

## NO 28 STRETCHING BEFORE EXERCISE

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1. Today I am going to do look at the question of stretching before exercise.
2. By stretching I mean strongly pushing or pulling parts of the body into positions they would not normally adopt if they were relaxed or released. In fact, stretching relies on muscular contracting and is itself a form of exercise.
3. The reason people do these stretches before starting their various exercise routines is the belief that this reduces the risk of muscle injury and muscle soreness. It also believed that it increases the flexibility of the joints which is felt to be a good thing and is particularly attractive to people who do yoga.
4. The idea that you should go through a stretching routine has been around for as long as I can remember. In my squash-playing days, I believed it was the thing to do.
5. Whenever I remembered, I would do a bit of pulling my heel up against my bottom and leaning against a wall stretching my leg out behind me to put a bit of stress into my Achilles tendon before we started playing. The harder I stretched the better, I thought. Ruth and I saw a man doing it as we were going across for a coffee last week.
6. Then I read a paper about stretching in the *British Medical Journal (BMJ)* about ten years ago. It was by two researchers, Rob Herbert and Michael Gabriel, from the School of Physiotherapy in the University of Sydney. They reviewed the available scientific literature on the effects of muscle stretching and concluded that it was pretty useless as a means of avoiding muscle damage or soreness.
7. The *BMJ* thought the paper was important enough to bring to the attention of doctors and ran an editorial about it in the same issue of the journal. The editorial 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.”<sup>1</sup>*

8. In the paper itself, the authors go into more detail but the conclusion is the same. Stretching before exercise brings a negligible reduction in the risk of injury. The way they put it was that the *...the average subject would need to stretch for 23 years to prevent one injury.*<sup>2</sup>
9. To me that was pretty heretical stuff and since the *BMJ* is quite an impressive source it made an impression on me. But it did not have any practical relevance for me – I had hung up my squash racquet and was into my teacher-training by then – and I simply filed it.
10. But I remembered it a couple of years ago when a pupil asked me what I thought about stretching before exercise. I went back and had a look at the paper to check that I had remembered it correctly – which I had.
11. I then looked to see whether medical and sports science opinion had changed in the meantime and found the story was the same.
12. One of the names which crops up in this area is a researcher called Ian Shrier of McGill University in Montreal and past-president of the Canadian Academy of Sports Medicine. In the abstract of a paper in the *Clinical Journal of Sports Medicine*, his conclusion was that  
*The basic science literature supports the epidemiological evidence that stretching before exercise does not reduce the risk of injury.*<sup>3</sup>
13. In another slightly later paper Shrier makes the quite alarming point 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.*<sup>4</sup>

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<sup>1</sup> *BMJ* 31 August 2002

<sup>2</sup> Herbert and Gabriel (2002)p

<sup>3</sup> Shrier (1999)

<sup>4</sup> *Ibid.*

14. I also found a review published in 2005 in the *Journal of Athletic Training* by J.C. Andersen of the University of Florida which concluded that

*...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.<sup>5</sup>*

15. Another review paper published in 2008 summed up the results of ten studies on the effects of stretching on muscle soreness after exercise. This said:

*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.<sup>6</sup>*

16. It also happened that I noticed a medical question-and-answer column in the *Guardian* Saturday review around the same time. Someone had written-in saying they were aged 55, went to the gym three times a week, had a 30 minute work-out, made a point of doing the necessary stretching exercises before and after, and were exhausted for the rest of the day.

17. The reply by the *Guardian* doctor was that it should not be happening and the person should have a health check. I sent an e-mail wondering whether it might be to do with the stretching and could the person be doing too much of it.

18. I got quite a nice reply which I will read to you.

*You may be right. It's true that studies on stretching before and after exercise haven't confirmed that it is beneficial, and won't prevent strains, sprains and pains. I note that you are an Alexander technique teacher, and that you suggest a quiet period, relaxing the muscles, before exercise. In practice I've found that some of the Alexander positions for relaxing the neck muscles very helpful for patients with tension headaches and nerve pains in the shoulders and arms, so I am sympathetic, in principle, to your approach.*

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<sup>5</sup> Andersen (2005)p 4

<sup>6</sup> Herbert and de Noronha (2007)

19. So where are we now? I think the faith in stretching is still very strong as we saw in the gym during our Alexandrian exile.
20. If we look at the basic physiology of muscles, it is clear that the sort of violent or forceful stretching we see people doing is not likely to be helpful. This is because of what is known as the myotatic or Liddell-Sherrington reflex. This is also known as the “stretch-reflex” and is to do with the reflex or automatic behaviour of a muscle when stretched.
21. The automatic response of a muscle to a stretch is to contract or tighten. When someone pulls your arm, for example, your body automatically resists it. The harder and more abrupt the pull, the harder and more abrupt the tightening reaction.
22. It is a very basic defence mechanism which prevents your arm being pulled out of its shoulder socket.
23. We see the stretch reflex in action particularly clearly when the doctor gives you a little tap just below the patella and there is 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 which straightens the leg.
24. So by stretching the muscles you are actually making them contract. This also applies if the muscle being stretched is already tight. When we exercise tight muscles we make them tighter. This has obvious implications for how we approach exercise in the gym.
25. A more engineering way of looking at this is that a tight muscle has a reduced ability to absorb further energy. So stretching before exercise reduces the ability of the muscle to deal with the effects of the exercise you are about to take. It is like tightening yourself up before lifting a heavy weight or singing a high note.
26. This leaves us with a bit of a mystery. If the trials and the underlying science say that stretching does not prevent injury and actually makes you slower and weaker, why do so many people believe the reverse? Why do people think stretching before exercise is a good idea?
27. I think we need to make some distinctions here. Not all stretching is a bad idea. Animals do it all the time; a cat certainly enjoys a good stretch. When we wake up after a good night’s sleep, it can be very nice to have a good stretch.

