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RUGBY



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Do You Need Specialized Sprint and Agility Tests When Differentiating Athletes of Different Levels?

Recently researchers in Australia developed two new performance tests designed to differentiate between high and low level Australian Rules football players: Twenty four high-level and fourteen low-level football players were recruited as subjects for the present study. Subjects participated in a battery of tests which included: 1) 10-m straight line sprint, 2) 8 – 9 m change of direction speed test, and 3) a reactive agility test. The sprint test required the subjects to sprint all out for 10-m. The change of direction test required subjects to run 1.5 m in a straight line and then cut toward a specified target for a total of 8 – 9 m in distance. The reactive agility test required the subjects to run forward then react to a movement performed by the tester with the complete distance covered being 10-m. Subjects were tested with multiple trials in order to assess the reliability of the different tests employed.

The results of the study indicated that all three test were highly reliable (ICC=0.870). When comparing the low and high performance groups, the high performance group was significantly better at the reactive agility test. Interestingly enough, the change of direction and straight-line sprint were not accurate tests for differentiating between different levels of players. The authors therefore suggest that traditional straight-line sprinting or closed change of direction tests may not be the best methods for differentiation of players—and that strength and conditioning pro-

fessionals need to utilize test such as the reactive agility test. (The reactive agility test, which was developed for this study, was shown to be a reliable and valid tool for the differentiation of Australian Rule football players.) Further research is warranted in order to determine if this new sprint and agility test is valid and accurate for the assessment of athletes in other sports.

Sheppard JM, Young WB, Doyle DLA, Shepard TA, Newton RA. (2006). An evaluation of a new test of reactive agility and its relationship to sprint speed and change of direction speed. *Journal of Science and Medicine in Sport*, 9:342 – 349.

Sprint Training vs. Endurance Training

In a recent article, researchers from McMaster University in Ontario, Canada, compared the metabolic and performance adaptation of high-intensity, sprint-interval training with that of traditional interval training. Sixteen active males were recruited and randomly assigned to either a high-volume endurance training group or a low-volume, sprint-interval training group. Both groups performed six training session over two weeks of training. The endurance-training group exercised at 65% of maximal aerobic power (~175 w) for between 90 – 120 min for a total of 6500 kJ of work. The sprint-interval group performed four to six sets of 30 second sprint intervals with four minute recovery between each set for a total of 630 kJ of work. Performance tests were conducted before and after the two weeks of training. There was no difference in the time to complete a 50 and

750 kJ cycling time trial between the two groups.

Both groups demonstrated significant improvements in muscle oxidative capacity, muscle buffering capacity, and glycogen content. However, there were not differences in the physiological adaptations between the two groups. The authors concluded that sprint-interval training was a very time efficient method for improving endurance, which has the potential to induce rapid performance and muscle adaptations that are comparable to endurance training. While the results of this study are extremely interesting—and suggest that sprint training is a very useful tool, more research is needed to determine the long-term effects of this type of training.

Gibala MJ, Little JP, van Essen M, Wilkin GP, Burgomaster KA, Safdar A, Raha S, Tarnopolsky MA. (2006). Short-term sprint interval versus traditional endurance training: similar initial adaptations in human skeletal muscle and exercise performance. *Journal of Applied Physiology*, 3:901 – 911.

Addition of a Light External Load Does Not Improve Sprint Performance in Middle-Aged Men and Women.

Researchers for Turku, Finland, recently examined the effects of a 16-week training intervention that divided 85 subjects into a light load and a no-load training group. The light-load group performed all exercise while wearing 1.1 kg ankle weights, while the no-load

training group had no weights on their ankles. The training program consisted of three blocks of training which lasted 60 minutes and required subjects to perform a 15-minute warm-up—followed by 30 minutes of sprint, agility and plyometric exercises. The sprint portion of the training program consisted of 3 – 5 m sprints. The agility drills were designed to increase coordination. The plyometric exercises consisted of countermovement vertical jumping drills, single-leg hops, squat jumps, and rebound jumps. After completing the training program subjects performed a 15-minute cool down which was focused on improving flexibility.

Subjects performed the training regime three times per week. A battery of tests was performed before and after the 16 weeks of training. The tests included assessments of 1) vertical jump displacement, 2) maximal anaerobic cycling capacity, 3) 20-m sprint time, and 4) maximal aerobic power. The addition of a low load to the training program resulted in significantly greater increases in squat jump performance and maximal anaerobic cycling performance when compared to the no-load training group. There were no other differences between the two treatment groups.

The authors suggested that the addition of a light load (2.2 kg) to plyometric exercises can result in a novel stimulus which has the potential to improve some performance variables. However, strength and conditioning professionals should be careful when interpreting these results. Neither group was participating in a structured resistance training regime—nor were they athletes.

J. Surakka, E. Alanen, S. Aunola, S.L. Karppi, and H. Pekkarinen (2006) Effects of light loading in power-type strength training on muscle power of the lower extremities in middle aged subjects. *International Journal of Sports Medicine*, 27:448 – 455.

