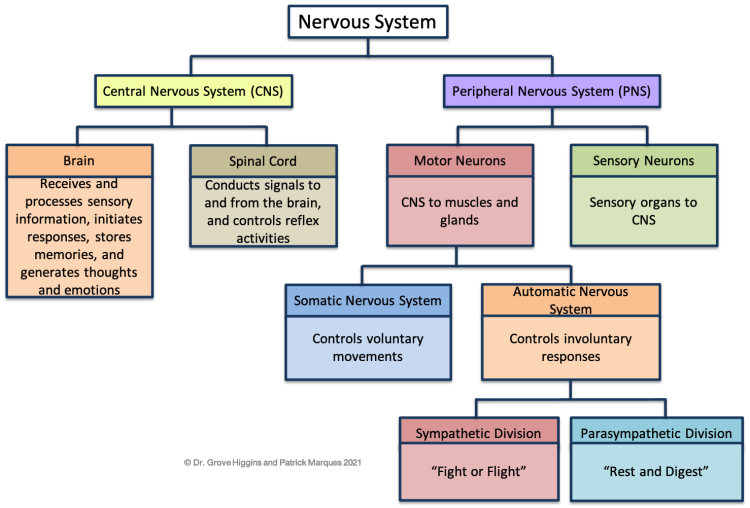
Module 6: *Epilogue*

Putting it all together – The "Neuro-Centric" Approach

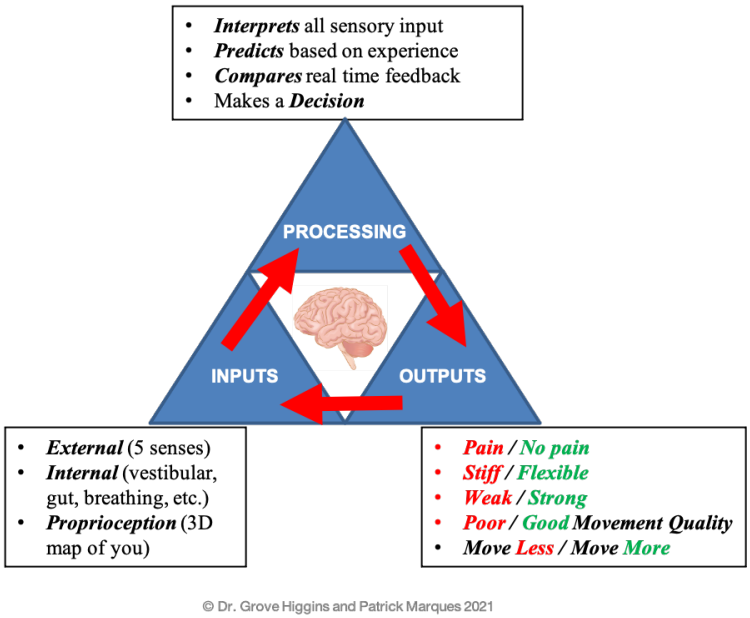
Our goal is to get beyond a simple biomechanical approach to training and use a NEURO-biomechanical approach. Remember why we want to use this "neuro-centric" approach:

- The nervous system is the fastest system in the body.
- The nervous system is very orderly.
- Neuroanatomy has rules.



If you keep in mind the "Big Three" Concepts your assessment and training of clients can be more effective and efficient:

1. The nervous system is the governing system of the body
2. The brain's #1 job is survival
3. The input to the brain determines the output



