Therapeutic Exercise

Definition of Therapeutic Exercise (Therex) (TE)

- TE is the systematic performance of planned physical movements, postures or activities intended to enable the patient/client to:
  - Remediate or prevent impairments
  - Enhance function
  - Reduce risk
  - Optimize overall health
  - Enhance fitness & well-being

Kisner, 2012, p2

Formulate a general program of Therapeutic Exercise to:

1. Maintain ROM
2. Increase Flexibility
3. Increase Strength
4. Promote Endurance
5. Maximize Balance
I. Maintain ROM

Types of ROM

- **AROM**: movements performed voluntary efforts of the patient without external aid.
- **AAROM**: movements performed by both voluntary efforts by patient along with assistance of an external force.
  - Assistance from another body part
  - Another person (PTA)
  - Device (i.e. cane)
- **PROM**: movements performed by external efforts only

Kisner, 2012, p52

I. Maintain ROM

ROM exercises

- When AROM, AAROM, PROM is performed for the purpose of maintaining current joint movement, it is considered a ROM exercise.
I. Maintain ROM

PROM Indications & Goals

• When do PROM?
  ◦ Acute, inflammed tissue
  ◦ When a patient is not able or supposed to actively move a joint (comatose, paralysis, contraindications due to surgery)

• Why do PROM?
  ◦ Maintains tissue mobility
  ◦ Prevents contractures
  ◦ Maintains muscle elasticity
  ◦ Assists with circulation
  ◦ Enhances synovial movement for cartilage nutrition
  ◦ Inhibit pain via stimulation of joint mechanoreceptors

Kisner, 2012, p52

I. Maintain ROM

AROM Indications & Goals

• When do AROM?
  ◦ When the patient is able to contract the muscle actively and move a segment without assistance
  ◦ When a body segment is immobilized for a period of time, AROM is used on the regions superior and distal to it for maintenance

• Why do AROM?
  ◦ Slow the rate of atrophy
  ◦ Increase proprioceptive input
  ◦ Increase circulation & prevent DVT
  ◦ Develop coordination & motor skills for functional activities

Kisner, 2012, p52-53

I. Maintain ROM

AAROM Indications & Goals

• When do AAROM?
  ◦ When a patient has weak musculature & is unable to move the joint through the desired range

• Why do AAROM?
  ◦ Same reasons as AROM!

Kisner, 2012, p52-53
I. Maintain ROM
PROM skills video
• Great to watch prior to lab if you have time!
• http://www.youtube.com/watch?v=RGCtC3PcFUp&feature=related

I. Maintain ROM
Think-Pair-Share
• Talk to a classmate about the difference between full ROM and functional ROM.
• Come up with an example.

2. Increase Flexibility
Stretching
2. Increase Flexibility

- With one of your classmates, consider all of the types of tissues that may inhibit flexibility of a joint or body part.

Indications
- When someone has limited ROM, especially when it can lead to bony deformities or decreased ADLs
- When the goals are to regain normal ROM, prevent contractures, and increase flexibility
- General fitness
- Injury prevention and reduced postexercise muscle soreness
- Enhanced performance

Kisner, 2012, p77

Precautions
- Do not passively stretch a joint beyond its normal value
- Use extra caution while stretching in the presence of osteoporosis or prolonged use of steroids
- Avoid vigorous stretching of tissues that have been immobilized for a long time
- Edematous tissue
- Avoid overstretching weak muscles
- Pain/soreness lasting more than 24 hours may be too aggressive

Kisner, 2012, p99
2. Increase Flexibility

Contraindications

- Contraindications
  - Bony block limiting ROM
  - Recent fracture or surgery
  - Acute inflammation or infection
  - Sharp acute pain with stretching
  - Hematoma
  - If the contracture helps the patient to function

Stretching Parameters

- Alignment
- Stability
- Intensity
- Duration
  - Static
  - Intermittent

- Speed
  - Ballistic
  - Dynamic
- Mode
  - Manual
  - Mechanical
  - Self

2. Increase Flexibility

Stretching Parameters: Alignment

- Where else did we discuss the importance of proper alignment?
- Alignment influences the amount of tension in the soft tissue and the ROM available in the joint
- Alignment of the muscles and joint to be stretched, as well as adjacent areas, need to be considered.

