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.”

- “Early and adherent physical therapy was associated with significantly lower utilization of advanced imaging, lumbar spinal injections, lumbar spine surgery, and use of opioids.”

- Early intervention treatment significantly improved return-to-work status.

- “[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.”
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.³

- Combined exercise and motivation program superior to standard exercise program (long-term efficacy).⁵

- Adherence more probable when patients receive info explaining effectiveness of self-management strategies and about illness.⁶

- Poor compliance overall positively associated with expectation of barriers in following treatment, co-morbidity, and longer duration of treatment.⁷
MANUAL THERAPY

- The use of skilled hand movements to manipulate tissue of the body to restore movement, alleviate pain, promote general health and induce relaxation.

- Manual therapy techniques in conjunction with therapeutic exercises is effective in regards to increasing function, active range of motion (AROM), while decreasing levels of pain and disability.\(^8\)

- Myofascial release has shown to be an effective manual technique to improve pain perception over a short duration.\(^9\)

- Muscle energy technique (MET) is a manual therapy intervention that can be used to stretch or lengthen muscles and fascia that lack flexibility. Muscle Energy Techniques (MET) have been shown to provide immediate improvement in ROM for peripheral joints.\(^10\)

- The use of manual therapy and exercise is superior to Home Exercise Program (HEP).\(^11\)
MANUAL THERAPY

- **Mulligan**– "concept of mobilizations with movement (MWMS) in the extremities and sustained natural apophyseal glides (SNAGS) in the spine are the logical continuance of this evolution with the concurrent application of both therapist applied accessory and patient generated active physiological movements.”\(^{12}\)

- **Maitland**– "The Maitland Australian Approach intentionally gently provokes the patient's actual symptoms using carefully graded osteokinematic (physiological) and arthrokinematic (accessory) passive mobilization. This approach is recognized worldwide as an efficient, safe and gentle way to evaluate and treat the orthopedic patient to alleviate pain, reduce inflammation, restore movement, and maximize function.”\(^{13}\)
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".14

- **McKenzie**—“This mechanical examination can classify most patient conditions by the level of pain or limitation that results from certain movements or positions, and eliminate the need for expensive and/or invasive procedures. Research has shown initial McKenzie assessment procedures to be as reliable as costly diagnostic imaging (e.g. X-rays and MRI's) to determine the source of the problem and quickly identify responders/non-responders.”15
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 body\textsuperscript{16}
  - Use Anaerobic sources first and then incorporate oxygen, or aerobic sources of energy\textsuperscript{17}
  - Energy Systems that replenish ATP\textsuperscript{17}
    1. Phosphagen system; Aka: ATP–PC systems
    2. Anaerobic glycolysis
    3. Aerobic metabolism
      - All three systems are active at any given time.
      - Magnitude of contribution is dependent on intensity and duration of activity \textsuperscript{17}

- Hypertrophy
  - Increased cross-sectional area of muscle from progressively overloading muscles\textsuperscript{16}
STRENGTH AND CONDITIONING

- Change Nervous System Input
  1. Increased motor unit recruitment\textsuperscript{17}
  2. Increased firing of motor units\textsuperscript{17}
  3. Improved synchronization of muscles\textsuperscript{17}

- Nervous system input also includes:
  1. Motor Control
  2. Motor Learning
  3. Motor Imagery
Isometric strengthening exercises done early [...] provides clinically significant improvement.\textsuperscript{18}

Early introduction of isometric exercise is a relevant choice in cases with sciatica caused by disc herniation. \textsuperscript{19}

Isometric exercises such as scapular retractions allow for early neuromuscular re-education of dysfunctional rhomboids and the middle trapezius. \textsuperscript{20}

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]. \textsuperscript{21}

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. \textsuperscript{22}
NERVOUS SYSTEM INPUT

STAGES OF MOTOR LEARNING

- **Cognitive Stage:** understand the activity, develop strategies, select best strategy to perform.\(^{23}\) *Involves patient education, exercise instruction, most used Phase 1.*

- **Associative Stage:** perform selected strategy, refine skill, refine movement patterns.\(^{23}\) *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.\(^{23}\) *Involves return to work, work simulation, integrated movements, in Phase 2.*
MOTOR IMAGERY TRAINING

- Motor Imagery (MI) with physical practice is more effective than practice alone, according to this research.\textsuperscript{24}

- MI contributes to enhanced movement efficiency and muscle strength. \textsuperscript{24}

- MI recruits more motor units/muscles and/or increases their intensity, leading to increased muscle force and strengthening. \textsuperscript{24}

- \textbf{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.\textsuperscript{25}

- Modification of prior learned movement patterns requires re−organization of neuromuscular patterns.\textsuperscript{25}

- Visual feedback or proprioceptive guidance from the physical therapist’s touch can be supplemental to verbal instructions, depending on the patient’s learning style.\textsuperscript{25}

- \textit{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.²⁶

- Motor control is determined by sensory inputs: Visual, Auditory or Vestibular, and Body position or Somatosensory.²⁶

- Biofeedback research group had lasting effect on motor and postural control at 6 weeks and 6 months after rehabilitation.²⁶

- **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 job\(^{27}\)

- Training Frequency

- Intensity:
  - As body adapts to exercise, allows for improved oxygen recruitment\(^{22}\)
  - Initiate overload of muscles\(^{27}\)
  - Improved cardiovascular response\(^{27}\)

- Duration: Length of time of training session.\(^{27}\)

- 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 resistant to fatigue.
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 work

- 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 work
SPECIFICITY

- Specific adaptation to imposed demands (SAID)\textsuperscript{17}

- Basic concept that must be incorporated in all training programs to enhance performance capabilities
  - Especially for high strength and power performance\textsuperscript{17}

- 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 environment\textsuperscript{16}
OVERLOAD

- Training regime of greater intensity than the individual is accustomed to
- Intent: stress body at higher level... 
- Goal is to improve ability of patient to make improvements
- 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 drills
RESPONSE TO RESISTIVE EXERCISE

- Optimal hormonal adaptation to resistance training through exercise prescription\(^{17}\)

- Muscle remodeling: inflammatory response + hormonal interactions = synthesis of new proteins\(^{17}\)

- Resistance training = only natural stimulus\(^{17}\)

- One or two heavy resistance exercise sessions can increase the number of androgen receptors in the muscle\(^{17}\)

- Type of workout used dictates hormonal response\(^{17}\)

- Examples:
  1. Deadlift, power clean squats: 50# versa log clean press
  2. Heavy resistance 85–95% one rep max: overhead box lift
  3. Mod–high volume exercise
  4. Multiple sets of multiple exercises ex: functional squats
  5. Short rest breaks (30sec to 1min)
FUNCTIONAL RESTORATION

- Emphasize physical conditioning through:
  1. Strengthening
  2. Stretching and endurance
  3. Coordination exercises
  4. Work/job simulation

- Objective is to return the injured occupational athlete to work without restrictions and prevent re-injury.
ADVANTAGES 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 Athletes.29

- Reducing risk of re-injury

- “Studies conclude that well designed worker rehabilitation programs can result in high rates of return to work.”30
REFERENCES


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http://www.ozpt.com/about.php


REFERENCES


23. Fitts & Posner’s Three Stage Model of Motor Learning, 1967