The "Neuro-Centric" Approach for Joint Replacement Clients

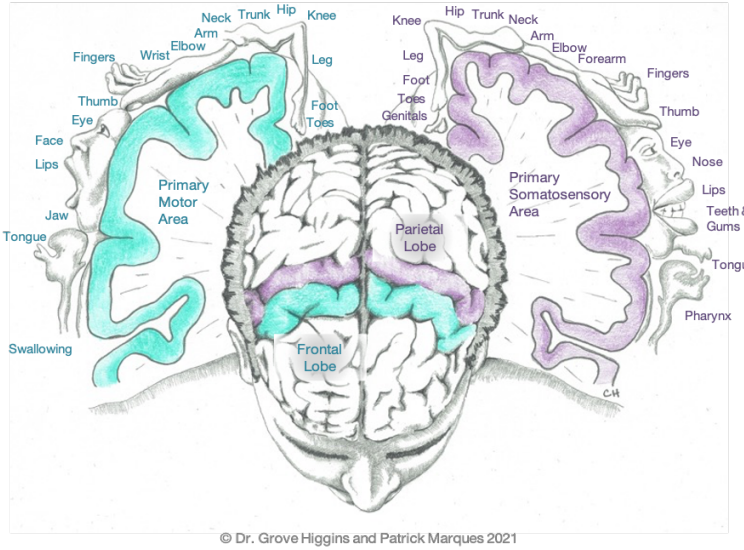
Our approach in this course is to utilize four specific training methods to improve outcomes for joint replacement clients:

- Sensory Input
- Motor Control Training
- Isometrics Training
- Dynamic Strength Training

Sensory Input

Goal: Improve mapping
Areas activated:
- Primary somatosensory cortex
- Spinal cord ascending pathways

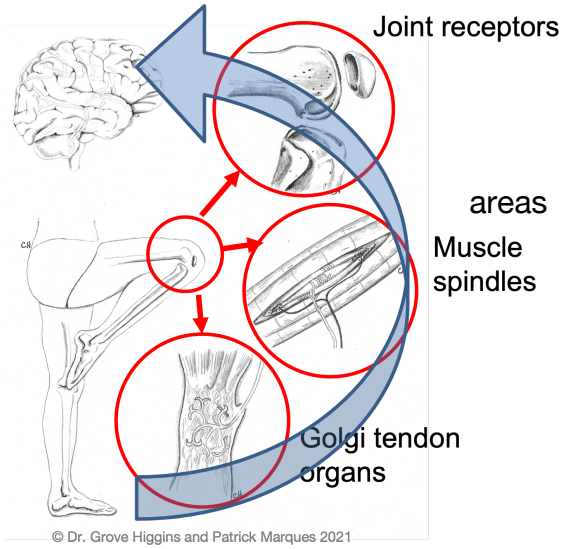
Benefits:
- Brain "sees" the area better
- Informs the motor cortex
- Improves spatial orientation
- Pain reduction



Motor Control Training

Goal: Improve mapping
Areas activated:
- Primary motor & sensory cortices
- Premotor & supplementary motor
- Spinal cord descending & ascending pathways

Benefits:
- Brain "sees" the area better
- Movement quality & coordination
- Improves strength & flexibility
- Pain reduction



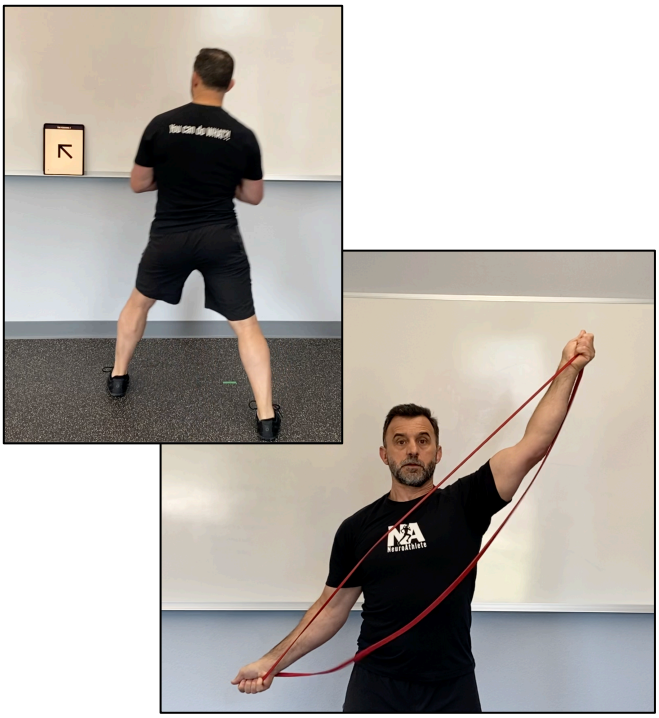
Isometric Strength Training

Goal: Improve strength
Areas activated:

