Dynamic Chiropractic

CHRONIC / ACUTE CONDITIONS

Conservative Management of Hamstring Strains, Part 2

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Editor's note: part 1 of this article, which discussed hamstring anatomy / function and mechanisms / risk factors for injury, appeared in the May 20 issue.

The fact that stretching has not been proven to lessen the potential for developing injury does not imply that stretching should be avoided. On the contrary, since a flexible muscle is able to tolerate higher eccentric forces with less muscle damage[6] and individuals with flexible hamstrings are less prone to a variety of injuries,[7] reducing muscle stiffness with gentle stretches is clinically justified.

Fig. 3: Stretch to isolate the long head of the biceps femoris muscle.

The problem is that converting a stiff individual into a flexible individual can take months to years, and may interfere with the storage and return of elastic energy. Because of these different factors, stretching should be prescribed on an individual basis and performed in a gentle manner during the acute stages of injury. The patient should be instructed of the long-term commitment necessary to modify muscle stiffness.

The stretch illustrated in Figure 3 isolates the long head of the biceps femoris muscle. To reduce stiffness in the upper hamstring, this stretch should be performed with the knee flexed 45° and 90°. Since fatigue increases the potential for hamstring injury, Verral, et al.,[8] recommend stretching the hamstrings for 15 seconds (with the knee bent at different angles) as the muscle becomes fatigued while exercising. Over a two-year period, the authors demonstrated significantly reduced rates of hamstring injuries in Australian Rules Football players when the stretches were performed during workouts and competition. This may also apply to marathon runners, who present with fatigue-related weakness at the end of their long runs.

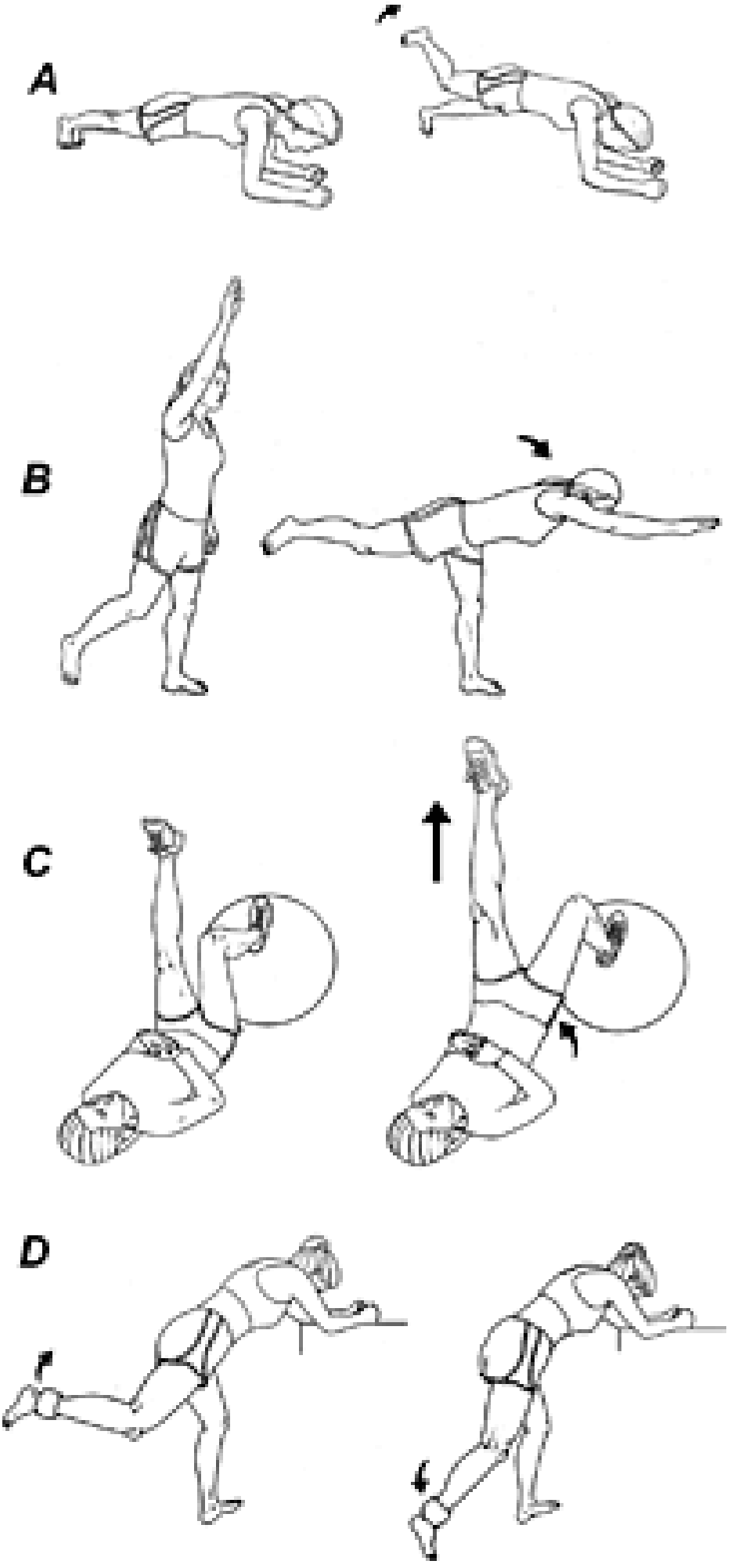
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Fig. 4: Other hamstring exercises for treating gait-related hamstring injuries.

