

Speed Training for Rugby

By Frederick Claro

Rugby HP Coach

TBI P-PS, JATS & Director of Training

It has certainly become a cliché to say that speed is one of the most important physical abilities any team sport player can develop. Needless to say, speed is a common factor in numerous sports and has to be developed in order to achieve the highest performance.

It is a bit complicated to accurately determine the specific type of speed which needs to be developed for a particular sport. What team wouldn't like to have Tyson Gay or Asafa Powell as members? They would certainly score so many tries, wouldn't they? But the answer is, probably not. Why? Because pure linear speed in team sport, if an asset, is not what makes players try-scoring machines.

Although it does happen from time to time (with an intercepted pass or a skilled player through the line in space, no defender in sight, 70m to go...), it is indeed very rare that a rugby player will have to linearly sprint for a long distance. To understand speed needs for rugby, we need to understand first the mechanical aspect of speed. Then we must analyze the speed characteristics of rugby, and finally identify the position specific needs for the groups of players composing the team and devise some strategies and methods to optimize speed development within a team. This is what we shall look at in this article.

I- Speed: Definition and Analysis

We could define speed as the ability of an object or a body to travel a distance over a period of time. Hence speed involves 2 major parameters: distance and time.

A fast running speed would therefore be the ability to travel (run) a distance within the shortest amount of time as possible. In order to do so, the runner has to set a forward motion applying force on the ground to cover a set distance in the least amount of time. Obvious, one would say. Yes, but this fate has very simple implications: the runner must apply force on the ground to move horizontally... Not vertically! This is very important as we shall see later. During a run, the athlete will first accelerate from a standing or near static position to achieve maximum speed which he/she would have to maintain for as long as possible until a point where he/she will not be able to sustain maximum speed and deceleration will occur.

The 2 major phases of sprinting, acceleration and peak speed maintenance, are explosive and last a few seconds, ideally less than 10 to 12 seconds to keep it a pure anaerobic alactic effort. That is what it takes to run a 100m dash on a track.

Speed can be mechanically explained through a simple biomechanical analysis of the movements. Speed is the combination of these 3 elements:

- Application of force to the ground by each leg to achieve peak forward motion

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- Number of strides taken to run the distance
- Length of strides during the run

The first element implies the application of force to the ground in order to move. We often hear, "What a powerful runner he/she is!" Power is indeed the dominant bio-motor ability for speed. What is power? The capacity for the athlete to recruit and fire as much FT muscle fibers in the shortest time as possible, hence the explosive result on the movement generated.

To be able to recruit as many FT fibers as possible is a feature of strength. Once recruited, FT fibers must function as fast as possible; this is power. This is the major reason why, "No one can be powerful before being strong!" (Tudor Bompa, =====).

We can therefore safely say that to increase the force applied to the ground in order to achieve peak velocity, a strength development phase must be provided to the athlete with appropriate conversion of the strength gains into power and power endurance.

The two other elements imply technique:

- Short frequent stride in the acceleration phase
- Increase of stride length for and during peak velocity

Here comes the important feature mentioned earlier: the athlete must provide the maximum horizontal motion through good acceleration technique (good arm action, leaning forward at the hips, trunk straight, looking up). It is a common mistake for the runner to use most of his/her power for vertical motion more than horizontal motion. The proper lean forward technique will minimize the useless elevation of the centre of gravity, which should remain in motion linearly as much as possible.

Team sport players should develop all aspects inherent to speed: strength/power and technique. Training for speed demands quality training more than quantity in order to keep neuromuscular activation and technique as sharp as possible. Training must take place according to plan in the gym, on the track, on the pitch, with and without the ball. Players must be well warmed up but not tired to train speed efficiently. The ideal period for training is earlier in a session, keeping bouts short with optimized rest intervals (3 minutes and over) to allow full ATP restoration prior to the next drill or sprint. Moreover, it is important to develop well to keep in mind the concept of the alternation of energy systems in training to facilitate recovery and overcompensation.

II- Rugby Specific Speed

It is important to note that the specific speed necessary for rugby is interrelated with the positions played by the players or group of players. We shall come to that aspect later on.

Rugby is classified as an intermittent power sport, where bouts of high intensity physical activity alternate with periods of recovery or low level physical activities.

Being involved in contact, rugby players need to be fast and powerful to deceive hardened defense lines where opposition players are also fast and powerful. Beyond the capacity of players to read the game efficiently, act quickly while making the right decision in a split second, the speed/power element will help players to beat tackles, finish an action and burst through the gain line or the try line for a score. No matter the situation, players will statistically rarely sprint for a long distance. Fast and deceptive players in rugby do possess an ultimate weapon to maximize efficiency: speed in changing direction.

