THE DREADED LEVATOR SCAPULAE

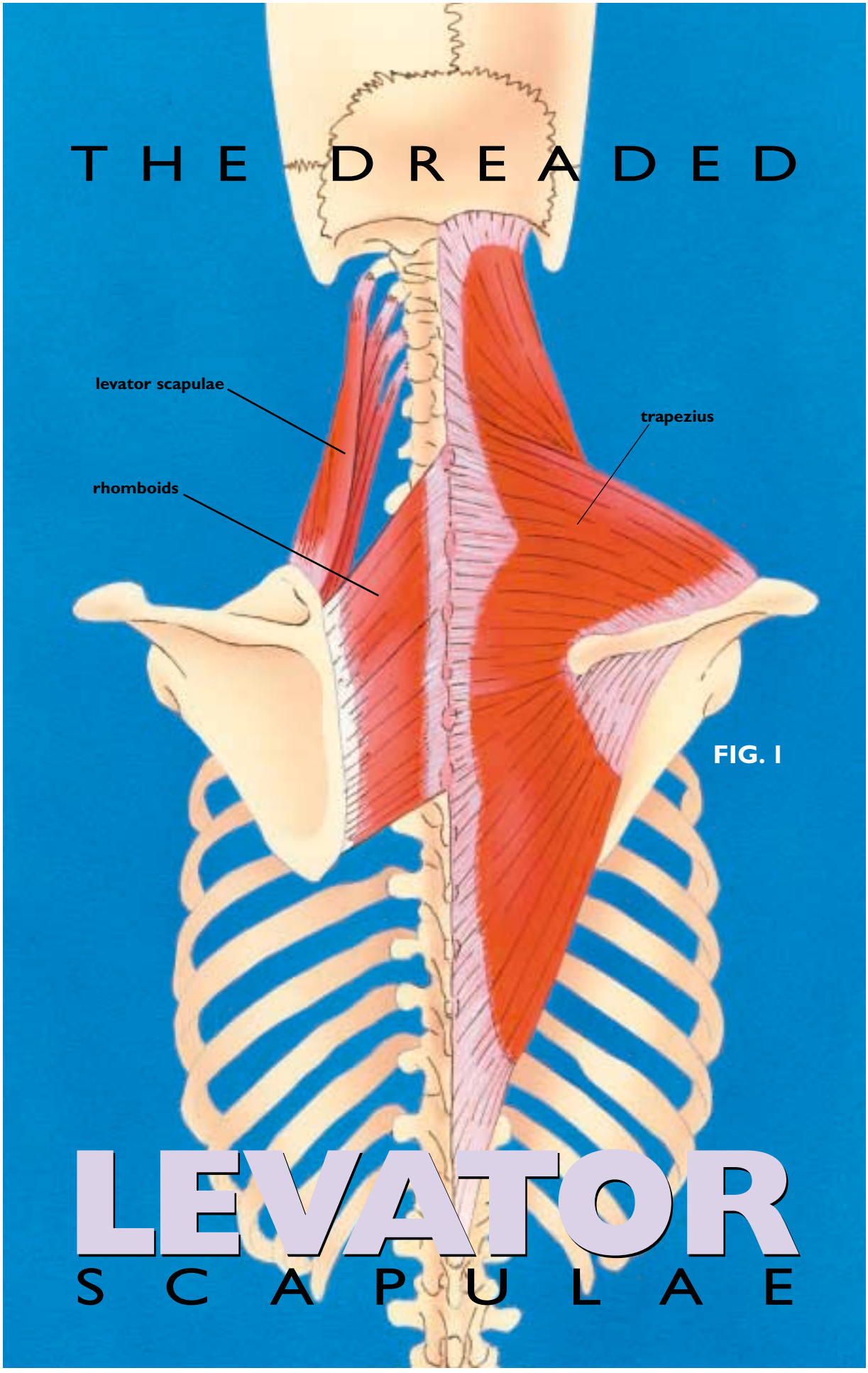

FIG. 1

No single muscle takes more blame for the problems of bodywork clients (or the occupational strains of bodyworkers themselves) than the poor, benighted levator scapulae. Many clients will roll their heads and point or dig at the base of their necks, urging us to put our fingers into this hard-to-reach place. If you are sitting down and a massage therapist comes up behind you, they are more than likely going to squeeze your traps a few times, and then start after the gold at the top of the scapula. And there's nearly always gold to find when they get down to the superior angle. Why is this such a universally sore area?

