Chicken or the Egg?

Myofascial Trigger Points and Central Sensitisation in Myofascial Pain Syndrome: Exploring their Enigmatic Pathophysiology, Dynamic Clinical Manifestations and Novel Strategies for Optimising Patient Outcomes

Pre-conference Workshop
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Faculty:
Jay Shah
John Srbely

Participants in **t**his interactive, thought-provoking, and clinically impactful workshop will explore the dynamic and pivotal roles that myofascial trigger points (MTrPs), sensitisation, limbic system dysfunction and associated objective/quantitative physical findings play in the evaluation and management of chronic myofascial pain syndrome (MPS). Participants will learn and integrate important palpation skills and psychophysical quantitative sensory testing techniques with various needling and electrical stimulation techniques to treat painful MTrPs and sensitised spinal nerve segments more effectively.

An important dichotomy in the current literature is whether the MTrP is a *cause* or *effect* (chicken or the egg?) of chronic MPS. The emerging research in basic and clinical neurosciences informs *novel directions* in diagnosing and managing MPS.

The Integrated Hypothesis is the current prevailing theory characterising the pathophysiology of MPS. According to this hypothesis, MTrPs are the primary source of nociception (*cause*) in MPS and are caused by a local injury to the muscle, either acute or chronic, leading to dysfunctional motor endplates and local muscle contracture.

Emerging research, however, suggests that neurogenic mechanisms play a foundational role in forming MTrPs and MPS without the need for direct local injury to the muscle. Accordingly, the *Neurogenic Hypothesis* proposes that the clinical manifestations of MPS are initiated, amplified, and facilitated by central sensitisation without mechanical injury to the muscle. MTrPs may form secondary to central sensitisation (*effect*) evoked by persistent nociceptive input from a distinct primary pathologic source (either somatic or visceral) in the common neuromeric field and/or dysfunction of descending pain modulation.

We will present novel animal models and clinical research from our lab demonstrating strong neuro-inflammatory responses in *neuro-segmentally linked* muscles and joint cartilage after both naturally occurring and experimentally induced spine osteoarthritis models. Our intriguing findings greatly enhance our understanding of the underlying neuro-inflammatory, and

neuro-segmental mechanisms in muscle, elucidate the potential physiologic mechanisms contributing to the dynamic clinical manifestations of chronic MPS, and have profound implications for patient management and optimising outcomes.

Long considered a "local" pain syndrome, MPS has a broader impact beyond the active (i.e., spontaneously painful) MTrP and has significant associations with mood, health-related quality of life and function. Recent findings compel us to look at the phenomena of MPS and MTrPs as a type of *spectrum disorder* of sensitisation that manifests clinically by varying symptoms and signs.

Spinal segmental sensitisation (SSS) is a hyperactive state of the dorsal horn caused by the bombardment of nociceptive impulses. Painful MTrPs are a very common source of persistent nociception and sensitisation that often results in SSS, facilitated segments, somato-visceral effects, and chronic myofascial pain.

In addition, viscero-somatic convergence may not only provide the means for pain referral to somatic structures but may also govern the reflex that induces muscle spasms and the eventual formation of MTrPs. Painful MTrPs, in turn, may serve as an additional source of nociceptive input and become a key component of a chronic visceral condition. Apropos, their deactivation through a targeted intervention may be critical to reversing central sensitisation and improving pain associated with an underlying visceral disorder.

Conversely, maladaptive changes in subcortical structures and dysfunctional descending inhibition may create somatic tissue abnormalities (e.g., tissue texture changes, tenderness, etc.) in addition to adversely impacting mood, affect and sleep. Either way, typical manifestations of the sensitised spinal segment include dermatomal allodynia/hyperalgesia, sclerotomal tenderness and MTrPs within the affected myotomes. These objective, quantitative and reproducible findings allow the clinician and patient to identify the affected spinal segment(s) that should be treated.

Non-pharmacological approaches such as dry needling, physical modalities (electrical stimulation, therapeutic ultrasound), and manual mobilisation/manipulation will be discussed, demonstrated, and practised by attendees. These techniques aim to deactivate painful MTrPs, desensitise affected segments and neuro-modulate subcortical dysfunction, providing more permanent pain and symptom relief. The diagnostic and treatment techniques presented in this workshop are applicable in managing various chronic musculoskeletal pain conditions.

About Our Speakers:

1. Jay Shah

Jay P. Shah, MD is a physiatrist and clinical investigator in the Rehabilitation Medicine Department at the National Institutes of Health in Bethesda, Maryland USA. His interests include the pathophysiology of myofascial pain and the integration of physical medicine techniques with promising complementary approaches in the management of neuro-musculoskeletal pain and dysfunction. He also completed the one-year UCLA Medical Acupuncture course and a two-year Bravewell Fellowship at the Arizona Center for Integrative Medicine.

Jay is a well-known lecturer on mechanisms of chronic pain, myofascial pain, neuro-anatomical acupuncture techniques and other related topics. He and his co-investigators have utilized novel microanalytical and ultrasound imaging techniques that have uncovered the unique biochemical milieu and viscoelastic properties of myofascial trigger points and surrounding soft tissue. He has given many invited lectures and hands-on courses nationally and internationally for physicians, physiotherapists, osteopaths, chiropractors, massage therapists, acupuncturists, and dentists, among other professional groups. His presentations integrate the fascinating knowledge emerging from the basic and clinical pain sciences in order to optimize evaluation and management approaches to musculoskeletal pain and dysfunction.

Jay was selected by the American Academy of Pain Management as the 2010 recipient of the Janet Travell Clinical Pain Management Award for excellence in clinical care and by the National Association of Myofascial Trigger Point Therapists as the 2012 recipient of the David G. Simons Award for excellence in clinical research.

2. John Srbely

Dr John Z Srbely DC PhD, is a full-time Associate Professor in the Department of Human Health and Nutritional Science, University of Guelph (Guelph, Ontario, Canada). He previously held a Canadian Chiropractic Research Foundation (CCRF) Research Chair in Spine Mechanics and Neurophysiology (2008-2013).

His interests in neurophysiology evolved during his formative years as a primary health care provider in chiropractic and acupuncture that focused on treating and managing chronic myofascial pain. His two decades of clinical observation underscored the fact that these, and other commonly adopted conservative clinical therapies/interventions, have a profound impact on human physiology, the scope and mechanisms of which are still poorly characterized.

Accordingly, his primary research interest centres around the study of the physiologic mechanisms and role of central sensitisation and neurogenic inflammation in the pathophysiology of myofascial trigger points and the clinical manifestations of chronic myofascial pain. He has received a prestigious Natural Sciences and Engineering Research

Council of Canada (NSERC) Discovery Grant to study the causal relationship between central sensitisation and the physiologic expression of sensitivity, morphology and electrophysiology of the myofascial trigger point within the human peripheral muscle.

His research program aims to advance both experimental and clinical techniques for the quantification of central sensitisation in humans, which can contribute to advancing diagnostic techniques for chronic myofascial pain. In addition, he and his team are investigating the neurophysiological mechanisms underlying the formation of MTrPs in an animal model and co-registering these with ultrasound and histologic findings.