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Course Objectives:

- Participant will identify the different types of exercises used in rehab
- Participant will be able to define the role of therapeutic exercises within the rehab plan of care
- Participant will be able to identify specific precautions for using therapeutic exercises
- Participant will be able to demonstrate specific therapeutic exercises for selected joints of the upper extremity
- Participant will be able to identify methods to modify exercises to meet the specific demand of patients
1. **Are therapeutic exercises occupation-based?**

Therapeutic exercises should be occupation-based. The reason is that each exercise should be selected to affect the patient’s functional level and it should be purposeful to the patient. Exercises should not be selected simply as a time-filler but instead for a functional purpose. Shoulder range of motion and strengthening exercises can be performed so a patient can put on a shirt, reach into their cabinet, and wash their hair. People must have range of motion and strength to perform those tasks so exercises are a step in the process.

2. **What is the difference between Theraband, Theratubing, and dumbbells for strengthening?**

All of the above items are used for strengthening exercises but each have different properties. Dumbbells come in a variety of resistance levels and require a good grip. During the exercise the dumbbell resists the motion. Theraband and Theratubing is a resistive elastic band or tube that provides both concentric and eccentric strengthening throughout the arc of motion. Both are easily used for home programs.

3. **How do therapists know when to upgrade an exercise?**

There are different indicators for when to upgrade an exercise. These indicators rely on the therapist understanding the goal or purpose of the exercise. For example, if a swiss ball roll is used to increase wrist extension and the patient is able to demonstrate full passive or active-assisted extension, then the exercise would be discontinued and upgraded to active wrist extension. In addition, if the exercise is being performed to increase strength, such as the Digiflex for grip strengthening, the exercise should be upgraded when the patient no longer is challenged or experiences fatigue at the completion.

4. **How should exercises be implemented as part of a patient’s plan of care?**

Exercises play a specific role in the patient’s plan of care. Consider the role of the exercises being planned. Are the exercises for range of motion, tendon gliding, edema management, strengthening, fine motor, etc. When implementing exercises, it is best to incorporate them into the treatment session over 1-3 sessions. By doing this, therapists can have the patient perform a small, select number of exercises and then assess the patient’s response to those exercises before implementing any additional exercises. This method allows the therapist to thoroughly evaluate the effectiveness of the exercise and identify any changes that need to be made.

5. **Should a home exercises include exercises performed in therapy sessions?**
Exercises selected for a home exercise program should be based on the specific needs of the patient. Due to this, patients may perform an exercise to increase shoulder active flexion at home and in the clinic. Often, exercises are chosen for the home program to reinforce exercises performed in the clinic. One important point to consider is that exercises performed in the clinic as a billable service are usually performed under the direction of a licensed therapist, so exercises at home may not be required the supervision of a therapist to be performed correctly.

6. Is it acceptable to have a patient perform more than 1 exercise to accomplish a specific task?

Yes. Often multiple exercises are selected to perform a specific task but each exercise may be performed in a different position, utilize different modes of resistance, or simulate a different functional task. For example, intrinsic strengthening can be performed with therputty, hand helper, clothes pin, BP cuff, etc.

7. Is it better to adapt an exercise or to simply change the exercise to something different?

If a patient is having difficulty performing an exercise due to the position of the exercise then it is acceptable to change the position if it allows the patient the opportunity to perform it with less difficulty. If the mode of resistance is causing a patient difficulty, then the resistance level should be graded to meet the patient’s level of function but still be challenging. If the patient is unable to recruit the muscles necessary to perform the exercise, the exercise should simply be changed. If the exercise does not provide any challenge to the patient, the exercise should be changed or upgraded.

8. Are there any precautions to the use of therapeutic exercise?

As with any treatment intervention, therapeutic exercises do have precautions. The most obvious precaution is that exercises must coincide with a patient’s postoperative status. Simply stated, this means that if the patient’s condition or surgical procedure has specific movement precautions or restrictions then the exercises performed should adhere to these guidelines. In terms of medical history, conditions such as high blood pressure, irregular heart rate, blood clots, asthma, COPD, CVA, etc. Make sure that a patient’s medical history will not present any adverse effects during therapy sessions. Also, consider the patient’s stage of healing or recovery. During the acute, inflammatory phase, exercises need to be selected carefully that will not increase the inflammatory process, cause increased pain or edema, or cause tissue damage.