The situation has become so serious Stone Phillips is preparing a *Dateline* segment titled "Levator Scapulae: Threat? Or Menace? You decide!" And Anne Robinson has declared the levator "the weakest link – goodbye." Okay, bad jokes. But what is the cause of the persistent tension, annoying trigger points, and fibrotic fascia in the levator scapulae? Most clients will say it's stress. I suppose they are describing the daily stresses which pile up into distress – a distress that involves feelings of fear or withdrawal. Lifting the shoulders to "turtle" the head is a protective response, ergo: lifted shoulders and constantly overworked levators.

In the spirit of the times, shouldn't we try to understand the levator scapulae in terms of its context? Go into its upbringing, socio-economic background and previous traumatic episodes? Surely, in these days of relativism, we can't actually blame anybody, or even any muscle, can we? Of course not, so this article is a plea for tolerance, an expansion of our understanding of the stresses the levator itself is working under, and a call to build the self-esteem of levators everywhere. So the following is my only slightly different theory as to why the levator is so commonly overloaded, but the theory leads to a different plan of treatment. Here goes.

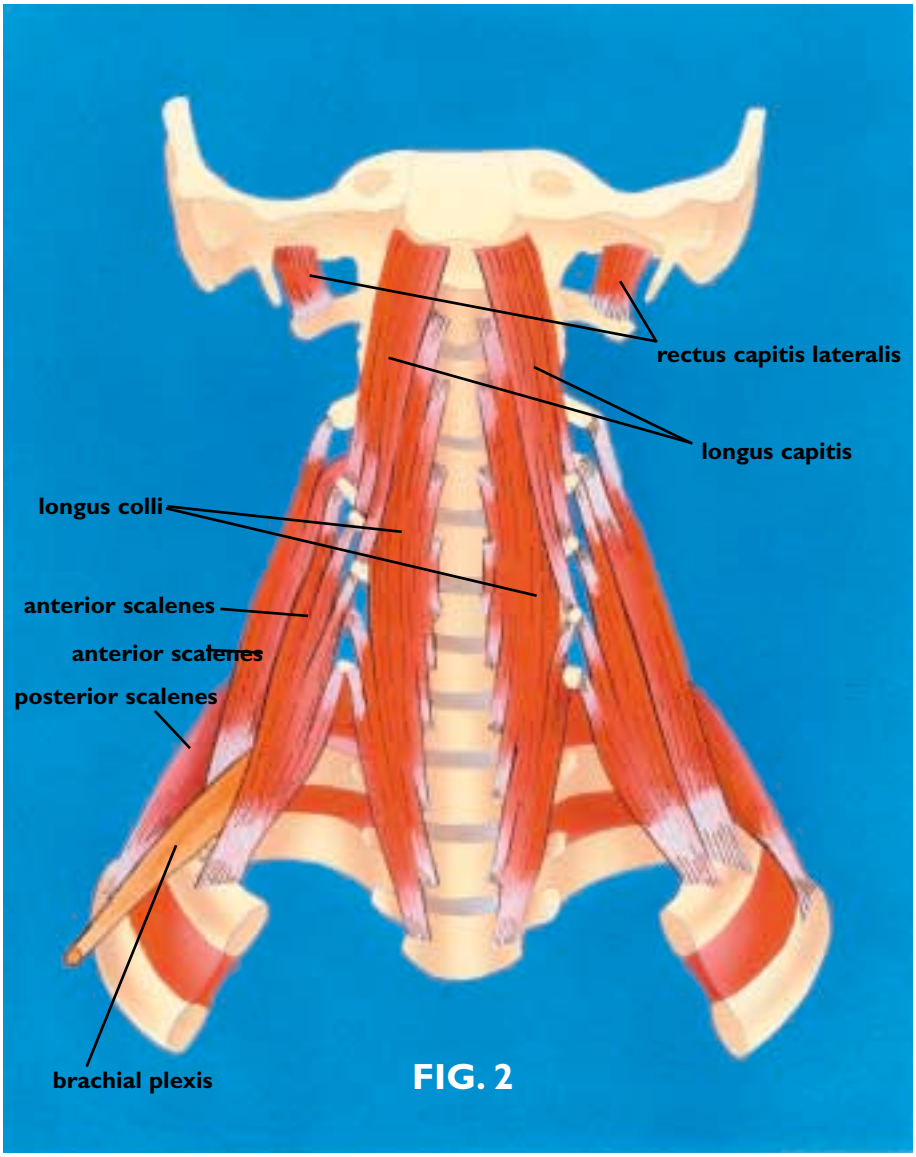

Fig. 2: ***(Above) Neck from the front.***
The front of the motor cylinder shows us the two longus muscles and the scalene group.

