

INTRODUCION TO SPORTS THERAPY

Practical – Passive and PNF Stretch

Learning Outcomes

- By the end of this session students should be able to:
- Describe and apply the principles of passive stretch
- Recognise and Treat using PNF

Stretching

- Resting length
 - Anatomical position
- Functional Length
 - Length obtained when muscle is used maximally:
 - This will always be greater than resting

Overstretching

- Forceful detachment of Actin and Myosin cross bridges
- Damage
- Inflammatory process

Stretching

- Stretching
- Maintenance stretch
 - 6-10seconds
- 3 stretches per muscle group
 - Developmental length
 - 20-30seconds
 - 3 stretches per muscle group
 - 3 weeks minimum
 - Never done in competition phase
 - Up to 9months post injury!
- Passive stretch
 - External agent
 - Advantage = potential to achieve greater lengths
 - Disadvantage = potential for injury/muscle tears
 - Relies on trust!

Stretching

- Glutes (Straight, diagonal)
- Hamstrings
- Gastroc
- Soleus
- Quadriceps
- Hip Flexor
- Adductors

Frequency, Duration & Intensity

- Acute effects of stretching
 - Transient and greatest immediately after the stretch
 - Significant improvements last from 3min to 24h
 - Longer lasting effects require a program
- 2ce per week for 5weeks significantly improves flexibility
- Static stretch hold for 15-30sec
- 3 stretches per muscle, 3 times per day, 3 weeks
- Intensity; mild discomfort NOT pain

When to Stretch?

- Following practice and competition
 - Within 5-10min
 - Increased body temp increases elastic properties of collagen within muscle, tendons, ligaments
 - May also reduce muscle soreness (?)
- As a separate session
 - Must warm up!
 - Recovery session day after competition

What are we trying to target when we stretch?

- Muscle Spindles
 - Within intrafusal muscle fibres, that run parallel to extrafusal muscle fibres
 - Monitor changes in muscle length
 - Stretch reflex controlled via sensory nerves
- Golgi Tendon Organs (GTO)
 - Mechanoreceptors
 - Near musculotendinous junction
 - When stimulated the GTO cause muscle to reflexively relax

Golgi Tendon Organs

- Autogenic Inhibition
 - Relaxation occurs in the same muscle that increases tension
 - Active contraction of a muscle immediately before a passive stretch in the same muscle
 - Tension of the contraction stimulates GTO's causing a reflexive relaxation during the stretch
- Reciprocal Inhibition
 - Relaxation occurs in the muscle that **OPPOSES** the muscle contracting
 - Simultaneously contract a muscle whilst passively stretching the opposite muscle
 - Tension in contracting muscle stimulates the GTO's and causes a reflexive relaxation of the stretched muscle

Types of stretching

- Static stretching
 - Slow and constant
 - End position held for 30sec
 - Because performed slowly: does not induce stretch reflex
 - Easy to learn
 - Effective in increasing ROM

Types of stretching

- Ballistic stretching
 - Active muscular effort and uses 'bouncing type movement'
 - End position is not held
 - Often used in pre-exercise warm-up
 - Usually triggers stretch reflex
 - Use with extreme caution!

Types of stretching

- Dynamic stretching
 - Functional based stretching
 - Uses sport specific movements to prepare for activity
 - Aka mobility drills
 - May appear similar to ballistic stretching BUT
 - Does not use bouncing
 - Performed in controlled manner
- Advantages
 - Keep warm unlike static
 - Stretch a number of joints (time)
 - Flexible for the specific movements required
- Disadvantages
 - Not as effective as static or PNF stretching in increasing ROM

Types of stretching

Proprioceptive Neuromuscular Facilitation (PNF)

- Initially developed as strengthening tool
- The adapted for rehab to decrease muscle tone
 - Performed with a partner
 - Uses both passive and active movements (concentric and isometric contractions)
 - Thought to be superior to other stretching methods due to 'muscular inhibition'
 - 3 specific muscle actions
 - Isometric (hold) & concentric (Contract) contraction of antagonist (stretched)
 - Passive stretch (relax) of antagonist (muscle being stretched)

PNF Hold-Relax

- Phase 1: passive pre-stretch of 10 seconds
- Phase 2: **HOLD**: isometric contraction of muscle being stretched
 - (don't let me move you!)
 - HOLD for 6sec
- Phase 3: **RELAX**: passive stretch held for 30seconds
- Result: increased flexibility due to **AUTOGENIC INHIBITION**

PNF Hold-Relax with Antagonist Contraction

- Phase 1: Passive pre-stretch of 10seconds
- Phase 2: HOLD: isometric contraction of muscle being stretched
 - (don't let me move you!)
 - HOLD for 6sec
- Phase 3: concentric contraction of antagonist is used *with* a passive stretch (hold for 30sec)
- RESULT: Increased ROM due to AUTOGENIC and RECIPROCAL inhibition*

Summary

- Stretching can be used lengthen muscle tissue
 - Long term as part of stretching programme
 - Short term in a clinical setting
- Clinic led stretching
- Passive stretch
- PNF
 - Hold-Relax method
 - Hold-Relax with antagonist contraction