Improving Acceleration

One of the easiest ways to become better at something is to become more efficient and co-ordinated at performing the movement. Becoming faster is no different. If you improve your running technique your speed times will come down. Therefore it is important to develop good acceleration technique. This article will help the reader understand some of the fundamentals of acceleration technique and offer practical coaching tips.

One of the most important aspects of quick acceleration is generating high forces in the correct direction. The legs of the athlete when running generate high forces by pushing against the ground. If the athlete wants to jump high, forces must be applied to the ground in a vertical plane. To run forwards forces are split between pushing backwards (horizontal) and vertically. The greater the force pushed backwards then the body will be pushed forward at greater speeds. This is one of the reasons why athletes benefit from weight training as it improves leg and hip strength, therefore generating greater forces in the lower limbs.

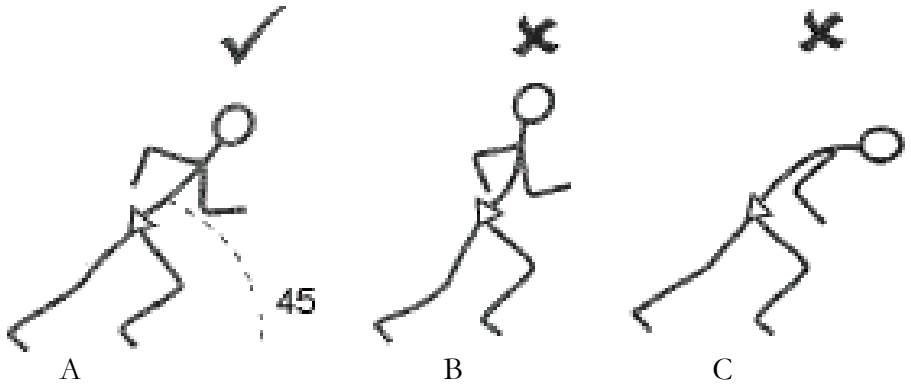

Diagram 1. Examples of good acceleration technique in example A and common technical flaws in examples B and C. (Reaburn and Jenkins, 1997)

Position A above shows the correct straight back position and the lean should come from the hips. Two very common mistakes are shown in example B and C. In example B the body lean is too upright therefore force is lost by generating forces that help to push the athlete into the air and not forward. Example C shows another common fault where there is a forward lean, but the lean comes from the upper back and not the hips. The head is also looking at the ground and not straight ahead.

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Both these flaws are very common, but they can be corrected over time. When correcting errors one of the most important aspects is the speed of movement. When teaching someone to improve technique if the pace of the exercise is too fast it is difficult to correct the fault. This is because the athlete does not know how to do the skill at high speeds for example, when teaching someone how to write you would not start using high speed movements. The same is true with running technique. Below is a simple sequence to help teach correct technique.

Arm Action

Start the athlete of by standing on both feet. Demonstrate the arm bend and arm action. The correct arm bend is approximately 90º. The correct arm action is staying relaxed swinging the arms past the sides from the butt to the face (or easily remembered as cheek to cheek). Again start at low speeds building up the pace slowly until arm action is almost at full speed, do not progress until technique is 100%.

A few ways to increase the difficultly is to perform the arm action standing on one leg. This forces the athlete to focus and control arm action. It also allows the coach to see how good balance is and if any twisting occurs at the knee and hip. A small amount of rotation will occur at the knee to counteract the arm action. However, excessive rotation of the knee should be avoided especially if there is a history of knee problems. Again start of at low speeds before progressing. The majority of team athletes will only need to sprint for 0-5 seconds at high speeds. Keep this in mind when prescribing speed exercises. Aim for QUALITY not QUANTITY at all times when speed training.

Forward Lean

As stated earlier one of the most common faults an athlete makes is leaning from the upper back and not the hips resulting in running posture similar to example C. Many athletes have not been taught how to lean correctly. Therefore it is the role of the coach to help them improve this weakness.

In order to perform a forward lean correctly start by standing on both feet two and demonstrate what a forward lean looks like. This involves bending forward from the waist, keeping the back straight and the head looking straight ahead. This will enable the athlete to learn the correct movement pattern before progressing.

Once this has been learnt incorporate the arm action into the two footed forward lean, advanced athletes could even move onto performing this action on one leg. By now the upper body technique should be improving.

Lower Limbs

One major difference between acceleration technique and maximal sprinting is the stride length (the distance of each step). During acceleration the stride length should be shorter than during maximal sprinting. A second difference is stride frequency (the number of steps per second) should be more frequent during the early acceleration phase than maximal sprinting. Most bursts of speed are performed from a standing or jogging start, therefore to reach maximal speed quickly athletes must use more frequent shorter powerful bursts.

A good drill to use to develop stride length/stride frequency is to perform quick feet movement drills interspersed with long recovery. However, bare in mind the other components of acceleration technique (arm action and forward lean) when deciding on what drills to use. One commonly used drill is performing fast feet movements over cones. One draw back with this is that athletes can concentrate too much on feet speed and forget about a correct forward lean. Therefore as a coach you are reinforcing poor movement patterns.

A better alternative is to use a leaning start with fast feet. A leaning start involves standing up straight with the feet shoulder width apart. The athlete falls forward and bends form the waste before accelerating. This insures that the upper and lower body begin to gel together.

Conclusion & Final Thoughts

When doing a speed session it is best to perform it after a dynamic warm-up and before the athletes are tired. Tired muscles don't get faster therefore the quality of training is reduced. Also it is harder to work on technique when the muscles are fatigued therefore if it is a technical running session you are doing make sure your athletes are fresh.

It is extremely rare to find an athlete who has excellent running technique. The vast majority of athletes can always improve. There is no question that if you improve acceleration technique speed times will improve. Proper acceleration is a skill. If you increase skill levels at something performance will increase straight away. Technical running sessions are one of the most effective ways to improve as an athlete.

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The most important and difficult problem for the coach is deciding on how quickly to progress an athlete or squad. Athletes progress at different rates, therefore when working with a squad improvements will never be as good as working one on one. These are some of the factors to bear in mind when planning speed sessions.

However, the most important tip is to look at the long-term development of the athlete. Improvements will not happen over night as the athlete has probably had poor technique all their life. Therefore take this on board when you feel as if you are getting nowhere fast.

References and Further Reading

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