- Premotor & supplementary motor areas
- Primary motor cortex
- Spinal cord descending & ascending pathways

Benefits:

- Low neurological threat
- Max force production / joint “packing”
- Postural stability (standing / walking)
- Pain reduction



Dynamic Strength Training

Goal: Improve strength & coordination
Areas activated:

- Occipital & parietal (control & memory of movements)
- Motor cortex (+ PM & SMA)
- Spinal cord pathways

Benefits:

- Builds the “library of priors”
- Associates vision with movement
- Unilateral vs. Bilateral
- Pain reduction

Recommended Reading

- *The Brain That Changes Itself; Stories of Personal Triumph from the Frontiers of Brain Science* – Norman Doidge
- *Therapeutic Stretching; Towards a Functional Approach – Eyal Lederman*
- *Explain Pain – David Butler & Lorimer Moseley*
- *Therapeutic Neuroscience Education; Teaching patients about pain – Adriaan Louw & Emilio Puentedura*

Recommended Courses

The Z-Health Performance Solutions, LLC curriculum. More information can be found at https://zhealtheducation.com. The Z-Health Curriculum has many courses and there are certain course tracks that are recommended depending on your profession/focus. For those who want to work with joint replacement clients we recommend the following courses (the folks at Z-Health can also help design a curriculum pathway for you):

- R-Phase – Designed to provide the best entry point and transition from where you are to a neuro-centric approach to your work, and look at pain and performance through a neural lens. It will immediately change your practice and training!
- I-Phase – Once you understand the information in I-Phase, there is no going back! Neurology and brain-first thinking will be your lens for the world and your work. I-Phase adds essential layers of neurology to the fundamentals you explored in R-Phase, with a heavy focus on how the eyes and inner-ear impact movement.
- T-Phase – The high speed, practical assessments and drills in T-Phase are the keys to unlocking the body's sticking points and long-held neurological threat. This course discusses what pain is and how it occurs, as well an in-depth look at sensory input. T-Phase is the most diverse course of the curriculum, and will address many systems from a neurological perspective.
- 9S: Strength & Suppleness – This is a high-level course designed to make you rethink strength and suppleness training from a foundational level. While we use these forms of training to change the periphery of the body, every rep of every

exercise is ultimately based on brain function. Topics include strength training neuroscience, practical blood flow restriction training, ligament techniques, improving flexibility/suppleness/mobility through a neuroscientific lens, and programming concepts.

Z-Health also offers some great training products that you can easily integrate into your training for all levels and types of clients (see the website for more information on each):

- The Z-Health Vision Gym
- The Z-Health Balance Gym
- The Z-Health Strength Gym
- The Z-Health Breathing Gym

MedFit Education Foundation:

- **Joints of the Human Body: An Exploration of Six Joints and their Wholistic Relationship to the Body (online course), presented by Dr. Grove Higgins and Master Trainer Pat Marques**

  Description: This 12+ hour course is a focused look at individual joints that then "zooms out" to see how each joint affects and is influenced by the whole body. Overall body performance and health is greatly linked to the function and health of joints. Function will be explored anatomically, clinically, biomechanically, and discuss how they are best trained for rehabilitation and performance. Special focus on the wholistic influence of each joint on the body will be presented. Specifically, the course includes lessons on the Ankle, Knee, Hip, Shoulder, Elbow, Wrist/Hand, with assessments & drills for each joint.