9. Can an exercise be functional?

Any exercise can be functional, even therputty. As long as the exercise ultimately affects the patient’s functional outcome or simulates a functional task then it is functional. The most important aspect is that therapeutic exercises should be meaningful to the patient and their current functional demands.
Therapeutic Exercises: An UE Regime

George LaCOUR, LOTR, CHT

Section I
An Introduction to Therapeutic Exercises

Course Objectives

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Why do we use therapeutic exercises?

Section I
An Introduction to Therapeutic Exercises

Chapter 1
Understanding the Role of Therapeutic Exercise

Role of Therapeutic Exercise

- To increase joint mobility
- To promote gliding of tendon / nerve and prevent adhesion formation
- To assist with maintaining connective tissue mobility and favorably affect scar tissue formation
- To decrease edema
- To restore normal active motion
- To increase strength / stability
- To improve fine motor / dexterity
- To decrease pain
- To improve joint / bone health
- To increase endurance
Most of All....

Therapeutic exercises are used to ultimately improve function.

Active Exercise
- Used to maintain mobility, enhance synovial diffusion, and decrease pain.
- Because AROM can apply stress to joints, soft tissue, and tendons, active exercises are the preferred mode of exercise when the integrity of repaired structures is not a consideration.
- Active exercise also provides for mechanical elasticity and contractibility of muscles and helps to stimulate bone integrity to prevent demineralization.
- Active exercise is more effective than PROM in reducing edema because of the muscle-pump mechanism when there is active muscle contraction.
- Active-assisted exercises are a type of AROM exercise with assistance being provided by an outside force, either mechanically or manually.

Passive Exercise
- Exercise is produced entirely by an outside force such as therapist, patient, machine, gravity.
- Passive exercise is used to maintain joint and soft tissue mobility as well as the mechanical elasticity of a muscle.
- Passive Exercise decreases edema, assists with circulation, enhances synovial diffusion, and decrease pain.
- Indicated when pain, paralysis, spasticity, and weakness prevent a patient from actively maintaining full joint range of motion.
- Also used when joint mobilization and stretching techniques are required to improve joint and soft tissue mobility.

Resistive Exercise
- Resistance can be applied manually or from an external device.
- Isometric strengthening involves active contraction of the muscle for strengthening without any movement of the joint.
- Isotonic strengthening can be divided into concentric and eccentric.
- Concentric strengthening occurs while a muscle shortens.
- Eccentric strengthening occurs while a muscle lengthens.

Selecting the Appropriate Exercise
- Consider the current status and needs of the patient
- Are there any precautions related to the patient’s condition?
- Does the patient have any physical limitations which affect the performance of exercises?
- What is the objective of the exercise?
- What is the patient’s tolerance level?
- Any pain, fatigue, instability, etc?
Defining the Types of Exercise

Passive Range of Motion

- Passive stretching can be done through the available ROM to maintain joint and soft tissue mobility or it can be done at end-range to lengthen shortened soft tissue structures.
- The corrective force should be applied in a gentle, slow, and sustained manner.
- When more than 1 structure is responsible for limitations in joint motion, separate exercises should be incorporated. (i.e. PIP flexion limited by joint tightness as well as intrinsic tightness)

Passive Range of Motion

- When stretching a joint, the hand or joint should be positioned to eliminate resistive force from surrounding muscle-tendon systems.
- The segment proximal to the joint being mobilized should be stabilized while the corrective force should be applied to the segment distal to the joint being mobilized.
- As a general rule, the corrective force should be applied to the most distal portion of the segment distal to the joint being mobilized as this will provide a longer lever arm and increase the amount of force that can be transmitted to joint structures.

Passive Range of Motion

- When joint contractures are present, stretching should be proceeded by joint mobilization to be most effective.
- Limitations in joint motion may result from changes in the contractile and non-contractile components of muscle.
- While passive stretching procedures are capable of elongating both components, active inhibition techniques facilitate stretching of the contractile element of the muscle.

Passive Range of Motion

- Active inhibition techniques reflexively relax the muscle fibers to be elongated prior to the stretching maneuver.
- The contract-relax exercise is an example of active inhibition techniques.
- When stretching muscle-tendon systems that cross multiple joints, the muscle must be stretched over one joint at a time, and then all joints simultaneously, until optimum length of soft tissues is achieved.
- To minimize compressive forces in the small joints, stretching should start with the small, distal joints, and proceed proximally.

