Dry Needling Physiology

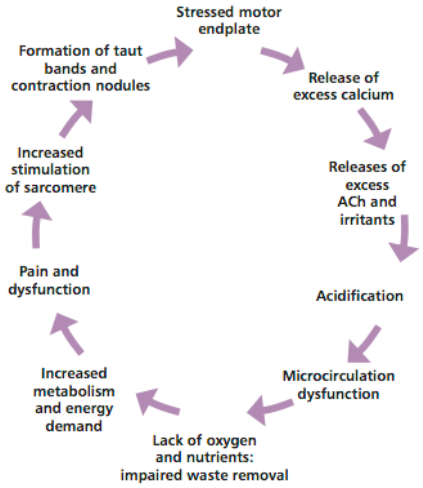
Trigger Point Model/ Motor End Plate Model

Trigger points are painful points within taut bands of connective tissue in which there is a pathological shortening[1]. These trigger points result from increased acetylcholine at the motor end plate or the neuromuscular junction[2]. Dry Needling removes the pain signals from trigger points, improve the acetylcholine levels at the motor end plates, which improves overall tissue healing, pain, and function[3]. Many other mechanical, chemical/cellular, electrophysiologic, and neurophysiologic effects occur as well[4].

Energy Crisis Model

Energy Crisis Model is an extension of the trigger point model based off the increased metabolic demand at trigger points[5].

Injury to muscle causes Calcium release, sarcomere shortens, increased metabolic demand and compromise of local circulation, recovery is compromised, prolonged shortening of muscle fibers, ischemic by-products accumulate and then back to further injury to muscle and more Calcium released as the spiral continues on[5].



Radiculopathy Model

- Focuses on musculoskeletal pain that result from neuropathies and radiculopathy[6].
- Denervated tissues develop supersensitivity (Cannon and Rosenbleuth's "Law of Denervation")[7]
- Muscles then shorten, have pain, and develop into taut bands with trigger points[6]
- Particular interest with muscles in the back: leads to disk compression and pressure on nerve roots, which leads to peripheral neuropathy and the development of supersensitive nociceptors and pain[6].
- Thus, there is restricted flow of nerve impulses in all innervated structures[6]
- Explains trigger points, tendinopathies and enthesopathies[6].

Mechanical Effects

The needle mechanically disrupts trigger points and tissue, resulting in normal resting length[8].

Micro-bleeding releases platelet derived growth factor into the tissue, promoting healing[4].

Chemical Effects

Chemical/Cellular Stimulus- The needle depolarizes and neutralizes abnormal chemicals at motor end plates, resulting in improved symptoms[4]

Electrophysiological Effects

Spontaneous Electric Activity improve at the motor end plates/ neuromuscular junction with dry needling[4].

Neurophysiological Effects

Inhibits painful neural pathways[4]

Activation of the descending inhibitory systems, which blocks noxious stimulus from pain neural pathways[4].

Sympathetic Nervous System Effects

Dry needling activates opioid-based pain reduction, mediated by the sympathetic nervous system[4]

Brain Stem Effects

Dry needling activates non-opioid pain relief via serotonin and norepinephrine from the brain stems[4]

Pain Effects

Dry needling reduces the painful input from trigger points[4]

Dry needling reverses sensitivity to pain and normalizes nociceptive (pain response) channels[4]

Inflammation Effects

Dry needling also triggers the systems that control inflammation and decrease pain[4].

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