Fig. 1: ***(Facing)*** **Levator scapulae from behind.**

MOTOR CYLINDER MAKEUP

The levator scapulae is one of the muscles of the "motor cylinder" of the neck – that inner core of cervical stabilizing muscles deep to the outer sleeve of the trapezius, sternocleidomastoid and platysma. The motor cylinder surrounds the entire cervical vertebrae, creating movement through their contraction, but also stabilizing the cervical spine like the guy wires on your local radio tower or sailboat mast. Depending on how you count, there are about a dozen major muscles in the motor cylinder, most with multiple slips to several of the bones, including the occiput; that is →

By Thomas Myers • Illustrations by Andrew Mannie

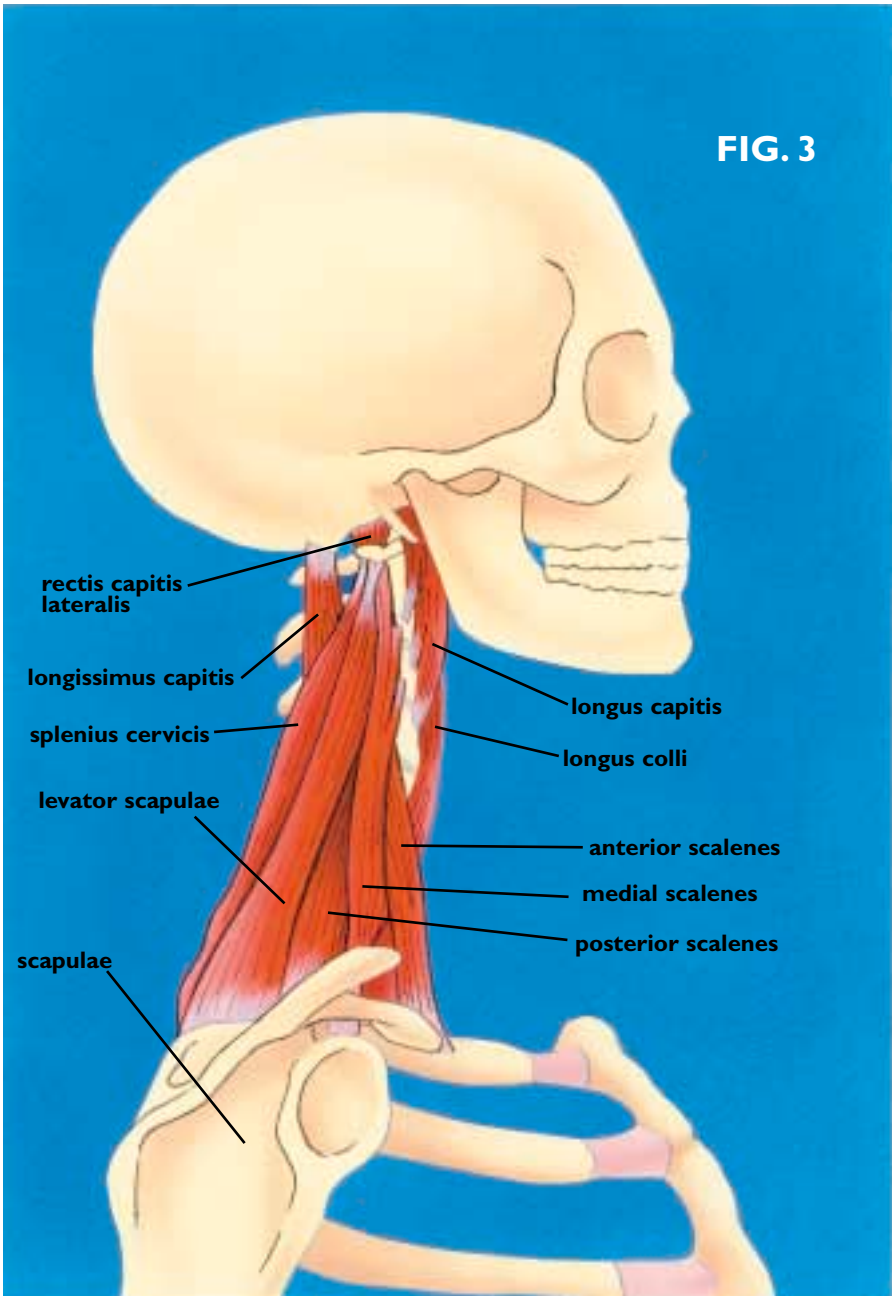

Fig. 3: ***Neck from the side, showing scalenes and levator.***
The levator scapulae is set right behind the scalenes, reaching down, back and out from the transverse process to the apex of the scapula.

not counting the really small one- and two-joint muscles of the transversospinalis. An astonishing number of muscles manage to find attachments to the transverse processes (TPs), though some attach to the spinous process (SPs).