Passive Range of Motion

- Stretching exercise should be used with caution when osteoporosis is suspected.
- After prolonged immobilization, vigorous or overly aggressive stretching is discouraged because immobilization can result in the decrease of the tensile strength of connective tissue.
- Precaution should be used when stretching edematous tissue because it is more susceptible to injury than normal tissue. Use the unaffected side as a guide to determine normal range.
- The potential abuses of passive stretching are mobilization of unprotected joints, stretching of the wrong joint or structure, and the infliction of additional tissue trauma.

Precautions for PROM

- Stretching exercise should be used with caution when osteoporosis is suspected.
- After prolonged immobilization, vigorous or overly aggressive stretching is discouraged because immobilization can result in the decrease of the tensile strength of connective tissue.
- Precaution should be used when stretching edematous tissue because it is more susceptible to injury than normal tissue. Use the unaffected side as a guide to determine normal range.
- The potential abuses of passive stretching are mobilization of unprotected joints, stretching of the wrong joint or structure, and the infliction of additional tissue trauma.
Active Range of Motion

- When used to maintain joint mobility, active exercise should be performed through the full available ROM.
- Composite motions, such as fisting and thumb opposition to each digit, should be encouraged, as they reproduce normal functional activities.
- When active exercise is used to restore mobility in the presence of increasing tissue resistance, fast, ballistic movements are discouraged by instructing the patient to maintain the end range position so that a gentle stretch can be applied.
- When active exercise is used to restore motion in stiff joints, care must be taken to ensure that the corrective force is directed toward the stiff joint and not dissipated in the adjacent normal joints.

Resistance Exercise

- Immobilization produces muscle atrophy, with complete inactivity resulting in decreased strength at a rate of 5% per day.
- Resistance exercises not only increase muscle strength and endurance, but also improve the ability of the patient to actively mobilize stiff joints.
- Resistance exercise can be classified as either static (isometric) or dynamic (isotonic).
- Isometric exercise allows for strengthening without the stress to joints and soft tissues produced by dynamic exercise. Strength gains made with isometric exercise occur only at the joint angle at which the exercise is performed. As a result, the patient should exercise at several different joint angles throughout the range of motion.
- Isotonic exercise occurs when a muscle is subjected to a constant or variable resistance throughout the available range of motion.
- Resistance exercises that strengthen functional muscle groups should be selected.

General Considerations

- The first priority for the shoulder is regaining passive range of motion.
- Passive range of motion is essential to prevent adhesive capsulitis as well as allow sufficient mobility for regaining active range of motion and strength.
- When focusing on active motion, it is best to begin with active-assisted motion as this will provide the patient with the opportunity to actively fire the muscle and monitor for any type of compensation.
- With active range of motion, it is best to begin in supine, progress to sitting, and finally to standing.
- For strengthening of the shoulder, exercises should target areas of weakness and strive to create a muscle balance to prevent compensation.
- NEVER neglect the muscles which control the scapula. The scapula is the cornerstone of shoulder motion and function.

Section II

Therapeutic Exercises by Joint

Chapter 2

The Shoulder

Supplies Needed for this Chapter

- Small Ball or Pillow
- Cane or Piece of 3/4“ PVC Pipe
- Swiss Ball
- Towel or Oven Mitt
- Pulleys
- Theratubing (Red or Green)
- Theraband (Red or Green)
- Dumbbell (1-2 #)
- Body Blade
- Plyoball (2-4#)
- Weighted Dowel (2#)
- Towel Roll or Foam Roll
Passive Range of Motion

- Passive range of motion should be performed in a supine position, if possible. This allows for easy handling by the therapist and stabilization of the scapula.
- Most patients are apprehensive and very guarded with passive motion.
- Passive motion begins with hand placement and overall handling by the therapist. The therapist should have one hand at the distal forearm and wrist while the other hand cups the distal humerus and elbow. The grip of the therapist should be firm but relaxed.

Passive Range of Motion

- Passive motion usually progresses as follows: ER; IR; Abduction; Flexion; Extension (depending on any applicable precautions)
- For ER/IR, the arm begins at 0 degrees abduction then progresses to 45 and finally 90 degrees of abduction.
- Passive motion allows for assessment of capsular tightness, teres tightness, subscapularis tightness, and any muscle guarding.

