The Hamstring Curl

Introduction

The hamstring curl, though often neglected as part of the weight training regimen, is essential to the stability of the knee and to the maintenance of a proper quadriceps to hamstring ratio. Inadequate or improper performance of this exercise can be attributed to three factors. First, because the hamstring group is incapable of generating large forces, the athlete is frequently frustrated by the seemingly great amount of energy expended to lift a relatively small amount of weight. As a result of this, the phenomenon of increased muscle bulk is not as readily apparent as are changes in the size of other muscle groups. Finally, athletes often find the prone position an uncomfortable one for execution of this exercise.

Nonetheless, the importance of hamstring strengthening in the total weight program is underscored by its role in protection of the knee joint. Ideally, the hamstrings should be 2/3 as strong as the quadriceps for prevention of muscle strain and for optimum performance in athletics. The hamstring is also an important dynamic stabilizer of the knee joint, especially for athletes who have sustained anterior cruciate ligament injuries.

Apparatus and Technique

Though there are several machines for hamstring strengthening, this discussion will be limited to use of a Universal knee flexion-extension bench (see Figure 1). The athlete starts the exercise with the knee in full extension, the achilles tendons are resting under the padded roller bars. The ankle is dorsiflexed (feet pulled up toward the face) throughout the exercise to negate gastrocnemius activity and, therefore, isolate the hamstring muscle group. Keeping the hips and thighs in contact with the bench, the athlete slowly pulls his heels up to the buttocks and slowly returns to the starting position. Should any arching of the back be unavoidable, the amount of weight
should be decreased until no arching is noted, otherwise the muscles of the back may be strained. The motion should be carried through out the entire range of motion and the muscles should be relaxed for an instant to gain maximum benefit from the exercise. As in all lifts, the athlete should breathe out when lifting the weight, and breathe in when returning to starting position.

**Applied Anatomy**

Anatomically the hamstring crosses the hip and the knee joints and therefore has the dual function of hip extension and knee flexion. In this exercise the hip is stabilized, so that the hamstring acts solely upon the knee joint. Other muscles, particularly those of the hip stabilizers and ankle dorsiflexors, are active isometrically. However, the hamstring derives the greatest strengthening benefit because of the isolation of this group.

Three muscles, the biceps femoris, the semitendinosus, and the semimembranosis, comprise the hamstring group (see Figure 2). The lateral (outside) muscle, the biceps femoris, can be selectively strengthened by laterally rotating (turning out) the leg before the motion is initiated. Conversely, medial leg rotation would isolate the semimembranosis and semitendinosus or medial (inside) hamstrings. Isolated hamstring pulls and rotatory instabilities of the knee (i.e., cruciate ligament laxities) are instances in which these selective exercises are essential for proper knee function. In light of these important functions of the hamstring, it can be said that the popular image of the hamstring curl is overcome by the enormous benefits to the athlete.

The hamstring curl is an exercise essential to the stability of the knee and the maintenance of a proper quadriceps to hamstring ratio.

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**Michael Carter's Two Sport Strength**

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because Carter hit a season best at the 1981 NCAA Outdoor Championships with a put of 68' 10¼" and then improved to 69' 6¼" at the 1981 Athletics Congress Meet.

After the 1981 Athletics Congress Meet Michael Carter competed on the European summer circuit. His weight program was recycled, but begun on the power phase eliminating the conditioning and strength phase for two reasons: first, the primary objective was maintaining the strength and power built during the past year; second, traveling around Europe discourages any type of definite training program. Still, Michael Carter fully understands what his coaches have done with him and he is fully able to train himself as he did while in Europe. This fact was demonstrated as he put the shot 69' 8¾", beating the Russians in the shot in the 1981 U.S. vs. U.S.S.R. Track and Field Dual Meet held in mid-July in Russia.

After returning from Europe Carter rested from lifting and began his conditioning program for the football season. It is at this point that he is weakest, since he has just completed his yearly training cycle. However, he is so strong that head football coach Ron Meyer, defensive line coach Tom Brasher and I do not worry about his strength level. We just want him in great running shape so that he can get ready for the upcoming football schedule.

After four weeks of full rest from the weights, Carter begins the two day/week lifting program that has been designed for the top fifty football players. He goes out with the team on Sunday afternoon to stretch, run, and lift. He also lifts on the second Wednesday after practice with the rest of the team. Following is the basic format of the program.

**Sunday**

1) speed squats—5 reps/3 sets
2) leg lifts—10/2
3) bench press—5/4
4) push press—5/3
5) curls—10/3
6) 4-way neck—10/3
7) twisting situps—30/3

**Wednesday**

1) speed squats—5/3
2) leg curls—10/2
3) bench press—5/4
4) push press—5/3
5) curls—10/3
6) 4-way neck—10/3
7) twisting situps—30/3

This program goes through three cycles of four weeks each during the football season and is similar to the way Carter trains in the weight room for his throwing.

This is Michael Carter's year-round program; a combination of Ted McLaughlin's coaching in the shot and discuss circles, Tom Brasher's guidance on the football field, and the weight and conditioning programs I have developed. It is a successful program because it works hard and communicates well with all his coaches. At the same time Coach McLaughlin, Coach Brasher, and myself stay in constant contact with each other during the year to coordinate Carter's strength and conditioning programs. It takes teamwork for success and Michael Carter has attained success, but there is no doubt that this great athlete will accomplish more in the years to come.