Beginning from the front, we have the longus capitis and longus colli, which seem to lie in front of the bodies of the vertebrae, but which actually attach to the very front of the TPs. These muscles act to flex the neck vertebrae and posturally to prevent neck hyperextension. They are intrinsic to the spine in that they do not have attachments anywhere else, though the longus colli reaches down through the thoracic inlet to the third or fourth thoracic vertebra.

The next muscles back in the motor cylinder are the scalene group. The scalenes form a skirt around the side of the neck, and are clearly felt as hard, wiry muscles when you push in from the side of the neck. All three attach to the TPs, but the anterior scalene attaches to the anterior tubercle of the TP, and passes down and forward (remember that, it'll be on the quiz later) to the anterior surface of the first rib just under and behind the medial part of the collarbone.

The middle and posterior scalene (which I think of as one muscle in terms of treatment) come from the posterior tubercle of the TP, passing straight out to the side to the first and second ribs. These guy wires create lateral flexion in movement, but act posturally to stabilize the side-to-side movements of the neck vertebrae. The nerves of the brachial plexus, by the way, go out through the trough

See Levator, p84

Levator, from p82

between the anterior and posterior tubercle, and therefore between the anterior and middle scalenes, a subject we will return to when we talk about palpation.

Right behind the scalenes comes the levator scapulae. This thin band of muscle actually starts as four slips from each of the first four cervical vertebrae, from the TPs like the rest, which blend into one muscle. The longus muscles attached to the vertebrae themselves, the scalenes attached to the ribs. What next? The next logical place from which to stabilize the neck is the scapula, and there the levator goes, attaching right to the upper inner corner known as the superior angle.

Because we want to concentrate on the levator, we will give short shrift to the rest of the motor cylinder, which consists of the erector spinae muscles – reaching down from the head and the posterior part of the cervical TPs and into SPs of vertebrae way down the back. The first ones are the large bandages of the splenius muscles (these, too, will be on the quiz). Splenius passes back and down, angling in sharply and acting like the reins of a horse: shorten the splenius on the right side, and the head will turn to the right. Splenius capitis comes from the side of the occiput and temporal bone (the TP of the skull, if you will) and cervicis from the first two cervical vertebrae, the atlas and axis.

Inside the wrapping of the splenii, we have the continuations of the erector spinae from the back: the iliocostalis most laterally, the longissimus in the middle, and the heavy band of the semispinalis closest to the SPs. Deep to these three are the smaller and shorter multifidus, and other little guys of the transversospinalis, but these muscles are intrinsic to the neck

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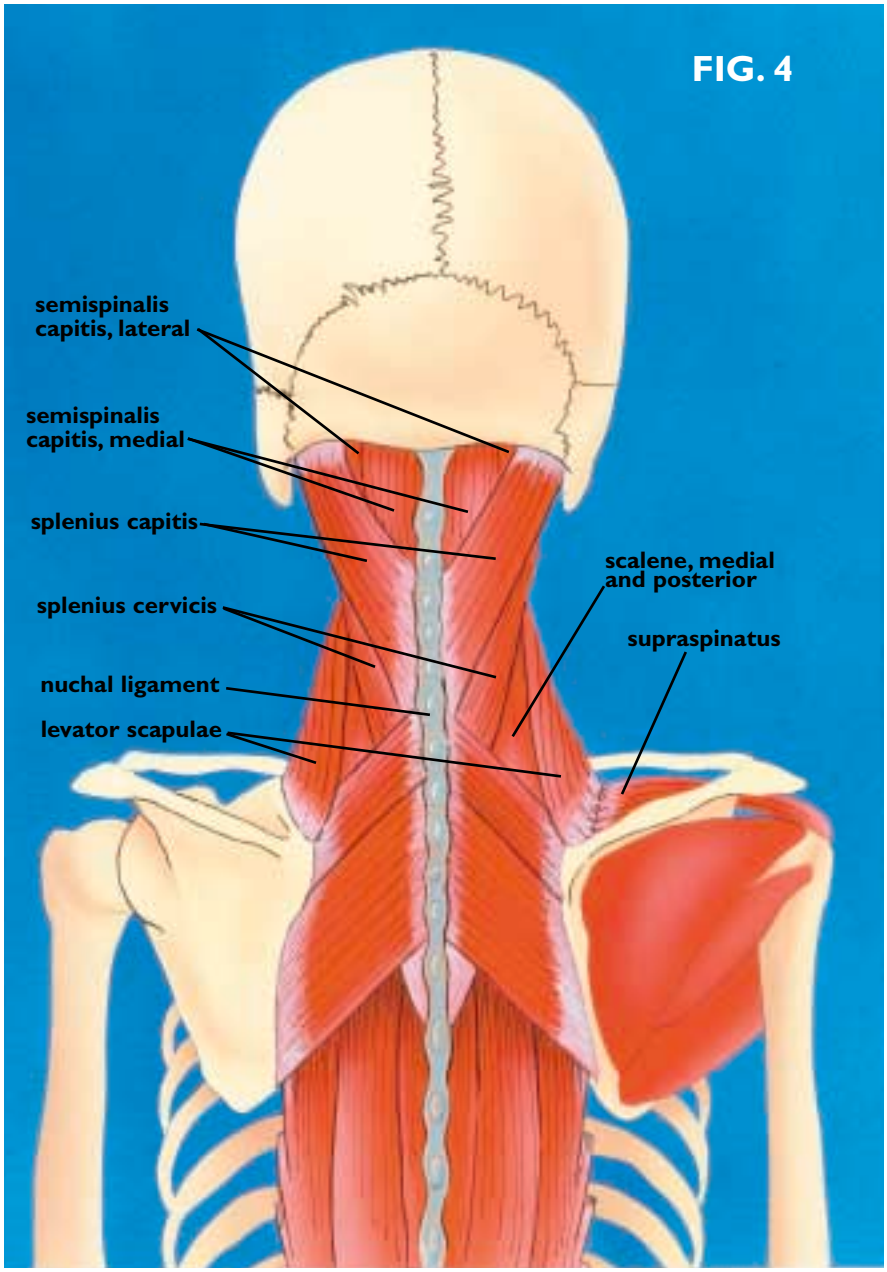

