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.

Uncumbered 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 lead 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.

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In orthodox medicine, when it comes to uncovering what actually ails patients and why (diagnosis) anatomy is a necessary beginning. Generally however, it is only that. It is not also the middle and end. This is equally true of ‘clinical’ (applied) anatomy (Mercer and Rivett, 2004 Manual Therapy), no matter how idiosyncratically interpreted. The simplistic SAB (structural–anatomical–biomechanical) approach whereby patients are ‘assessed’ largely in terms of articulated skeletons or unfeeling cadavers is no longer sufficient, or acceptable in enlightened manual therapy circles.

Mercer and Rivett’s editorial appears to be an attempt to put something of a new spin on the outmoded SAB approach to clinical reasoning and decision making. For instance, the fact that the facet joints, or outer laminae of the lumbar intervertebral discs, are innervated is hardly revolutionary. Among other things, this simply suggests that there is little unique physiologically regarding the cause and mechanisms of back pain. That is, at least initially the pain is mediated by inflammatory chemicals, however produced, with the potential to be provoked or aggravated by mechanical (and other) stimuli. Of itself, or even when coupled with biomechanics, such routine applied anatomy tells us nothing about how manual therapy might or might not ‘work’ with our patients.

It is gratifying to note that Mercer and Rivett define manual therapy as was originally meant. Namely, “... the application by hand of forces intended to move joints and surrounding tissues” (p.59). Hence, interventions for back pain which employ re-education of ‘wasted’ or tardy trunk muscles to actively ‘stabilise’ (sic) or control discrete segments of the lumbar spine are conceptually unrelated to such passive procedures. Not that the SAB rationale for this approach is itself entirely without uncertainty. For instance, it is unclear how and why with the resumption of everyday activities back pain is able to subside at all in the presence of such a continuous pathognomonic anatomical ‘defect’ (Hides et al., 1994, 1996, cf. Käser et al., 2001). It also seems somewhat paradoxical that there is not an automatic relationship between resolution of the clinical variables of importance—pain and disability—and change (or otherwise) of muscle bulk measured at long term follow-up, (Daneels, 2001; Daneels et al., 2001; Hides et al., 2001). If ‘control’ (central nervous system) is the problem, ‘wasting’ (peripheral anatomy) may effectively become an artefact.

The seminal evidence for muscle ‘wasting’ indicates that the primary problem is not one of trunk muscle anatomy, but pain (Hides et al., 1994). As is the case with delayed activation of abdominal muscles, the trigger for extensor muscle ‘wasting’ (in such naïve patients) is obviously nociception, and the mediator is the nervous system (Hodges and Moseley, 2001). Spontaneously arising or mechanically provoked ‘symptoms and signs’ are not the product of applied/‘clinical’ anatomy or biomechanics. They are the result of chemically mediated neural activity and an increase of sensitivity in the peripheral and/or central nervous systems. The anatomical (and physiological) changes of clinical significance include those which transpire acutely, and may persist chronically, in pain pathways in (particularly) the central nervous system (Willis, 2002, Zusman, 2004).

As Daykin and Richardson (2004) reveal, being locked-in to SAB-based ‘assessment’ with failure to recognise the actual (central) nervous system source of sensory and motor responses, can have several detrimental consequences. Understandably, this is particularly so with relatively inexperienced clinicians having to deal with more ‘difficult’ cases, chronic pain, and ‘psychological overlay’. These clinicians were left with feelings of low self-efficacy and poor outcome expectations. Together, these are attributed to insufficient skills and knowledge needed to treat patients in order to obtain the ‘results they had anticipated’ (Daykin and Richardson, 2004).

Consequent feelings of disheartenment and frustration contribute to clinicians increased impatience, neglect to offer patients appropriate explanations (deemed critical nowadays), and a tendency to be less sympathetic. Indication that the above are a direct result of what Daykin and Richardson (2004) term clinicians ‘biomedical [effectively SAB] world view’ comes from noting their beliefs regarding the cause and meaning of patients’ pain, treatment selection, nature of any proffered explanations and reasons given for outcome expectations. Further evidence of the rigidity of
clinicians SAB orientation is the choice of ‘biomedical’ treatments in the face of overt psychological factors. The uncertainty and confusion—indeed potential harm—this can cause is suggested by a totally dichotomous approach to management. That is, when confronted with (possible) failure clinicians either ‘wrote patients off’ and returned them to the pain clinic ASAP, or were driven to persist with patently inappropriate treatment for weeks on end by the “... feeling one should be able to do something” (Daykin and Richardson, 2004, p.787) (italics mine). In other words, the clinician is lost....

It goes without saying that of course passive movements need to be expertly selected and administered. The same is certainly the case with respect to re-establishing motor ‘control’ with the prescription of therapeutic active movement, posture re-education and gait training. Naturally, all of the above require an in depth knowledge of somatic anatomy and biomechanics. However, it is time to move beyond applying such knowledge almost exclusively for purposes of deciding ‘what to do’ with little regard for understanding why (insight into ‘why’ also helps inform ‘why not’). Practitioners knowledge base needs to be broader than applied anatomy and biomechanics if insight into (how and) why is to be included in the clinical reasoning and decision making process.

It was optimistically assumed that replacing the SAB approach with a biopsychosocial model—for which there is overwhelming evidence (eg Bardin, 2002a, b)—would render sad situations such as described by Daykin and Richardson (2004) a thing of the past. Emphasis on combined physiological and psychological influences on (central) pain mechanisms is an invaluable aid to comprehending, and perhaps even predicting in advance, why different patients may and may not respond to physical treatments. Increased ability of even naive clinicians to make such judgements—and feel reasonably good about them—is what is needed. Not further endorsement of idiosyncratically interpreted applied anatomy (and biomechanics), however contemporary or ‘clinical’.

References


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