Kisner, 2012; p86
2. Increase Flexibility

Stretched Parameters: Stabilization

- “to achieve an effective stretch to a specific muscle or muscle group and associated peri-articular structures, it is imperative to stabilize either the proximal or distal attachment site of the muscle being elongated.” (Kisner, 2012, p86)
- Manual stretch: PTA will stabilize one and move the other
- Self stretch: a stationary object is often used (chair, doorframe, table, wall, floor) (Kisner, 2012, p86)

Stretched Parameters: Intensity

- “The intensity (magnitude) of a stretch force is determined by the load placed on soft tissue to elongate it.” (Kisner, 2012, p86)
- Stretching should be applied at a low-intensity (via low-load) to maximize patient comfort and minimize muscle guarding

Selective Stretching

- Maximizing function by stretching some muscles and not others
- ie. SCI – tenodesis grasp

Overstretching

- Athletes whose sport requires extensive flexibility
- Overstretching can lead to instability when applied to a joint that isn’t strong enough to maintain a stable, functional position during activities.

Kisner, 2012, p75
2. Increase Flexibility
Stretching Parameters: Duration

- **Duration** = the period of time a stretch force is applied for each repetition (not the cumulative set)
- The stretch duration that you choose should be:
  - Safe
  - Effective
  - Practical
  - Efficient

Kisner, 2012, p87

2. Increase Flexibility
Stretching Parameters: Duration

- “In general, the shorter the duration of a single stretch, the greater the number of repetitions applied.” (Kisner, 2012, p87)
- Despite many studies over several decades, there is a lack of agreement on the ideal combination of duration/repetitions needed to increase muscle flexibility. (Kisner, 2012, p87)

2. Increase Flexibility
Stretching Parameters: Duration

- **Static or Intermittent?**
  - Soft tissue is elongated just past the point of tissue resistance and then held in the lengthened position for a certain period of time (either predetermined or based on the patient’s tolerance to the stretch) from 5 seconds to hours (when mechanical devices are used).

Kisner, 2012, p88
2. Increase Flexibility
Stretching Parameters: Speed

- **Slow Speed**
  - Minimizes muscle activation during stretching
  - Reduces the risk of injury to tissues
  - Less likely to activate the stretch reflex
  - Safer because easier for the PTA to control

- **High Speed**
  - Ballistic stretching
  - Dynamic stretching

Kisner, 2012, p89

2. Increase Flexibility
Stretching Parameters: Speed

- **Ballistic Stretching**
  - High speed, high intensity
  - Quick, bounding movements
  - Can cause greater trauma to stretched tissues
  - Stimulates the stretch reflex

- **Dynamic Stretching**
  - High speed, lower intensity
  - Used for carefully selected individuals
  - Athletes who require dynamic flexibility, as a warm up prior to an athletic event

Kisner, 2012, p89

2. Increase Flexibility
Stretching Parameters: Speed

- **BALLISTIC STRETCH**
  - Imposes repetitive bouncing or jerking movements on the muscles to be stretched
  - Ballistic stretching has fallen out of favor among most clinicians due to possibility of injury caused by uncontrolled jerking movements & b/c afferent nerve fiber activation of the muscle spindle causes a contraction of the same muscle that is being stretch

- [http://www.youtube.com/watch?v=ep3Q1gzH8AQ&feature=related](http://www.youtube.com/watch?v=ep3Q1gzH8AQ&feature=related)
2. Increase Flexibility

Stretching Parameters: Speed

- **DYNAMIC STRETCH**
- For athletes
- Static stretching immediately prior to participation in a sport can increase possibility of injury
- Static stretching is best for geriatric and non-athlete populations