Fig. 2: ***Neck from back.***
The posterior part of the motor cylinder, behind the levator, is taken up with the spinal muscles – the longer erector spinae and the shorter transversospinalis muscles.

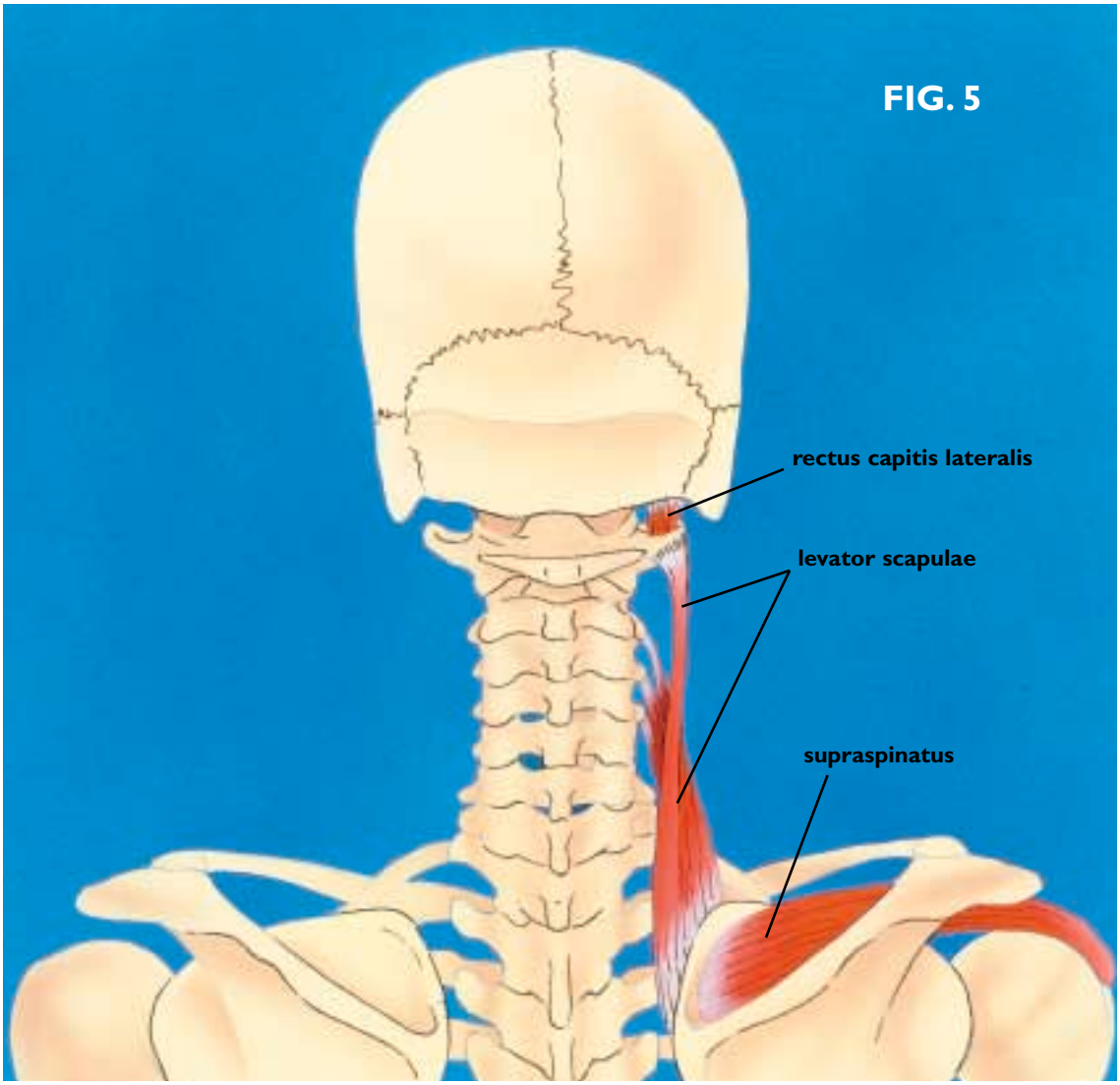

Fig. 2: *Deep Back arm line.* **Consider the levator's fascial connections, and we see it connected from the skull, via the tiny rectus capitis lateralis, to the little finger, via the supraspinatus. triceps and ulnar periosteum.**

Levator, from p84

and have less to do with the guy-wire action we are talking about.

To summarize, we have guy-ropes arrayed around the neck: the longus muscles along the front, the scalene muscles around the side, the levator to the shoulder blade, and the erectors down the back. Over these are the more superficial trapezius and sternocleidomastoid, which can also act as stabilizers, but are more concerned with moving the shoulder and rotating the head respectively.

Now why are you carrying on about the neck when the levator scapulae is clearly a shoulder muscle? Because, dear reader, my theory is that the ubiquity of levator scapulae pain and dysfunction has more to do with the neck than with shoulder use. But you're right. To be fair we should detail the connections the levator has to the shoulder before we spout off about neck balance.

The levator, as we have noted, goes from the TPs of the first four cervical vertebrae to the apex of the scapula. If we continue in either, via the connecting fascia, what other muscles is it connected to? (This is a favorite game of mine called the Anatomy Trains, which was explained in *Massage & Bodywork* (April/May 2001), and in a recently published book of the same name.)

At the top, the levator scapulae connects to one more tiny muscle, the rectus capitis lateralis, which connects from the TP of the atlas to the TP of the occiput, so that the levator is fascially connected to the skull, even though it cannot directly act on it muscularly. At the bottom, the supraspinatus muscle, that abducting member of the rotator cuff, is the continuation of the levator scapulae, and these connections carry on out the back of the arm to the little finger.

Clearly problems in the arm, triceps or rotator cuff could show up in the levator scapulae, but I don't