Pendulums

- Pendulums occur when motion of the shoulder is generated by the trunk and lower extremities.
- Pendulums can be modified and performed in a prone position to provide greater distraction and mobilization of the glenohumeral joint.
- 3 Motions usually occur: Flexion/Extension; Abduction/Adduction; Rotation
- It is best on rotation to perform clockwise and counterclockwise

Pendulums

- Most basic form of shoulder exercise
- Often used in times of acute pain or immediately post-operatively
- Primary use of pendulums is to gently mobilize the glenohumeral joint and capsule.
- Pendulums are generally pain-free.
Pulleys

- Pulleys can be a passive exercise, active-assisted, or a low-load stretch.
- Pulleys are a versatile exercise because they can be performed in the clinic or at home.
- To be performed correctly, the angle of pull should be correct and the patient should perform each “pull” slowly with a hold at end range.

Pulleys Walk-out

- The patient grasps the handles of the pulleys with both hands.
- The patient relaxes both shoulders and arms and simply steps backward letting the tension on the pulley ropes pull the shoulder into flexion.
- Make sure the patient remains relaxed and also does not lean back as this can place too much traction on the shoulder joint.

Pulleys for Flexion

- Pulleys for flexion can be progressed in 3 stages:
  1. Walk-out
  2. Sitting
  3. Standing

Pulleys in Standing

- The patient grasps the handles of the pulleys with both hands.
- The patient relaxes the affected shoulder and uses the unaffected arm to pull the rope which in turn raises the affected arm into flexion.
- If shoulder hiking is observed, the patient is actively trying to flex the shoulder. This should be avoided.
- Pulleys in standing can be used for flexion to 90 degrees.
Standing Pulley for Flexion

• The patient is seated in a chair with the pulley positioned in line with the affected shoulder.
• The position of the chair will determine the level of stretch from the exercise.
• The patient grasps the handles of the pulleys with both hands.
• The patient relaxes the affected shoulder and uses the unaffected arm to pull the rope which in turn raises the affected arm into flexion.
• If shoulder hiking is observed, the patient is actively trying to flex the shoulder. This should be avoided.
• If the patient is guarded, have them use the affected arm to pull down the pulley.

Pulleys for Abduction

• The patient grasps the handles of the pulleys with both hands.
• The patient relaxes the affected shoulder and uses the unaffected arm to pull the rope which in turn raises the affected arm into abduction.
• At the first sign of tension with abduction, usually evidenced by hiking, the patient is instructed to actively depress the affected shoulder.

Pulleys in Sitting

• The patient is seated in a chair with the pulley positioned in line with the affected shoulder.
• The position of the chair will determine the level of stretch from the exercise.
• The patient grasps the handles of the pulleys with both hands.
• The patient relaxes the affected shoulder and uses the unaffected arm to pull the rope which in turn raises the affected arm into flexion.
• If shoulder hiking is observed, the patient is actively trying to flex the shoulder. This should be avoided.
• If the patient is guarded, have them use the affected arm to pull down the pulley.

Standing Pulley for Abduction

Sitting Pulley for Flexion

Pulleys for Abduction

Standing Pulley for Abduction

A

B

Insert Video

Pulleys

A

B
Cane exercises

- Also known as Wand or L-Bar
- Cane exercises can be a passive exercise, active-assisted, or an external stretch.
- Hand placement is key for performing the exercises correctly.
- Patient positioning will determine the mobilization of a specific structure.

Cane exercises: Supine Scaption

- For supine scaption, the motion occurs in the plane of the scapula.
- The patient holds the affected hand on the end of the cane with the thumb pointing in the direction of the motion.
- The unaffected hand begins at the level of the hip and moves the affected shoulder within the plane of the scapula.
- At end-range, the patient can push with the cane or the therapist can pull which will provide a level of distraction to the glenohumeral joint.

Cane exercises: Supine Flexion

- Supine flexion should be performed with the palms facing up if possible.
- If this position is uncomfortable, the patient can be allowed initially to perform the exercise with the palms down.
- The patient begins at the knees and moves into flexion overhead.
- As the patient improves, weight can be added to provide a greater stretch or increased level of resistance for strengthening.