Do Periods of Overreaching Result in Improved Performance?

The effects of six weeks of overload training with limited recovery, followed by a seven-day taper, were investigated in order to determine if systematic overreaching improves performance. Seven rugby players were recruited in Australia to participate as subjects in the present study. The training program involved two to three days a week of free weight exercises (squats, deadlifts, hang cleans, etc) and plyometric—as well as rugby training. Subjects performed 23 – 30 sets of five to eight repetitions performed at 78.5 – 86% of 1-RM. The taper consisted of five repetitions per set with the average number of sets being performed per session being between 18 – 21 with an intensity of 55% of 1-RM. Prior to (and after) the six weeks of overreaching and the seven-day taper maximal strength, endurance, sprinting speed, isokinetic strength, and vertical jump performance were assessed. After the overreaching period endurance, sprinting speed, 3-RM squat and bench press strength, and isokinetic strength and power all decreased. However, it is important to note that statistical significance was not always reached. After the taper there was a trend which suggested that performance variables tended to recover. However, only the 10 m sprint, 3-RM squat and bench, and isoki-

netic torque exhibited a trend toward improvements when compared to the pre-overreaching time point.

It is possible that the small subject sample masked the effects of the six-week period on performance or that the seven-day taper was not long enough to elicit statistically significant improvements. The important message presented in this study is that when training volume and intensity are high, performance will most likely be depressed as a result of increase fatigue masking the performance effects. The greater the training stress, the longer the taper may need to be in order for increases in performance to be realized.

The present study suggests that a seven-day taper does offer some benefits for improving sprinting and strength power performance. Much research is still need in order to determine the optimal overreaching and taper protocols.

Coutts A, Reaburn P, Piva TJ, Murphy A. (2006). Changes in selected biochemical, muscular strength, power, and endurance measures during deliberate overreaching and tapering in rugby league players. *International Journal of Sports Medicine*, 28:116 – 124.

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Get a Grip: Advice for Vise-Like Hands

Joseph M. Warpeha, MA, CSCS,*D, NSCA-CPT,*D

Grip strength is an important component of many sports/activities but often receives a disproportionately small amount of time (if any) specifically devoted to its training. In occupations like the military and law enforcement or pursuits like mountain climbing, a strong grip can sometimes mean the difference between life and death. While the situation would never be so grave in athletics, a weak grip could result in a missed tackle in football or rugby, the loss of a wrestling hold in a match, or the inability to perform certain maneuvers on various gymnastics apparatus like the rings or bars. In less mainstream activities like arm wrestling, strongman, and martial arts, a vise-like grip is an absolute prerequisite. These examples are obviously more extreme cases, but many sports require some degree of grip strength, particularly those involving the holding/swinging of an implement (baseball bat, golf club, hockey stick, tennis racquet, etc.), the throwing/catching of a ball (baseball, football, etc.), or the grabbing/holding/tackling of an opponent. This article seeks to briefly discuss the rarely talked about, but often necessary, component that is grip strength.

Testing Your Grip

The first topic related to grip strength is its assessment. Grip is one of the few areas of muscular strength that is almost exclusively tested isometrically. Grip testing involves maximally squeezing a hand-held dynamometer that has been properly adjusted for hand/finger size for a brief period of time (no more than a few seconds) after which the device indicates the highest force that was produced via a digital reading or a gauge dial. The test should be performed in a standardized manner either according to the manufacturer's recommendations or in line with how the normative data that you will be using for ranking purposes was collected. Figure 1 illustrates a common style of hand dynamometer performed in a standing position with the elbow held at ninety degrees which is often the procedure used to standardize the test. Each hand should be assessed two or three times (with at least 30 seconds in-between tests) and then the average or best score of the trials for each hand is recorded. Norm tables will either require: 1) the best score from each hand to specifically rank the strength of the individual hands or 2) the sum of the best scores from each hand to give a more general assessment



Figure 1. Grip strength is almost exclusively tested isometrically with a hand-held dynamometer.

of overall grip. When recording scores, it is important to know what units the dynamometer uses as well as the norm table (most use kilograms but some use pounds). For the most accurate readings, grip testing should be performed when the hands/forearms are not fatigued or sore from previous workouts or activities that heavily involve the hands. While normative figures for grip strength are not as abundant as other physical measures, there is data out there that allow one to see how their grip measures up.

Training Your Grip

Grip strength is often somewhat developed in those who train seriously with weights; in particular, people who perform heavy pulling movements like upper back exercises without straps (which take grip out of the exercise) tend to have strong hands as a result of all of the holding that takes place. A common mistake in grip training is the idea that isolation movements for the forearm flexors/extensors translates to a stronger grip. More times than not, this type of forearm training leads to hypertrophy of the forearms, sore wrists, and usually no significant change in hand or grip strength. Wrist curls/reverse wrist curls performed excessively put undue stress on the wrist joints—joints that are not designed to be significant weight bearing joints. In bodybuilding, this type of forearm training may be desirable due to the localized hypertrophy of the lower arms, but for strength athletes there are much more effective ways to strengthen the hands.

