

On the Fast Track

At Williams College, sprinters are shaving seconds and heading off injuries with a progressive strength and conditioning program.

By Ralph White and Fletcher Brooks

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The blink of an eye. For a sprinter, that can be the difference between winning and losing. Races are sometimes decided by hundredths of a second, which is less time than it takes to blink. Shaving such a sliver off a sprinter's time, however, is the result of months and months of work, much of it in the weight room.

Many factors, both physical and mental, go into developing fast sprinters. While track coaches usually takes care of teaching proper sprinting technique, increasing confidence, and helping sprinters to learn how to run relaxed, the strength and conditioning coach plays a key role in building the physical abilities needed to save those precious fragments of time.

Building lower-body strength is the most obvious way a strength and conditioning coach can help sprinters improve, but it is not the only one. At Williams College, we have found that improving conditioning, reducing injuries, and developing upper-body strength also help sprinters—both over the long haul and during the short run.

A Balanced Plan

Here at Williams, we address our strength and conditioning program by first establishing a plan for the entire season. We start by determining what we will be doing with our sprinters on the day before the national championships, then work on two days before, then a week before, and so on until we have the whole season mapped out.

Developing this plan requires a high level of communication between the track coaches and the strength and conditioning coach. It is important for both parties to understand what the other is trying to accomplish. Without knowing which events on the schedule are the most important, the strength coach cannot have the athletes in top condition at the right time. Without knowing what the strength coach is doing with the athletes week to week, the track coach may be surprised to find his or her athletes are feeling tired and worn out as they head into their biggest meet of the season.

It is important that your plans account for a wide range of experience and skill levels. All too often, the focus is on the team's top athletes. But a plan that will help an All-American senior often will do little for an inexperienced freshman and may actually cause substantial harm.

At a Division III program such as Williams, we see many incoming runners who are relatively weak and who have had little, if any, experience with strength training. As a result, we may spend up to two years working with these athletes to establish their base strength before moving on to more specific work to help them become faster sprinters.

But just because an incoming athlete has experience with strength training doesn't mean he or she won't have problems that need to be resolved. Oftentimes, new athletes come into our program with some sort of strength imbalance that we must address before moving on to event-specific work.

As with all our athletes, we start with our sprinters' strength and conditioning program by first measuring for strength imbalances. We do this by comparing their results in any number of simple lifts, such as the front squat versus the back squat or a clean versus a snatch. If the differences fall outside predetermined percentages, we know that we have identified an area that needs to be more balanced. Simply watching an athlete squat may reveal certain problems we need to correct before moving onto sprinter-specific work.

We have found that most athletes have some strength imbalances, which can usually be equalized through exercises designed to strengthen the weaker muscle. If you do not address those imbalances first, you can exacerbate them, leading to decreased performances or increased risk of injury. For example, if someone is quad dominant or glute dominant compared to the hamstrings or hip flexors, a lift that might work both muscles areas will be taken over by the stronger muscle group. Therefore the imbalance is never corrected. Once strength imbalances have been corrected, real performance gains can be attained.

Sprint Strength

With strength imbalances addressed and base strength developed, we focus on ways to turn strength into speed. We use plyometrics to help make the transition from base strength to sprint strength in conjunction with targeted weight training, mostly using Olympic lifts.

We have a very structured plyometric program, aimed at getting muscles strong and ready to handle the speed work on the track. Plyometric work usually begins in January and increases in intensity very gradually. We increase the number of touches per session week-by-week rather than jumping into heavy work immediately.

To decrease the risk of injury, we perform many of our plyometric workouts on soft surfaces, such as a synthetic track or dry grass. We emphasize to the athletes the importance of landing on their full foot, not just their toes, and make sure they have plenty of recovery time with a typical work-to-rest ratio of one to five. Typically, we have one plyometric session every four days.

Table One lists some sample plyometric routines that we have used early in the training schedule for athletes who have attained a sufficient base of strength. The number of sets and reps will increase as we progress through the schedule and will be adjusted for individual athletes.

Our lower-body strength work focuses on variations of Olympic lifts, along with back squats, split squats, front squats, and lunges. At our level, we find that sprinters get stronger with greater ease than they get explosive, and we will often see them performing better cleans than snatches. Since the snatch is more of a speed lift, we will often use more variations of the snatch than the clean to help build that explosiveness. Snatches also involve the whole posterior chain—a critical area for sprinters that includes the hamstrings, glutes, and low back—more so than the clean does.

