Modalities and Rehab in the Athletic Training Room

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Disclosures
The Great Debate

- “To Be or Not To Be” (Included)
- Active vs Passive rehabilitation
- “Old School” Mentality vs “New School” Tools
- Scientific basis for medical treatment vs anecdotal
Active vs Passive Rehabilitation

- Multiple studies have shown that active rehabilitation leads to improved results and long term outcomes
- Need these be independent in the Sports Medicine field?
- There are several considerations for use of modalities
Factors for Use of Modalities

• Scientific studies showing the efficacy of modality use in conjunction with rehab programs

• Time frame of rehabilitation
  – Increased time with athlete allows inclusion of modalities to be adjunct to rehabilitation

• Not worried about reimbursements
  – Can use modalities that the athlete’s state make them better without restrictions from insurance companies
Reasons for Use of Modalities

• Most of the injuries in the athletic training room are of the acute variety or post op

• Modalities on acute / post op injuries focus mostly on the following:
  – Pain Control
  – Edema Control
  – Tissue Elasticity
  – Neuromuscular Re-education
Pain Control

- Multiple studies have shown cryotherapy has an analgesic effect in the management of pain.
- Electrical Stimulation is commonly used as a method for pain control.
  - Many follow the gate control theory.
  - Studies have shown there to be efficacy for use of IFC in a multimodal approach.
  - Phys Ther. 2010 Sep;90(9):1219-38.
Edema Control

• Compression has been shown to help reduce edema and inflammation
• There are several different units on the market for compression purposes
  – Sequential Compressors
  – Compression and cryotherapy combinations
Tissue Elasticity

• As the athlete heals and the inflammatory process is controlled there are several common modalities used to help heat the tissue

• These modalities aim to increase tissue extensibility, increase blood flow of the target tissue, and increase collagen elasticity

• These modalities include:
  – Whirlpool, Ultrasound, Shortwave Diathermy
NMES

• Neuromuscular electrical stimulation
• Application of electrical stimulation to elicit a muscular contraction
• There are mainly two types of waveforms utilized
  – Biphasic
  – Russian
NMES

• Improved Quadriceps Strengthening with NMES combined with exercises vs exercise alone

• Increase in self reported knee function at 12 weeks and 16 weeks as compared to those who did not use NMES
NMES

• Main question is of parameters and protocols
• Several studies have looked at various parameters and the following is a good guideline
  – 10 to 20 Hz stimulate Type I slow twitch fibers
  – 50 to 70 Hz stimulate Type IIa intermediate fibers
  – 75 to 130 Hz stimulate Type Iib fast twitch fibers
NMES

• Post surgical protocols may differ
  – Acute / Early phase will be utilized to increase volitional control or increase strength in isometric contraction
  – Sub Acute / Intermediate phase will be used to increase motor recruitment during functional movements
Cryotherapy Debate

• The old adage of “Just Ice It” may not be the answer
• Even before Dr. Gabe Mirkin published the term RICE in “The Sportsmedicine Book” in 1978 we have been using ice for injuries
• It has proven effects on edema and pain control but what about healing rates
Cryotherapy and Tissue Repair

• Debate on whether limiting the body's natural inflammation response to damaged tissues only delays the healing times
  – Topical Cooling (Icing) Delays Recovery From Eccentric Exercise–Induced Muscle Damage
• There is lacking evidence showing cryotherapy increases healing times of injured tissue
Recovery and Performance

• Latest trends in athletics and athletic training rooms
• Athlete’s looking for “Edge”
• Looking for Improved recovery to assist them with training and competition
• Some of the latest trends
Normatec

- A sequential pulsed pneumatic compression device that helps to assist active recovery
- Shown to improve recovery through several methods
  - Lactic Acid flush
  - Improved arterial flow mediated dilation
  - Activation of lymphatic system to help remove waste products
Marc Pro

• Muscle Activated Recovery Cascade
  – Proposes activation of Nitric Oxide which has dilation effects on the vascular system
    • Increases blood flow, allows for waste removal
  – Muscle “pump” helps to activate lymphatic and venous system to help flush “waste” products

• Tool to help healthy tissue recover faster from exercise
Marc Pro

• Studies have shown the use post exercise “enhanced recovery relative to the muscle tissue remodeling and strength development”.

• Muscle performance and recovery potential may be increased due to NO production, mitochondrial biogenesis, angiogenesis, and fiber type transformation
Compex

• An Electrical Stimulation unit that can be used in several ways
  – Active Recovery
  – Strength Gains
  – Pain Relief
Compex

• Active Recovery through the following processes
  – Significant increase in blood flow enabling muscular toxins to be drained
  – Reduction in muscular pain by increasing the production of endorphins and enkephalins
  – Reduction in muscular tension through a relaxing effect on the muscle fibers
• Significant increase in quadriceps MVC after 8 weeks from neural adaptations the first four weeks and changes in muscle mass weeks 4 to 8.

• Use of EMS recovery between innings pitched showed statistical significant decrease in BLa levels.
  – *Journal of S & C* Volume 25 #3 March 2011
Discussion

• Modalities can play an important role in acute and post surgical recoveries
• Importance to utilize the latest research to guide appropriate interventions
• New and improved technologies may lead the way to utilization for injury prevention