

# Anatomical and Performance Evaluation for Sprinters in Track and Field

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In every high school in America, there are state caliber sprinters walking the halls that aren't involved in track and field. Many do not realize the greatness they possess and many coaches fail to identify those athletes or address minor weaknesses with the sprint potential to compete at an elite level.

A great physical education program can really help in identifying those potential sprinters on the performance-based side. If you are fortunate enough to coach at a high school where athletes are identified by varying performance testing in physical education, feel very fortunate. If you are recruiting based on personalities of the coach and athlete, then here are some areas to examine once your season begins. Many areas will require more than just performance tests, causing the need for some anatomical analysis of the athlete on your part.

**Calf Height**-A high calf muscle is crucial in sprinting. The closer the calf is to the knee joint the better. A high calf will cause the gastrocs, soleus and Achilles to act like a long rubber band, propelling the athlete down the track. The longer this area, the better.

**Range of motion in the ankle**-Have your athletes sit with the soles of the feet against a wall. On command, have them move their toes away from the wall toward their body/shins. Make sure the heels remained locked on the wall. The further they can move the toes away from the wall the better. This is a great test for measuring ankle range of motion and flexibility in the calf and Achilles area. Often times the ankle will be locked up causing issues up in the knee area.

**Flexibility of the toes and feet:** This area is often overlooked and is critical in sprint success. The entire lower leg, foot and toes must have flexibility and range of motion. Placing the foot in dorsiflexion and massaging the bottom of the foot is essential. Additional massage in the shin area on the medial and lateral sides of the lower tibia will also aid in the function of the foot. Big toe flexibility is crucial.

**Adequate movement in the Sacral Iliac Joint-** Nothing will cause a cavalcade of muscle problems than a tight SI joint. This area may require some massage and movement rehab work.

**Pliability of the IT band-**This is another area that may require some massage work if the athlete demonstrates a tight IT band.

**Recruitment of correct muscle firing sequences-**Your athlete will often be able to tell you what muscles they feel they are using and whether or not they are firing sequentially. For example, if they aren't using their buttocks and relying solely on their quads, the quads will be really sore. This may require better joint range of motion or massage to break up muscle tissue sticking or adhering to other muscle. A great example of this area is in the high jump where the athlete will not fire sequentially and jump strictly with their quads, while the hams and gluts are disengaged. This may also be a locked up SI issue and require examination on whether the SI joint is properly functioning. If the SI joint is locking, muscle firing may be re-routed from the proper firing sequence.

**Filming a sprinter for amortization-**Film your athlete doing a 30 or 60-meter fly from the side. On front foot contact, does the knee collapse/bend? If so, you have what is called amortization. The thigh may not have the needed strength to support the weight at foot contact. Working the vastus medialis and other supporting muscles is essential.

**Reaction time of the athlete-**The central nervous system plays a very important part in the success of the sprinter. Have the sprinter get on all fours. Make sure the hands are directly below the ears. Stand above the athlete with a tennis ball. Hold the ball about 1 foot above the ear, lined up directly over the hand. As you drop the ball, the athlete will feel the ball as it drops by the ear. The athlete's goal is to roll the hand over and catch the ball. This is a great evaluation of the athlete's reaction abilities.

When performing a battery of performance tests, inform the athlete of the reasons for those tests or specific workouts. They are much more likely to give a maximum performance if they know that you testing with a purpose and not testing just to test or doing a workout just to do one.

**30 meter fly-**This is an indicator of top end speed. Use a 20-meter lead in zone and then time 30 meters. Remind the athlete that they must be going all out at the first

cone and not hit it once they get to the first cone. Remind them also to run past the second cone and not use it as the finish.

**Overhead backward throw with a 4k shot put**-This is an indicator of total body power and coordination. Be sure and stress safety here. Before throwing, have the athlete drop to a sit/squat position to load the thighs before throwing. This will eliminate the athlete from leaning forward and using their back.

**Standing long jump**-This is an indicator of leg power.

**Standing triple jump**-This is an indicator of leg power, acceleration, and coordination.

**30 meter block**-This is an indicator of leg power and ability to accelerate.

**60 meter block**-This is an indicator of top end speed and block clearance and acceleration mechanics.

**150 standing**-This is an indicator of top speed and speed endurance

**250 standing start**-This is an indicator of long speed endurance and anaerobic power

**Straight leg bounds**-Dynamically strengthens gluts/upper hamstrings relative to actual sprint cycle

**Speed Bounds**-Hip flexor/hip extensor strength. Allows for correct cycling to occur.

**Lunges**-Addresses acceleration, poor flexibility, stride length, and strength endurance

**Short hills (2-3% grade)/Short drag work**-Addresses acceleration, hip flexor, and extensor strength.

**Hurdle hops/short jumps**-Addresses hip flexor, extensor strength, and ground contact turnaround time.

**Swimming-Recovery**-Aerobic work/upper bodywork.

**10 bounds**-This is an indicator of leg power, coordination, speed endurance and acceleration.

When evaluating and putting together workouts based on testing and evaluation remember the following:

The following are compatible (they go together):

**\*\*\*Endurance runs (general strength, specific) with strength endurance exercises that help to develop general strength endurance.**

**\*\*\*Speed Development runs with Strength Development exercises. Jumping and bounding. Do the strength development exercises first.**

**\*\*\*Speed Development runs with movement coordination (starts and finishing drills and specific sprinting drills).**

**These aren't compatible. (They don't go together)**

**\*\*\*Speed Development with any type of endurance run over 80 meters.**

**\*\*\*Speed Development with strength endurance development exercises.**

**\*\*\*Strength Development (maximal) with any type of endurance runs.**

**\*\*\*Coordination Exercises with strength development. (Maximal)**

**Strength Endurance-More than 9 seconds**

**More than 90 meters**

**More than 9 reps**

**Speed Training-Under 6 seconds**

**4- 6-minute recovery**

**Extend top velocity for as far as you can.**

**Speed Development-Reaching max speed for 1-2 seconds with some form of assistance.**

**Examining the areas above will better manage your athletes' success. Coaches have used the shotgun approach or dumping athletes through a filter to see which ones come out on top, but a long range plan and well thought out evaluations will prove to be much more effective in the long range success of your sprinters.**