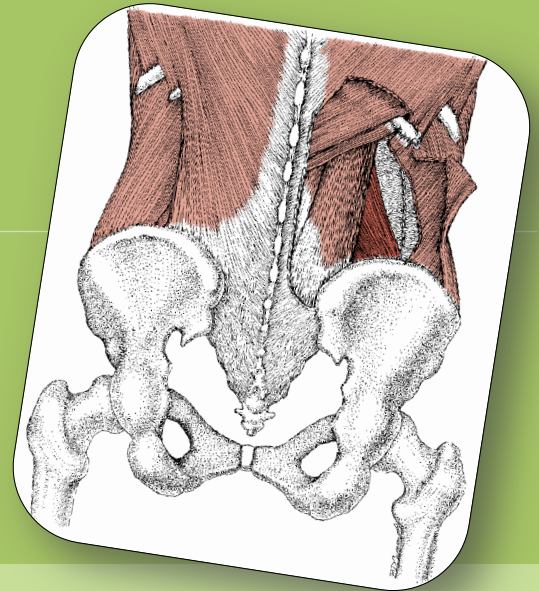


Multifidus

The mighty, multi-tasking multifidus muscle is so deeply hidden that it is often overlooked!



April 14, 2016

Fig. 1 – Where is Multifidus?

NMT for Torso and Pelvis

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The Significance of Back Pain

Back pain is one of the most frequent complaints addressed by manual therapy. 15% - 20% of Americans report with back pain yearly and 80% will suffer from at least one episode of back pain during their lifetime (Lou et al 2004). Almost \$9 million in Worker's Compensation costs are back pain related, with over 100 million lost workdays accounted per year. (Atlas et al 2004) The Bureau of Labor Statistics (2002) estimates that among back pain sufferers 21% lose 3-5 days of work, over 14% miss 6-10 days of work, and almost 30% miss 3 or more weeks! See more stats listed in green box below.

The National Institute of Health (NIH 2006) suggests risk factors, including smoking, job tasks, getting older, being overweight, inherited conditions, poor physical fitness, and diseases, such as cancer and arthritis. They note that the common causes of back pain include spasm, tension, disc degeneration, scoliosis, spondylosis, spondylolisthesis, arthritis, spinal stenosis, pregnancy, kidney stones, infections, endometriosis, fibromyalgia, tumors, stress and trauma (and others). WHEW! That is quite a list!

Low back pain statistics: Newschannel10.com/story/18914357/low-back-pain-statistics. Viewed 4/14/16

\$11.1 billion in office visits per year
\$9.5 billion in hospitalizations
\$3.9 billion for prescription drugs
\$4.7 billion for outpatient services

\$1.1 billion in ER visits
\$40 billion in treatment alone
PLUS
\$100 - \$200 billion per year - Indirect costs
(disability, work loss)

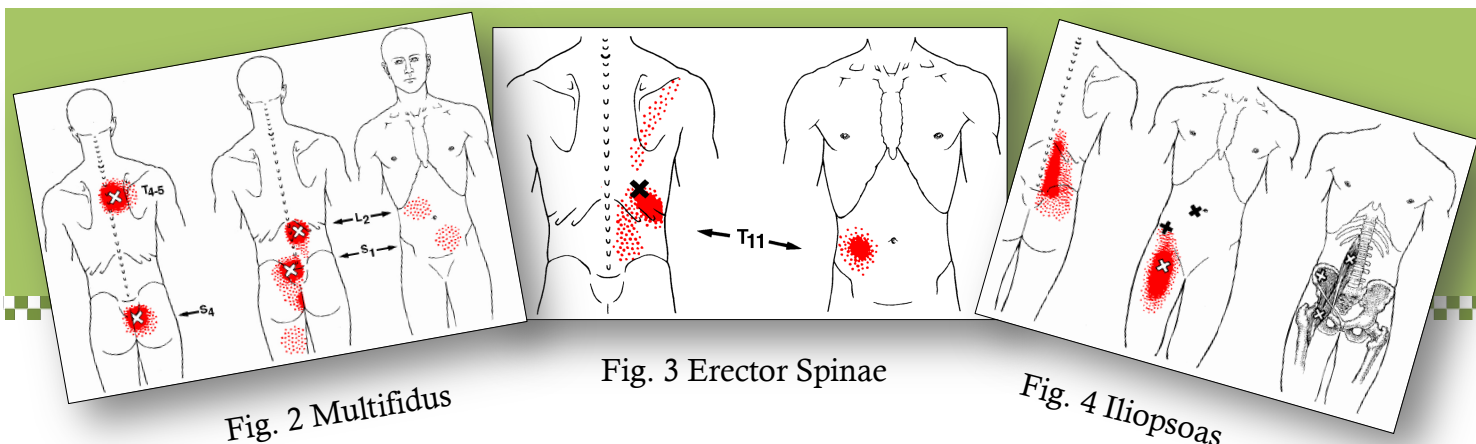


Fig. 2 Multifidus

Fig. 3 Erector Spinae

Fig. 4 Iliopsoas

People commonly indicate that their “back pain” occurs anywhere from the shoulder to the hips. However, lumbar spinal pain (medial to erector spinae, inferior to T12 and superior to S1) is distinguished from thoracic pain (T1 - T12), flank pain and from pain overlying the sacrum or hips, as each of these will have different structures and biomechanics involved.

Back pain divides into ‘simple backache’, nerve root pain and serious pathology. Back pain originating from the latter two may stem from sinister causes, including visceral pathology. Referral for further investigation should be considered if the patient with back pain:

- Is under 50 years of age, whose back pain has failed to improve (under 20, caution should be exercised until anomalies - scoliosis, spondylolisthesis, etc.- have been ruled out; over 50, serious conditions - osteoporosis or metastasis -should be considered)
- Has a previous history of cancer, tuberculosis, rheumatological or other systemic diseases, use of steroid medication, drug abuse or a diagnosis of HIV positive
- Is patently unwell or reports unexplained weight loss
- Also reports thoracic or chest pain
- Presents with widespread neurological symptoms or has had a road traffic accident or any other severe trauma.

