



Strength Training for Speed

So you've tried coaching your players for speed but they are not getting any faster. You start to get a bit frustrated and decide to give up on this component of their fitness. Does this sound familiar? Unfortunately this is often the case with many S&C coaches, and it has a knock on effect when your players look to compete at the highest level. Ireland has never been pleased with many speedsters, and since Dennis Hickie has retired the National side has struggled for blistering speed. Speed is an enduring skill and as such takes a lot longer to develop than fitness, however, once the skill of speed is developed and refined it has greater longevity and arguably more rewards on the pitch. Speed did not come by chance to Dennis, he spent years developing and improving his speed, so much so he was running as fast as ever during his final year of playing. Although a long term approach must be taken to coaching speed, with a carefully planned programme some noticeable changes can occur over 6 weeks. For example, an AIL player came to me over the summer looking to get faster. His acceleration was poor at 1.83seconds for the 0-10m, after six weeks of strength and speed training he finished with 1.68seconds which was a good improvement. Before you go and prescribe a speed programme for your player/s some fundamental speed biomechanics are important to note.

What do we need to consider when coaching speed?

You have probably heard about how stride length and stride frequency are the two most important aspects to consider when coaching speed. Well this coaching concept is now outdated and current research will show how contact length (distance travelled by the player while their foot is in contact with the ground) and contact time (time the player's foot spends on the ground) are the two most important variables. Stride length and rate are mere products

of having improved contact length and contact rate. To understand this better let's look at what forces we need to overcome in order to sprint fast. Firstly, we can't get away from gravity so we are always going to have this vertical force acting on us as we move. Secondly air resistance applies a horizontal force against us. The job of running at top speed is then to apply forces in such a way that we are able to overcome these two forces acting on our body. Once we are aware of the two forces acting on us when sprinting, what variables are available to us when our foot is on the floor?

The first is contact length, this is controlled by how long your legs are and how far you reach in front of your centre of mass and/or push off behind. The second is contact time, the time your foot spends on the floor. This is controlled by how long it takes your player to overcome the effects of the gravity and air resistance. Below is a simple equation which coaches need to consider for speed (acceleration and agility for that matter):

Velocity = Contact Length / Contact Time

So how do we make changes to contact length and contact time?

Well as coaches we are unable to make any ethical changes to our player's leg length and coaching reaching in front has proven to be ineffective so we are limited in how we can impact upon this variable. So that leaves us with contact time. This variable is hugely important when looking to improve speed. What do faster players do compared with slower players? They are able to generate much higher leg extension forces on the ground and they do it much more quickly. This means they can overcome the effects of gravity (vertical forces) much more quickly and propel themselves back into the air (the effects of air resistance being equal to each player). With this in mind they can overcome their contact length in less time. What does this do to our velocity equation above? Simple, less contact time equals more velocity which equals more speed.

“Quicker feet”, “faster hands” and “more arm drive” are often heard when watching a speed session, but are these coaching cues very effective?

Sprinting fast is all about how we affect ground force production. Therefore, good speed mechanics, coaching cues and drills are all about how they affect ground force production.

Coaching “quicker feet” results in the player focusing his attention on getting his foot off the ground, but this isn’t how we affect ground reaction time in rugby. In rugby or any sport for that matter, we reduce our ground reaction time by expressing our forces more quickly to enable the acceleration phase to happen in a shorter time frame so that the player can then move on to the next movement skill requirement in the game. By coaching “quicker feet” to your players, you are effectively cueing an inappropriate pattern of movement which results in lower ground force production on contact. This can often be seen when using SAQ ladders in a session. Players are coached to speed up their contact times which result in training them to express less force on ground contact. As much as they are a nice tool to have to create some variation in training, overuse of them can often result in diminished returns for the more experienced player.

What gym/pitched based exercises can you do to improve speed?

Once you have a group of players who have a couple of years of weight training, a more specific programme can be prescribed to enhance performance. Like any exercise that is prescribed to your players, you must have a specific rationale for prescribing it. So let’s look at what actions of the body are important for speed.

Powerful hip extensors provide two important functions

1. Reduce braking forces and brace the leg against the ground
2. Facilitate high rates of force production vertically as we sprint (counteracting effects of gravity)

Other important areas to consider include an ability to stiffen the knee and ankle through eccentric control in knee extensors and ankle plantar flexors plus strong tendons, allows for fast force production on contact. When we prescribe gym based programmes we must have an outcome goal intended for the programme and player/team. Otherwise all programmes given to a player are general in nature and will not have any real performance effect on any specific aspect of his conditioning. Before deciding on the strength programme you want to help improve your player’s speed, look at which type of programme will help his speed the most. For example, Shane Horgan is a tall player who I would class as a hip dominant sprinter. He has a long contact length (observation) reaching in front allowing himself longer

contact time to express force and overcome gravity. A knee and ankle programme may prove effective for Shane in allowing him to express these forces more quickly. This would result in shorter contact times which should translate to improved speed. Below are a list of some exercises which can be used to have a specific effect on the hip extensors, knee extensors and plantar flexors:

Region	Gym Based	Pitch Based
Hip Extensors	Olympic Lifts, deadlifting, RDL's	Sled runs, viper resisted runs, hopping and bounding
Knee Stiffness	Full Squats, single leg leg press, squat jumps	Double leg hurdle bounds
Ankle	Calf raise/lower with eccentric control	Double leg hurdle bounds

To consult with Karl on any speed related topics, visit:

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