Application of a muscle energy technique (MET) – stretching the psoas using the Thomas position

Putting maximus back into the gluteus

John Gibbons looks at a case study that demonstrates how pain does not always present itself at the site of the problem

The client was a woman of 34 and a physical trainer for the RAF, presenting with pain in the superior aspect of her left scapula.

The pain was intense and would come on four miles into a run, forcing her to stop. The discomfort would then subside, but quickly return if she attempted to keep running. This was the only activity that caused the pain.

Her complaint had been ongoing for eight months, worsened over the past three, and was starting to affect her work. There was no previous history or related trauma to trigger the complaint.

After seeing different practitioners, who all focused their treatment on the 'upper trapezius', she visited an osteopath who treated her cervical spine and rib area. The treatments she had received were biased towards soft tissue techniques of the affected area – the trapezius, levator scapulae, sternocleidomastoid, scalenes, and so on. The osteopath had also used manipulative techniques on the facet joints of her cervical spine – C4/5 and C5/6. Muscle energy techniques and trigger point releases were used in a localised area, which made it feel better at the time but had no impact when she attempted more than four miles' running. She had not undergone any scans (e.g. MRI or x-ray).

Assessing the symptoms and cause

Tissue(s) that seemed to be causing the client's pain/symptoms:

- Upper trapezius
- Levator scapulae
- Scalenes
- Thoracic rib
- Cervical rib (extra rib forming from the transverse process of C7).

Potential causes of the problem:

- Referral pain from cervical facet C4/5 or C5/6
- Protective spasm/strain of upper trapezius or levator scapulae
- Dysfunction of the gleno-humeral joint (or even the acromio-clavicular or sterno-clavicular joint)
- Inter-vertebral disc bulge of C4/5 or C5/6
- Elevated first rib
- Tightness of the scalenes
- Positional – due to upper crossed syndrome (forward head posture and rounded shoulders due to tight pectorals and sternocleidomastoid, and weak rhomboids and serratus anterior)
- Upper lobe of left lung, referring to the trapezius
- Diaphragm – this is innervated by the phrenic nerve that originates from the level of C3, 4, and 5, which could relate to the

shoulder via the neurological dermatome.

You can see there are many possibilities that could be causing the pain. Although this list is not exhaustive, it highlights the many avenues to consider with a common complaint of 'shoulder/trapezius pain'.

Taking a holistic approach

Let us now assess the client globally rather than locally, remembering that the pain only comes on after running four miles.

When I see a new patient, I normally assess the pelvis for position and movement, as I feel this is the 'foundation' for everything that connects to this part of the body. I often find that when I correct a dysfunctional pelvis, my client's presenting symptoms settle down. However, when I assessed this client, I found her pelvis was level and moving correctly.

I went on to test the firing patterns of the gluteus maximus (or g-max), which I often do with athletes who participate in regular sporting activities, but only if I feel the pelvis is in its correct position. The logic is that you often get a positive result that the muscle is mis-firing when the pelvis is slightly out of position.

I found a bilateral weakness/misfire of the g-max, but it seemed a bit slower to fire on the right side. As I hadn't found any dysfunction in the pelvis, I pursued this avenue further.

So how does a right side weakness of the g-max cause a pain in the left trapezius? Is there a link, and if so how is this possible? What can be done to correct this and why has it happened in the first place?

To answer these questions, we need to look at the anatomy of the function of the g-max and its relationship to other anatomical structures, as detailed below.

The g-max, and form and force closure

The main action of the g-max is as a powerful hip extensor and a lateral rotator, but it also plays a part in stabilising the sacroiliac joint (SIJ) by helping it to 'force close' while going through the gait cycle.

Part of the g-max is attached to the sacrotuberous, a ligament that runs from the sacrum to the ischial tuberosity. It is the 'key' ligament that helps to stabilise the SIJ.

To help us understand this action, we need to consider 'form closure' and 'force closure', which are both associated with the stability of the SIJ *(see diagram 1)*.

The shape of the sacrum – along with its ridges and grooves, and the fact that it is wedged between the ilia – helps to bring natural stability to the SIJ. This is known as 'form closure'.

