

Physical Therapy Concepts and Modalities for TCS/OTCS

Patricia Stott, DPT, MS, ATC, CHT



Physical Therapy Approach to TCS/OTCS

1. Safe movement education, body mechanics, self-care
2. Monitoring for systemic inflammation and heightened neural sensitivity
3. Restoration of neurodynamic mobility
4. Neurological retraining
5. Re-establishing neuromuscular control over affected muscle groups

Safe movement education, body mechanics, self-care

- Teach neutral spine position and how to support this
- Assess hip hinge motion, sacral nutation (how does the lower spine and sacrum move?)
- Teach what neural tension is and ways to avoid prolonged positions, and work in better tolerated ranges
- Self-care may have to review strategies on brushing teeth, toiletry, intimacy, putting on clothes and shoes, etc.
- Are ambulatory aides needed for safety?

Monitoring for systemic inflammation and heightened neural sensitivity

- When to go back to the doctor?
- Is this a temporary flare-up that can be resolved or does more work up need to be done?

Restoration of neurodynamic mobility

- Neurodynamic work (nerve flossing and gliding) – never working into discomfort, nerves don't respond well to stretching when they are irritated
- Hip hinging and sacral nutation – this is usually monitored or manually worked on, and used as a measurement for improvement
- Manual therapies: fascial counterstrain with advanced neurological training, Barral trained neuromeningeal manipulation and brain trained, lymphatic specialists that work around neurological tissue
- Tools and modalities: frequency specific microcurrent, pulsed electromagnetic frequency, shockwave therapy, red light therapy, laser

Neurological retraining

- Central sensitization and neural hyper-sensitivity are common with TCS/OTCS
- Conservative care and post-surgical care will require neural retraining strategies to help retrain the communication between the central, autonomic, and peripheral nervous system
- What works for an individual is unique to their presentation:
 - Brain retraining programs: DNRS, Gupta, Primal Trust, etc.
 - Pain reprocessing theory
 - Happiness homework
 - ANS strategies (vagus or cranial nerve stimulation, temperature exposure training, activities that stimulate the parasympathetic or sympathetic systems, etc.)
 - Many, many more...

Re-establishing neuromuscular control over affected muscle groups

- Orthopedic alignment and muscle activation and control is needed before strengthening begins.
- Muscles typically affected are:
 - gluteus maximus
 - gluteus medius
 - Hamstrings
 - deep hip rotators
 - pelvic floor muscles
 - intrinsic foot muscles
 - multifidus and erector spinae
- Muscle must activate and hold the contraction strong and firm before movement or resistance is introduced.
- A variety of techniques can be used (biofeedback, muscle activation techniques, neuromuscular activation work)

BACK TO TOOLS – Shockwave Therapy

- Shockwave therapy may help as an adjunct treatment strategy to a variety of spinal related conditions, including spinal cord injury. (FIANI, B., DAVATI, C., GRIEPP, D. W., LEE, J., PENNINGTON, E. & MOAWAD, C. M. 2020. Enhanced Spinal Therapy: Extracorporeal Shock Wave Therapy for the Spine. *Cureus*, 12, e11200.)
- Some studies have shown improvement in muscle spasticity, walking ability, bladder function, quality of life reports, and independence in daily tasks (OPARA, J., DYMAREK, R., SOPEL, M. & PAPROCKA-BOROWICZ, M. 2024. Extracorporeal Shock Wave Therapy (eSWT) in Spinal Cord Injury-A Narrative Review. *J Clin Med*, 13.)
- This may help to stimulate localized healing at the spinal tissue and decrease adhesions present. As with microcurrent, more studies need to be done with this specific population.

BACK TO TOOLS – Shockwave Therapy

- Medicinal shockwave is created through electrohydraulic, electromagnetic, or piezoelectric technology.
- Radial shockwave therapy is not the same – the wave has completely different characteristics.
- It is considered a type of acoustic wave (along with ultrasound and radial pulses).
- Works on the intra and extracellular matrix
- SWT influences toll-like receptors, macrophages, and interleukins – stimulates regenerative processes starting with angiogenesis
 - Modulation of neurotransmitters and inflammatory factors
 - Encourages analgesia and pain management even in chronic and complex pain conditions
 - Progenitor cell, mesenchymal stem cell, and growth factor proliferation
 - Osteogenesis
 - Tendogenesis

Vincent, K. C. S., & d'Agostino, M. C. (2018). History of shockwave treatment and its basic principles. *Shock. Med*, 6, 1-16.

BACK TO TOOLS – Shockwave Therapy

- Appropriate education is key to outcomes and success (www.ismst.com)



Vincent, K. C. S., & d'Agostino, M. C. (2018). History of shockwave treatment and its basic principles. *Shock. Med*, 6, 1-16.

BACK TO TOOLS – Frequency Specific Microcurrent

- Electrical modality that can be used therapeutically to address targeted issues.
- Microcurrent is approximately 1,000 times less amperage than a standard TENS unit.
- Frequencies are directed at specific tissues and pathologies, including adhesion reactions at spinal tissue.
- Microcurrent may be helpful in reducing neurological adhesions and cytokine activity after spinal trauma. [ADAMS, J. & MCMAKIN, C. 2017. Frequency specific microcurrent resolves chronic pain and adhesions after ulnar transposition surgery. *J Novel Physiother Rehabil*, 1, 99–103.][MCMAKIN, C. R., GREGORY, W. M. & PHILLIPS, T. M. 2005. Cytokine changes with microcurrent treatment of fibromyalgia associated with cervical spine trauma. *Journal of Bodywork and Movement Therapies*, 9, 169–176.]
- An understanding of both FSM and connective tissue pathologies is important to avoid flaring patients due to mast cell and inflammation.

BACK TO TOOLS – Frequency Specific Microcurrent

TCS – Adhesion not from neuroimmune factors

- 13/10 (adhesion cord), 13/443 (adhesion dura)
- Maybe 13/482 (adhesion pia), 13/474 (adhesions arachnoid)
- Maybe 40/10, 443, 482, 474 (inflammation/ of the cord, dura, pia, arachnoid)
- While on this (20 minutes), the patient is encouraged to work on neurodynamic movement within tolerance

BACK TO TOOLS – Frequency Specific Microcurrent

In TCS/OTCS presentations with a neuroimmune component:

- This tool works better in conjunction with systemic approaches to “**why**” someone is developing changes in the connective tissue of the filum and spinal tissue
- Need to be working on inflammation and immune system support in other ways
- FSM can be programmed to address other issues at the meningeal layers (not just the “adhesion”)
 - A) frequencies would address things such as viruses, mold, other environmental toxins, histamine, etc.
 - B) frequencies would include the cord and meningeal layers (dura, arachnoid, pia)

FSM Patty's Base TCS-NI Protocol

- 9, 40, 41, 94, 50, 51, 91, 3, 13/10, 443, 396, 78, 110, 142, 355
- 29/142
- Channel A – histamine, inflammation, tension, nerve trauma/tension, congestion, scar/fibrosis, hardening inflammation, sclerosis, adhesion/scarring
- Channel B – spinal cord, dura, peripheral nerves, sacral plexus, cauda equina/lower spine, fascia, skin
- 29/142 (spasm/fascia)

FSM Adjunct Treatment NI

- ANS settings (vagal tone, relax and balance, 81/109)
- General Inflammation
- Immune Support
- Concussion and Vagus
- Brain based protocols (hindbrain, midbrain, forebrain, medulla)



Thank you!

Summiting Pikes Peak: 12 miles and 7,400 foot elevation gain