Grip practitioners break the grip down into several sub-categories, but for the purposes of this discussion, it is sufficient to say there are three major types of grip. A crushing grip is dynamic and can be seen in a wide range of activities from the everyday firm handshake to the late night talk show act involving crushing an unopened can of soda. The supporting grip is isometric and usually involves gripping and holding (and possibly carrying) objects like a bucket of water or a barbell or dumbbell in the gym. The pinch grip is defined as having all of the fingers on one side of an object and the thumb on the opposite side; like the supporting grip, this is isometric with



Figure 2. University of Minnesota head strength coach Cal Dietz demonstrates how plate-loaded grip machines allow the resistance to be adjusted accordingly for a person's strength level.

such common examples being lifting a sheet of plywood or picking up a weight plate/disc by their top edges. The crushing grip is usually the least trained of the three grips since the other two (supporting and pinch) get worked frequently in everyday activities as well as more intensely in resistance training. The supporting and pinching grips are easy to train from an equipment standpoint because everything a person needs is in the weightroom. Pinching grip could be worked by putting two plates together (plate denomination determined by the individual's strength) and pinching the smooth outsides of the plates as you lift and hold them together to keep them from falling apart. Training the supporting grip is as simple as carrying heavy dumbbells or holding a heavy bar an inch or two above appropriately posi-



Figure 3. Plate loaded grip machines are relatively small and inexpensive and have applications ranging from high-use settings like athletic training centers to the home gym.

tioned safety pins (from which the bar is initially lifted) in a power rack.

The crushing grip, however, typically requires specialized equipment. The simplest and most inexpensive tool is a handgripper. This piece of equipment has been around for decades and involves squeezing the bases of the two handles of the gripper together. These can be purchased in most sports stores but for everyone but beginners, these usually offer too weak of a resistance and therefore do not present an adequate stimulus for strength gains. There are companies however that cater to the higher end of handgrippers.

Regardless of the make and model of the handgripper, the exercise is simple: close the gripper fully until the base of the two handles touch. If strength is

the goal, a gripper should be used that allows only a limited number of full repetitions; banging out 50 reps and expecting to get stronger is like a person who can bench 400 pounds expecting to increase their pressing strength by doing reps with 135 pounds. Some gyms/weightrooms will actually have equipment for training crushing grip; usually this comes in the form of plate-loaded machines that involve squeezing two handles or bars together (Figures 2 and 3). Again, if strength is the goal, this would be trained the same way as a person trying to increase their maximal strength in other lifts - low repetitions with heavy resistance performed no more than two to three times a week.

Whether the goal of having strong hands is to have a better grip while pole vaulting or to impress a prospective employer with an especially firm handshake, grip strength is one of those more unconventional types of strength that often goes untrained or gets trained accidentally by virtue of other exercises. It is likely that if people knew how simple it is to design a grip exercise with the equipment they most likely already have at their disposal, more would venture into this strange world that is seen by some as more of an underground cult of strength enthusiasts that prove their mettle by bending nails and lifting thick-handled dumbbells. However you view the topic of grip strength, one thing is certain - few sports and activities in life would be possible without some degree of grip strength.

About the Author

Joe Warpeha is an exercise physiologist and strength coach and is currently working on his PhD in exercise physiology at the University of Minnesota-Minneapolis. His current work focuses on NASA-funded research related to the application of innovative technology to manipulate thermoregulatory physiology in humans working, living, and performing in extreme hot and cold environments. Joe teaches several courses at UM including "Advanced Weight Training and Conditioning", "Measurement, Evaluation, and Research in Kinesiology," and "Strength Training Program Design." He has a master's degree in exercise physiology and certifications through the NSCA, ACSM, USAW, USAPL, USATF, ASEP, and YMCA. He has over 15 years of resistance and aerobic training experience and has been a competitive powerlifter since 1997. Joe is a two-time national bench press champion and holds multiple state and national records in the bench press while competing in the 148, 165, and 181-pound weight classes.



Is Jumper's Knee Keeping You On the Ground?

Jason Brumitt, MSPT, SCS, ATC, CSCS,*D

Jumper's Knee

Overuse injuries to the patellar tendon may affect athletes in volleyball, basketball, soccer, and tennis (1). Known as jumper's knee, this injury can be debilitating and affect an athlete throughout his or her career (1). Athletes who suffer from this condition experience pain in the distal patella tendon (the portion of the patella that originates from the base of the patella and inserts into the tibial tubercle on the tibia). Jumper's knee was originally considered an inflammatory condition brought on by straining the knee during jumping and running activities, but now it is considered to be a degenerative, non-inflammatory condition caused by repetitive tendon overload.

Some athletes experience numerous episodes throughout their athletic career. Many athletes will attempt to play through the pain, with symptoms affecting their performance. Others will require surgery when rest and conservative treatment fails to alleviate pain and improve function.