- **Arthritis Fitness Specialist, presented by Christine Conti, M. Ed.**

  Description: This online course is designed to provide fitness and medical professionals the knowledge needed to design and implement exercise programs for arthritic populations safely and effectively. Gain an in-depth understanding of various types, symptoms, and causes of arthritis, as well as how it affects joints and organs in the body. Examine exercises to create safe and effective fitness programs that will improve range of motion, flexibility, and strength, to expand the overall health and wellness for your clients. This course also includes a module on marketing your services as an Arthritis Fitness Specialist.

RockTape Kinesiology Taping: We highly recommend the RockTape FMT (Functional Movement Techniques) Basic and Advanced training courses for how to use kinesiology tape. The RockTape company has a very "neuro-centric" view of movement and rehab and have many tools we use consistently with our clients. Their courses and products can be found at www.rocktape.com.

Recommended Tools/Equipment

These are some of the tools we use for sensory input, motor control training, and strength training.

Sensory Input

- Temperature:
  - Heat – Chemical hand-warmer packs, or rechargeable electric hand warmers
  - Cold – Small gel-packs that can be kept in the freezer

- Skin Stimulation: Good to have a soft bristle brush and a stiff bristle brush; a light touch can also be applied simply with a Q-tip or corner of a tissue

- Vibration: There are many vibration tools out there these days; here are some we like:
  - Z-Vibe (https://www.arktherapeutic.com/z-vibes-all/) – Great form a smaller amount of vibration. Specifically designed for use in the mouth but useful for small areas such as fingers or toes.
  - Hyperice (https://hyperice.com) – This company has three levels (and price points) of percussion guns, as well as vibration spheres that are easy to hold and use.
  - Face Massagers – Small, inexpensive, hand-held face massagers can also be useful and can easily be found on Amazon.

- Skin Stretch: Kinesiology tape; we favor the RockTape brand as we find the tape quality is high and the adhesive is better than most and stays on longer.

- Pressure: A deep pressure can be applied by multiple tools:
  - Bandage Wraps – Commonly found in drug stores, elastic bandage wraps are inexpensive and convenient to use for pressure input. This is usually what we use to assess pressure input due to the ease of use, then if found to be beneficial we will try some of the others listed here for home use.

- Floss bands – Bands specifically made to have a very deep pressure are RockFloss bands and Voodoo Bands; although stroke is not listed as a contraindication for flossing in any references we have found, there are some such as deep vein thrombosis (DVT), high blood pressure, varicose veins, pregnancy, cardiac disease, and others. Be sure to consult with your client's medical providers to determine if using floss bands is appropriate.
- Therabands – You are likely familiar with this brand of thin, wide strips of resistance band material often used in PT clinics for rehabilitation. This can be used as a much lighter form of flossing to provide some pressure input around an area.
- Neoprene/Elastic Sleeves – Also commonly found in drug stores and usually made specifically for ankle, knees, elbows, and hands, but many manufacturers also make them for thighs, whole arms, etc.

Motor Control & Strength Training

- Resistance Bands: Having several resistance bands of varying strength/tension will be very useful for providing both regular resistance/loading, but also for adding perturbation to motor control drills as discussed in the course. We suggest having very light to medium resistance bands.

- Yoga Blocks & Straps: As shown in the course, you can do a wide variety of isometrics with these simple and inexpensive tools.

- Laser-guided targeting: You could easily strap/attach a laser pointer to an arm, leg, hand, or foot using small elastic wraps found at home improvement stores. Alternately, many of the head lasers described below could also be used.

- Switched On application: This app is downloadable for both iOS and android. There are free and paid versions. This app is incredible useful for randomized visual stimulus to drive movement/decision making. You can develop and save your own programs, and it is easy for clients to download and use. Some of the characteristics:
  - You can use colors, numbers, or arrows as the stimulus
  - You set how long the stimulus comes up for, and how long until the next stimulus
  - You can have the stimulus come up for time or the screen must be tapped