It is apparent that the most efficient and fastest players in the game are not the players able to run a dash 100m the fastest, but indeed are the players able to change direction swiftly without losing balance or speed. Looking specifically at players' line of run during a game one finds that with the ball or off the ball, the lines run are rarely straight, but mostly involve stepping, swerving and sharp deceleration/acceleration movements.

In that aspect, we are here looking at a very complex bio-motor ability, which for some players is difficult to acquire: the deceleration/acceleration pattern once the player has already gained high velocity, or, more likely still, is in the acceleration phase of the run. The complexity is inherent to the two phases involved in the process: the deceleration, which will induce an intense eccentric contraction of the runners' lower limb prime mover muscles, and the following sharp re-acceleration phase after the change of direction, which will demand a strong concentric contraction of the prime movers. Most players with training can achieve such feat, but to do it optimally at high velocity demands a lot of hard work coupled with an excellent flexibility of the joints involved, specifically the ankles, a joint too often overlooked for performance optimization.

As we have just seen, rugby specific speed is more the capacity for a player to optimally change directions in a single run to attack available space, evade tacklers and provide continuity of game play to support players beyond the gain line. Off the ball, fast players are able to run lines with sharp changes of direction to deceive defenders and get the ball in the created space.

Specific speed for rugby could be summarized as follows:

Acceleration → Changes of Direction (deceleration/acceleration) → Speed Endurance
(position specific for peak velocity and general ability to maintain speed under condition of fatigue as game goes on)

III- Speed as Position Related

Modern rugby is asking players to be more and more polyvalent. The top teams in the world at club, province or international levels are fast developing the new generation of players where a prop will be asked, after multiple game frames, to take and run the ball in a centre or wing position, while the centre actually cleared the ruck from which this ball was coming from... Put simply, players will be asked to run more, faster and longer, due to the increasing amount of time the ball is in play. This is even truer in southern hemisphere rugby.

We can see the following patterns in the speed abilities asked from the different units composing a team:

- Props and second row: Fast off the mark, good acceleration skills, increase acceleration speed on 5 to 15m distance
- Back row and hooker: Fast off the mark, good acceleration/deceleration skills, change of direction at speed for support play or take the ball in contact/across the gain line. These players will often run and cover ground at or near VO₂max speed (vVO₂max) and sprint short distances 10 to 25m with direction changes. They must be able to maintain the highest speed possible in the condition of fatigue and high lactic acid buildup.
- Scrum-half/halfback: Very similar to back rower, but should be able to burst through around rucks, scrums and lineouts. Fast acceleration and change of directions on short distances: 10 to 20m
- Fly-half and inside centre (1st and 2nd five-eights): Acceleration off the mark, short sprints 10 to 20m with changes of direction
- Outside centre/Centre: More like a winger he/she must be able to cover longer distances at near peak velocity and accelerate at peak velocity. Longer running at high velocity, acceleration/deceleration and changes of direction, speed endurance are trade marks of the centre...
- And the back three: Wings/Full back: These players will run longer distances at peak velocity but will not do it as often as other players during a game. They are the typical alactic players able to run long distance at near peak velocity, change direction suddenly to get the ball and reaccelerate at peak velocity at which they must maintain longer. Speed endurance is a must for these players.

So to improve speed, rugby players must:

- Develop good running form which will help in conserving energy, and increase efficiency, specifically in the acceleration phase
- Train alternatively and mainly on short distances: from 5m to 35m, with and without the ball, linearly and with changes of directions, on a track and on the pitch
- Periodize the training during the Preparatory Phase of the season, training from general speed (tests, technique, on track, various distances), to specific speed (after the Maximum Strength development and during the power conversion phase of the training), position based (with and without the ball), in conjunction with agility training, on the pitch emphasizing changes of direction (single and then multiple changes in a run with and without the ball)
- Maintain speed during the season, specifically after maintenance of MxS and Power

IV- Periodization of Speed

To optimize speed development in players, the following plan could be applied:

Preparatory Phase		Competition	Transition
General Speed	Specific Speed	Maintenance	-
<ul style="list-style-type: none"> • Tests/Speed 10m, 15m, 20m, 30m, 40. • Technique development with and without the ball 	Position specific: <ul style="list-style-type: none"> • Direction changes with and without ball, various distances (10-35m best) • Speed endurance (position spec.) • Acceleration/deceleration • Field emphasis 	Position spec. in combination with MxS/power and agility maintenance	-