Figure 1. Standing Quadriceps Stretch



Figure 2. Hamstring Stretch

Training Program

Athletes who have experienced jumper's knee in the past may be able to reduce their risk of reagravating this condition with a proper training program. This article will present a preventative training routine. It must be stressed though, that if you or a member of your team is experiencing acute symptoms, do not substitute this program in lieu of a visit to your medical provider.

Flexibility Training

Researchers from Belgium conducted a two-year prospective study to investigate the intrinsic risk factors that contribute to the onset of jumper's knee (2). They

found those who developed jumper's knee were less flexible in the quadriceps and the hamstrings when compared to healthy subjects (2).

All athletes who compete in high risk sports should participate in a regular flexibility program. The standing quadriceps stretch (figure 1), a hamstring stretch (figure 2), and the kneeling hip flexor stretch (figure 3) should all be performed daily throughout the season at the end of practice or competition. Perform two to three repetitions of each stretch, holding each stretch for 30 seconds.



Figure 3. Kneeling Hip Flexor Stretch



Figure 4. Step Down Exercise



Figure 5. Decline Single Leg Squat

Strengthening Exercises

Despite the fact an individual participates in a sport, some athletes do not possess an adequate baseline level of fitness. In an attempt to prevent a recurrence of jumper's knee, closed kinetic chain exercises should be included in one's training program (see table 1). Despite what you may have heard or read, do not perform these exercises if they are painful. If an exercise is painful, stop the exercise, and consult with your medical provider. Painful programs may be effective when performed under the supervision of a physical therapist or an athletic trainer.

Step Down (Figure 4)

Stand on one leg on a step four to eight inches off the ground. Bend your hip and knee (as if you were performing a single leg squat) lowering the non-weightbearing leg towards the ground. Touch the heel to the ground but do not place your weight on the foot. Attempt to keep your pelvis level and your ankle-knee-hip in alignment throughout the step down.

Squat and Decline Single Leg Squat (Figure 5)

The traditional squat is an effective exercise for increasing functional lower extremity strength. In addition to the traditional squat, you should also perform a single leg squat. Position yourself so that you are standing on one leg on a step. Once in position perform a single leg squat attempting to maintain alignment of each lower extremity joint. Perform two to three sets of 15 – 20 repetitions. This exercise can also be performed on a 25 degree angled step.

Summary

Jumper's knee can be a painful condition that may affect athletic performance or sideline one from competition. Addressing flexibility issues and increasing lower extremity strength may help to decrease the onset or recurrence of patella tendinopathy.

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2. Witvrouw E, Bellemans J, Lysens R, Danneels L, Cambier D. (2001). Intrinsic risk factors for the development of patellar tendinitis in an athletic population. *American Journal of Sports Medicine*, 29(2): 190 – 195.

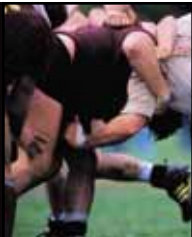
Table 1. Jumper's Knee Preventative Program

Stretching Exercises	Perform daily after practice or competition. 2 – 3 repetitions for 30 second holds	
	Hamstring stretch	
	Quadriceps stretch	
	Kneeling hip flexor stretch	
Strengthening Exercises	Perform each exercise two days a week	
	Step Down Exercises	2 – 3 sets x 15 repetitions
	Traditional Squat	3 – 4 sets x 8 – 10 repetitions
	Single Leg Squat	2 – 3 sets x 15 – 20 repetitions

About the Author

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Rugby

Post Game Recovery Strategies for Rugby

Ian Jeffreys, MSc, CSCS,*D, NSCA-CPT,*D

No matter how sophisticated and carefully planned a training program, without adequate recovery it will never be optimally effective. Recovery must be an essential part of all training programs, and must be carefully planned and programmed. Optimal recovery requires a multidimensional approach, that addresses all aspects of the athletic lifestyle, such as sleep, nutrition, overall stress levels, etc. Rugby can produce high levels of fatigue, and given the length of rugby seasons and the number of games played, proactive recovery is an area that can give rugby teams and players a real advantage. An important element of this multidimensional recovery program is to develop a recovery ritual for use after matches.

Fatigue in a Rugby Game

Rugby is a high intensity intermittent sport, involving a great deal of physical contact, played over a period of 80 minutes. Despite its duration, the key actions in rugby are of a high intensity, (scrumming, tackling, lineout jumping and lifting), all require a high degree of force and power production. This

combination of high intensity actions, an extended playing period, and physical contact mean that there is a high level of physical fatigue after a game of rugby. These combinations also mean that fatigue following a rugby game involves all three physical fatigue types, namely:

Physiological fatigue

Fatigue associated with the energy systems and associated metabolic by products.

Neural fatigue

Fatigue associated with repeated high intensity exercises, and involving the neuromuscular elements of force production.

Tissue damage

Damage to muscle tissues from physical contact and eccentric actions.

