WORDS DR MEGHAN HESTER

FLEXIBILITY

How much is too much?

Flexibility work is seen as an important aspect of rowing, whether as part of a training programme or as an injury prevention strategy. Whether you are an injured or healthy rower, you are sure to have experienced a coach, fellow rower or manual therapist saying something like, "You should stretch your hamstrings," or "Your lack of flexibility affects your rowing". To which, in my opinion, the response should be, "Why?" and "How much?". In the same vein, measuring rowers' flexibility with the sit-and-reach test (a measure of back and hamstring flexibility) or knee-to-wall test (a measure of calf flexibility) begs two questions: firstly how is being flexible an advantage; and secondly is it possible to have too much flexibility? →

Defined most simply as *"the ability to bend with ease and without breaking"*, flexibility is an important fitness component for rowers. This is essentially because greater stroke length, when used correctly, can correlate to greater rowing efficiency. In other words, if a rower rows longer, they can make the boat travel further per stroke and not necessarily have to rely solely on increasing their rating to increase overall boat speed. Optimal stroke length cannot be obtained without the range of motion and muscle extensibility that is part of being flexible.

So, what determines an individual's level of flexibility?

For a start, flexibility is much more than simply stretching. As with any fitness component like muscular endurance and aerobic capacity, there are determinants of flexibility that we can modify and there are some components you can't change. For example, being older and male is correlated with decreased flexibility. A specific issue is the anatomy of the male hip joint which is different to the female hip joint. In males, the shape of the hip socket (femoral acetabulum) is deeper and narrower than for females which means the articulating thigh bone (femur) is more congruent in this bony space. That means the available range of motion is less than for females, who have wider and shallower sockets. In rowing, this advantage in flexibility translates into women generally having a greater ability to externally rotate and flex their hips as they come into the catch position and thus get more length up the slide. It's a great technique for women (particularly those on the shorter side) to make up length on the slide if they lack the genetic predisposition to being taller. As another example, the type of joint also determines the degree of anatomical motion available. A ball-and-socket type joint like the hip or shoulder can access three planes of motion, unlike the knee or ankle which are uniplanar, hinge-type joints. This is important because when range of motion is lost or restricted in an innately more mobile joint like the hip, emphasis needs to be placed on regaining that range. This prevents surrounding, often more stable areas such as the lumbar spine, having to compensate.

Another simple but often overlooked determinant of flexibility is temperature. Both the temperature of the environment and the rower's body temperature can lead to greater muscle extensibility. For example, if we wish to "bend with ease and without breaking" as we row, the importance of a good warm-up cannot be underestimated as a way of accessing our full functional range of motion from the beginning of the session. Equally important is the rower's hydration status; general lack of hydration is a predictor for restricted motion and as such, drinking plenty of fluids should be emphasised as part of maintaining good flexibility among the many other physiological benefits of doing so. On a cellular level, studies have shown that as we age, our intervertebral discs dehydrate and lose some of their height as a result. Given that discs are designed to allow for greater flexibility of the spine, the less hydrated discs are a prime example of how dehydrated tissue can diminish range of motion in an area and thus affect performance.

The most traditionally addressed component of flexibility is the extensibility of muscles and the surrounding connective tissue. This is because of the tangible results produced with respect to mobility and range of motion in the boat.

When a joint with restricted range of motion caused by surrounding connective tissue (ie muscles, fascia, ligaments and skin) is subject to load, a series of changes occurs around the joint which can hamper a rower's performance. For instance, a rower with relatively tight hip flexors and restricted hip flexion/extension motion, could end up with chronic shortening of the connective →

LITTLE ATTENTION IS PAID TO WHAT ISSUES AN OVERLY FLEXIBLE OR MOBILE JOINT CAN PRESENT.

WHAT THEN IS THE ANSWER WHEN MORE STRETCHING IS NOT NECESSARILY THE PATHWAY TO BETTER PERFORMANCE?

tissue if left unaddressed. The tissue can become less able to cope with load and as a result fatigues very quickly. In addition to this, the relationship between the hip flexors (agonist muscle) and their opposing glutes and hamstrings (antagonist muscle) may lead to a dysfunctional set-up in which one is chronically activated and the other has real difficulty firing. This concept is called reciprocal inhibition and very often, without good technique correction and addressing of the neuromuscular imbalance, a rower can develop altered, compensatory movement patterns around the pelvis which either result in eventual injury or movement patterns that are very difficult to correct.