Because injury results in protective splinting of the hamstrings and neighboring muscles, it is important to evaluate each muscle of the hip and thigh for the presence of trigger points that might be responsible for increasing muscular stiffness. Since adhesions and/or trigger points may increase tensile strain on the hamstring origin during late swing phase, vigorous deep-tissue massage along the full length of each of the affected hamstring muscles may enhance the transfer of tensile strain through the fascia and perimysium, possibly reducing the potential for muscle-tendon junction injury. Home stretches should be performed following deep-tissue massage with a foam roller, with the goal being restoration of pre-injury flexibility of the entire muscle and its fascial envelope.

Additionally, since it is thought to improve arthrokinetic reflexes, several authors suggest spinal manipulation may play a role in the prevention and treatment of hamstring injuries. In the largest study to date, Hoskins, et al.,[9] demonstrated in a randomized, controlled trial that Australian Rules footballers treated before and during a competitive season with occasional chiropractic care had reduced rates of hamstring and total lower-body muscle strains with no adverse outcomes.

While stretches and various manual therapies are helpful when treating hamstring injuries, comprehensive strengthening exercises play the most important role in the management of hamstring strains. In an impressive study comparing the efficacy of different treatment regimens used in the management of acute hamstring strains, Sherry and Best[10] showed that compared to a conventional protocol of static stretching and isolated progressive hamstring resistance exercises, an exercise regimen including progressive agility and trunk stabilization exercises produces significantly better short and long-term outcomes. (See Table for a summary of these exercises.)

ProgressiveStrengthening Exercises for Hamstring Injuries
Phase 1
1. Low- to moderate-intensity sidestepping, 3 x 1 minute.
2. Low - to moderate-intensity grapevine stepping (lateral stepping with the trail leg going over the lead leg and then under the lead leg), both directions, 3 x 1 minute.
3. Low- to moderate-intensity steps forward and backward over a tape line while moving sideways, 2 x 1 minute.
4. Single-leg stand progressing from eyes open to eyes closed, 4 x 20 seconds.
5. Prone abdominal body bridge (performed by using abdominal and hip muscles to hold the body in a face-down, straight-plank position with the elbows and feet as the only points of contact), 4 x 20 seconds.
6. Supine extension bridge (performed by using abdominal and hip muscles to hold the body in a supine, hook-lying position with the head, upper back, arms and feet as the points of contact), 4 x 20 seconds.
7. Side plank, 4 x 20 seconds on each side.
8. Ice in long-sitting for 20 minutes.
Phase 2
1. Moderate- to high-intensity sidestepping, 3 x 1 minute.
2. Moderate- to high-intensity grapevine stepping, 3 x 1 minute single-leg windmill touches.
3. Push-up stabilization with trunk rotation (performed by starting at the top of a full push-up, then maintaining this position with one hand while rotating the chest toward the side of the hand that is being lifted to point toward the ceiling; pause and return to the starting position), 2 x 15 reps on each side.
4. Fast feet in place (performed by jogging in place with increasing velocity, picking the foot only a few inches off the ground), 4 x 20 seconds.
5. Proprioceptive neuromuscular facilitation trunk pull-downs with exercise band, 2 x 15 to the right and left.
6. Symptom-free practice without high-speed maneuvers.
7. Ice for 20 minutes if any symptoms of local fatigue or discomfort are present.
Key: *Low intensity:* a velocity ofmovement that is less than or near that of normal walking. *Moderate intensity:* a velocity of movement greater than normal walking but not as great as sport. *High intensity:* a velocity of movement similar to sport activity. *Progressioncriteria*: Subjects progressed from exercises in phase 1 to exercises in phase 2 when they could walk with a normal gait pattern and do ahigh-knee march in place without pain.
Exercise protocol described by Sherry and Best[10]

Compared to conventional rehabilitation, the agility and stabilization group returned to sport sooner (22 days versus 37 days), and suffered fewer reinjuries during the first two weeks after returning to sport (55 percent of the conventional rehab group were reinjured, compared to no reinjuries in the progressive agility and trunk stabilization group). The beneficial effects of the agility and stabilization exercises were even present one year following return to sport, as 70 percent of the athletes treated with conventional stretches and exercises were reinjured, compared to only 7.7 percent of the athletes completing the progressive agility and trunk stabilization program. The alternate hamstring exercises illustrated in Figure 4 are also helpful when treating gait-related hamstring injuries.

Because nonsteroidal anti-inflammatories may result in impaired tendon healing,[11] the routine use of these drugs should be reconsidered. A safer alternative to improve healing is to perform aggressive deep-tissue massage directly over the damaged tendon, as this may stimulate tendon repair without adversely affecting tendon strength.[12-13] If pain reduction is important, the typical runner responds well to ice packs applied in 15-minute intervals, 4-5 times per day. Given the recurrent nature and long-term disability associated with hamstring strains, it is important to treat this injury with comprehensive conservative care.

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