For more advanced athletes, we add some contrast sets. Some of our favorites are squats followed by hurdle jumps, squats followed by jump squats or in-place jumps, and snatch pulls

with chains followed by a full recovery and box hops. These sets are a little more fun for the athletes, but it is vital that they have the proper lifting experience and strength base to avoid injury. Rarely do we have athletes doing any of these complex exercises in their first year.

While much of the focus for sprinters is on the lower body and core, it is important to also work on the upper body. If we can make their arms and torso stronger, athletes can move them with more efficiency and relative speed to the lower body and in turn increase sprint performance. This is especially important for female runners who generally do not have the same upper-body strength as males.

Running Work

When prescribing running workouts for our sprinters, we follow a simple rule—sprinters need to sprint. Sometimes, younger sprinters will tell us they want to run cross country to help them prepare for the track season. It is their decision to make, but our philosophy is that if you train slow, you will run slow.

Although most of these athletes are correct in thinking they have to establish a strong base for the track season, we feel there are much better ways for sprinters to do this than by running cross country. Instead of having them run four or five miles to improve their aerobic base, we have them run 20 to 30 minutes Fartlek style. This is a form of interval training where athletes will sprint, jog, and walk for a specific time or distance.

For example, after warming up they may sprint for 30 seconds, jog for 30 seconds, and walk for one minute. This pattern is then repeated until they reach their desired time. This trains the athlete to run fast at the same time they are building their appropriate speed endurance levels.

Here is an example of running workouts we might use early in the indoor season. Of course the exact workout will vary based on the athlete's fitness level and experience. We begin each workout with a 10-minute jog followed by running drills and dynamic stretching.

Monday: Three sets of three reps of 100-meter form running at 80 percent of max with 15 seconds between each 100 meters and three minutes between each set.

Tuesday: Circuit (see [Table Two](#)).

Wednesday: 20 to 30 minutes of Fartlek running, with sprint times ranging from 10 seconds to one minute. Athletes should be jogging or walking when not sprinting.

Thursday: Swimming or games, such as water polo, ultimate Frisbee or angle ball after warm up. The goal is to give the legs a chance to recover while still keeping the athletes active.

Friday: Three sets of two reps of 150 meters with each 50 meters getting faster (75 percent, 85 percent, 95 percent). These also provide an opportunity for sprinters to work on running relaxed.

Once we have developed a solid strength and conditioning base, we focus more on sprinting specific work including hill work. Here are sample January workouts. All are performed after warm up.

Monday: Two reps of 30 seconds hill work at 85 percent with 2:30 rest. Two reps of 20 seconds hill work at 90 percent with 1:45 rest. Two reps of 10 seconds hill work at 95 percent with 60 seconds rest. Athletes sprint up the hill and walk or jog down.

Tuesday: Nine 30-meter sprints at 98 percent, three from a standing start, three from a three-point start, and three from a jogging start. Rest 1 minute between each sprint. Three sets of three one-minute reps of 200 meters. (For example, if it takes the athlete 35 seconds to complete the 200, her or she would rest for 25 seconds.) Rest four minutes between sets. It is much better to start out too slow and get faster each set than to start out fast and get slower.

Wednesday: Six reps of 100-meter form running with walk back. Two reps of split 300 meters at 400-meter race pace. (Example: Run 200 meters at 400-meter race pace, rest one minute, then run 100 meters.) Focus on mechanics throughout.

Thursday: Pool workout. This could be swimming Fartlek-style or a ladder of flutter kicks such as four sets of one-minute flutter kicks followed by four sets of 45-second flutter kicks followed by four sets of 30-second flutter kicks. Use a 1:1 rest-to-work ratio.

Friday: Two to four sprint starts with gun, baton work, and 150 meters at 98 percent.

Although recovery is a key part of the training process throughout the entire season, it becomes even more important as the championship meets approach. At this point, we focus on quality over quantity and run less volume with increased intensity and rest. Here is an example of late season work:

Monday: Three sets of 20 seconds hill work with 10 minutes between runs.

Tuesday: Block and baton work.

Wednesday: Four flying 60-meter sprints at 99 percent with complete recovery followed by one quality 150-meter sprint.

Thursday: Running drills in pool.

Friday: Active warm up or rest.

Injury Prevention

One of the realities of track is that even that fastest runner will not win a race when they are injured. Injury prevention is such a big part of our program that we follow a philosophy that it is better to be at 95 percent of peak performance 100 percent of the time than to be at 100 percent of peak performance 95 percent of the time. If we have any doubt about a workout, we believe it is better to go too easy than go too hard. The last thing we want to see is an athlete missing a big meet due to injury.

