

Only the Strong Shall Survive: Hamstring Helpers

By: Bill Starr

In sports like tennis, basketball, soccer, football, lacrosse and sprinting, where athletes generate quick bursts of speed, strong hamstrings are critical because they provide the acceleration. They're also important for stabilizing the knees and hips. You need powerful hamstrings if you want to move heavy weights off the floor or squat big poundages. Or, if you're a bodybuilder, you want well-developed hamstrings that enhance your lower body, adding the appealing sweep that's often the difference between winning a contest and being an also-ran.

Everyone who lifts seriously or plays any sport understands how important hamstrings are, but in truth, they're really a neglected group. When trainees exercise them directly, they usually use token movements such as machine leg curls or light stiff-legged deadlifts. At the same time they work their quads hard and heavy. It causes the hamstrings to fall behind, strengthwise, and that spells trouble.

Pulled hamstrings are extremely painful and take a long time to rehabilitate, so you need to pay attention to them.

One reason that people neglect their hamstrings is that you don't see them as easily as you see your quadriceps. You can check out your quads while doing squats, leg extensions and lunges, but you can only feel your hamstrings. Checking out your legs in front of a mirror means flexing your quads. Seldom do people bother to examine their hamstrings.

In recent years there have been a rash of hamstring injuries reported on high school and college football teams. Even though they're fairly common in football, the rate was so much higher than in previous years that it caused much concern. Team trainers and doctors blamed creatine, but when I read the accounts of the injuries, I found that fewer than half of the athletes were using creatine. In some cases I had to agree that creatine was the culprit in an indirect way. One of the side effects of taking creatine, especially during the loading period, is a laxative effect that causes you to lose vital nutrients, particularly minerals. If you don't replace them right away and a deficiency occurs, you'll start to experience cramping or, more seriously, injure your hamstrings to some degree.

My athletes usually informed me when they started taking creatine, wanting my input. I always told them to buy a bottle of multiple minerals, plus some vitamin C, and take lots while they were using the supplement. None experienced any difficulty.

But what about those other cases, the ones where the athletes weren't taking creatine? No one seemed to be asking the questions that were on my mind: Why was it always the hamstrings? Why not the quads or calves?

I believe that athletes suffer so many hamstring injuries because they so often let the hams become disproportionately weaker than their antagonist group, the quads. Enlisting many spies, I found out that in those high schools and colleges where athletes were sustaining a high rate of hamstring injuries, they weren't doing full squats. What they were calling squats were no more than half or quarter squats. That's a common practice in high schools because it runs up the numbers: The coach

can brag of having 2,500-pound squatters. It makes him look good and is a big plus on recruiting forms sent to colleges.

Every year, when the off-season strength program was about to start, I'd hear about some freshman who squatted 500 pounds as a senior in high school. Great, I'd think, this will make my job easier, but deep down I doubted that it was true, and it never was. The 500-pound squatter would barely manage 315 when he had to go below parallel.

Full squats are essential, since they develop all the groups of the legs, hips and lower back in proportion. That's as opposed to partial squats, where the quads do the bulk of the work, letting the hamstrings lag behind. Going low also helps secure the knee joints, since it strengthens the attachments of the hamstrings and quads that surround the joints so much more than partial movements do.

Note that anytime you work your hamstrings, you're also hitting your glutes and lumbar. That's desirable because those groups make up your power plant.

The technical name of what we call the hamstrings is the biceps femoris. It's also referred to as the leg biceps because, as with the biceps of the upper arm, it's formed in two parts, the long and short heads. Hamstrings actually refers to the two tendons coming off the biceps femoris, but for this discussion I'll use its more common definition as the name of the muscle group. Joining the hamstrings in the rear of the leg are the semitendinosus and the semimembranosus muscles, and the overlapping gluteus maximus. All except the short head of the biceps femoris act on the hip joint, and all but the glutes play a role in the flexion and inward and outward rotation of the knee.

There are two primary reasons why the hamstrings get injured: They're disproportionately weaker than the quads, and they get an insufficient warmup. I've already mentioned the problem with partial squats, and the same thing happens frequently with the leg press. Lifters stack on plates until there's no more room left, and then they move the stack a few inches, usually accompanied by loud screams. That's strictly for show. Partial leg presses like that put the quads under great stress while neglecting the hamstrings, and that will eventually lead to trouble. They'd be much smarter to use moderate poundages and do a full-range motion. If the hamstrings lag behind, progress will come to a halt on any exercise in which they're involved, and that's a lot.