Cane exercises: ER

- For external rotation, this can be performed in standing or supine.
- Supine offers a better stretch but is often not tolerated during the painful stages of acute pain from an injury or surgery.
- In standing, make sure the patient moves the shoulder within the correct line of motion. Monitor the patient to make sure they are not performing shoulder abduction or elbow extension to substitute for shoulder external rotation.
- In supine, the shoulder can be moved through ER with the arm at 0/30/45/60/90 degrees of shoulder abduction.
- In supine monitor that the motion occurs in line with the axis of motion.
Cane exercises: Abduction

- For abduction, the exercise can be performed in standing or in supine.
- Supine offers a better stretch without compensation as the scapula is fixed by the surface the patient is on.
- In standing, have the patient perform the exercise with their back against the wall to prevent compensation.
- Monitor for shoulder hiking or painful impingement. Both should be avoided.
- Initially, strive to have the patient reach 90 degrees of abduction and then progress.

Other Active-Assist Exercises

- Active-assisted exercises involve the use an external device to accomplish a motion.
Swiss Ball Roll Exercises

- Swiss Ball Roll is an exercise used primarily when initiating active motion for shoulder flexion. It can also be used for horizontal abduction/adduction.
- Swiss Ball Roll can also be used for self-mobilization or stretching for shoulder flexion, abduction, and the thoracic spine.
- For standing swiss ball roll, the patient begins with the hand placed at the umbilical level on the front surface of the ball. The patient then pushes out to roll the ball.
- The size of the swiss ball helps to determine the level of flexion achieved and the amount of active motion required.
- The roll can also be performed in sitting to increase the incline for active motion.

Swiss Ball Roll

Assisted Glides

- Assisted glides are used for retraining flexion, scapula mobilization, and for increasing strength for shoulder flexion and the scapula stabilizers.
- Assisted glides are progressed in 3 phases: Table; Incline; Wall
- As the patient is able to tolerate active motion against gravity, the glide is progressed.
- With the incline and wall glide, the objective is to maximize active flexion without compensation.
- At the first sign of shoulder hiking, the patient should return to the starting position.
- Tactile cues from the therapist on the top of the affected shoulder may help to avoid hiking. Also, taping of the scapula prior to the exercise can help.

Table Glides

Incline Glide

Wall Glide
Supine Prayer Stretch

- Supine Prayer Stretch is used to increase shoulder flexion, especially when the patient is apprehensive and guarding during passive flexion by the therapist.
- The patient clasps both hands together, like a prayer, and the unaffected side assists to perform supine shoulder flexion.
- Flexion should be to the level of the chest or mouth initially and then progress overhead.

Rhythmic stabilization: Place & Hold

- Rhythmic stabilization is a form of exercise which is used to promote joint co-contraction which in turn increases joint proprioception and stability.
- A basic form of rhythmic stabilization for the shoulder is place/hold.
- For Place / Hold, the shoulder is placed in varying degrees of flexion with the elbow fully extended and the patient is asked to hold this position. Initially the shoulder is placed at 90 degrees and then at various points as stability improves.

Supine Place and Hold in 90 degrees Flexion

Rhythmic stabilization

- Rhythmic stabilization can also be performed in flexion and/or scaption with external stimulus applied by the therapist to challenge the joint.
- Rhythmic stabilization for ER/IR can be performed, initially with the patient in supine with the arm at 0 degrees abduction then progressed up to 90 degrees of abduction.
- As stability and strength increase, ER/IR can be challenged by having the patient hold this position in varying degrees of abduction while in sitting and standing with the therapist applying external stimulus.
Short-Arc Motion

- Short-arc motion is an extension of rhythmic stabilization by adding a component of active exercise by the patient.
- Instead of an outside stimulus being applied by the patient, the patient is instructed to perform short-arc motion in a smooth, controlled manner.
- As stability of the GH joint increases, the arc of motion is increased and resistance is added.
- This exercise is often used early in shoulder rehab as active exercise is initiated. Short-arm motion allows for the establishment of joint stability and co-contraction which helps to minimize compensatory shoulder hiking during active range of motion against gravity.

