

The Rugby League
Coach Education Programme

The Think Coaching E-Link



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Introduction

This issue is taken up by a well researched article on flexibility that has been submitted by one of our subscribers James Marshall. This informative article is of particularly slanted to those who coach Rugby League.

Coach Development

The South Yorkshire Coach Development project will be running the following courses throughout the year.

Game Sense
Wickersley Sports College
Thursday 12th July 2007—7:00 pm to 9:00 pm

FUNDamentals of Fitness
Don Valley Stadium
Wednesday 1st August 2007—7:00 pm to 9:00 pm

The Coaching Coordinator
Keepmoat Stadium, Doncaster
Monday 13th August 2007—7:00 pm to 9:00 pm

Kicking Strategy
Wickersley Sports College
Thursday 23rd August 2007—7:00 pm to 9:00 pm

Coaching for Tomorrow
Don Valley Stadium
Thursday 30th August 2007—7:00 pm to 9:00 pm

Match Officials Courses
Teachers Course
Venue—TBC
Wednesday 12th September 2007 - Time: TBC

Match Plans
Wickersley Sports College
Wednesday 19th September 2007—7:00 pm to 9:00 pm

An Approach to Skills Development
Keepmoat Stadium, Doncaster
Thursday 25th October 2007—7:00 pm to 9:00 pm

Flexibility for Rugby League

By James Marshall

Stretching is stretching isn't it? You may do a bit before training; you may do a bit more after training, then hit the showers and go home. Is that ideal, or is there more to it than that? Why do you need to stretch? Is it to develop your flexibility, or is to assist in preparation for, and recovery from training and playing? Research has shown that stretching can help prevent injury, increase sprinting speed and help develop power- three areas key to almost all rugby players.

This article will review some common types of stretching, look at their purpose and when they should be used. Hopefully as a player or coach you will be able to develop 3 or 4 different routines rather than have a "one size fits all" stretching practice.

Practice and research shows that the components of stretching are as varied as other training principles such as speed or strength, but all too often it is overlooked at worse, or a tag on to other forms of training at best. Repeating the same routine will get you the same results. Adding a variety of stretches and altering the type of stretching that you do at different times of day, time of season, or time of year should enable you to improve your flexibility and your performance.

Stretching is bad for you (not).

I have recently had this comment thrown at me by coaches and players alike. As is common amongst this population, information is misheard or misapplied in the wrong context (with the best of intentions) and then becomes dogma- such as "weight training makes you slow". There has been a lot of research in recent years that has shown that static stretching as part of a warm up may not improve performance, and may actually inhibit speed and power activities (1). This has then been extrapolated to mean that all stretching is bad for you at any time! There may be a clue in the phrase "warm up" as to what you are supposed to do! We will examine this later.

Is this warm up research the latest information? In the 1960s martial artists from the East who came to Britain did warm ups with little no static stretching, but lots of movements. Eastern European coaches at the same time were getting their athletes to do movements in their warm ups. Anecdotally, having worked in the Fitness industry for 8 years in the nineties, I suspect the fad for doing a warm up, then stretches, and then the workout, came from gym based exercise courses. I was always asking my fitness staff why they prescribed warming up on an exercise bike for 5 minutes, and then 5 minutes of static stretches, then run on a treadmill for 20 minutes, rather than walk, jog, and then run on a treadmill.

So now the wheel has turned and researchers are confirming what experienced coaches from different countries have been doing for years. So, if static stretching is not based placed in the warm up- does that mean that it is bad for you? If acute stretching in the warm up does not prevent injury and can lead to an immediate performance decrement, does chronic stretching and improved flexibility prevent injury in the long term and improve performance (2)?

Studies looking at the regular benefits of stretching have found the opposite effects to that of acute stretching before an activity. These benefits include: a possible decrease in the likelihood of injury (3); an increase in muscular force and power and a possible increase in sprinting speed (4). The improvements may only be mild (2-5%) but in athletic performance terms, very significant. All three areas are obviously very important to most athletes, so developing flexibility should assume a corresponding importance in an athlete's training programme.

But how can you fit it all in? Time constraints may hamper your efforts, and flexibility training should not necessarily replace your strength or endurance and especially not your skills training. However, training smarter, looking at the time of day and type of stretching may allow you to show benefits without additional training.

Time of Day

The body has natural rhythms known as circadian rhythms. There are best times to do strength and power workouts, sleep and take on board mental information. The body's ability to stretch also changes throughout the day, and so the type of stretching you do should change too. One recent study of healthy 24 year old males measured patella tendon stiffness in the morning and in the evening. Tendon stiffness was found to decrease by 20% at 6pm compared to 8am (5). This should mean that the evening is a better time of day to work on developmental flexibility as the tendons are more compliant. However, no mention was made in the study of the subject's current level of flexibility or exercise status, including stretching routines. The results may be different in another population who had more or less exposure to flexibility routines. Why are tendons less stiff in the evening? It could be down to an increase in body temperature; increased movement patterns during the day; or increased testosterone and cortisol levels that have been found later in the day and can influence tendon compliance (6).