The two most common injury types for sprinters are shin splints and hamstrings problems. To help keep these injuries at bay, we do a daily dynamic warm up, which includes running drills.

Many times, coaches will have their athletes jog for 10 or 15 minutes and then sit and stretch. The problem with this approach is that quite often the body cools down during the 20 to 30

minutes of stretching. Also, with static stretching, there is no movement of the joints—there is no activation of the synovial fluid to lubricate the joints, there is really no warming of the joints or the muscles at all. You need movement to accomplish that.

There is nothing complicated about dynamic warm up. It is just a matter of moving the joints as well as stretching and working the muscles. We start with a five- to 10-minute run, followed by running drills that include leg swings, arm swings, backward weaving runs, skipping, and side-sliding. Following the drills, we have our athletes do some hurdle-mobility drills, such as going over the hurdles with a single leg, walking over and then under the hurdles, or going over sideways, which warm up the hips and core muscles.

We also take static stretches and make them active by adding movement. For example, our version of a quad stretch looks like this: Athletes grab one leg, hold it for a few seconds, then take a step forward and grab the opposite leg.

In some cases, our active warm up may take 30 minutes or more, but the beauty of an active warm-up is that it is more than just a warm up. Motor learning and strengthening even occurs with many of these exercises. Early in the season, athletes will sometimes think the warm-up is the workout! But within two weeks, they are breezing through it, which shows its value as a conditioning tool as well. We also vary the surface we use for our active warmups and often do them on the grass or even in the jumping pits, where the sand offers greater resistance.

Another thing we do to help prevent injury is bare-foot training. We will do many of our warm ups and running drills in bare feet, which has helped to reduce the number of shin splints we see almost to zero.

It is also important to make sure that shoes fit correctly. Athletes sometimes focus on the shoes they wear in competition and forget about the importance of good training shoes, even though injuries are more likely to occur from training. Of course, none of these steps will eliminate the possibility of injury, but we have seen very few shin splints or hamstring problems over the years—something that has helped keep our sprinters on the right track.

Table One: **Plyometric Routines**

Here are some sample plyometric routines we use to help develop strength and conditioning in our sprinters:

Easy

- Hop on both feet over a line for 30 seconds, rest 2:30, and repeat
- Hop on one foot over a line for 30 seconds, rest 2:30, and repeat with other foot
- Hop for distance and height with both legs x 10, rest 60 seconds
- Hop for distance and height on right leg x 10, rest 60 seconds
- Hop for distance and height on left leg x10

Moderate

- Two sets of 10 depth jumps off 12- to 18-inch box, rest two minutes, and repeat

- Three sets of tuck jumps for 30 seconds with 2:30 rest between sets
- Three sets of double-leg jumps over six to eight low hurdles with 90 seconds rest

Difficult

- Two sets of alternate leg bounds for 60 meters up hill followed by slow walk back for recovery
- Two sets of 10 double-leg depth jumps down and immediately up from 18- to 24-inch box with two minutes rest between sets
- Two sets of single-leg bounds on each leg and two sets of double-leg bounds onto and off of six to eight 12- to 24-inch boxes with 2:30 recovery between sets

Table Two: **Circuit Training**

Our circuit consists of eight stations located 50 meters apart. Each station is assigned three related exercises.

Athletes begin by pairing up. The first member of the pair starts the circuit at Station 1 and performs the first exercise at that station 25 times. He or she then sprints 50 meters to Station 2 and performs the first exercise listed there 25 times. Athletes continue until they have done the first exercise at all eight stations. The second member of the pair then completes all eight stations while his or her partner rests.

After the second partner completes his or her first circuit, both partners run 400 meters. The process then repeats with athletes completing the second circuit, running 400 meters, completing the third circuit, and finishing off with a 400-meter dash.

Station	First Circuit:	Second Circuit:	Third Circuit:
1	Regular-grip push ups	Wide-grip push ups	Closed-grip push ups
2	V sit ups	Crunches	Leg scissors
3	Tuck jumps	Split squats (each leg)	Burpees
4	Arm circles	Back uprisers	Shoulder shrugs
5	Toe raises (straight)	Toe raises (inward)	Toe raises (outward)
6	Crunches	Crunches	Crunches
7	Bent-leg doggies (right)	Straight-leg doggies (right)	Back-leg extensions (right)
8	Bent-leg doggies (left)	Straight-leg doggies (left)	Back-leg extensions (left)