

Speed Training for Sports Performance

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Introduction

The ability to achieve optimal running speed is vital for any land base sports, however, achieving maximal linear velocity in sporting situation are infrequent. How can we utilize speed training to meet the demands imposed?

Can speed training help?

Speed training can be broken down into several components: starts, accelerations and maximal velocity. Not all sports will require all the components in speed training due to the specific demands of each individual sports, for example, during basketball where rapid accelerations and decelerations are performed during a game set up. However, all land-based sports will require starts and accelerations to achieve optimal running speed in order to be in the position to intercept, to defend playing area and for marking opposing players.

Running speed can be determined by both stride length and stride frequency. Stride length is primarily due to impulse and biomechanics consideration of each individual athlete. Stride frequency is the ability of individual athlete in moving their limbs as quickly as possible through space. Both of these variables are trainable and could be address with proper running mechanics, maximal strength program, flexibility program and plyometrics training.

Components of Speed Training

The focus will be on the starts, accelerations and maximal speed for team/field sports. However, there are some differences between the components of speed training for linear running as compared to team/field sports. The components can be modified from conventional linear sprinting to adapt to the needs of team/field sports.

Starts

- Modified to standing starts by getting athletes to assume a forward falling motion from the ankle. That will set the athlete up for the optimal alignment for the next phase of the acceleration as shown in Figure 1.

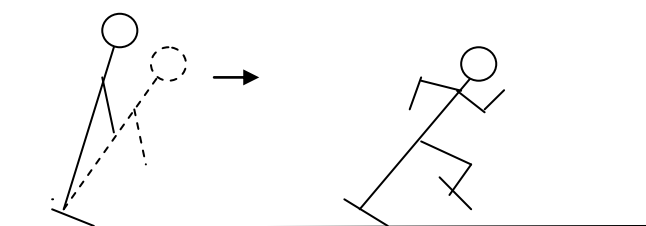


Figure 1. Leaning from ankle and forward falling motion.

- Athletes should be conditioned to starting off from non dominant leg as well due to games situation that may not always permit them to do so with the dominant leg (Figure 2a, 2b)

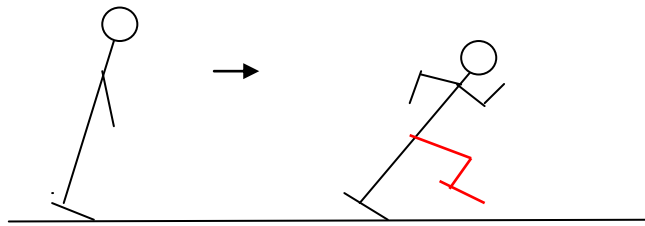


Figure 2a. Starting from left leg.

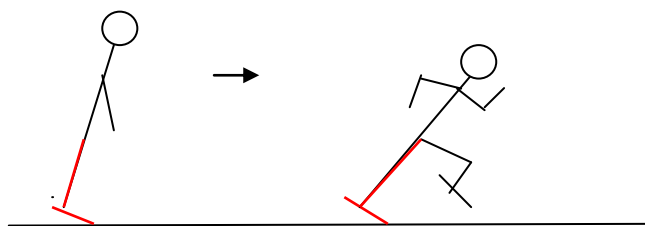


Figure 2b. Starting off right leg.

- Athletes could be conditioned to start from various starting positions (Figure 3a and 3b); lying on the ground (Figure 3c), etc to prepare for actual sports demands and to add varieties to the training session.

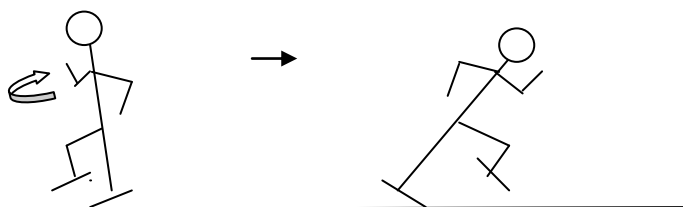


Figure 3a. Jogging backwards, turn and sprint (with or without external command).

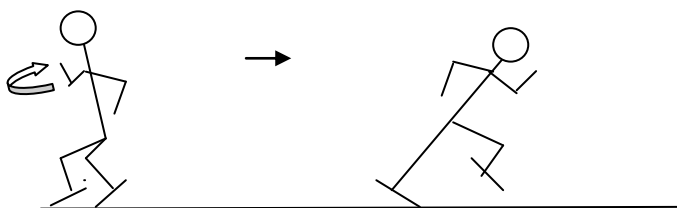


Figure 3b. Starting backwards in staggered stance, turn and sprint (with or without external command).

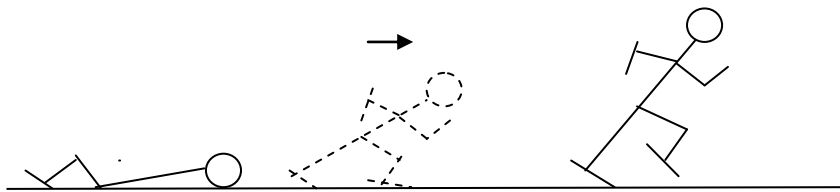


Figure 3c. Laying supine, turn and sprint (with or without external command).