Studies looking at the muscle force contraction or tendon compliance at different times of day have measured skin temperature changes that occur naturally, or have artificially induced temperature changes externally. In a study looking at peak power contractions at 7am and 6pm skin temperature changes were low (2.6C) compared to studies looking at externally induced temperature changes (usually about 10C) but the evening power contractions were still as high (7). This led the authors to surmise that temperature changes were not responsible for the evening muscle power being higher because the results appeared to be similar whether the temperature change was 2.6C or 10C. Another study tried looking at external methods of temperature change- ice packs and hot packs- but found no change in tendon stiffness as a result (8).

Whilst temperature changes in the muscle and tendon may influence compliance slightly, it is more likely that movement and hormonal changes have caused the greater evening tendon compliance. The reasons behind increased hormones affecting tendon compliance are not yet clear, but there does seem to be a link. However the increased movement explanation may not seem ground breaking- just try touching your toes when you have just got out of bed in the morning, or have been sat in a car for a couple of hours, compared to when you have been moving around all afternoon.

Type of stretching

If the tendons are more compliant in the evening, then this is when your developmental stretching should take place. But what about first thing in the morning? You get out of bed, you are stiff, and ignoring all circadian rhythm advice (because you have to work) you are intending to train before 8am. We have seen that movement is likely to increase tendon compliance, so movement type or ballistic stretches are best performed in the morning or immediately before training. These ballistic stretches may seem like heresy, but performed in a controlled manner, are a way of increasing range of movement (ROM) effectively, without an acute detriment to performance.

A study on college male and female basketball players compared the effects of static stretching versus ballistic stretching versus no stretching in the warm up on Vertical Jump (VJ) performance after 20 minutes of playing (9). The authors delayed the VJ test for 20 minutes, because that is when improvements in power are needed- in the middle of the game- rather than before the start. The static stretches were held for 30 seconds, whereas the ballistic stretches were in the same position but consisted of small bounces at the end of the ROM in time to a metronome set at 60 beats per

minute. Many athletes will have been told not to bounce when stretching, but there is a difference between small controlled movements and flinging your limbs around wildly beyond your normal ROM.

The authors of this study could find no evidence that ballistic stretching was harmful.

An example of ballistic stretching for the quadriceps would be to lie on your front and pull one foot towards your bum with both hands. Then pull your heel into your bum about 1cm and release, do this for 30 seconds, then change legs. This is providing that you can comfortably do this stretch in a static position, never try and go beyond your normal ROM, especially first thing in the morning.

Dynamic stretching can take place first thing in the morning too. This consists of more circular or action or orientated movements that mobilise joints. A 10 minute routine before breakfast that replicates movements found in your sport or in your fitness training sessions will “kick start” your mobility for the day. Rather than wait for your body to become mobile throughout the day, a structured session will fast track this progress.

Sample Dynamic stretching routine using circles

Perform each movement in 2 directions, either forward and back or clockwise/ anti-clockwise 10 times, and for both left and right sides of your body.

- (1) Wrist circles- clasp hands together and rotate wrists around
- (2) Neck semi circles- start with your chin on your left shoulder, roll chin down and forward across your chest to your right shoulder, and come back the other way.
- (3) Shoulder circles – hands by your side roll your shoulders forward.
- (4) Small arm circles – hands out to side, make small circles about the size of a tennis ball
- (5) Large arm circles – try and get your arms brushing your ears and your hips
- (6) Waist twists- bend both knees slightly, keep your hips facing forward, bend both arms so that fingertips are touching each other level with your chest and twist to the right and then to the left.
- (7) Hip circles- hands on your hips, circle your hips around like you are hoola hooping.
- (8) Full body circle- bend forward from the waist, let your fingertips sweep across the floor from right to left (keep your knees bent slightly) carry on up to the left bring your arms behind your head and down to outside your right foot.

This can be done first thing in the morning before breakfast.

Try each exercise 5 times to start, left and right side. You can then progress up to 10 times, the object is to mobilise you, not tire you out. Do all exercises in a controlled manner so that you can stop your body at any time in the movement, don't use momentum.

- (1) Knee raises- lift knee to chest
- (2) Bum kicks- kick your bum with your heel
- (3) Knee circles out to in- bring knee out to the side, parallel with the floor and then in to the middle of your body and down.
- (4) Knee circles in to out- bring knee up to the middle of your chest, then out to the side of your body and back down.