2. Increase Flexibility

Stretching Parameters: Mode

- **Mode of Stretch**: the manner in which the stretching exercises are carried out
- **Modes of Stretch**:
  - Manual
    - Static
    - PNF
  - Mechanical
  - Self-Stretch

2. Increase Flexibility

Stretching Parameters: Mode

- **MANUAL STRETCH**:
  - The clinician provides the external force and controls the direction, speed, intensity and duration of the stretch
2. Increase Flexibility
Stretching Parameters: Mode

- **MECHANICAL STRETCH:**
  - Low load, long duration (20 minutes or more)
  - Applied through positioning of the patient
  - More effective than a manual stretch

- **SELF STRETCH:**
  - When a patient can stretch the tissues independently
  - Often given as part of a home exercise program, therefore education regarding correct and safe stretching methods is very important

- **Proprioceptive Neuromuscular Facilitation (PNF)**
  - Knott & Voss
  - Can be used to both strengthen & increase muscle flexibility
  - Right now will discuss flexibility component
2. Increase Flexibility

Stretching Parameters: Mode

- PNF continued
  - The patterns of motion for PNF are mass movement patterns characteristic of normal motor activity
  - The mass movement patterns are spiral and diagonal and closely resemble movements used in sports and work and ADLs

- PNF Patterns can be done...
  - Passively
  - Active assisted
  - Actively
  - Resisted

- PNF Patterns
  - Are functional
  - Use multiple muscles at once

- PNF Continued
  - There are 2 diagonals of motion for each of the major parts of the body
    - Head and neck
    - Upper trunk
    - Lower trunk
    - Upper extremities
    - Lower extremities
2. Increase Flexibility

Streching Parameters: Mode

- PNF Patterns – Upper Extremity

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1 fl</td>
<td>Flexion/Adduction-ER</td>
</tr>
<tr>
<td>D1 ex</td>
<td>Extension-adduction-IR</td>
</tr>
<tr>
<td>D2 fl</td>
<td>Flexion-adduction-ER</td>
</tr>
<tr>
<td>D2 ex</td>
<td>Extension-adduction-IR</td>
</tr>
</tbody>
</table>

- PNF Patterns – Lower Extremity

  - D1 flexion: flexion, adduction, ext rot
  - D1 extension: extension, abduction, int rot
  - D2 flexion: flexion, abduction, int rot
  - D2 extension: extension, adduction, ext rot

- 3 types of stretch according to PNF
  - Autogenic Inhibition (aka Hold-Relax or Contract-Relax)
  - Reciprocal Inhibition (aka Agonist Contraction)
  - Combination (Hold Relax with Agonist Contraction)
Autogenic Inhibition (aka hold-relax or contract-relax)

1. PTA passively stretches the muscle to the end of its range
2. Then the patient isometrically contracts that muscle (against the resistance of the PTA) for 15 seconds
3. The patient is instructed to relax & the PTA moves the muscle to its new end range (new stretch position) and held for 30 seconds
4. The process may be repeated 3-5 times.

Reciprocal Inhibition (aka agonist contraction)

1. PTA passively stretches the muscle to the end of its range
2. Then the patient concentrically contracts the opposite muscle, thereby actively causing more of a stretch
3. The PTA takes up the slack, patient relaxes and PTA holds the new ROM 30 sec.
4. Process can be repeated 3-5 times

Combination (Hold relax with agonist contraction)

1. PTA passively stretches the muscle to the end of its range.
2. Patient isometrically contracts that muscle for 10 seconds, then concentrically contracts the opposite muscle, while the PTA takes up the slack
3. Patient relaxes 30 sec
4. Process can be repeated 3-5 times
Think-Pair-Share

- What is the rule of thumb for stretching a monoarticular muscle?
- What is the rule of thumb for stretching a bi-articular muscle?