Short Arc Motion: Flexion/Extension

Short Arc Motion: Adduction/Abduction
Isometric Strengthening

- Isometric strengthening involves active contraction of a muscle without mobilizing the distal segment.
- Isometric strengthening should be slow and controlled with the patient holding the contraction for 3-5 seconds.
- Submax isometrics are a form of isometric exercise with the patient performing 25% of normal contraction. This is most often performed with the therapist providing manual resistance to monitor the force of contraction.
- Isometrics can be performed with feedback being provided by manual contact, a pillow, or a slightly deflated ball.
- Isometrics for shoulder ER/IR can also be performed with theratubing.
Isotonic Strengthening

- Isotonic strengthening involves active contraction of a muscle(s) with movement of the distal segment. This is otherwise known as an open chain exercise.
- Isotonic strengthening should be performed once active range of motion has been restored.
- Isotonic strengthening can be performed with dumbbells, weight cuffs, weighted dowels, or with resistive bands such as TheraBand or TheraTubing. CanDo also makes these products.

Exercises in Prone/Sidelying/Supine

- The advantage of performing exercises in these positions is the ability to control compensation.
- Strengthening is often performed in these positions initially then progressed to standing using the resistive bands.
- Once the patient is able to perform exercises in these positions with 2 lbs. resistance the patient is progressed to the resistive bands.
- ER/IR is often performed in supine initially as gravity is eliminated and the scapula is stabilized. As the patient improves, they are progressed to sidelying.

Isotonic Strengthening

- Isotonic strengthening should be performed in a smooth, slow, controlled motion with a hold.
- Hand placement during the motion can alter the difficulty of the exercise.
- Isotonic exercises should result in fatigue at their completion. It should not elicit pain.
- If a patient complains of pain or instability during the exercise, modifications may be necessary.
Exercises in Prone/Sidelying/Supine

- Sidelying ER should be performed with a towel roll to optimize the exercise.
- During sidelying ER, a towel can be used to prevent compensation and isolate motion. The patient should begin at the abdomen and then move in ER to neutral or 30 degrees of ER but not any farther.
- The patient can be instructed to hold the position which increases the level of difficulty.
- Sidelying IR is often difficult due to weight bearing on the affected shoulder.

- Sidelying Shoulder ER

- Prone Horizontal Abduction can be performed with the forearm in varying positions (Forearm in neutral, pronation, supination) to change the level of difficulty.
- Prone horizontal abduction utilizes all posterior rotator cuff muscles as well as the scapula stabilizers.
- If the patient is compensating by using the scapula muscles, the exercise needs to be corrected.
- Often place/hold in the position of horizontal abduction can be used initially. The patient can lower the arm from the position through eccentric contraction.

- Prone Horizontal Abduction

- Supine chest press is performed to assist with strengthening of the pectoralis muscles as well as the serratus anterior.
- Chest press can be performed with the can or a weighted dowel initially.
- A plyoball can be used (usually 4#) to perform the chest press and requires more dynamic stabilization. As the patient progresses, they can hold the plyoball to perform the chest press with a single arm which significantly increases the level of difficulty.

- Supine shoulder press

- Sidelying Shoulder IR

- A plyoball can be used to perform the shoulder press with a single arm which significantly increases the level of difficulty.

- Sidelying Shoulder IR
Supine Chest Press

AB

Exercises in Standing

- Exercises in standing are the most challenging as there is no support to the scapula.
- The patient must be able to stabilize the scapula against the thoracic wall in order to complete the motion correctly or else compensation and impingement will occur.
- When performing exercises in standing both the affected and unaffected sides should perform the motion. This allows for balanced strengthening as well as proprioceptive training.

Open Can / Empty Can

- Open can is an exercise which promotes flexion in the scapula plane. It also allows for a focus on humeral head depression when initiating shoulder flexion.
- During open can, the thumb is point up, in the direction of the motion.
- Open can is targeted for flexion to 90 degrees but should be stopped at the level where any compensation is noted.
- Empty can is a more challenging exercise which isolates the supraspinatus. The thumb is pointing at the floor during this motion.
- Performing the exercises in front a mirror can be helpful to provide feedback to the patient. The patient can also perform the exercise with their eyes closed for proprioceptive training.

Open Can

A B

Insert Video

Prone/Sidelying Exercises
Exercises in Standing

- Put-em-up combines both scapula and shoulder motion.
- It is best performed with the back against the wall.
- The exercise begins with the arms relaxed. The patient moves into shoulder abduction at 90° and with the elbows flexed to 90° moves into ER.
- During the motion the patient retracts and stabilizes their scapula.

