

The importance of functional neurological system as a marker for injury prevention

Andy Barker

It is well documented about the importance of correct neuromuscular function in the goal of reducing athlete injury risk and promoting gains in physiological health. Whilst many prehabilitative programs focus on joint mobility, activation and function, very few include a specific neural component. This could be considered surprising given the large number of neural related problems commonly seen within the athletic population. Within rugby league, similar to many collision sports, upper limb neural injuries are prevalent, either as a result of entrapment proximally at the neck and brachial plexus or distally at the shoulder, elbow, wrist and hand.

Because of the complexity of the neural system it is no surprise that such injuries are often more challenging to treat, largely due the highly irritable nature of neural structures and their subsequent slower healing rates when compared to other soft tissue structures. There also seems to be a misconception that nerves are rigid structures and different to other soft tissues. However, nerves are pliable and elastic structures, thus, need to be mobilised. If they are insufficiently mobilised they can become susceptible to shortening, fibrosis and entrapment similar to any other soft tissue such as muscle or fascia. Caution must be taken with an athlete presenting with neurological dysfunction however this does not mean a disregard for neurological rehab. The ability of the nerves to slide, glide and mobilise as single units and in combination with surrounding tissues is paramount for both injury prevention and physiological development.

Commonly, athletes may present or complain of reduced power in a particular exercise or movement. This may be the first indicator of neurological dysfunction. Those athletes who feel they need two-three sets of an exercise or even two-three exercises to 'warm up' during a gym session may be suffering from such dysfunction. Such athletes are therefore inevitably losing out on potential gains in physiological development during sessions. Add these sessions together over a period of weeks or months and the losses in potential growth could be massive.

A series of neural rehab exercises are shown below. The first two, pec minor and scalene active isolated stretches act to mobilise proximally at the brachial plexus whilst offering additional muscle and fascia stretching. This is important to address particularly due to common entrapment within the coraco-pectoral tunnel. The later two techniques focus on more distal neural pathways. It is important that the stretches are performed in this order to ensure proximal mobility is addressed prior to peripheral mobility. With all the techniques, athletes should be instructed to ease into each mobilisation slowly and gradually. Athletes should never force or feel pain during these techniques.

Pec Minor Stretch AIS Stretch

- Elbow is pointed upward at 45 degrees anchored against supporting surface (wall or doorway)
- **Contract the posterior muscles of the shoulder blade and** squat and pivot away from the supporting surface

- Hold for 2 seconds and exhale. Repeat 10 times each side
- Athletes should feel the stretch across the anterior upper chest
- To increase the stretch the hand may be placed behind the head

Scalene AIS Stretch

- Start in sitting
- Look left 45 degrees
- Tilt left ear back to left shoulder using muscles at back of the neck and exhale, use hand to help with slight overpressure
- Repeat 10 times
- Repeat on right side
- A stretch should be felt in the anterior, medial neck musculature on the opposite side to ear tilt

Median Nerve Wall Stretch

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- Start with palm of hand flat against wall with elbow bent
- Rotate body away keeping palm on wall and straighten elbow
- Bring opposite ear to shoulder while looking straight ahead
- Exhale and hold for 2 seconds
- Repeat 10 times and switch side
- Athletes should feel a stretch down the bicep, along the inner forearm towards the hand

Radial Nerve Roll and Reach

- Place arm by side of body ensuring elbow fully extended
- Tuck thumb into palm and flex wrist and fingers up towards inside of forearm
- Roll shoulder forwards and take opposite ear to opposite shoulder
- Holding this position reach as far as back as possible then make large anti-clockwise circles
- Repeat 10 times and switch sides
- A subtle stretch should be felt down the tricep area of the arm, down the forearm into the back of the hand

Gains of between 15-20 % in unilateral grip strength have been noted within athletic practice, after athletes have conducted the above two exercises. These exercises take approximately two minutes to complete, and therefore could serve as a quick but specific nerve mobilisation technique. Furthermore the gains made in the gym and the reduced likelihood of future nerve dysfunction mean that the importance on such exercises should not be overlooked.

Biography

Current assistant first team physiotherapist for the Leeds Rhinos.

Graduated in Physiotherapy from University of Bradford with first class honours degree which followed on from a previous Bachelor of Science degree from Leeds Metropolitan University in Sports Performance Coaching.

Have previous experience working in rugby league within both amateur, junior and youth representative level.

Andy also works as an associate physiotherapist for Pro Sport Physiotherapy providing assessment and treatment for patients at the 4 star hotel Oulton Hall. For more information on Pro Sport Physiotherapy visit their website at [**www.prosportphysiotherapy.co.uk**](http://www.prosportphysiotherapy.co.uk)