

When are Dynamic Movement and Static Stretching Appropriate?

Static Stretching



Clinical studies have found that static stretching prior to athletic activity can negatively impact performance i.e. it can cause performance deficits. Findings have shown a clear link between static stretching prior to athletic activity being a precursor to later injuries.

Clinical Studies have shown that static stretching before training or sporting activity has been shown to:

- Impact balance
- Decrease muscle strength
- Reduce power and explosiveness
- Increase reaction time
- Decrease sprint performance

Dynamic Movements



Prepare's the Body for Performance by:

- Increasing muscle temperature. Our bodies optimal temperature at rest is between 37 - 37.5 degrees Celsius (98.6 – 99.5 degrees Fahrenheit). For optimal performance of our muscles during exercise our blood temperature needs to be 40 degrees Celsius (104 degrees Fahrenheit).

- Regulating the autonomous nervous system (ANS) function through the sympathetic nerves stimulated by our central nervous system (CNS). For effective, efficient and optimal performance we need our nervous system to be in an activated sympathetic state (associated with fight or flight response).
- Improving power and agility assisting speed, reducing drag caused by amount of body in water, improved rotation of upper body and improves bio-mechanics in catch and pull phase.
- Improving standing vertical jump and rate of force development (RFD) for faster starts and greater driving force off wall following tumble turns.
- Improves sprinting performance as prepares muscles to allow faster stroke rate, faster kicking etc.
- Reducing the risk of muscle, tendon, ligament and joint injuries e.g. Shoulders

Swimming at higher levels places more emphasis on having loose joints and stable shoulders.

Shoulders

- Our shoulders are actually a group of structures made up of many different elements in the region of the shoulder joint. The Shoulder Joint is where the ball at the head of our humeral bone (our upper arm bone) attaches to the scapula.
- As our shoulders are made up of three bones that aren't connected they lack stability. The three bones are the Clavicle (our collar bone), Humeral (our upper arm bone that connects to our trunk in a ball & socket joint) and our Scapular (situated towards the top of our back).
- Our shoulders are unique in that they can move in all three planes of motion being sagittal, frontal and transverse.
- Stability is provided by ligament's, surrounding deltoid muscle group made up of anterior or front deltoids, lateral or middle/side/outer deltoids and posterior or rear deltoids), neuromuscular feedback mechanisms.
- It's very important that Swimmer's incorporate specific dry-land and resistance training into their training regime to build the muscles that surround their shoulders to provide strength and stability.

Competitive Swimming Stroke's

Not one of the competitive strokes in swimming requires any excessive range of motion. Therefore, there is no advantage to be gained or any necessary reason to stretch beyond your normal physiological means.

Increasing Muscle Mobility by way of Static Stretching

With regular swimming or squad training/competing there is definitely a place for Static Stretching and other muscle tension release methods such as foam rolling or trigger ball work on trigger points.

In swimming there is a propensity for the Trapezius (Traps); Scapula; Pectoral (Pecs); Latissimus (Lats) muscle groups to shorten which we feel as tightness or pain. However, due to the many variables of every swimmer in terms of physique, stroke style, stroke rate, favored stroke, swimming intensity, swimming volume etc. there is no set formula when it comes to mobility exercises like static stretching. As a general guideline for static stretching target a specific muscle between 1-3 times holding for 20-30 seconds on each occasion for approximately 5 days a week. Always remember the importance of ceasing stretching a muscle group as soon as the tightness or soreness goes away. There is absolutely no benefit to be gained from continuing to stretch it.



- Static Stretching prior to any athletic activity negatively impacts performance.
- Dynamic movements prepare the body for athletic performance.
- Static Stretching is important but needs to be done as an adjunct at a time separate to training or competing.
- There is no benefit to stretching beyond normal physiological means.
- Shoulder stability and joint agility are both very important factors in swimming..

Technical Overview

- Develop and incorporate dynamic warm-up routines for use before training or competition, between events if there is no warm up pool and at the completion of training or competition. Appropriate static stretching or foam rolling can then take place. You will find that ensuring you do an appropriate length in pool warm down then incorporate a dry-land dynamic warm down into your routine that the majority of post exercise tightness and/or sore muscles will become a thing of the past. The vital importance of a sufficient warm down should never be underestimated. The warm down serves a number of key purposes especially so if the training has been of high intensity. It initiates the commencement of the recovery process by increasing the volume of oxygen back into the muscles. It allows our core body temperature of our muscles and blood to start decreasing towards normal levels. It allows lactate (lactic acid) levels to disperse around our body for more efficient elimination. During exercise, even more so with intense exercise, lactic acid and other by-products of exercise are produced at a much faster rate than our body can eliminate them and it tends to pool or gather together in the areas of our muscles that are working the hardest. It's important to be aware that a significant amount of post exercise soreness is a result of ineffective release of lactate and other by-product's created by exercise. It allows our muscle spindles to relax and naturally initiate a return to their correct length.
- Discontinue static stretches that can create a destabilising effect on the integrity of the shoulders structure.
- Refrain from stretching muscles that aren't tight, sore or doing a certain stretch because it's a favourite stretch as you can elongate (lengthen) the muscles and tendons. This can create problems that will actually reduce your performance e.g. Alter your rhythm and stroke timing, Change your stroke dynamics and biomechanics, Decrease your force application dynamics on catch and pull phases, Create body imbalance.
- Never stretch muscles when they are fatigued as it increases the likelihood of muscle spindling which is the opposite action to what you are wanting. Structurally muscles at their smaller level are telomere's which are in turn made up with very large numbers of sarcomeres. Very large numbers of Telomeres create chains that form to make muscle fibres. Fibres join together by essentially plating themselves like we do with strands of rope to create greater strength. Our common muscle groups are just the grouping together of large numbers of these plated fibres which are technically called muscle spindles. Muscle spindling refers to the action of the plated fibres being pulled tighter together and more constricted which is not the outcome an athlete wants post activity. I also inhibits GTO firing. GTO firing is a highly important function as Golgi Tendon Organs sense changes in muscle tension to protect muscles from injurious effects of excessive force production. If a muscle is stretched too much the Golgi Tendon Organs become active and via autogenic inhibition the muscle will be inhibited to prevent further stretching. Consequently if the GTO is not functioning properly as you are stretching a fatigued muscle (thereby inhibiting GTO firing) a muscle tear can easily be the result.

Our guest blogger is Paul Barry an Elite International High Performance Swimming, Sports and Conditioning Coach from Brisbane, Australia. He is qualified in diverse fields including Swimming, Strength and Conditioning, Athlete Rehabilitation, Advanced Nutrition, Sports Supplementation, Soft Tissue Therapies, Anatomy and Sports Physiology.



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