Another reason that athletes develop an imbalance between hamstring and quad strength is that they don't work hard enough on hamstring exercises. Some include in their programs useful movements for the hamstrings, like stiff-legged deadlifts, good mornings and leg curls, but use light weights, while at the same time they're attacking their quads with huge poundages. The fact is, the most beneficial exercises for developing and strengthening the hamstrings aren't the least bit fun to do, and in order for them to produce results, you have to work them hard and heavy. Teasing the hamstrings with token weights just doesn't get the job done.

I mentioned that a major cause of hamstring injuries is insufficient warmup. The warmup should include a few exercises that flush blood directly into the rear of the legs, as well as some stretching. Of all the body's large muscle groups, the hamstrings are most prone to becoming tight during exercise, so it's vital to take the time to prepare them for the work ahead. It isn't complicated and only takes a few minutes.

Do one set for your abs and follow with a set of hyperextensions, a set of leg extensions and then a set of leg curls. Since it's a warmup, you don't need heavy resistance on the leg machines, but always use at least half as much on the leg curl as you used on the leg extension. I'll explain the reasoning below. Now stretch your hamstrings. The hurdler stretch works well. If you're squatting or deadlifting first, do the first set deliberately. Once you feel completely warmed up, you can do the lifts more explosively. I also recommend that you stretch your hamstrings after each set of squats, deadlifts and good mornings. You're not doing anything else anyway, other than talking, and you can do that while you stretch. Stretching between sets will improve flexibility and help you handle more weight. After you complete the sets, stretch your hamstrings again. More is always better when it comes to stretching the hamstrings, so you might want to do some stretches at night after a heavy squat workout as well.

Athletes who religiously stretch their hamstrings before practice or a training run will walk in the gym, drop their bags and go directly to the squat rack. They often suffer the consequences. Even mild exercise like walking requires that the hamstrings be stretched afterward. I do my best to pay attention to that discipline, but I, too, am often negligent when I'm in a hurry. Then in the middle of the night my hamstrings remind me how stupid I was. Nothing can ruin a good night's sleep more than a cramping hamstring, and it takes an eternity to figure out some way to plant my feet on the floor to alleviate the pain.

It's clear that I think the full squat is an excellent hamstring exercise, but there are many others. Front squats are great, since they force you to go very low. Lunges done with a barbell or dumbbells are also useful, but you have to work them heavy. Deadlifts are good, and if I'm using them specifically to build strength in my hamstrings, I do them with 25-pound plates and set my hips very low. You can also use the leg press and hack machine to develop hamstring strength, but as mentioned above, you must go low or they won't be effective.

The two best exercises for working the hamstrings directly are stiff-legged deadlifts and good mornings. Along with squats and leg curls, they're the exercises I use for rehabbing injured hamstrings. For as long as I've been writing for fitness magazines, I've been trying to get readers to understand that the names this exercise is known by, stiff-legged deadlifts and straight-legged deadlifts, are misnomers. The lift should be called 'almost-straight-legged deadlifts' because you should not lock your knees. Doing so places the attachments at the rear of the knees under too much stress, and since it doesn't make the exercise any more beneficial, why risk it? Simply bend your knees just a bit and all will be well. The same idea holds true for good mornings, but every time I visit a new gym, I see the members doing both exercises with their knees locked. Fortunately for them, they aren't using much weight, but it's a mistake that can prove costly.

The only time I ever injured a hamstring was when I lowered the bar to the platform with my knees locked after completing a snatch. Why I did such a silly thing I can't tell you, but I paid the price.

I once had an athlete tell me that the backs of both of his knees hurt after every workout and he didn't know what was causing the problem. I watched him go through his program for the next few days, and he was doing all the exercises correctly. I was stumped until I happened to notice that he was doing his warmup hyperextensions with locked knees. That was the fly in the ointment. When he started bending his knees slightly on hypers, the problem disappeared right away. Strange, but true.

I recommend doing almost-straight-legged deadlifts on the floor using 25-pound plates, rather than standing on blocks or benches. It's much safer, especially for the equipment, and eliminates the balance factor. You can load lots of 25-pound plates on the bar. Start the movement with the bar extremely close to your legs, up against your shins. It must stay close to your body on the up-and-down motion. It should move in a smooth fashion. Don't jerk the bar from the floor, but rather ease it upward. Stop at midthigh. That helps maintain a constant tension on the hamstrings. It's harder than going all the way to the top, but that's the point. Lower the bar deliberately; don't let it crash to the floor. Jamming the loaded bar into the floor can irritate your shoulders and elbows. And don't get in the habit of rebounding the plates off the floor. Once you get the bar there, pause and do the next rep.

