue and therapeutic modalities to control pain and swelling early in the healing process. (**Grade of Recommendation: F**)

Evidence Rating Scheme

Levels of Evidence Table[a]

Level	Intervention/ Prevention	Pathoanatomic/ Risk/ Clinical Course/ Prognosis/ Differential Diagnosis	Diagnosis/ Diagnostic Accuracy	Prevalence of Condition/ Disorder	Exam/ Outcomes
I	Systematic review of high-quality randomized clinical trials (RCTs) High-quality RCT[b]	Systematic review of prospective cohort studies High-quality prospective cohort study[c]	Systematic review of high-quality diagnostic studies High-quality diagnostic study[d] with validation	Systematic review, high-quality cross-sectional studies High-quality cross-sectional study[e]	Systematic review of prospective cohort studies High-quality prospective cohort study
II	Systematic review of high-quality cohort studies High-quality cohort study[c] Outcomes study or ecological study Lower-quality RCT[f]	Systematic review of retrospective cohort study Lower-quality prospective cohort study High-quality retrospective cohort study Consecutive cohort Outcomes study or	Systematic review of exploratory diagnostic studies or consecutive cohort studies High-quality exploratory diagnostic studies Consecutive retrospective cohort	Systematic review of studies that allows relevant estimate Lower-quality cross-sectional study	Systematic review of lower-quality prospective cohort studies Lower-quality prospective cohort study

Level	Intervention/ Prevention	Pathoanatomic/ Risk/ Clinical Course/ Prognosis/ Differential Diagnosis	Diagnosis/ Diagnostic Accuracy	Prevalence of Condition/ Disorder	Exam/ Outcomes
		ecological study			
III	Systematic reviews of case-control studies High-quality case-control study Lower-quality cohort study	Lower-quality retrospective cohort study High-quality cross-sectional study Case-control study	Lower-quality exploratory diagnostic studies Nonconsecutive retrospective cohort	Local nonrandom study	High-quality cross-sectional study
IV	Case series	Case series	Case-control study		Lower-quality cross-sectional study
V	Expert opinion	Expert opinion	Expert opinion	Expert opinion	Expert opinion

a Adapted from Phillips B, Ball C, Sackett D, et al. Oxford Centre for Evidence-based Medicine - Levels of Evidence (March 2009). Also, refer to Appendix E of the original guideline.

b High quality includes RCTs with greater than 80% follow-up, blinding, and appropriate randomization procedures.

c High-quality cohort study includes greater than 80% follow-up.

d High-quality diagnostic study includes consistently applied reference standard and blinding.

e High-quality prevalence study is a cross-sectional study that uses a local and current random sample or censuses.

f Weaker diagnostic criteria and reference standards, improper randomization, no blinding, and less than 80% follow-up may add bias and threats to validity.

Recommendation Rating Scheme

Grades of Recommendation

Grades of Recommendation		Strength of Evidence	Level of Obligation
A	**Strong evidence**	A preponderance of level I and/or level II studies support the recommendation. This must include at least 1 level I study	Must or should
B	**Moderate evidence**	A single high-quality RCT or a preponderance of level II studies support the recommendation	Should
C	**Weak evidence**	A single level II study or a preponderance of level III and IV studies, including statements of consensus by content experts, support the recommendation	May
D	**Conflicting evidence**	Higher-quality studies conducted on this topic disagree with respect to their conclusions. The recommendation is based on these conflicting studies	
E	**Theoretical/ foundational evidence**	A preponderance of evidence from animal or cadaver studies, from conceptual models/principles, or from basic sciences/bench research support this conclusion	May
F	**Expert opinion**	Best practice based on the clinical experience of the guidelines development team supports this conclusion	May

Related Content

Supporting Documents

No supporting documents available.

Implementation Tools

- The Original Guideline includes the following:
    - Decision Tree (p. 21)

Patient Education

No patient education materials available.

Disclaimer

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TRUST Scorecard

Composition of Guideline Development Group (GDG)

Multidisciplinary GDG Members	Yes
Methodologist Involvement	Yes
Incorporation of Patient and Public Perspective	★★★☆☆

Systematic Review of Evidence

Literature Search	★★★★★
Study Selection	★★★★★
Evidence Synthesis	★★★★☆

Foundations for Recommendations

Strength of Evidence Grade	★★★★☆
Description of Benefits and Harms of Recommendations	★★★★☆
Summary of Evidence Supporting Recommendations	★★★★★
Strength of Recommendations Rating	★★★★★
Clear Articulation of Recommendations	★★★★☆

Funding Source — Yes

Disclosure and Management of Financial Conflicts of Interests — ★★★☆☆

External Review — ★★★★★

Updating — ★★★★★

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