- Reports the pain is constant or progressively severe and is apparently unrelated to mechanical influences (no relief from bedrest) These serve as ‘red flags’ and may indicate advancing pathologies, which need ruled out quickly. Delay of treatment could have serious consequences.

‘Simple backache’, on the other hand, often emerges from a compounding of minor influences, usually overlying predisposing myofascial factors (shortness, tightness, altered firing sequences, trigger points, weakness, etc.). Massage therapists usually think of the trigger point referrals of muscles that lie in the region of the low back (Fig. 1), such as latissimus dorsi, serratus posterior inferior, quadratus lumborum, multifidus (Fig. 2), erector spinae (Fig. 3), and rotatores. However, because of trigger point referrals as well as the impact on biomechanics, consideration should be given to anterior and lateral muscles, such as rectus abdominus, obliques, transverse abdominus, and iliopsoas (Fig. 4), as well as muscles of hips.

The astute practitioner would also examine muscles of the lower extremity that attach to the pelvis and potentially tilt, torsion, or otherwise distort it from neutral position (tensor fascia latae, gluteals, piriformis, rectus femoris, sartorius, adductor group and hamstrings), as well as habits of use, posture, and gait. Among these listed muscles, the multifidus is frequently overlooked as a *substantial* source of lumbar dysfunction. Hence, it is the focus of the remainder of this article.



About the author: Judith DeLany, LMT

For over 30 years Judith DeLany has presented internationally and to multiple disciplines on the use of neuromuscular therapy for soft tissue pain and dysfunction. She has co-authored 5 academic textbooks on NMT and served as an associate editor of a peer-reviewed journal for 12 years. In 2015 she was honored with the AMTA National Distinguished Service award. She brings to the table a broad perspective manual therapy and its impact within multiple healthcare fields.



Fig. 5 Erector spinae overlies and hides multifidus



Fig. 6 Multifidus muscle fibers cross L5-S1

The mighty multi-tasking multifidus

A muscle's length, mass and fiber direction has implications to its function. A muscle's length indicates the amount of excursion (movement) it produces, its mass (size in cross section) directly relates to its power, and fiber direction indicates the direction the joint will move. The more obliquely oriented the spinal muscle fibers, the more rotational movement they produce; the more vertically oriented fibers produce flexion-extension movements.

Cervical and thoracic multifidi appear as small muscle slips and are deeper, thinner, and their fibers more tendinous and oblique than the lumbar multifidi. In the lumbar, they are considerably thicker, more vertically oriented and significantly more powerful. They lie deep to the erector spinae (Fig 5) and attach to its aponeurosis, to the dorsal sacrum and to the spinous processes. Crossing 2-4 vertebrae, they attach to the mamillary processes on the articular pillars of the vertebrae. Some of the deepest fibers attach to the zygapophysial (facet) joint capsules and appear to help protect the capsule from being 'pinched' by the joint during movement.

The obliquely oriented thoracic multifidi are undoubtedly associated with rotational movements, perhaps primarily as stabilizers during rotation. This is consistent with the angulation of zygapophysial (facet) joints of the thoracic vertebrae, which allow rotation, while forbidding flexion, extension, and lateral flexion to protect the heart and lungs from intrusion by the ribs.

The vertical orientation of the fibers of most of the lumbar multifidi (Fig 6) imply that they would not be involved in direct vertebral rotation, which is confirmed by the orientation of the lumbar facets, which allow flexion, extension and lateral flexion

while discouraging rotation.

Since the line of action of multifidus lies posterior to the lumbar curve, they extend the lumbar spine, thereby increasing lumbar lordosis and giving it a 'bowstring' effect. Each multifidus segment applies tension to the posterior elements and increases compression on all vertebrae and discs interposed between the attachments. They also stabilize the lumbar region against unwanted flexion produced by the abdominal muscles during rotation of the thorax, firing during contralateral trunk rotation. (Bogduk 2005) This allows the spine to remain vertical (rather than flexing forward) when pure rotation occurs.

Perhaps the most important feature pertains to the fact that multifidus fibers are the only muscle fibers posterior to the lumbosacral transitional point of L5-S1. Therefore, multifidi must produce enough tension to ensure that L5 does not slide forward on the sacral plateau (spondylothesis), even though this surface naturally, sometimes significantly, slopes downward. Fortunately, they present their largest mass precisely in this segment of the spine. Unfortunately, they often suffer from disuse atrophy, appearing as 'motheaten' elements and infiltrated with fat.

The lumbar multifidus is particularly thick in the lower lumbar region, where it fills the majority of the lamina. Repetitious and (if appropriate) progressively deepening gliding strokes can be applied throughout the lumbar lamina and posterior sacrum to influence multifidi. Although applied through the thick overlying tendinous elements of the superficially placed erector spinae, latissimus dorsi, and associated dense fascia, treatment often offers some relief for multifidus.

A portion of most lateral fibers can sometimes be influenced by approaching the fibers more directly - lateral to and deep to the erector spinae (see Fig. 1), particularly at the level of L2-L4. However, **exercise caution!** Avoid compressing (and potentially bruising) tissues against the lateral aspect of the transverse processes, which lie deep to the lateral fibers of multifidi (see Fig 2).

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Learn more about multifidus, its trigger points and other thoracic, lumbar and pelvic muscles in *NMT for Torso and Pelvis* seminars. See dates and locations on first page of this article.

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