

Strength and Power Training for Rugby

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Rugby Football is classified as an *intermittent collective combat power sport*, where bouts of high intensity physical activities mainly generated through the anaerobic energy pathway alternate with periods of active or passive rest. The work/rate ratio depends on position and intended game plan chosen by the team (dynamic total rugby versus a more classic and static approach).

Rugby players need to be repetitively powerful throughout a game and should train to enhance power and power endurance. Power is directly connected with strength and actually is the conversion of strength gain into specific explosive bio-motor abilities development.

The statement “No one can be powerful without being strong” (Bompa, 1999) should be kept in mind once it comes to power development.

Strength could be defined as the ability for the body to recruit more FT muscle fibers to overcome an increase in the load of muscular activity. Power could be defined as the speed rate these FT fibers are recruited. The faster FT fibers are recruited in numbers, the more power is developed hence we can say that power involves a speed factor in the muscular contraction whereas strength doesn't.

Strength Training for Rugby

The very best way to train for strength no matter what sport we are in is to periodize the training. How many times did we see rugby players struggling in the gym with poor technique or even inappropriate loads for their age group or level of experience? It must be very clear that the development of strength for sport should be directly related to the phase of development of the athletes since pre-puberty all the way to high performance.

The biggest mistake usually made by individuals is the one inducing “burning stages” in development: Players haven't been much exposed to progressive strength training in the early developmental stages and all of a sudden feel the need for it or even worse are pushed by coaches to “bulk up” at all cost if they wish to retain their place in the team. Athletes and players should be gradually exposed to strength and power development from the early stages on. From pre-puberty until post-puberty (17 years old), bodies should be prepared for the coming increase in workloads and Maximum Strength (MxS) development. Only after a gradual adaptation to loads and exercise volume increase using the proper techniques, can young players be exposed to periodized strength and power development. As a good rule of thumbs, free weights or machine training should not occur until 15 years of age and with loads never exceeding 60% of 1RM (1 Repetition Maximum) until 17 years of age. This time should be designed to develop the proper technique, develop core strength and power using light weights, medicine balls, circuit training, light plyometrics (no depth jumps in early stages!). Two sessions a week could

be planned during the preparatory phase with a maintenance program during the in-seasons.

The goal is to increase the performances gradually from one year to another. Use many exercises to develop all muscle groups in the early stages, sport specificity should not occur until after 17 years of age. Use games, relays, circuits make it fun! If young players have fun in the gym not playing rugby, they will carry this enthusiasm in the later stages of development and nothing will ever look or feel like a chore!

Once the basics and fundamentals are reached, players are ready for MxS development. It is imperative not to use too many exercises and work with a step loading method until high performance. It is admitted that a 6 weeks MxS phase in the preparatory phase is enough for the yearly performance enhancement. The MxS phase should only start after a 5 to 6 weeks Anatomical Adaptation (AA) phase, designed to prepare the body in the load increase.

MxS development can only occur through lifting heavy loads (80 to 100% of 1RM). There is no other way! A step loading plan is necessary to provide enough stimuli for strength improvement and still manage good recovery from the heavy loads.

The periodization of MxS could be schematized as follows:

Preparatory		Competition		Transition	
General	Specific	Pre-Comp	Comp		
AA	MxS	Power	Maintenance	Rest	AA

If we consider a 6 weeks MxS phase (2 sessions per week), the step loading format would be as follows:

- Week 1: 70% of 1 RM
- Week 2: 80% of 1 RM
- Week 3: 90% of 1 RM
- Week 4: 80% of 1 RM
- Week 5: 90% of 1 RM
- Week 6: 95 to 100% of 1 RM with this week also being the first week of Power conversion of MxS gained. It is a good idea for these 2 phases to overlap to maximize gains and training.

Upper and lower body can be worked out within the same session. It should also be noticed that there is no real need for a hypertrophy phase as muscles will develop a chronic hypertrophy necessary for the progressive strength gain. Stabilization of muscle mass should be in order and concentrate on MxS strength development to be converted into power should be the primary goal. Hypertrophy specific work could apply for the prop position starting with the high performance phase, other positions do not really need hypertrophied muscles. Nonetheless, the gain in strength will increase the cross section of the muscular fibers and induce a necessary muscular hypertrophy.

MxS and Power development are both anaerobic alactic type of work, using essentially the P-Cr (phospho-creatine) pathway of energy production. To be efficient in performance development, special attention should be brought to the rest intervals (RI) between sets. For maximum efficiency, full recovery of the ATP through the P-Cr system should be in order. RI should therefore be between 3 and 5 minutes after each set. Shorter RI will build lactic acid and will not work the muscles within the fixed objectives of MxS and Power development. It will also be advised to alternate energy systems training sessions to enhance the players' recovery, for example, on days where MxS session is scheduled in the afternoon, a general/specific speed session could be scheduled in the morning to tax the alactic system that day. The following day will see an aerobic or lactic/aerobic training session if any session is scheduled for the team. Anyhow, a minimum of 48 hours should be scheduled between MxS and Power development sessions.