Keep your back flat on these, and use straps. You may not need them for the lighter weights, but they do help with the final, heavy sets. For these to be productive, you have to work them hard and heavy. I've mentioned the weight guidelines I use for these in relation to the poundages you'd use for back squats in previous articles, but I'll lay them out again here: On the almost-straight-legged deadlift you use three-fourths of your best squat poundage for eight reps. So a 400-pound squatter should be handling 300 for eight on the almost-straight-legged deadlift to ensure that the hamstrings stay in balance with the quads.

This ratio is a goal, and it may take a few months to reach, but once you get there, you can keep the two lifts in balance from then on. Let's say you want to work up to 300 on your final set. Start with one 25-pound plate on each end of the bar and add two more on each subsequent set. Your sets would look like this: 95, 145, 195, 245 and, finally, 300'all for eight reps.

Good mornings rank high on my list of useful hamstring exercises. Many of my athletes tell me that their hamstrings get sorer than their lower backs after a workout of good mornings. I inform them that it's because their hamstrings are relatively weak in relation to their lumbar. If you want to work your hamstrings, do the standing rounded-back or flat-back version of the good morning. The seated style doesn't hit the hamstrings nearly as much. If you still want to do some seated good mornings for variety, use them only about once a month.

Your good morning should be 50 percent of your best squat for eight reps. Again, that's a goal, and it may take some time to attain it. Once you do, however, the two lifts can move up at a constant rate, which will ensure that you maintain the critical balance between the quads and hams. Good mornings and almost-straight-legged deadlifts fit in best right behind squats on the light day. Do either but not both once a week. If you work them as suggested, that will be plenty. It's concentrated work, and your hamstrings are also involved in many other exercises in your program. I also recommend that you don't do leg curls on that day.

Leg curls, performed while standing or lying on a conventional bench, are a useful hamstring exercise, but they aren't a core movement like squats, lunges, leg presses, hack squats, good morning and almost-straight-legged deadlifts. They're auxiliary exercises, since you don't use heavy weights. Whenever lifters try to use lots of weight on leg curls, their form gets sloppy, and they lose the exercise's usefulness.

I suggest doing a light set as part of your warmup routine, using half the weight that you used for the leg extensions. That also holds true for your work sets, which you need to do after you complete all the core exercises, toward the end of the session. Alternate them with leg extensions for three

sets of 20 each. There's also a rule-of-thumb percentage for the weights to use on these two exercises, and it's been around for a very long time. The weight you use on the leg curls should be at least 50 percent of what you used on the leg extensions.

It's not uncommon to see people handling 300 pounds for reps on the leg extension machine, but seldom do I see them using 150 pounds for reps on the leg curl. That's what they should be using to ensure a balance between quads and hams.

The good thing about doing the two exercises back to back is that you can find out right away if the groups are in balance. If you can't handle half as much on the leg curls as you use on the leg extensions, pull back on the leg extensions until you can. You can accomplish that by doing extra sets on good mornings, almost-straight-legged deadlifts, hypers or more leg curls.

If you have a standing leg curl machine and a conventional machine, use both, alternating either at different workouts or from set to set. You can do leg curls and leg extensions at the end of every workout, except when you do almost-straight-legged deadlifts or good mornings.

Hyperextensions are useful for developing hamstrings. They're good warmups, great for rehab and hit the hamstrings in a slightly different manner from the other exercises. I don't suggest adding resistance or at least not very much because it usually forces people to alter their form to where it becomes sloppy and not nearly as productive. It's better just to run the reps up. Try starting out with 20, then adding a couple of reps each week until you reach 50. That's enough, but if you decide you need more work on them, do another 50-rep set or two.

The hamstrings are potentially powerful muscles that help stabilize the hips and knees and are responsible for running speed and leaping ability, along with countless other physical acts. Still, you have to work them diligently, stretch them regularly and keep them in proportion to the quads. A disparity in strength between the two groups will adversely affect progress in the weight room, at the least, and at worst will result in an injury. Every strength program needs several exercises that hit the hamstrings directly, but you have to attack them. Merely teasing such large muscles with light weights just doesn't feed the bulldog.

Editor's note: Bill Starr was a strength and conditioning coach at Johns Hopkins University from 1989 to 2000. He's the author of *The Strongest Shall Survive* and *Defying Gravity*. IM