Given this high level of fatigue, the need for recovery is clear. What is important is that actions are taken which can promote recovery, in other words an athlete needs to be proactive in enhancing recovery. Proactive recovery activities

can significantly assist in the overall recovery process. Additionally, after a rugby match there is a high level of psychological fatigue which is present in most competitive situations. Given this high level of fatigue, it is important to develop an appropriate post game routine designed to promote recovery in all of these fatigue areas.

The Power of Rituals

A key to optimizing recovery is the consistent use of key strategies. A fundamental aspect in the effective integration of recovery into an athlete's schedule is the use of rituals. Much of our behaviour is ritualistic, where we carry out tasks without the need for great thought or effort, indeed a great deal of what we do each day is carried out in this way. If we think of what we do each morning after we wake, it is likely that the vast majority of it is unvarying and occurs without the need for a great deal of thought or effort, in other words we have our morning rituals. It is important to use this characteristic of rituals to make positive changes in our lifestyle, and developing a post game ritual is one

thing that can significantly contribute to recovery and subsequent performance.

This ritual needs to incorporate a number of strategies that can address the key types of fatigue elicited by a rugby game. To be optimally effective, the ritual needs to become a habit, and this takes time. In the early instances it will require a bit of thought and planning, but once this is established, then the ritual will require little effort and will simply be a part of the athlete's lifestyle.

Developing the Recover Ritual

Earlier the aspects of rugby fatigue were outlined, and the multiple types of fatigue associated with the game outlined. An appropriate rugby recovery program will therefore need to address all four fatigue elements, and will need to integrate strategies which address all four elements.

Physiological Strategies

These require the replacement of energy substrates and the removal of metabolic bi-products. This should involve a cool down and nutritional strategy, which promotes physiological recovery and provides for an intake of appropriate nutrients to refuel.

Neural Strategies

This will involve a number of aspects such as the replenishment of key neural transmitters, and can be facilitated by appropriate hydrotherapy and self massage strategies

Tissue Damage Strategies

This involves strategies which minimize the levels of tissue damage and promote

Inset 1. A Post Competition Rugby Recovery Ritual

Within the First 5 minutes—Rehydrate and Refuel

Eat/drink carbohydrates and protein, in a 4:1 ratio, utilizing high Glycemic Index (GI) carbohydrates. A recovery sports drink is ideal.

5 – 20 minutes—Cool Down

Move lightly for five to eight minutes. Stretch for eight to ten minutes.

15 – 20 minutes—Neural Recovery

Use a hydrotherapy tool (e.g. contrast showers or cold bath). Self massage. (Using predominantly shaking techniques to stimulate neural recovery). Continue to hydrate.

Within the First Hour—Refuel and Psychological Recovery

Continue to hydrate. Take in more food (high and medium GI carbohydrates and protein). Carry out a performance review. Start to unwind, using music for example as appropriate.

In the Evening—Psychological Recovery

Relax as appropriate (e.g., read, take in a movie, socialize). Continue to hydrate and refuel as appropriate.

Prior to Bed—Sleep Optimization

Use relaxation skills to switch off. Follow your sleep guidelines.

healing. Appropriate cryotherapy can be utilized effectively here.

Psychological Strategies

This requires that the athlete is able to distance themselves from the stresses and worries of the game. This form of recovery needs to incorporate methods by which the athlete can disengage from the game and engage in relaxation activity.

Inset 1 outlines an appropriate post game ritual that can effectively be used after a rugby match.

Elements of the Recovery Ritual

The Cool Down

This is a simple but effective part of any post game ritual. The cool down should involve a period of light activity such as jogging. This activity has the effect of removing metabolic bi-products, and enhancing energy system replenishment

via maintaining blood flow to the muscles. This light activity should be followed by a period of stretching which helps maintain muscle length and range of motion, and promote muscle relaxation. Rehydration should be occurring throughout this period to replace fluids lost during a game, which can be significant, especially in hot or humid conditions.

Post Game Nutrition

The keys here are to rehydrate and refuel. Ideally hydration should have been carried out throughout the game, and should continue after the final whistle. A window of opportunity exists in the first hour after exercise, where a disproportionate amount of the carbohydrates consumed go to replenish the glycogen stores, stores which can be significantly consumed during a rugby match. The idea is to provide the body immediately with the nutrients it requires for recovery, and so high glycemic index carbohydrates should be consumed as soon as possible after exercise. High glycemic index carbohydrates require little digestion and can enter the blood stream rapidly, providing for a rapid rise in blood sugar which is conducive to refuelling. Ideally this should also contain some protein (in a 4:1 carbohydrate to protein ratio). Appropriate recovery sports drinks are ideal, and can easily be brought to each game by the athlete. This drink can then be consumed straight after the game, before the cool down, and can contribute to both hydration and refuelling. A meal can then be consumed once the remainder of the routine is completed. This again should contain high to medium glycemic index carbohydrates and pro-

Table 1. Refuelling Guidelines (2)

Immediately Post-Workout	High GI carbohydrate and protein drink (4:1 ratio CHO/Protein; using 1.5g/Kg CHO)
Post-Exercise Follow Up	Moderate/High GI carbohydrates and mixed meals with protein.