Standing Horizontal Abduction

Insert Video

Standing Exercises
**Theratubing Exercises**

- In general, exercises performed with theraband or theratubing allows for strengthening with both a concentric and eccentric contraction.
- Theratubing exercises should be performed slow and controlled for the most effective results.
- The starting and ending position of the arm during the exercise is important for proper strength training.
- For ER/IR with the arm by the side, a towel roll or foam roll is used to isolate the motion and promote scapula stabilization.
- PNF exercises are diagonals which are more advanced forms of strengthening. These exercises target muscle groups instead of an isolated muscle.

**Shoulder Extension**

**ER with Arm By Side**

**IR with Arm By Side**

**ER with Arm @ 90 degrees Abduction**

**IR with Arm @ 90 degrees Abduction**
Scapula Stabilization

- Scapula stabilization is imperative for proper shoulder function.
- Without scapula stabilization, there will be abnormal scapulothoracic rhythm which will result in limited motion, impingement, and eventually pain.
- Initially, scapula exercises focus on shoulder shrugs and rolls to isolate motion.
- The BOSU can be used to promote dissociation of the shoulder girdle mobilizing the scapula for depression.
- Scapula pinch is the initial exercise for scapula stabilization.
- As the patient improves, the scapula clock is added as this encompasses all muscles for scapula stabilization and assists with "setting" of the scapula.

PNF: John Travolta

PNF: Close the Door

UBE

- The UBE can be used for ROM if performed slowly without resistance.
- The UBE can be adjusted in terms of height as well as resistance.
- The UBE is used for endurance training once the strengthening phase of rehab has been initiated.

Insert Video

Theratubing Exercises

Scapula Stabilization with BOSU
Rowing is performed in 3 stages: standing, prone, and standing with theraband.

- For the standing 1-arm row, the patient moves from a relaxed position to a position of shoulder retraction. I instruct the patient to "start the lawn mower".
- In prone, the patient moves the arm from the starting position to a position of retraction with the upper arm at the level of the trunk. The therapist should be able to palpate the scapula as it is retracted and adducted. Make sure to keep the shoulder adducted during the exercise.
- In standing, the row is most effective if performed bilaterally with theraband. The patient will perform a low row with the arms by the sides. As the hands approach the trunk, the patient will supinate the forearm, triggering additional scapula pinch.
**Scapula Stabilization with Shoulder Extension**

- Prone shoulder extension is initiated to strengthen the posterior shoulder, latissimus, and lower trapezius. The patient can perform the exercise with the forearm in neutral, prone, or supination to change the level of difficulty.
- The patient should extend the arm, with the elbow locked in extension and the wrist locked in neutral, to a point level with the hip.
- As the patient improves with prone shoulder extension, they can then be progressed to Shut-the-door in standing and or Latissimus pulldowns.

**Lat Pulldown**

**Serratus Punch**

- Serratus punches are performed in supine initially to support the scapula. The patient performs a chest press-type motion and lifts the scapula from the table to engage the serratus anterior.
- A dumbbell can be used as resistance.
- A plyoball can also be used and is more challenging to the patient to stabilize throughout the exercise.
- Serratus punch can also be performed in standing with theratubing.

**Supine Serratus Punch**

**Shut The Door**

**Prone Shoulder Extension**
**Supine Serratus Punch with Plyoball**

- The Tree Hug is an exercise which works the pectoralis, serratus, as well as the scapula stabilizers.
- Push-ups are the basic form of scapula stabilization. They are progressed from standing against the wall, on the side of a bed, to the floor. Push-ups with a plus provide an added emphasis on the serratus anterior.

**Scapula Stabilization**

**Advanced Scapula Stabilization**

- Scapula ball on a wall with plyoball is a more advanced form of scapula stabilization. Position of the arm can be varied to increase difficulty.
- Body blade oscillate and require scapula stabilization to perform. The arm position can vary greatly to target specific muscle groups. Body blades can be used as a single or in tandem.
- The Iron Cross is an advanced scapula stabilization exercise and requires good shoulder ROM and strength to perform correctly. Be sure to not have the patient stand with their back against the wall.
Exploring Hand Therapy

Scapula Stabilization with Ball on Wall

A B

Prone Scapula “T” and “W”

A B

Body Blade: Single

A B

Iron Cross

A B C

Body Blade: Bilateral

A B

Insert Video

Scapula Stabilization
**Stretching**

- Stretching is a necessary part of the rehab of the shoulder. Position of the shoulder and the application of stress will determine the structure being targeted for stretch.
- All stretches should be performed with the structure being held in position of stretch for 5-10 seconds per repetition.
- Capsular stretches can be performed manually or with the assistance of an outside device (cane, swiss ball, etc).