Testing is a vital part of the MxS phase process, and players should be tested on 1 RM for all exercises involved in the development. Testing should take place after the AA phase at the very beginning of the MxS phase and at the end of the MxS phase just prior the conversion phase to Power. Players should log testing results and all sessions with precise data including loads, number of sets/reps, RI and RI between sessions. This log should be referred to for the year to year improvement plan.

Power Training for Rugby

The applications of power in rugby are multiple: speed running, tackling, tackle breaking, jumping, sharp changes of direction, kicking, passing, rucking and mauling to cite the most obvious. Moreover, players must be able to repetitively repeat these actions during a game lasting 80 minutes as well as in training. In the past, sequences of play were mainly divided between forwards and backs play. It is not much the case today except for the set pieces where every player has a positional task to fulfill. In the modern multi frames open play type of rugby played today, players must be able to perform all tasks repetitively minimizing the effects of fatigue. Hence players need not only to be powerful but also be able to sustain power bouts again and again both with and without the ball. We can confidently say that there is therefore a power endurance factor one can not neglect in planning for optimum training.

By definition, a powerful athlete/player is someone who is able to fire/contract quickly as many FT muscular fibers as possible in order to move faster and more decisively. During the muscular contraction, the numbers of FT fibers recruited will give strength to the movement, the firing rate or speed will give it its power. Although it is possible to train power only without strength development, a level of stagnation or "plateau" will quickly occur as the recruitment of the fibers will be limited through an insufficient neuro-muscular stimulation. This is why power must be developed after a gain in force/strength and in that order.

Once the MxS phase is coming to its end strength gains has been achieved and time has come to transfer this strength into an increased firing rate of FT fibers recruitment. This is the objective of power training. How to proceed?

Power training will involve explosive actions during weight lifting. Loads will be decreased to 70-75% and 10 to 12 reps will be performed looking for maximum explosiveness during contraction. Training to exhaustion is not in order and again sufficient RI should be applied for maximum recovery between sets.

Plyometrics exercises will be used for upper (medicine ball) and lower body (bounds, jumps, depth jumps). For well trained players, a complex system of training is advisable where circuits can be devised using weights, plyometrics and specific rugby actions.

The number of exercises involved should be kept low, targeting the prime movers (agonists and antagonists muscles). Power development should also come to more specific players' action pending of their position (props, second row will not train specifically as hookers and back rows, idem for half backs versus wingers...). Power training starts in the specific period of the preparatory phase, and as close as possible to the competition phase, it should actually end at the beginning of the competition phase so players will benefit directly from increased performance.

It could be schematized as follows:

Preparatory		Competition		Transition	
AA	MxS→Power	Power→Power Endurance	Maintenance MxS+Power	Rest	AA

On a 4 weeks power conversion phase (2 sessions per week):

- Week 1: weights 70% 1RM
- Week 2: weights 70-75% of 1 RM + plyometrics
- Week 3: weights + plyometrics + specificity
- Week 4: complex training + game situation

As for MxS training, power training will involve the alactic anaerobic pathway of energy production, full recovery should be allowed for maximum power development. Lactic acid production should not occur. Anaerobic alactic day should be scheduled these days, and proceed to alternation of energy pathway training to enhance recovery.

At the end of the MxS and Power conversion phases, players will have gained strength and increase power. They should be tested in comparison to the tests made at the very beginning of the Preparatory Phase. Regardless of the position played, all players should be stronger, faster, jump higher, decelerate and accelerate quicker, change direction faster, kickers should have improve distance range, passes should be longer and smoother, moreover players should have adapted well, without fatigue, and should be in a

state of super-compensation after a taper just before the season kicks in... If not, well something definitively went wrong and a complete program reassessment should be made.

A training rule states: “what we don’t train and use will detrain” and it surely does. It is therefore extremely important to manage a maintenance program for both MxS and Power during the in-season or players will lose the hard gained strength and power. If players are suddenly becoming slower, and unable to sustain intensity throughout games, fatigue has set in, lack of recovery is kicking in, and most probably the maintenance program isn’t followed properly, specifically with an increase in fatigue level. A re-adjustment will be necessary to realign all functions properly.

Oh yes! As players become stronger and faster, it will also be necessary to re-adapt technical and tactical training to the new gain in speed and power achieved. A dream situation for any coach isn’t it?

Safe training,

References and recommended reading:

Periodization, Theory and Methodology of Training, Tudor Bompa, 1999, Human Kinetics

Periodization Training for Sports, Bompa, Carrera, 2004, Human Kinetics

Power Training for Sports, Tudor Bompa, 1996, Coaching Association of Canada