Table 2. Contrast Shower Guidelines

Contrast shower	Alternate 1 minute of hot (as hot as tolerable) with 30 seconds of cold (as cold as tolerable). Repeat three times
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Table 3. Cold Plunge Guidelines

Cold Plunge	Use a temperature of 5 – 15 degrees C Immerse for 5 – 7 minutes Move body parts during the immersion
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tein. Table one provides guidelines for post game refuelling.

Hydrotherapy

Hydrotherapies are an effective way of promoting neural recovery. Ideally the athlete should have a number of strategies which can be used at both home and away venues. Contrast showers are a suitable option which can be integrated into the post game routine. Table 2 provides guidelines for the use of contrast showers.

Self Massage

Self massage is a strategy easily assimilated into any post game routine, as it can be performed anywhere. Ideally shaking movements should be used as this enhances neural recovery (1).

Cryotherapy

Ice has long been an integral part in the treatment of injuries. Rugby can produce a number of minor areas of tissue damage, many of which may not be immediately evident. Icing and the use of cold baths can assist in the treat-

ment of injuries and minor knocks, etc that are common in rugby. The cold baths work on the principle that blood vessels are constricted, assisting in the removal of blood. Subsequent dilation of blood vessels following the plunge allow for fresh blood to return to the muscles assisting recovery. Table 3 provides guidelines for using cold baths.

Disengagement

Competition can produce high levels of psychological fatigue. It is important that the athlete is able to distance themselves from this as soon as possible after the game. A performance review is an ideal way of doing this. By committing themselves to a short written performance review, the athlete starts the disengagement process. It has been shown that the process of writing helps an athlete clarify and organize their thoughts, and identify actions to be taken at a later date. Once down on paper, many of these thoughts lose their power to annoy and distract, and assist in the athlete's ability to disengage from the game.

Relaxation

In the evening following a game, it is important that the athlete is able to undertake relaxing activities. The choice of relaxation activity will likely be individual to the athlete, and they need to experiment to find which strategies are most effective. This state of relaxation will facilitate psychological recovery and will also help the athlete get to sleep, which is vital for optimal recovery on a physical and psychological basis.

Post game rituals can greatly enhance an athlete's recovery and can provide a valuable tool in the quest for enhanced rugby performance. Using the tips provided in this article will help you recover from the stress and fatigue of rugby matches.

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Nutrition for Ultra Endurance

Events: *Energy and Macronutrient Guidelines*

Debra Wein, MS, RD, LDN, NSCA-CPT,*D

Have you been running or cycling regularly and feeling ready for a new challenge? Have you been doing the 10-K scene and wanting to take your program to the next level? If so, here is the nutrition plan to help support your training as you plan for an ultra endurance event.

Ultra endurance exercise is classified as prolonged exercise lasting longer than four hours in duration and most commonly involves running, skiing, cycling, or swimming (1). Events such as running the South African Comrades Marathon, swimming the English Channel, cycling the Tour de France, or the Hawaiian or South African Iron Man Races are examples of such events (6). The ability to maintain performance during prolonged endurance exercise is dependent on a number of factors, including meeting calorie needs, appropriate macronutrient intake, adequate water replacement, and electrolyte intake. In this two part series, we will discuss how to best perform in endurance activities through optimal nutrition.

Calories

Adequate energy intake is necessary to maintain an appropriate weight and body composition while meeting the

needs of a physically demanding training and competition program. Typically, recommendations for endurance athletes are for between 37 – 41 Calories per kg (5) or 1.5 – 1.7 times resting energy expenditure. The best way to determine calorie needs is to evaluate the kind of exercise performed with regard to frequency, intensity, and duration and then add this to the daily energy requirements.

Women, in particular, need to be sure that their energy needs are met in order to maintain normal reproductive function and prevent amenorrhea, osteoporosis, and the female athlete triad. The estimated minimal level of body fat one should maintain in order to prevent adverse consequences to health and performance is 5% for men and 12% for women (5). Note that optimal levels may be higher for individuals and should be determined on a case by case basis with the athletes' physician / RD team.

Carbohydrate Daily Needs and During Exercise Recommendations

Carbohydrate intake during prolonged exercise has been shown to improve time to exhaustion by providing a regular source of exogenous energy (3). The

general recommendation is for athletes to consume 6 – 10 grams per kg of carbohydrate daily with 30 – 60 grams of carbohydrate during each hour of activity (5). More specifically, athletes can calculate their needs as 0.7 grams per kg of body weight per hour to individually determine their carbohydrate needs during exercise (5).

For ultra endurance athletes, some research supports the addition of liquid or solid carbohydrate, at a rate of 40 – 80 grams per hour during prolonged running events, and more than 90 g/h during prolonged cycling events (4). In addition, other research suggests the use of carbohydrate, in the form of glucose, maltose, fructose polymers, and branched chain starches with high glycemic indices in fluid replacement beverages at a concentration of 7.5 – 12%. This provides carbohydrates late in exercise as muscle and liver glycogen stores become depleted and the risk of hypoglycemia is increased (4).