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Considered as a guy wire, the levator would prevent the upper cervicals going forward by pulling back on them like the reins on a horse. The longus muscles prevent the neck from hyperextending, the scalenes prevent it from falling or leaning to the side, the levator prevents the neck from falling forward, and the erectors prevent the heavy face from falling into your soup.

Levator, from p86

think that is what's happening most of the time. Let us return to the guy wires of the neck idea.

QUIZ TIME

First quiz question: What is the levator's job if described from lower insertion to upper insertion? I cleverly avoided answering this in the above discussion so I could spring it on you now. The very name, levator scapulae, implies the muscle works top to bottom, lifting the scapula. But what if it works from scapula to neck? Since it goes up and forward from the scapular apex to the first four cervical TPs, it would pull these cervicals down and back. That's right. You could also say it would contract to prevent these cervicals from going forward. So if we considered the levator scapulae working from its lower insertion to its upper, we could rename it "capitis-preventus-going-forwardus."

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But now, second quiz question: Which of these muscles has the least stable base (meaning distal or lower insertion)? The vertebrae move with neck and back motion, and the ribs move with breathing, but the scapulae is clearly the most movable bone of all of these lower insertions.

THE REAL HERO

We arrive now at my main point: If the head starts to move forward, carrying the neck vertebrae with it, what is in place to stop it? The levator scapulae, or, as we now prefer, capitis-preventus-going-forwardus. And where is this hero standing? On the highly movable scapula. So what happens? The scapula starts to creep up the ribs, the structural balance of the neck and shoulders is substantially disturbed, and the levator scapulae – doing its best to hold the head on for 16 hours a day – develops chronic tension, retains painful metabolites, lays down extra fibrotic fascia, takes on trigger points, you name it.