2. Increase Flexibility
Procedural Guidelines

- Preparation
- Application
- Follow Up

Kisner, 2012, p98
2. Increase Flexibility
Procedural Guidelines

- **Application:**
  - Firmly grasp areas proximal & distal to the joint using the broad surfaces of your hands
  - Move the distal segment slowly while stabilizing the proximal segment
  - Stop at the point of tissue restriction & as the tension decreases, move the joint a little farther
  - When done, gradually release the stretch force

  Kisner, 2012, p98

- **Follow Up:**
  - When new range is achieved, the patient should then use the new range for a functional type of exercise (AROM & strengthening)
  - Apply cold to the soft tissues that were stretched and allow them to cool in the lengthened position

  Kisner, 2012, p98

3. Increase Strength
3. Increase Strength

- **Terminology**
  - *Muscle Strength*: the maximum force that a muscle or muscle group can exert during a contraction
  - *Muscle Power*: the aspect of muscle performance related to strength and speed
  - *Endurance*: the ability of the muscle or muscle group to sustain contractions repeatedly or over a certain period of time

Kisner, 2012, p158

3. Increase Strength

- **Guiding Principles**
  - *Overload Principle*
  - *SAID Principle* (*Specific Adaptation to Imposed Demands*)
  - *Cross-Training Effect*

Kisner, 2012, p160

3. Increase Strength

- **Overload Principle:**
  - The foundation on which using resistance training to improve muscle performance is based
  - If muscle performance is to improve, a load that exceeds the metabolic capacity of the muscle must be applied
  - The muscle must be challenged to perform at a greater level to that which it is accustomed

Kisner, 2012, p160
3. Increase Strength

- **SAID Principle:**
  - The nature of the training load determines the training effect
  - Each type of exercise has its own specific training effect, which results in specific adaptations
  - The load must be specific to the individual & to the activity for which he or she is training
  - Exercises incorporated should mimic the anticipated function (whenever possible)

Kisner, 2012, p160

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3. Increase Strength

- **Cross-Training Effect**
  - Patients may improve performance in one mode of exercise by training in another mode.
  - Although cross-training occasionally provides some transfer effects, the effects are not as great as those that could be obtained by increasing the specific training by a similar amount.
  - Although cross-training benefits are sometimes observed, they are usually noted in physiologic measures & rarely in performance

Kisner, 2012, p160

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3. Increase Strength

**Parameters**

- Alignment
- Stabilization
- Intensity
- Volume
- Frequency
- Rest Interval
- Velocity
- Mode of Exercise
3. Increase Strength
Parameters: Alignment

- Proper alignment is determined by the direction of muscle fibers and the line of pull
- The patient and body should be aligned so that the limb movement replicates the action of the muscle to be strengthened
- The effects of gravity must be considered by positioning the patient and body segments

Kisner, 2012, p170

3. Increase Strength
Parameters: Stabilization

- Holding the body steady can be achieved externally or internally:
  - **External stabilization**: manual stabilization by PTA or via equipment (table, back of chair, belts, straps)
  - **Internal stabilization**: isometric contraction of an adjacent muscle group

Kisner, 2012, p171

3. Increase Strength
Parameters: Intensity

- **Submaximal**
  - Early stages of healing
  - After prolonged immobilization
  - When initially learning an exercise to emphasize correct form
  - Most children and older adults
  - To improve muscle endurance
  - Warm up and cool down

- **Maximal**
  - When the goal is to increase muscle strength, power and size
  - For healthy adults in the advanced stage of a rehab program in preparation for return to high demand job or recreation
  - Individuals with no known pathology
  - Training for competitive weight lifting or body building

Kisner, 2012, p171
Think-Pair-Share

• How would you know if the exercise intensity is too much for the patient?