Guideline for Starts

- Distances for starts can cover from 1metre to up to 15metres depending on playing area.
- Progression should start from simple drills like lean and fall, changing of dominant and non-dominant legs and finally advance to more complex drill like lying down starts with external command.
- Steps or time taken used to cover stipulated distance can be used to gauge the training effectiveness of the program.
- The exercises shown are not exhaustive by any mean and are subjected by coach's imagination and creativity to improvise drills to suit individual needs.

Accelerations

- Athletes are required to accelerate from both static and dynamic positions (Figure 4a), therefore, sprints training have to include accelerations during walking, jogging and during running.

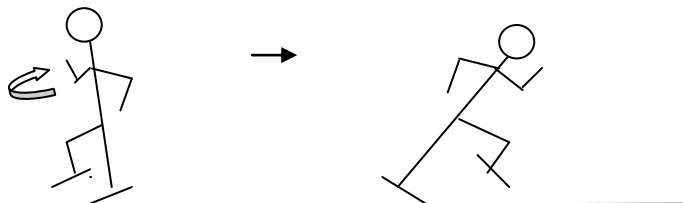


Figure 4a. Jogging backwards, turn and sprint.

- Special training methods like sprinting with a weighted sled (Figure 4c) or a parachute (Figure 4b) might be used to promote the optimal positioning of the body during accelerations.

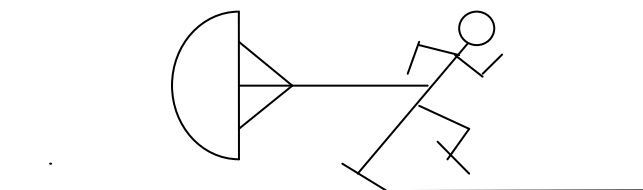


Figure 4b. Acceleration training with parachute.

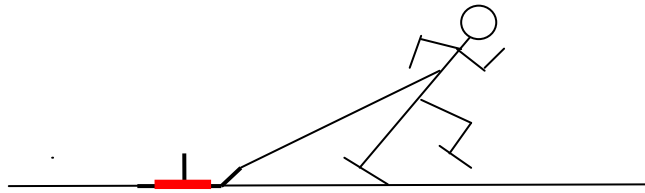


Figure 4c. Acceleration training with weighted sled.

- Specific games set play situations during training should be considered and used as a form of acceleration training.

Guidelines for Accelerations

- Distances for accelerations might cover from 10metres to 25metres depending on playing area.
- Progression from simple drills that consist of linear accelerations over shorter distances, to longer distance with change in directions and finally to advanced drills that used special training methods or specific games situations over longer distances.
- Steps or time taken used to cover stipulated distance can be used to gauge the training effectiveness of the program.
- The exercises shown are not exhaustive by any mean and are subjected by coach's imagination and creativity to improvise drills to suit individual needs.

Optimal Velocity

- Athletes should be able to achieve optimal velocity within fewer acceleration steps due to the shorter distance during game play when compared to conventional linear sprinting. The ability to accelerate efficiently is the vital key to obtaining maximal velocity.
- The high knee lifts in conventional linear sprinting are not been demonstrated in team/field sports due to the requirement of sudden change in directions (Figure 5).

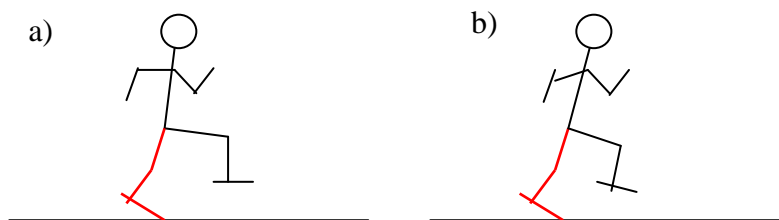


Figure 5. Shows the differences between conventional maximal velocity running mechanics compared to optimal velocity running mechanics in team/field sports.

- Conventional maximal velocity running mechanics with nearly full extension of the back leg (in red), 90 degree angle in knee lifts, rigid upright posture of trunk and almost full extension of the about the shoulder joint.
- "Sports" optimal velocity running mechanics demonstrate less extension of the back leg (in red), lower knee lifts, a slight lean in trunk position, a lower and wider arm swing position and a slightly lower centre of mass. All this serve to allow the athletes to maintain the ability to change directions rapidly.

Guidelines for Optimal Velocity

- Distances for optimal velocity might start from 30metres onwards depending on playing area. The ability to accelerate is vital in achieve maximal velocity.
- Progressions from acceleration drills, to accelerate with change in direction to maximal velocity and finally ability to achieve maximal velocity after coupling of acceleration and deceleration.
- Steps or time taken used to cover stipulated distance can be used to gauge the training effectiveness of the program.
- The exercises shown are not exhaustive by any mean and are subjected by coach's imagination and creativity to improvise drills to suit individual needs.

Conclusion

Speed training is vital in sports that required running as their form of locomotion. However, there are slight differences in preparing athletes for linear sprinting as compared to "sports" sprinting.

* These exercises have been considered by the Performance Conditioning Unit coaching staff to be suitable if all safety measures are observed and correct technique is used. However, readers are advised to seek professional advice on their personal condition before attempting these exercises. The authors will not be held liable for any injuries sustained as a result of following any of the training methods and techniques shown in any articles.