Note that in performing this function, the levator scapulae is tense-stretched, not tense-bunched. We use "locked long" for this strained, eccentric/isometric contraction, as opposed to the "locked short" concentric/isometric chronic contraction. The muscle is already being stretched by these forces into a "too long" state, and us coming around with our fingers to stretch it and relax it and make it longer is only going to make it feel better in the most temporary way. In fact, over the long term, continual stretching of the already overstretched levator will actually contribute to a greater head-forward postural problem.

I hate to say I told you so, but do you see why it's not the levator's fault? The more practical point is that working on the levator is not going to help much, despite the temporary good feeling. So how can we help in a more permanent way? Since the problem is the ubiquitous head-forward posture, we can help by doing a few things which might lead to the head sitting in a balanced way atop the spine and body.

- First and most important is to release those myofasciae that are contributing to a head-forward posture. This can be due to quite distant muscles, such as rectus abdominis or even the hip flexors, or any of the fascia running along the sternum and chest. Closer to home, both the sternocleidomastoid or anterior scalene (because they both run down and forward from the cervical TPs) might need release. On a deeper level, the scalene fasciae are attached to the top of the lung fascia, so that breathing restrictions might be involved in pulling the head

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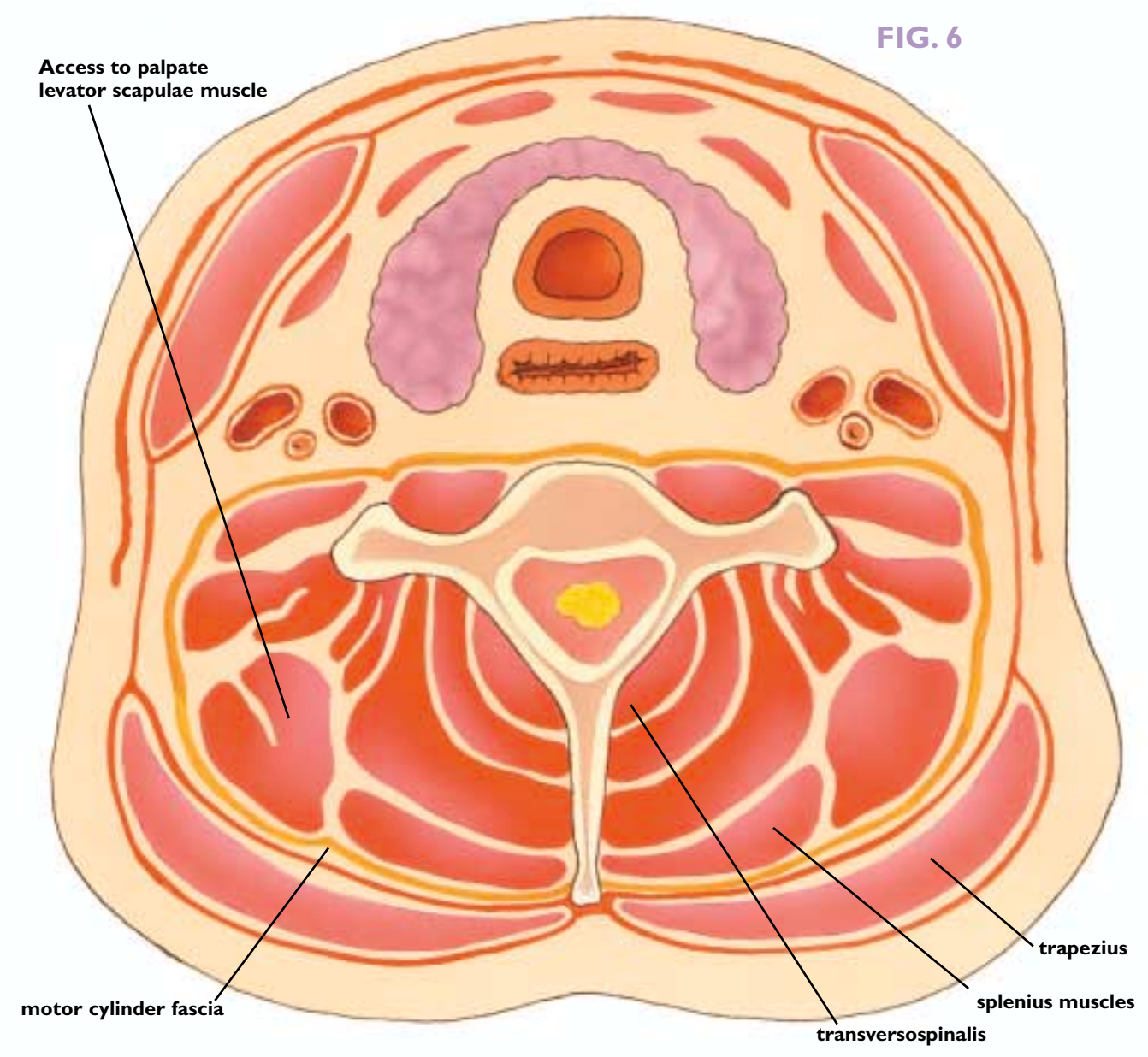