If the articular surfaces of the sacrum and the ilia fitted together with perfect form closure, mobility would be practically impossible. However, form closure of the SIJ is not perfect and mobility is possible, which means stabilisation during loading is required. This is achieved by increasing compression across the joint at the moment of loading.

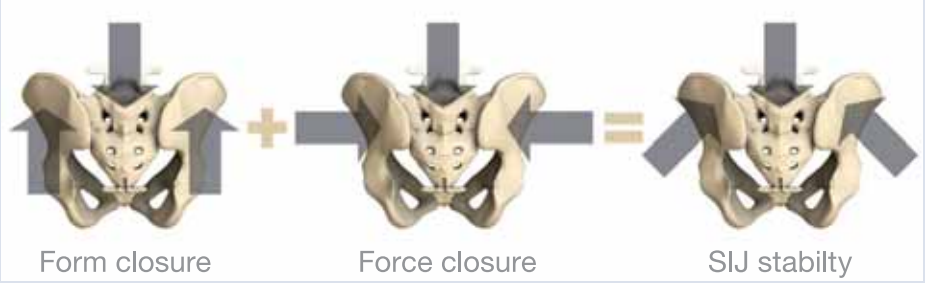
The surrounding ligaments, muscles and fascia are responsible for this. When the SIJ is compressed, friction of the joint increases and consequently augments 'form closure'.

When working efficiently, the forces between the innominate and sacrum are adequately controlled and loads can be transferred between the trunk, pelvis and legs.

So how do we link this to the client's complaint? In one of my previous articles on training the Oxford rowing team (IT March 2008), I wrote about the posterior oblique 'sling'. This directly links the right g-max into the left latissimus dorsi via the thoracolumbar fascia.

The latissimus has its insertion onto the inner part of the humerus, and one of its functions is to keep the scapula against the thoracic cage and aid in the depression of the scapula.

Diagram 1: Form closure and force closure (Schamberger, 2002)



Piecing it all together

So what do we know? We know that the right side of the g-max is slightly slower and that this muscle plays a role in the 'force closure' of the SIJ. This tells us that if the g-max cannot do one of its functions, then something else will assist in stabilising the joint. The left latissimus is the synergist to help stabilise the right g-max and, more importantly, the SIJ.

As the client runs, every time her right leg contacts the ground and goes through the gait cycle, the left latissimus contracts. This causes the left scapula to depress and the muscle that resists this is the upper trapezius and the levator scapulae. Subsequently, these muscles start to fatigue and for this client, it occurs at approximately four miles, at which point she feels pain.

Treatment

You might think the easy way to treat the weakness in the g-max is to simply add in 'strength' biased exercises. However, in practice this is not always the case, as sometimes the tighter antagonistic muscle is responsible for the apparent weakness. The muscle in this case is the psoas (hip flexor) and this, when shortened, can result in a weakness inhibition of the g-max.

My answer to this puzzle was to stretch the client's right psoas muscle to see if it promoted the firing activation of the g-max, while at the same time introducing strength exercises for the g-max.

Visit www.fht.org.uk/g-max exercises to find information about using a core ball to activate the g-max.

Prognosis and conclusion

I advised the client to abstain from running and to get her partner to assist in stretching the psoas twice a day. Strength exercises were also advised twice daily until the follow-on treatment.

I reassessed her 10 days later and found normal firing of the g-max on the hip extension firing pattern test, and a reduction in the tightness of the associated psoas.

Due to these positive results, I advised her to run as far as it felt comfortable. I wasn't sure if it was going to correct the problem, but she reported that she had no pain during or after a six-mile run.

The client is still pain-free and continues to regularly use the g-max exercises and psoas stretch.

This case study demonstrates that very often, the underlying cause of a condition or problem may not be local to where the symptoms/pain presents, therefore all avenues need to be fully considered.

PICTURES: JOHN GIBBONS; ISTOCKPHOTO

John Gibbons, BSc (OST), is a registered osteopath, sports therapist and a lecturer in sports medicine at the University of Oxford. Call 07850 176600, visit www.peaksport.co.uk or email j.gibbons@peaksport.co.uk