Interestingly though, while restricted flexibility clearly has its performance-hampering effects, little attention is paid to what issues an overly flexible or mobile joint can present. What then is the answer when more stretching is not necessarily the pathway to better performance?

Hypermobility refers to movement beyond the normal range of motion expected. People often describe it as being "double jointed". Hypermobility can be generalised (ie affect the whole body) or relate to specific joints (ie the articulation of the L4 and L5 vertebrae in the low back). The trade-off between greater mobility in a certain area is an accompanying lack of stability. This means the surrounding connective tissue must compensate for the joint dysfunction. For individuals suffering from hypermobility, the muscles tend to be working harder at rest or during simple daily activities like study or work to maintain normal postures. When rowing comes into the equation the connective tissues work harder and fail more quickly than they would with an innately stable joint.

Whether you're considering a restricted or an overly-mobile joint, normal function is altered resulting in susceptibility to injury. With each stroke we take, our muscles and joints adapt to the stresses and strains, whether it be from a compressive force such as the weight of gravity on our intervertebral discs, a tensile force such as the pull at either end of the erector spinae muscles when they contract, a sheer force such as the movement of the L4 vertebrae on the L5 vertebrae or a torsion force such as the rotation through the spinal segments seen predominantly in sweep rowing.

These stresses and strains are fundamental to human movement but they do become an issue when pushed to extremes. For example, the tensile load on the serratus anterior muscle where it attaches to the lateral aspect of the rib surpasses the capacity of the tissue to cope. This leads to deformation, ie tearing of the serratus anterior muscle or repeated micro-fractures on the bone itself (aka a rib stress fracture). When rowing, injury can occur quite suddenly, either due to a single maximal effort such as we do in starts practice or, more commonly, when repeated micro-stresses occur over time and eventually break through the point at which the tissue can keep up with repair. This is evidenced by the occurrence of rib stress injuries, tendinopathies and chronic non-specific low back pain – examples of repetitive strain injuries.

> WHEN ROWING THE CONNECTIVE TISSUES WORK HARDER AND FAIL MORE QUICKLY THAN THEY WOULD WITH AN INNATELY STABLE JOINT.

In recommendations for injury rehab, prevention or simply a training programme there is often both a flexibility and strength component. A systematic review conducted by McDonnel *et al* on rib stress fractures in rowers found evidence for "strengthening the serratus anterior, strengthening leg extensors, stretching the lumbar spine, increasing hip joint flexibility and reducing excessive protraction to be among the prevention strategies". Prevention strategies are multifaceted because no single joint, muscle, connective tissue or individual can operate optimally without this balance.

So when it comes to working on flexibility, there are many strategies. The most rowing-specific strategy would be using technical drills in the boat such as bodies-over and quarter-slide checks. Land exercises are commonly used and prescribed for rowing (outside of the boat). These include but are not limited to – stretching, foam rolling, spikey ball release techniques and manual therapy. There is also the option of using and/or adjusting boating equipment to help the body access this range where it is restricted. Additional equipment can include seat pads, BAT Logic ShoePlates or Custom Shims and stable, correctly sized shoes. Equipment adjustments can include foot stretcher height, foot angles, slide lengths and oar gearing. Simple, often underestimated strategies such as drinking more water, having quality nutrition, managing fatigue, managing any injuries well and assessing body composition can also play a role when looking at the bigger picture.

Ultimately what this shows is that a multifaceted approach to achieving greater flexibility and preventing injury is best. Bringing together strength and flexibility training ensures joint stability is not sacrificed for excess mobility. As we have seen so often in osteopathy and BAT Logic philosophy, a holistic approach is ultimately the best to get the optimal outcomes. ROW360

Dr Meghan Hester is an Osteopath and a consultant for BAT Logic/Project B