3. Increase Strength
Parameters: Volume = reps & sets

• Repetitions
  - The number of times the exercise is repeated consistently
  - The number of reps makes up one set

• Sets
  - The performance of an exercise for a given number of consecutive repetitions, followed by rest or a different exercise
  - Ex: 10 reps of bicep curls, followed by 2 minute rest, followed by another 10 reps = 2 sets
  - Generally, most exercise programs include 2 or 3 sets of each exercise

Kisner, 2012, p173

3. Increase Strength
Parameters: Frequency

• How often the exercises are performed
• Frequency of exercise relates to the goal of the exercise program
• Some forms of exercise require greater recovery time (eccentric contractions)
• Optimal frequency per week has not been determined

Kisner, 2012, p174
3. Increase Strength
Parameters: Rest Interval
- Rest intervals are dependent on intensity and volume of exercise
- In general, the higher the intensity, the longer the rest interval
- High intensity resistance may require 3 minutes or longer of rest, moderate intensity = 2-3 minutes
- Resistance exercises can be performed by another muscle group during the rest interval

Kisner, 2012, p174

3. Increase Strength
Parameters: Velocity
- **Concentric** muscle contractions
  - As the speed increases, the force the muscle can generate ___________
- **Eccentric** muscle contractions
  - Findings are less consistent
  - Overall, eccentric force production is essentially unaffected by speed

Kisner, 2012, p177

3. Increase Strength
Parameters: Mode of Exercise
- **Forms of Resistance:**
  - Manual
  - Mechanical
  - Constant
  - Variable
  - Accommodating resistance
  - Body weight

Kisner, 2012, p175
3. Increase Strength
Parameters: Mode of Exercise

- Type of Muscle Contraction:
  - Isometric
  - Concentric
  - Eccentric
  - Isokinetic

Kisner, 2012, p175

3. Increase Strength
Parameters: Mode of Exercise

- Range of Movement:
  - Short-arc
  - Full-arc

Kisner, 2012, p176

3. Increase Strength
Parameters: Mode of Exercise

- Open-Chain & Closed-Chain
  - Open Kinetic Chain (OKC):
  - Closed Kinetic Chain (CKC):

Kisner, 2012, p186
3. Increase Strength
Types of Contractions

- **Isometric Contraction**: static; produced when muscle tension is created without a change in muscle length.
  - Isometrics performed at one angle results in strength gains only at the angle trained (or possibly the adjacent angles as well)
  - Generally used in the early stages of a rehab program for an acute injury or immediately after surgery
  - Usually performed at sub-maximal levels of intensity
  - Frequently termed "sets"

3. Increase Strength
Types of Contractions

- **Isotonic Contraction**: contraction during dynamic change in muscle length
  - **Concentric**: as the muscle shortens
  - **Eccentric**: as the muscle lengthens

**Isotonic**: The muscle contracts while lifting a constant resistance, and the muscle tension varies over the full ROM due to changes in muscle length and lever arm

3. Increase Strength
Isotonic Continued

- **Functional**: concentric & eccentric occur during the performance of functional activities
- When *performing* the isotonic program: avoid causing swelling & pain while having the patient work to his/her max exercise tolerance
- When *progressing* patients through isotonic programs, ensure it does not lead to increased pain, crepitus & swelling
3. Increase Strength
Isotonic Programs...

• ...incorporating the optimal amount of resistance & repetitions to produce max gains in muscular strength
  - Delorme
  - Oxford
  - McQueen

3. Increase Strength
Delorme

<table>
<thead>
<tr>
<th>Set</th>
<th>Weight</th>
<th>Repetitions</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>50% of 10 RM</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>75% of 10 RM</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>100% of 10 RM</td>
<td>10</td>
</tr>
</tbody>
</table>

• Progression from light to heavy resistance, adding resistance with each set
• Strengthening without injuring the joint

3. Increase Strength
Oxford

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</table>

• Goal is to achieve strengthening & increased endurance
• Appropriate if patient lacks endurance
• Ex: MS, patients with cardiac issues, myasthenia gravis
3. Increase Strength

**McQueen**
- Used specifically for strengthening
- 3 sets of 10 rep max
- 10 rep max = 60% of 1 RM (one rep max)

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3. Increase Strength

**Precautions**
- Substitution Patterns
- Valsalva Maneuver
- Overtraining
- Delayed Onset Muscle Soreness

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**Kisner, 2012, p194**

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3. Increase Strength

**Precautions**

**SUBSTITUTION PATTERNS**
- When too much resistance is applied, substitution may occur to produce the desired movement
- Can you think of a substitution pattern?
- How would you avoid substitution patterns?