- (5) Leg swings forward- stand with left leg slightly in front of the right, swing your right leg forward and off the floor so foot is level with hip (or higher if you are more flexible) and back down.
- (6) Leg swings back- swing right leg back behind you to about a 45 degree angle and back down
- (7) Leg swings out to in- same idea as for the knees, but leg straight (it is a bit harder) so keep your leg straight and bring it out to the side, foot level with your hip and around to the front of your body and down.
- (8) Leg swings in to out- bring your foot level with your hip to the front and then around to the side of your body and down.
- (9) Chest hugs- cross both your arms across your body and hug, then straighten the arms out and back to the side.
- (10) Chest hug diagonals- same as before, but release your arms diagonally, so one hand is pointing to the floor and the other to the ceiling, squeeze in and then reverse.

So if ballistic and dynamic stretching are useful first thing in the morning and pre workouts, what about post workout and the evening? Two main types of stretching are useful here. The first is commonly known now as Proprioceptive Neuromuscular Facilitation stretching (PNF) but is also known as isometric stretching (10). The second is static stretching and is most commonly used for developmental stretching.

Two interesting studies have compared the two different methods of stretching on hamstring flexibility. The first compared static stretching, self stretching, PNF and a control group (11). After 4 weeks of a 30 second stretch 3 times a week for 4 weeks, only the static stretching group showed an increase in hamstring ROM compared to the control group.

The second study compared 5 minute stretching protocols from rest and after 60minutes of exercise (12). This study showed that PNF stretching was effective in improving acute hamstring flexibility after exercise, whereas static stretching was not effective.

PNF stretching can be used post workout or as a separate flexibility session, but it is probably more effective immediately after exercise. However, any method that requires isometric contraction can also cause fatigue as the muscle is working, so care should be taken in how much PNF stretching is done. One stretch per muscle group would be enough. PNF stretching could be done after any strength training session, or on the same day, but not on alternate days otherwise those muscles will not be allowed sufficient time to recover before the next strength training session.

To start with, try holding the isometric contraction for 2-3 seconds then relax and stretch for 10-15 seconds and repeat 2-5 times. Try to perform the stretch as soon as you have finished the muscle contraction, preferably within one second. Make progress by holding the contraction for up to 10 seconds and the stretch for up to 30 seconds. Repeat this up to 5 times, this is quite a lot of work for your muscles, and then becomes very time consuming. If time is a factor, then stretch 2 or 3 muscle groups at each workout, and then rotate to different ones throughout the week.

Proprioceptive Neuromuscular Facilitation (PNF)

PNF stretching works on the principle that muscle relaxation is greater immediately after a muscle contraction allowing a greater range of motion to be obtained. The Golgi tendon organ (GTO) found within the tendon at the junction with the muscle attachment is responsible for this mechanism. When a heavy load is placed on the muscle, the GTO triggers a response that causes the muscle to automatically relax when the load has been released. By contracting the muscle isometrically and then releasing and stretching the muscle, greater gains in flexibility can be made in theory.

Example of PNF stretch for quadriceps

Lie on your front and with your leg bent and foot near your bum. Hold a towel in both hands and loop it under the instep of your foot. Try and straighten your leg by pushing your foot down into the towel, resist by pulling the towel with your hands. Stop pushing and then pull your foot towards your bum with the towel and hold the stretch. Repeat as necessary, then change legs.

Static Stretching is perhaps the safest and least fatiguing of all stretching methods. As such, it is ideal for use on rest days or after fatiguing workouts, or as part of a relaxation routine. It is best done in the later part of the day when tendon compliance is at its greatest. It shouldn't be done immediately before performance or competition, unless the athlete has specific tight areas that they wish to release. Static stretching should be performed in a warm comfortable, preferably quiet environment, to allow full relaxation of the muscles. Thursday night at 9pm sat in a puddle on a rugby training pitch in December, is possibly not the optimal environment for developing flexibility.

Perform the stretch slowly until you can not reach any further. Breathe in and out slowly, and try to stretch a little bit further, hold this position for another 25 seconds, relax and then repeat again. Concentrate on releasing all tension within the muscle that you are stretching to allow a greater ROM. Because you have to relax your muscles, you may find that you are mentally relaxing too. This is another benefit of performing static stretching at the end of the day for many players. Try to match stretches for the left and right side of your body and also the front and back. For example, if you perform two stretches for the hamstrings, then do two for the quadriceps. Variety within stretching is as important as for any other training method, so think about two to four stretches for each muscle group that you can rotate between stretching sessions.

Summary

Doing the same stretching routines all the time and at the wrong time will lead at best to maintenance of your current levels, but at worst to a short term performance decline and possibly staleness. If you realise that increased flexibility will lead to long term performance improvements, and less likelihood of injury, then you may put time aside to stretch. By adjusting what type of stretching you do to what time of day you are doing them, you can improve your performance through working with your body and not against it. If you do not have time to do additional stretching routines in the day, simply performing the right type of stretching within your workout will help you improve performance.

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Drop us a line at haydn.walker@rfl.uk.com

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