Post exercise

It is well established that the sooner and more frequent carbohydrate is consumed after exercise, the greater the rate of post-exercise muscle glycogen resynthesis. Recommendations are for carbohydrate intakes of 1.2 – 1.5 grams

of carbohydrate per kg of body weight per hour at 30 minutes intervals in order to maximize glycogen resynthesis during the first 4 – 5 hours following exercise (5).

Recent studies have shown that a carbohydrate-protein supplement is even more effective for the rapid replenishment of muscle glycogen than a carbohydrate supplement alone if quicker synthesis is necessary. Use of a protein-carbohydrate compound, however, has not been shown to be as effective in replenishing muscle glycogen stores as very large doses of carbohydrate provided at more frequent intervals (4).

Protein

Protein recommendations for endurance athletes are 1.2 – 1.4 grams per kg of body weight. Note that vegetarian athletes may need to take in an additional 10% in order to make up for the slightly lower digestibility of plant proteins (2).

Fat

Fat recommendations consistent with the Institutes of Medicine's newly released guidelines of 20 – 35% of total calories should meet the needs of endurance athletes (5). Additionally, one gram per kg of body weight is another way for athletes to individualize these recommendations.

Summary

If ultra endurance is what you are after these are the sport nutrition guidelines to follow to maximize your performance. Part two of this article will cover fluid and electrolytes.

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Rugby

Seven Self-Management Strategies for Rugby Matches

John Coumbe-Lilley, PhD, CSCS

Rugby is a high impact sport that demands a wide variety of skills such as power, speed, agility, and quickness over an 80 minute game. Players need to demonstrate and execute these skills while determining the correct decision making requirements of the game. Players that are both physically and mentally prepared for the match are more likely to see the benefits as it translates into performance. This article will focus on seven key elements of self-management so that players and coaches have a take home guide to help improve match day performance.

Assessment

To assess the level of expected goal achievement, there are key indicators that determine whether someone is going to be successful or fall short of their desired outcomes. Players that perform consistently well have received training and preparation in various forms of self-management. The steps that follow outline how players can improve their performance and enjoy playing better rugby.

Seven Match Day Self-Management Steps

1. Pre-Match Preparation

The night before a rugby match is an important step in the self-management process as this is the time to prepare for the upcoming performance. Players should focus on getting all their equipment packed and ready to go in addition to other items such as water bottles, pre-game food, a small first aid kit, a charged cell phone, extra money, and directions to the match (if necessary). The more things that can be taken care of the day before a match the better. Many times players will show up at a match without certain equipment or lacking adequate food or water. This can and should be prevented by preparing in advance of the match.

2. Know the Opponent

As rugby is mostly a sport played at the amateur level, it may be difficult to pre-scout an upcoming opponent before the match. As players move up to higher and higher levels it becomes more important to assess teams before they are played. The key benefit to knowing an opponent is that players can tailor aspects of their game to that of

the opponent. If for example a team has been scouted as big and tough, they may not be fast and agile. This is where players can become students of the game in terms of finding out about the opposing and creating a personal strategy to defend against and possibly exploit weak areas of the other team. At the very least players can use this information in step seven when they visually prepare for the upcoming match.

3. Current Personal Assessment

The next step in pre-match planning is to take current stock of feelings, abilities, and mental state. If a player is in a poor mental state from an external factor, such as relationship troubles or a poor evaluation at work, it will affect pre-match self-management skills. Players need to determine a realistic assessment of how they are feeling and thinking so that goals and strategies can be prepared to overcome and adjust to these obstacles. Perhaps talking to other players, friends, or a coach may be beneficial to help assess your current state, and they may be able to offer methods to sort out potential problems before this affects game performance.

4. Set Match Goals

In order to perform at the highest possible level it is critical to have a set of goals in place before the match. These goals can range from a wide variety of skills or outcomes such as scoring a goal, executing a certain skill properly that has been worked on in practice, exercising patients while handling the ball, or focusing on the correct technical skills in a tackle. Whatever the specific goal, it should be noted that a set of criteria are in place to determine the effectiveness of the goal and the result. A checklist might be helpful to help log current goals and then mark down after the match if those goals were met and at what frequency were they achieved. This way players can become more self aware of their abilities and skills so that in practice and future games these skills can be improved.

5. Identify Internal and External Distractions

With a game plan in hand and a set of goals for the upcoming match the next step for players is to identify any internal or external distraction that might take away from performance. Situations such as a rain delay, flat tire on the ride to the field, a poor sleep, relationship troubles, etc., are all circumstances that will potentially detract from game performance. It is important to identify the existence of these factors and then determine methods to diffuse or eliminate them from your pre-match preparation. Sometimes however events will happen that are beyond a players control, which leads to step six.

6. Getting Back on Track

Every game ever played will have a multitude of possible outcomes that cannot be planned or factored in the pre-game plan. A pre-game plan is carefully thought out and executed, but sometimes this is not enough to ensure a solid performance. Players need to have a strategy or plan to get back on track when things start to go wrong. A set plan to help get back into a favorable mental and competitive state is essential for a solid performance. This should be developed in advance of the match and perhaps with a member of the coaching staff.