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**Kisner, 2012, p195**
3. Increase Strength
Precautions

- **VALSALVA MANEUVER:**
  - Holding one's breath during exertion; to be avoided; encourage the patients to breathe properly during all exercise

Kisner, 2012, p195

3. Increase Strength
Precautions

- **OVERTRAINING:**
  - When an individual does not take sufficient time to fully recuperate after chronic bouts of training
  - When training loads are too demanding on the individual's ability to adapt
  - Results: fatigue, possible substitution patterns & injury, performance deterioration instead of performance improvement

Kisner, 2012, p195

3. Increase Strength
Precautions

- **DOMS:** Delayed Onset Muscle Soreness
  - Dull, diffuse pain; stiffness & tenderness to direct pressure; loss of AROM; decreased ability to produce force
  - A symptom of eccentric exercise-induced muscle damage
  - Develops 8-12 hours after exercise, peaks at 2-3 days and slowly dissipates by 8-10 days post-exercise.

Zainuddin, et al; Armstrong; Cheung, et al; Connolly et al
3. Increase Strength

Precautions

DOMS continued:
- The underlying mechanism of DOMS is unclear
- It is generally accepted that DOMS is caused by the efflux of substances from the damaged muscle/connective tissue (which is inflammed) to the extra-cellular space that sensitize free nerve endings.
- can be reduced by incorporating warm-up & cool down
- educate the patient

Zainuddin et al; Armstrong; Cheung, et al; Stauber, et al

3. Increase Strength

Contraindications

- Pain
- Inflammation
- Sever Cardiopulmonary Disease

Kisner, 2012, p199

4. Promote Endurance
4. Promote Endurance

- The ability of the whole body to sustain prolonged exercise

- AKA Aerobic training

<table>
<thead>
<tr>
<th>Signs &amp; Symptoms of Aerobic Exercise Intolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angina: chest, left arm, jaw, back, or lower neck pain or pressure</td>
</tr>
<tr>
<td>Unusual or severe shortness of breath</td>
</tr>
<tr>
<td>Abnormal diaphoresis</td>
</tr>
<tr>
<td>Pallor, cyanosis, cold &amp; clammy skin</td>
</tr>
<tr>
<td>CNS symptoms: vertigo, ataxia, gait problems, confusion</td>
</tr>
<tr>
<td>Leg cramps or intermittent claudication</td>
</tr>
<tr>
<td>Physical or verbal manifestations of severe fatigue or SOB</td>
</tr>
</tbody>
</table>

4. Promote Endurance

Benefits of regular aerobic exercise

- Decreased fatigue
- Improved performance in work & sports related activities
- Improved blood lipid profile
- Enhanced immune function
- Improved glucose tolerance
- Improved body composition
- Enhanced sense of well-being
- Decreased risk of CAD, colon & breast CA, HTN, type II DM, osteoporosis, anxiety & depression

4. Promote Endurance

Exercise Prescription

- Intensity: How hard should the patient exercise? Use maximal HR due to correlation between HR & stress on the heart (it is also easy to monitor)
- Duration: optimal duration is 20-60 minutes (include minimum 5 minutes warm up & cool down)
- Frequency: optimal = 3-5 X/week
4. Promote Endurance  
Exercise Prescription continued

- **Mode:** the greatest improvement in aerobic capacity is achieved through activities involving large muscle groups (walking, running, hiking, cycling, rowing, swimming).
  - Deconditioned patients should start with activities that can be maintained at a constant intensity (treadmill).

5. Maximize Balance

5. Maximize Balance  
Balance Terminology

- **Base of Support (BOS):**
  - The perimeter of the contact area between the body and its support surface
- **Center of Gravity (COG):**
  - The vertical projection of the center of mass to the ground. In anatomic position, the COG is slightly anterior to the second sacral vertebra

Kisner, 2012, p260
5. Maximize Balance

**Balance Terminology**

- **Limits of Stability**: It is the greatest distance a person can lean away from the BOS without changing that base. To maintain balance in standing, the COG must be kept within specific boundaries of space, referred to as limits of stability.

