

**Susan R. Mercer**

**School of Health Sciences**

**Faculty of Health and Medicine**

**The University of Newcastle**

**Australia.**



**Publications:**

**2008: S Phillips; Susan Mercer; Nikolai Bogduk**

Anatomy and biomechanics of quadratus lumborum.

Proceedings of the Institution of Mechanical Engineers. Part H, Journal of engineering in medicine 2008;222(2):151-9.

**2007: Mercer SR, Bogduk N**

Intra-articular inclusions of the elbow joint complex. Clin Anatomy; 20:668-676, 2007.

Cadaveric study of 28 elbow joints to investigate intra-articular inclusions. Ft pads and fibroadipose meniscoids were found in all joints, and capsular rimes in 50% of joints.

**2004: Peter Lau; Susan Mercer; Jayantilal Govind; Nikolai Bogduk**

The surgical anatomy of lumbar medial branch neurotomy (facet denervation).

Pain medicine (Malden, Mass.) 2004;5(3):289-98.

**2003: Ray Baker; Paul Dreyfuss; Susan Mercer; Nikolai Bogduk**

Cervical transforaminal injection of corticosteroids into a radicular artery: a possible mechanism for spinal cord injury.

Pain 2003;103(1-2):211-5.

**2002: D Gareth Jones; George J Dias; Susan Mercer; Ming Zhang; Helen D Nicholson**

Clinical anatomy research in a research-driven anatomy department.

Clinical anatomy (New York, N.Y.) 2002;15(3):228-32.

**2000: Nikolai Bogduk; Susan Mercer**

Biomechanics of the cervical spine. I: Normal kinematics.

Clinical biomechanics (Bristol, Avon) 2000;15(9):633-48.

**1999: Susan Mercer; Nikolai Bogduk**

The ligaments and annulus fibrosus of human adult cervical intervertebral discs.

Spine 1999;24(7):619-26; discussion 627-8.

Anatomical study of 12 adult specimens. Anulus is thick anteriorly, but posteriorly is minimal, reinforced by the posterior longitudinal ligament centrally and virtually absent poster-laterally

**1996: Mercer SR, Jull GA**

Morphology of the cervical intervertebral disc: implications for McKenzie's model of the disc derangement syndrome. Man Ther; Mar;1(2):76-81, 1996.

As the morphology and degenerative process of the cervical spine is different from the lumbar spine the authors conclude that the model does not conform to known anatomy. (see also discussion McKenzie Institute (UK) Newsletter 5:1;10-14,1996)

Editorial

## Clinical anatomy serving manual therapy

Manual therapy primarily involves the application, by hand, of forces intended to move joints and surrounding tissues, in an effort to improve function and relieve symptoms, such as pain. Fundamental to understanding theories on how manual therapy might work is a thorough knowledge of the anatomy and biomechanics of the structures treated. This same knowledge is also crucial to understanding limitations of theories, and appreciating why they might be incorrect.

Clinical anatomy can be an ambiguous term because it can mean different things to different people. In textbooks of anatomy it can mean little more than a short paragraph at the end of a chapter or section, which describes one or two clinical applications of the material just covered by the text. To some teachers clinical anatomy means ensuring that the material taught appears to have some clinical relevance. What is frustrating for manual therapists is that these clinical applications are typically directed at surgical or medical practice.

A more demanding yet relevant definition of clinical anatomy can be formulated. It is the application, both in research and in teaching, of the discipline and scientific principles of anatomy to the comprehension and solution of problems that occur in clinical practice. This definition requires the clinical anatomist not only to be trained and well versed in the skills of anatomy but also to be thoroughly familiar with the problems that arise in clinical practice.

In the context of manual therapy, the clinical anatomist should not only know, in detail, the structure and biomechanics of the neuromusculoskeletal system but also must be aware of what manual therapists believe they are doing when assessing patients and applying treatment, as well as the various theories that underlie this treatment. This definition does not require that the anatomist has consummate clinical competence in how to execute the treatment, but they must have more than a superficial insight into the nature of that treatment and its purported biological basis.

Unencumbered by patient loads and other demands of clinical practice, the clinical anatomist can afford the time to reflect on the alleged basis of various interventions. They can serve clinicians by providing insightful analyses that practitioners themselves cannot produce, either for lack of time, or for lack of knowledge and skills to analyze anatomy and biomechanics in detail. The value of this service to practitioners is that from clinical anatomists, they can learn the errors and limitations of the traditional literature upon which

clinical practice has often been based, and thereby avoid becoming victims (and perhaps unwitting promulgators) of misperceptions and misrepresentations of biological facts. This serves to ensure a high intellectual level of clinical practice.

Such clinical anatomy relevant to manual therapy practice has been published over the last 30 years. Until the 1980s the anatomical basis for pain arising from the lumbar or cervical disc had not been established. Strange as it seems now, until these simple contributions were made it was common belief that the intervertebral disc could not be a source of pain. In the mid-1980s a complete revision of the anatomy of the erector spinae and multifidus was made, revolutionising the development of clinical and biomechanical models of trunk function. Textbooks of anatomy would have us believe that cervical and lumbar spine intervertebral discs are the same and clinical models were developed along these lines. However, clinical anatomical studies have shown that this is not the case. These same textbooks still deny that the zygapophysial joints are innervated but clinical anatomical studies have demonstrated their innervation which has led to successful diagnosis and treatment of zygapophysial joint pain. The anatomy of the abdominal wall is often taught from the perspective of general surgery by traditional anatomists not aware of the current importance of the abdominal muscles in the context of lumbar spine stabilization and interventions for back pain. Indeed recent research of the clinical anatomy of the trunk and pelvic musculature highlights the problems of applying this traditional or textbook anatomy to the biological basis of current clinical practice.

Clinical anatomy is not an unchanging collection of facts but an evolving field of science. The unique insight it can offer serves manual therapy by challenging and advancing clinical practices and providing biological evidence to support their application.

Susan R. Mercer

*Department of Anatomy and Structural Biology,  
University of Otago, Lindo Ferguson Building, PO Box  
913, Dunedin, Otago, New Zealand  
E-mail address: susan.mercer@stonebow.otago.ac.nz*

Darren A. Rivett

*Discipline of Physiotherapy, University of Newcastle,  
Callaghan, Australia*