We have to insist here on some important points inherent to speed training:

Speed training is extremely demanding on the neuromuscular system and its gradual adaptation. To train for speed optimally, it is of paramount importance to keep training within the alactic pathway of energy production. This means:

- Keep action time explosive and short. No drills/sprints should exceed 12 seconds no matter the distance, the shorter the better for explosiveness purposes.
- Keep the rest intervals (RI) between runs long to totally replenish the ATP necessary for muscle contraction. To keep training for speed, RI should be in the range of 3 to 4 minutes between drills/sprints. Less than that will result in accumulation of lactic acid, and players will not train for speed any longer but for lactate tolerance (which is a completely different kind of training).
- Keep training for speed short and sharp. Training must focus on quality, not quantity! An optimized speed session should run for a maximum of 20 to 25 minutes. Past that time, technique will deteriorate with the fatigue accumulating. It should also be run when players are fresh, at the beginning of a training session, just after the warmup. Moreover, it is not recommended to stretch muscles after a warm up and for a speed session, as scientific studies have shown that it tends to slow down the fibers recruitment. Reserve stretching for after the session.
- Last but certainly not least: Plan speed sessions in alactic-only planned training sessions. Follow the principle of alternation of the energy systems in training to optimize the overcompensation of the players, hence their recovery and training overload adaptation.

V- Methods of Speed Improvement:

What are the priorities for speed training in rugby?

- Starting power
- Acceleration (concentric contractions of prime movers)
- Deceleration (eccentric contractions of prime movers)
- Speed endurance
- Sprinting form (technique both general and specific) short distances
- Stride rate
- Stride length
- Stepping, cutting, swerving (also parts of agility development)

How to improve speed through training:

Factors to improve	Training program
<ul style="list-style-type: none"> • Strength & Power • Starting power, acceleration, stopping, cutting, stepping and swerving 	<ul style="list-style-type: none"> • Starting technique general and specific rugby • Muscles development through MxS (Maximum Strength) and power conversion phases • Stop and go, acceleration, deceleration, cut and step training • Speed-strength training • Sprint-assisted acceleration
<ul style="list-style-type: none"> • Increase stride length 	<ul style="list-style-type: none"> • General and specific sprint technique training • Speed-strength training • Muscle imbalance training • Plyometrics • Sprint-assisted training • Technical form training • Agility and flexibility training
<ul style="list-style-type: none"> • Increase stride rate (or number of strides taken per second) 	<ul style="list-style-type: none"> • Sprint-assisted training • Quick feet work • Muscle imbalance training • MxS & Power development
<ul style="list-style-type: none"> • Improved technique 	<ul style="list-style-type: none"> • Form/technical training both general and specific • Speed-strength training
<ul style="list-style-type: none"> • Improved speed endurance 	<ul style="list-style-type: none"> • Interval sprint training • Hollow sprints • Sprint distance increase

Adapted from Dintiman & Ward, 2003.

We have analyzed in this article the following; what is speed, its different components, how it applies to rugby and the players according to their specificities in the game and we also looked at how to optimize speed training for better rugby development.

Correcting players to improve their technique in running fast is paramount to specific speed development with and without the ball. Rugby should be about movement, deception, and running the ball up the field to score, not like the poor show we saw in the last phases of the 2007 World Cup where so many opportunities were lost simply because the idea was to play not to lose, which makes a big difference in the game's approach. To play a total rugby game, speed should be developed as:

Individual Speed Development → Specific/Position Speed from player → Units → Collective/team development where gained speed is applied in order to deceive the opposition and win games.

To do this, a team must develop technically and physically as we know that no one can be faster without being stronger. In that instance, speed becomes a factor of strength and power development to which technique and tactics on and off the ball must be adapted for superior achievement.

Again, we can't say it enough: There is not the thickness of a hair between technique, physique and mental abilities necessary to reach peak performance. Physical and technical developments can't be accomplished separately. They must be trained together and from a young age through a complete multilateral sport development, leading to specialized high performance achievements. This is the only way to optimal development and success

Good training!

Recommended reading:

"Periodization, Theory and Methodology of Training", Dr. Tudor Bompa, 1999, Human Kinetics, Illinois (4th Edition)

"Periodization Training for Sports", Bompa, Carrera, 2nd Edition, 2007, Human Kinetics

"Sports Speed", Dintiman, Ward, 3rd Edition, 2003, Human Kinetics

"Sports Power", David Sandler, 2005, Human Kinetics