Fig. 6: ***Superficial cylinder fascia containing trapezius and sternocleidomastoid.*** **Finger position for supine movement palpation of the levator scapulae.**

Levator, from p88

forward. Assessing which of these tissues might be restricted and then releasing them may lead to letting the head lift up and back, and thus releasing the locked long tension of the levator scapulae.

• Second, strengthen those muscles which are better placed to be capitis-preventus-going-forwardus, namely, the splenii muscles. Since these muscles also act like reins to the neck and head, and since they are anchored to the far-more-stable spinous process of the upper thoracic vertebrae, it's better to urge them into the job of holding the head and neck back.

• Third, we need to educate these clients about letting the head float up and back to be on top of the body. Putting a pillow under your client's head while they are on the table may be temporarily comforting, but it reinforces the pattern of having the back of the

head more forward than the thoracic spine. Or, when the client is finished with the session, spend a little time reinforcing the "helium bubble in the top of the head" image. Invent other client homework to let the head float up. Also, encouraging your client to drop their scapulae down the rib cage can be helpful in this context – I have my clients clasp their fingers in front of them, and then use the idea of pulling their fingers apart to induce the downward movement of the scapulae.

WHAT DOES IT MEAN?

Trying to use the levator scapulae to hold the upper neck vertebrae from going forward is a mistake which leads to all kinds of misuse patterns for the head, neck, upper back and shoulders. Reversing the head-forward posture is the surest way to reduce all the negative manifestations – such as pain and trigger points – in the levator scapulae. Working on the muscle itself is a quick fix, but results are surely temporary, and in the long run may exacerbate the problem.

In rounding out the discussion, let's quickly identify the levator palpatorily, and distinguish it from its surrounding muscles. It is easy to find down by the scapula, but impossible to distinguish where it attaches to the transverse processes. Yet, with a little guidance, we can find it in the middle of the muscle belly.

Sit at the head of your table, with a client or model lying supine. Put your hands to the side of her neck with your fingertips fairly near the bottom of the neck in the triangle between the front edge of the trapezius and the back edge of the clavicular head of the sternocleidomastoid. The most prominent cable you feel beneath your fingers is the middle scalene. Nerve pain or tingling in the fingers means you are on the brachial plexus. Move posterior a little to find the muscular element of the middle scalene.

Just behind and slightly more medial than this lies the posterior scalene and the levator scapulae. Since these muscles are both small and hard to distinguish at this point, we need a movement to parse them out. With your four fingertips laid in behind the middle scalene, reach across the body with your other hand and hold the shoulder down against the rib cage. Ask your client to raise her shoulder toward her ear – the levator scapulae will tighten while the posterior scalene will not. If you do not feel the muscle tightening under your fingers, you are not quite in the right place. Move your fingers a bit and have your client do it again; you will be able to distinguish the levator scapulae when you are correctly placed. Do the complementary move on the other side to find the other one for certain. Then have your client clasp her fingers in front of her and slide her scapulae down the table toward her feet, and you will feel the muscle stretch.

The splenii muscles are just behind the levator, and these can be found fairly easily by putting your hands under the occiput and a bit to the side such that your fingertips are under the lateral part of the occipital ridge and the mastoid process, with your thumbs extended up the side of the skull above the ear. Have your client rotate her head one way and the other against the resistance of your thumbs. You will feel the splenii contract on the same side to which she is turning. These are the muscles you need to strengthen if the levators are working too hard to try to keep the head on.

In conclusion, it is always important to know if a tense muscle is tense because it is too short, or, as is often the case with levator, tense because it is too long, or strained. Muscles that are strained like this benefit more from release work in complementary muscles than they do from work directly on the affected muscle. So, the quiz is over and you passed.

Next time we are going to turn the attention of the "Anatomist's Corner" away from the discussions of individual muscles we have been exploring, toward some of the historical issues in the odd, interesting and occasionally gruesome details in the development of our anatomical knowledge. M&B

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