7. Visualization

The final step in pre-match self management is the visualization aspect of sport. During this time players should focus on what they see themselves doing in the match in a positive manner so that they are filled with confidence for the upcoming match. Visualization should not only be a thought or a feeling but a real picture of what players envision for the match. Negative thoughts and worries should be eliminated during this step as the pre-planning, goal setting, and plan to get back on track will have handled these situations. With proper visualization, an athlete will focus intently on positive outcomes, situations and experiences for the match and create a visual and mental picture of these feelings. In alpine skiing, for example, you can often find racers standing on the top of the hill with eyes closed, turning the body back and forth as they visualize racing down the hill. Rugby players should be no different. This mental picture will help calm the mind and ready the athlete for the match that is unmatched by preparation alone.

In order to play the best rugby possible players need to begin some form of game day self-management in order to produce lasting results. Self management starts with a self evaluation and assessment of current strategies used for matches and ends with the player being able to combine all the critical skills into a worthy on-field performance. Armed with this knowledge you will be able to enjoy the game at the highest level you can play.

About the Author

John Coumbe-Lilley earned his doctorate from the University of Illinois-Chicago in Education Psychology following a masters degree in Kinesiology specializing in sport psychology. John is a Probationary Sport and Exercise Psychologist with the British Association of Sports and Exercise Sciences, and is a member of the Association for the Advancement of Applied Sport Psychology. John is the Head Coach of the Canadian U19 Womens and Ontario Senior Womens rugby teams and is former Scotland rugby league international representative.



No Hoping Allowed

Suzie Tuffey Riewald, PhD, NSCA-CPT,*D

“I hope I have a good practice today.”

“I just wish I could lift as much as my training partner.”

“I hope I do well in the competition.”

“Please, let me hit my times.”

Do you ever find yourself thinking something similar to the statements above? My guess is that you answered “yes” since thoughts such as these are quite common among athletes. Of course you want to have a great practice, achieve specific goals and perform well in competition. What is wrong with hoping or wishing for positive outcomes? Hold that thought while we consider a follow up question. Read the statements again and ask yourself, “Do these comments inspire much confidence?” Or, put another way, if you were to say these things to yourself, do you think you are going to approach the practice or competition with a strong belief in your abilities and the ensuing performance? Probably not—that is what you get when you rely on hope.

“Hoping” and “wishing” are best saved for events where you have no control or can’t influence the outcome, things like winning the lottery or making a connecting flight. Your performance in practice and competition should not be left to hope because you can exert some level of control and influence many of the

factors that relate to performance success. Do not hope for a desired outcome. Instead, work to influence the outcome. Let us look at three simple steps you can use to turn hope into action.

1. Watch Your language

It is important to become aware of the words you use when talking to yourself. Are you someone that tends to use words such as “hope” and “wish” when referring to athletic endeavors? Take a week or two to simply monitor or increase your awareness of how and when you tend to hope and wish for positive outcomes. In my work with athletes, I am attuned to the language athletes use. I find myself pointing it out when athletes use words like hope, wish, want, please, and luck. These words tell me (and the athletes) that their performance is something that happens to them not something they cause or influence.

2. Change Your language

Hoping and wishing imply little control or influence – this needs to change. It may seem nit-picky to focus on words, but these words can indirectly influence how you think about and respond to a given situation. The goal is to switch from hoping to using words that communicate strength, confidence, and control over what you are going to do and what is going to happen. For example, compare the following, very similar, statements

and determine which one is more conducive to performance success.

“I didn’t do well in the training session yesterday. I just hope it goes better today.”

“I didn’t do well in the training session yesterday. I am going to have a great practice today as I took more time to warm up my body and get mentally prepared.”

There is a big difference, isn’t there? A small change in words can go a long way towards impacting attitude, feelings and ensuing behavior.

3. Action

Changing your thoughts and words is not enough, however. You will note in the example above that it is not simply a matter of changing words, but also taking action by controlling factors that can be controlled and that can influence performance. The athlete went from hoping for a good practice to believing she will have a good practice because of things she did to influence her practice performance, namely warming up better and getting mentally prepared. This concept of controlling factors that influence performance is something we have discussed in past MindGames articles. As you will recall, it is important to take steps to manage or control the factors that influence your performance. Identify the things you need to do and think to set yourself up for success and then do it.

No hoping allowed. Instead, control your thoughts and make the necessary preparations to manage and control your performance. Have a great month of training.

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Suzie Tuffey Riewald received her degrees in Sport Psychology/Exercise Science from the University of North Carolina – Greensboro. She has worked for USA Swimming as the Sport Psychology and Sport Science Director, and most recently as the Associate Director of Coaching with the USOC where she worked with various sport national governing bodies (NGBs) to develop and enhance coaching education and training. Suzie currently works as a sport psychology consultant to several NGBs.