Kisner, 2012, p260

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5. Maximize Balance

**Balance Control**

- The process of controlling the body’s COG over the BOS, or within the limits of stability, whether stationary or moving.
  - **Static**: ability to maintain a stable antigravity position while at rest
  - **Dynamic**: ability to maintain a stable antigravity position while at motion

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5. Maximize Balance

**Improving Balance Control**

- **Improving Static Balance Control**
  - Have the patient maintain sitting, half-kneeling, tall kneeling and standing postures on a firm surface
  - To progress to more challenging activities: practice tandem and single leg stance
  - Can progress further by working on softer surfaces, narrowing the BOS, moving the arms or closing the eyes

Kisner, 2012, p273
5. Maximize Balance
3 systems vital to Balance

1. Proprioception/Somatosensory
2. Vision
3. Vestibular

Kisner, 2012, p262

5. Maximize Balance
Testing Balance

- **Romberg Test:**
  - Patient stands shoulder width apart, can balance be maintained 30 seconds with eyes open? 15 seconds with eyes closed?

- **Berg Scale:**
  - Performance based assessment of function requiring an armchair, armless chair, stopwatch & a step. Patient is assessed in static & dynamic activities

- **Timed Up & Go Test (TUG):**
  - Tool to evaluate balance during mobility. Patient is asked to stand, walk 3 meters, then turn around, return and sit. This is timed and if it takes < 10 sec, no mobility issues, > 30 sec indicates limited mobility & assistance may be required

5. Maximize Balance
Automatic Postural Reaction Strategies

- If sway occurs outside the patient’s limits of stability (the cone), a strategy must be used to restore balance
- There are 3 primary strategies used for controlling AP sway
  - Ankle strategies
  - Hip strategies
  - Stepping strategies
- These strategies adjust the body’s COG so that the body is maintained within the BOS, preventing LOB & falling
5. Maximize Balance

Automatic Postural Reactions

- **Ankle Strategies:**
  - Small disturbances in COG caused by slow speed perturbations can be compensated by ankle motion. Anterior sway countered by gastroc & post sway by ant tib

- **Hip Strategies:**
  - If disturbance to COG is too great to be counteracted by ankle, hip strategies are used, usually in response to a moderate or large postural disturbance

- **Stepping Strategies:**
  - A sudden, large amplitude force displaces the COG beyond limits of stability, a step is used to enlarge the BOS

5. Maximize Balance

Interventions to...

- **Improve ankle strategies:**
  - SLS on firm surface, SLS with hip flexion, shoulder flex, ball toss; all firm surface

- **Improve hip strategies:**
  - Unstable surface, SLS with hip flexion, ball toss to reach, SLS on trampoline, rocker board, slider board, bolster, SLS hop from stool

- **Improve stepping strategies:**
  - Step ups, downs, fwd & lat, carioca

Building a program that prepares a patient for ADLs

- First, consider which functional activity the patient is having difficulty with
- Second, consider why. What is the impairment? (decreased ROM, MMT, balance, etc.)
- Address the impairments individually
- Address the impairments combined (simulate the activity)
Recognizing a Change in Status

- The PTA must recognize when a change in the patient’s status occurs & should report it to the PT.
- This change may be a significant *improvement* or *regression* in the status of a patient.

How do you recognize a change?

- By collecting data:
  - …Vital signs, cognition, skin integrity/condition, patient safety while using assistive devices, gait, balance, MMT, muscle tone, administer standardized pain questionnaires, assessment of posture, ROM, recognizes cyanosis & activities that aggravate or relieve edema, pain, dyspnea…..

Which of the following is NOT a transfer?

- A. Stand <> supine
- B. Supine <> prone
- C. Sit <> supine
- D. Sit <> stand
References


References Continued


References Continued