



Treatment Philosophy for the Occupational Athlete



PHASE 1

Early Intervention Leading to Functional Independence

EARLY INTERVENTION

- “Early access to a physical therapist is associated with significant reductions in subsequent health care utilization and overall costs of care.”¹
- “Early and adherent physical therapy was associated with significantly lower utilization of advanced imaging, lumbar spinal injections, lumbar spine surgery, and use of opioids.”¹
- Early intervention treatment significantly improved return-to-work status.²
- “[O]ne possible reason for the link between early care by a physical therapist and positive outcomes may be that physical therapists can contribute to promoting a greater sense of self-reliance in managing LBP and confidence in a positive outcome.”³

PATIENT EDUCATION

- “Education and counseling regarding pain management, physical activity, and exercise can reduce the number of days off work in people with fear-avoidance beliefs and acute low back pain.”⁴
- Back schools more efficacious when coupled with comprehensive rehab program.⁵
- Combined exercise and motivation program superior to standard exercise program (long-term efficacy).⁶
- Adherence more probable when patients receive info explaining effectiveness of self-management strategies and about illness.⁷
- Poor compliance overall positively associated with expectation of barriers in following treatment, co-morbidity, and longer duration of treatment.⁸

MANUAL THERAPY

- oThe use of skilled hand movements to manipulate tissue of the body to restore movement, alleviate pain, promote general health and induce relaxation.⁹
- oManual therapy techniques in conjunction with therapeutic exercises is effective in regards to increasing function, AROM, while decreasing levels of pain and disability.⁹
- oMyofascial release has shown to be an effective manual technique to improve pain perception over a short duration.⁹
- oMET (Muscle Energy Techniques) have been shown to provide immediate improvement in ROM for peripheral joints.⁹
- oThe use of manual therapy and exercise is superior to HEP. ¹⁰

MANUAL THERAPY

o *Mulligan*–MWM (Mobilization with Movement), SNAGS(Sustained natural apophyseal glides), NAGS (Natural apophyseal glides). Theory is based on a mechanical model that states that minor positional faults occur in the body secondary to injury leading to maltracking of the joint resulting in symptoms of pain, weakness and stiffness.⁹

o *Maitland*–Maitland’s techniques involve the application of passive and accessory oscillatory movements to spinal and vertebral joints to treat pain and stiffness of a mechanical nature. The techniques aim to restore motions of spin, glide and roll between joint surfaces and are graded according to their amplitude. Graded I–V (Thrust).⁹

MANUAL THERAPY

- *Paris*– Teaches therapist should treat function not pain, 6 grades of motion. Manipulation–skilled passive movement to a joint. "Manipulation is for stiff joint, stabilization is for unstable joints and education is for all".¹¹
- *McKenzie*–"Based on a consistent 'cause and effect' relationship between historical pain behavior as well as the pain response to repeated test movements, positions and activities during assessment process. [N]amed these three mechanical syndromes: Postural, Dysfunction, and Derangement. [T]reatment uniquely emphasizes education and active patient involvement in the management of their treatment in order to decrease pain quickly, and restore function and independence, minimizing the number of [clinic visits]."¹¹

COMPONENTS

- Continue Manual Intervention as needed
- Continue Patient Education as needed
 - Facilitate patient independence
 - Promote functional independence as patients progress from Phase 1 to Phase 2
- Advance Strength and Conditioning
- Making the patient more progressive and independent

STRENGTH AND CONDITIONING

- Change Energy Sources
 - More efficient use of energy sources within the body¹²
 - Use Anaerobic sources first and then incorporate oxygen, or aerobic sources of energy¹²
 - Energy Systems that replenish ATP¹³
 - Phosphagen system; Aka: ATP-PC systems
 - Anaerobic glycolysis
 - Aerobic metabolism
 - All three systems are active at any given time.
 - Magnitude of contribution is dependent on intensity and duration of activity¹³
- Hypertrophy
 - Increased cross-sectional area of muscle from progressively overloading muscles¹²

STRENGTH AND CONDITIONING

- Change Nervous System Input
 - Increased motor unit recruitment¹²
 - Increased firing of motor units¹²
 - Improved synchronization of muscles¹²
- Nervous system input also includes:
 - Motor Control
 - Motor Learning
 - Motor Imagery

ISOMETRIC AND ISOTONIC EXERCISES

- Isometric strengthening exercises done early [...] provides clinically significant improvement.¹⁴
- Early introduction of isometric exercise is a relevant choice in cases with sciatica caused by disc herniation.¹⁵
- Isometric exercises such as scapular retractions allow for early neuromuscular re-education of dysfunctional rhomboids and the middle trapezius.¹⁶
- Static and dynamic PNF programs may be appropriate for improving short-term trunk muscle endurance and trunk mobility in people with [chronic low back pain].¹⁷
- Resistance exercise resulted in substantial improvement in pain and grip strength[...]. Strengthening using resistance exercises is effective in reducing pain and improving function [...] but optimal dosing is not defined.¹⁶

NERVOUS SYSTEM INPUT

STAGES OF MOTOR LEARNING

- **Cognitive Stage:** understand the activity, develop strategies, select best strategy to perform.¹⁹ *Involves patient education, exercise instruction, most used Phase 1.*
- **Associative Stage:** perform selected strategy, refine skill, refine movement patterns.¹⁹ *Involves increasing difficulty/resistance, as in Phase 1.*
- **Autonomous Stage:** action learned, less thought, more automatic performance, attention to obstacles, challenges, add secondary task, or energy conservation.¹⁹ *Involves return to work, work simulation, integrated movements, in Phase 2.*