28. No one is saying that a gentle moving stretch is harmful. It seems a natural and beneficial way of getting yourself into a proper state for action after you have been resting. It is the ferocious stretching, especially the static stretching, before taking exercise that is both useless and dangerous.
29. This brings us to the question of warming up before exercise. How does one warm up properly? I tried to find some scientific background and was quite surprised to find there is little published research.
30. The only useful thing I found was an abstract of a 2003 paper by David Bishop of Victoria University in Australia in the journal *Sports Medicine*. This is mainly dealing with the world of sport and athletics but is obviously relevant to jogging and working out in the gym.
31. Bishop said:
- While warm-up is considered to be essential for optimum performance, there is little scientific evidence supporting its effectiveness in many situations. As a result, warm-up procedures are usually based on the trial and error experience of the athlete or coach, rather than scientific study.<sup>7</sup>*
32. He goes on to say:
- ...short-term performance may be impaired if the warm-up protocol is too intense or does not allow sufficient recovery..*
33. In other words, the warm-up should be gentle but Bishop finishes by saying there are many factors involved and further research is needed.
34. Another interesting paper I came across is by a sports physiologist called Stacy Ingrahams of the University of Minnesota and is called *The role of flexibility in injury protection and athletic performance*<sup>8</sup>. She is very dismissive of stretching and says about warming up among professional baseball players:
- The common warm-up for professional baseball players involves a few sprints and then lengthy sessions of stretching, particularly of the hamstrings.*

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<sup>7</sup> Bishop (2003)

<sup>8</sup> Huxley (1937)p

*This might explain the frequent hamstring injuries suffered in baseball.<sup>9</sup>*

35. I have talked to many sports and not so sporty people about this and they say that whatever I may say, they feel better after their stretching routine. They do not feel they are functioning properly unless they have done their stretches.
36. I suspect this has something to do with habit. If you always go through a stretching routine and believe it does you good, then you are going to feel there is something lacking in your preparation if you leave it out. I am also sure that all the people who feel they need a cigarette whether at half-time in the rugby match like the great Serge Blanco or mid-way through the morning in an office believe they need it to function properly.
37. I think we may also be seeing the analgesic effect of stretching.
38. Ingraham also makes a couple of other interesting points that challenge common assumptions. One is that:

*The most overstated assumption in sport today is that trained athletes are well-conditioned athletes.<sup>10</sup>*
39. By this she means that many athletes who train themselves to be extraordinarily good at certain things are often extremely lacking in their general level of fitness.
40. She also discusses the questing of what is called “joint laxity”. This is an over looseness in the joints which she says can serious problems. She says:

*Increased hamstring flexibility and joint laxity is associated with a higher incidence of anterior cruciate ligament injuries in football players.<sup>11</sup>*
41. She goes on to say that this is a particular danger for women who generally have far more joint laxity than men so that

*...practices that increase the ROM (range of movement) in female athletes should certainly be questioned.*
42. So there we have it. A lot of what we see in the gym is not doing people a great deal of good and may be doing harm.

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<sup>9</sup> Ingraham (2003)p4

<sup>10</sup> Ibid.p3

<sup>11</sup> Ibid.p4

43. So what, as AT teachers do we say to our pupils who want to go to the gym?
44. One big advantage we have is that science is firmly on our side as AT practitioners. We do not need to change our basic message. We know the body works best when we stop pulling ourselves down
45. So we tell our pupils that before they start exercising it is a good idea to stop and get rid of whatever tightening and pulling down they are doing, and allow themselves to lengthen and widen. This brings their muscles into a state of lengthened and balanced equilibrium which is the best state to be in for doing the next thing.
46. And if they are going to the gym or going to play squash or tennis, they should certainly go through a gradual warm-up to whatever level of activity they want. And they should do this by beginning with gentle movement rather than violently pulling at themselves in static stretches.
47. It is commonly believed that the AT is against exercise but nothing could be further from the truth. The AT is against mindless harmful exercise but it is not about withdrawing from the world. It is about making sure we are in the best state possible for doing whatever it is we want or have to do.
48. An expanded version of this talk is presented in a more academic format at:

<http://www.geraldfoley.co.uk/Pre-exercise%20stretching.pdf>

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