

Muscle stretching and exercise

Gerald Foley

It is widely believed that vigorous stretching before exercise is beneficial. This is how the *British Medical Journal (BMJ)* set the scene for a paper it published on the subject in 2002. The authors were R. Herbert and M. Gabriel of the School of Physiotherapy in the University of Sydney, and the *BMJ* said:

“No competition is complete without countless athletes throwing shapes along the track-side, trainers and coaches each favouring their own particular exercises, and locker room experts, kinesiologists, and self-appointed specialists inventing new contortions for long forgotten muscle groups. Sport is rife with pseudoscience, and it is difficult to disentangle the evangelical enthusiasm of the locker room from research evidence. But in this issue, Herbert and Gabriel question conventional wisdom and conclude that stretching before exercise does not reduce the risk of injury or muscle soreness.”¹

Herbert and Gabriel had decided to investigate whether all this enthusiasm for stretching was justified by carrying out a review of the published scientific papers on pre-exercise stretching. They set quite high standards for the quality and rigour of the studies they were prepared to consider. They then searched the medical and scientific literature and found a total of six studies which they regarded as satisfactorily rigorous. They pooled the results – and the conclusions were unambiguous.

The combined results of the studies showed that the effect of pre-exercise stretching on muscle soreness during the 72 hours after exercise was so small that, in the authors' view: *Most athletes will consider effects of this magnitude too small to make stretching to prevent later soreness worth while.* The studies also showed that pre-exercise stretching brought a negligible reduction in the risk of injury. The way the authors put it was that: *...the average subject would need to stretch for 23 years to prevent one injury.* The review, in short, provided no support for the idea that pre-exercise stretching brings any appreciable benefits or protection against injury.

J.C. Andersen of the University of Tampa in Florida carried out another review of the literature on the topic in 2005. The results were published in the *Journal of Athletic Training*.² The conclusions were similar to those in the Herbert and Gabriel paper. Andersen states

...the results of this review do not support the role of pre-exercise or postexercise stretching as an intervention addressing postexercise soreness. In addition, the evidence presented in this review does not support the role of pre-exercise stretching in the reduction of lower extremity injury risk.

R. Herbert and M. de Noronha revisited the subject, and published a paper in the *Cochrane Review* in October 2007. This was based on a review of ten studies and reached essentially the same conclusions with regard to muscle soreness. They reported:

¹ Herbert and Gabriel (2002)p

² Andersen (2005)p

*The 10 studies produced very consistent findings. They showed there was minimal or no effect on the muscle soreness experienced between half a day and three days after the physical activity.*³

The most curious aspect of this whole question is that basic muscle physiology provides no reason to suppose that stretching before exercise, especially of the violent kind, is likely to do anything to prevent muscle soreness or damage, rather the contrary. When muscles are stretched, tiny elements, called sarcomeres, in the muscle fibres lengthen. The sarcomeres have an optimum operating range; below it the muscle exerts no force and above it, the effectiveness of the muscle falls off rapidly and beyond this muscle-damage occurs.

In a leading article in *British Journal of Sports Medicine*, Ian Shrier mentions that even mild stretching can cause damage at the cellular level in muscles. He also points out that

*...stretching somehow increases tolerance to pain – that is it has an analgesic effect. It does not seem prudent to decrease one's tolerance to pain, possibly create some damage at the cytoskeletal level and then exercise this damaged anaesthetised muscle.*⁴

It would appear that the various routines of stretching through which so many joggers, swimmers, gym-users and sports people push themselves are based on pure superstition, or as the *BMJ* calls it locker-room pseudoscience. The practice of over-stretching of tight muscles, especially when the task is approached with the excessive “determination” shown by many exercisers, is almost guaranteed to cause damage.

It is also worth bearing the “stretch reflex” in mind. The initial stretching of a muscle in the arm or leg tends to evoke an automatic tightening of the muscles involved. Its most familiar form is seen in the doctor's surgery where a tap below the kneecap produces an automatic straightening of the leg. This happens because the tap on the tendon slightly extends the quadriceps muscle in the thigh causing a reflex contraction and a straightening of the leg.

In addition to running the risk of damaging the muscles, an additional perverse result of some stretching regimes may thus be to shorten the muscles. If this occurs, the increased level muscular tone may shift the muscles out of their zone of maximum operating efficiency with a negative impact on their performance.

This medical and scientific background accords well into what we do as Alexander practitioners. Preparation for exercise in an Alexandrian perspective requires an initial quietening of the musculature. Before launching into activity, we insist it is important to stop and “allow standing to happen.” This mobilises the postural reflexes and brings the muscular system into a state of balanced equilibrium.

The level of muscle tone at which this occurs is sufficient to keep the muscles firm but not to produce movement. It also keeps the neck free of excess tension and the head in a state of balance on the top of the cervical column. One of the standard physiology textbooks in discussing this level of tone says:

For example, when the muscles in the back of the neck are in normal tonic contraction, they keep the head upright and prevent it from

³ Herbert and de Noronha (2007)

⁴ Shrier (1999)

*slumping forward on the chest, but they do not generate enough force to draw the head backward into hyperextension.*⁵

In contrast with the heightened level of muscle-tension so easily stimulated by vigorous stretching routines, this gentle preparation brings about a mobilisation of the muscles up to their initial optimum length for efficient working. It is then possible to go through a spell of gradual warming-up to the required level of activity without any fear of damage to the muscular system.

References

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21 November 2009

⁵ Tortora (2000) p288