MOTOR IMAGERY (MI) TRAINING

- MI with physical practice is more effective than practice alone, according to this research.²⁰
- MI contributes to enhanced movement efficiency and muscle strength.²⁰
- MI recruits more motor units/muscles and/or increases their intensity, leading to increased muscle force and strengthening.²⁰
- *Clinical Application: beneficial in teaching exercises to novices in Phase 1 and improving efficiency and strength of advanced patients in Phase 1 to Phase 2.*

MOVEMENT RETRAINING AND REAL-TIME FEEDBACK

- Motor learning can be enhanced through verbal feedback of performance in real-time.²¹
- Modification of prior learned movement patterns requires re-organization of neuromuscular patterns.²¹
- Depending on patient learning style, visual feedback or proprioceptive guidance from physical therapist touch, are supplemental to verbal instructions from the therapist.²¹
- *Clinical Application: Combination of feedback used in the clinic facilitates motor learning and optimizes outcomes.*

MOTOR CONTROL LEARNING

- Biofeedback helps physical therapists assess physiologic responses and helps patients re-learn motor control for activities of daily living.²²
- Motor control is determined by sensory inputs: Visual, Auditory or Vestibular, and Body position or Somatosensory.²²
- Biofeedback research group had lasting affect on motor and postural control at 6 weeks and 6 months after rehabilitation.²²
- *Clinical Application: teaching motor control learning in physical therapy applies to daily life and work environment. Exercises should be task specific, for work or sport athlete, to increase carryover from Phase 1 to Phase 2 treatments and return to work.*

Progressing Phase 1

- Exercise Mode:
 - Increase specificity of exercise as it relates to job²³
- Training Frequency
- Intensity:
 - As body adapts to exercise, allows for improved oxygen recruitment²²
 - Initiate overload of muscles²³
 - Improved cardiovascular response²³
- Duration: Length of time of training session.²³
- Exercise Progression: Transition to Phase 2 and Return-To-Work Functional Strengthening

PHASE 2

Building Safer, Smarter, Stronger Occupational Athletes

PRIMARY FOCUS...

○Normalizing neuromuscular function with strengthening, endurance, power, dynamic stability exercises, functional and work simulated activities through graded progressions, tailored to each patient.

OUR GOAL...

○Enhance performance and recovery by implementing training programs with proper sequencing of therapeutic exercises and activities in the amount of time we have with our occupational athletes.

○Become more resistance to *fatigue*.

SUPPORTING LITERATURE: COMPREHENSIVE REHABILITATION PROGRAMS

- Combination of conditioning exercises, work simulation education, and behavioral modification
 - 73% returned to full duty work following completion
 - 38% of patients who did not participate in program returned to work²⁴
- 3 week functional restoration program
 - 87% of patients who participated in program returned to work rate
 - 41% of patients who did not participate in program returned to work²⁵

SPECIFICITY

- Specific adaptation to imposed demands (SAID)¹³
- Basic concept that must be incorporated in all training programs to enhance performance capabilities
- Especially for high strength and power performance¹³
- Type of demand placed on body dictates type of adaptation
- Increase likelihood of specific muscle/muscle group recruitment through resistance training exercises that mimic the movement patterns of the occupational athlete's work environment¹²

OVERLOAD

- Training regime of greater intensity than the individual is accustomed to¹³
- Intent: stress body at higher level...¹³
- Goal is to improve ability of patient to make improvements¹³
- Concept can be accomplished by:
 - Increasing # of sessions/wk or day
 - Adding sets/increasing weight
 - Emphasizing complex over simple exercises
 - Decreasing length of rest breaks
 - Advanced plyometric program from single to multiple drills¹³

HORMONAL RESPONSE TO RESISTIVE EXERCISE

- Optimal hormonal adaptation to resistance training through exercise prescription¹³
- Muscle remodeling: inflammatory response + hormonal interactions = synthesis of new proteins¹³
- Resistance training = only natural stimulus¹³
- One or two heavy resistance exercise sessions can increase the number of androgen receptors in the muscle¹³
- Type of workout used dictates hormonal response¹³
- Some examples:
 - Deadlift, power clean squats: 50# versa log clean press
 - Heavy resistance 85–95% one rep max: overhead box lift
 - Mod–high volume exercise
 - Multiple sets of multiple exercises ex: functional squats
 - Short rest breaks (30sec to 1 min)

FUNCTIONAL RESTORATION

- Emphasize physical conditioning through:
 - Strengthening
 - Stretching and endurance
 - Coordination exercises
 - Work/job simulation
- Objective is to return the injured occupational athlete to work without restrictions

ADVANTAGE OF INCORPORATING PHASE 2

- A program consisting of progressive agility and trunk stabilization exercises is more effective than a program emphasizing isolated specific muscle stretching and strengthening, for promoting successful return to work/sport and preventing injury recurrence in Occupational Athletes²⁶
- Reducing risk of re-injury
- *“Studies conclude that well designed worker rehabilitation programs can result in high rates of return to work.”²²*

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