**Capsular Stretching**

- Capsular stretches can be performed manually or with the assistance of an outside device (cane, swiss ball, etc).

**Internal Rotation Stretch**

- IR can be stretched in standing with a towel, in sidelying, or in supine.
- With a towel, the patient will pull the affected arm straight across the buttocks initially to perform the stretch. Once the patient is able to reach across and touch the opposite buttock, the towel stretch is progressed over the shoulder.
- In sidelying, the patient will be on their unaffected side. The patient will then simply let the affected arm drape anterior across the chest and the weight of their arm will perform the stretch. A 1-2# weight can also be used to elicit a stronger stretch.
**Corner Stretch**

- The pectoralis can be stretched manually in supine or with the corner stretch.
- For the corner stretch, the patient will place one foot forward into the corner. The hands are placed on the wall. Initially, the patient should keep the hands around the lower chest level and eventually progress to shoulder level.
- The patient will stabilize their hands on the wall and then stretch the pectoralis by leaning forward onto their anteriorly placed foot until a stretch is felt in the anterior chest area.

**IR Stretch with Towel**

**Stretching**

- Flexion can be stretched with a corner wall glide, swiss ball on wall, or self-mobilization.
- For the corner wall glide, the patient performs a wall glide moving the shoulder into flexion with the corner serving as a guide and a block. At the end-range, the patient can lean into the wall to achieve full stretch.
- The swiss ball roll on the wall allows the patient to actively move against gravity into flexion. At their maximum point of flexion, the ball will assist with an end-range stretch.
- Self-mobilization resembles a table glide, except the patient leans forward allowing the table surface to further mobilize the shoulder into flexion.

**Corner Pectoralis Major Stretch**

**Swiss Ball Roll on Wall**
Self Mobilization: Flexion

Additional Shoulder Stretches
- Self-mobilization for ER at 90 degrees abduction
- ER door stretch
- Low-load ER stretch

Low-Load ER Stretch

Self Mobilization: ER with Abduction

Insert Video
Shoulder Stretches
Chapter 3

The Elbow

General Considerations

- Even though the elbow is concerned with simply extension and flexion, motion can become severely limited following an injury, surgery, or period of prolonged immobilization.
- Elbow extension is often the motion which is commonly affected and may require extensive attention in order for it to be fully restored.
- For strengthening, elbow flexion is affected by forearm position. Due to this, strengthening of elbow flexion should be performed in varying degrees of forearm rotation in order to effectively strengthen all involved muscles.

Supplies Needed for this Chapter

- Swiss Ball
- Towel or Oven Mitt
- Pulleys
  - Theratubing (Red or Green)
  - Theraband (Red or Green)
  - Dumbbell (1-2 #)
- Body Blade
- Plyoball (2-4#)
- Weighted Dowel (2#)

Passive Range of Motion

- Passive range of motion of the elbow is best performed in supine but can be performed in sitting.
- For flexion, the upper arm is stabilized while the distal segment is moved into flexion.
- For extension, a roll is placed under the elbow to provide a fulcrum. The upper arm and shoulder are stabilized while the distal segment is moved into extension.
- During extension, a distraction force can be used to provide a more effective stretch.
- For both extension and flexion, muscle energy techniques can be used with contract/relax to decrease resistance during passive motion.

Elbow Extension

Elbow Flexion
Active-Assist Exercises

- Active-assist exercises for the elbow are similar to those used for the shoulder.
- Swiss ball roll is used to promote extension and flexion.
- Pulleys can be used for extension stretch with active flexion from the extended position.
- Table glides can be used for both extension and flexion with stress to the medial and lateral elbow controlled.
- The UBE is used for ROM of the elbow with resistance set to zero. The chair position will determine if the exercise targets extension or flexion.

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UE Ergometer for ROM

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Swiss Ball Roll

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Isotonic Strengthening

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Table Glides

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Elbow Extension with Theratubing
Self-Stretching & Low Load Stretching

- Self-stretching is difficult for the elbow.
- Passive stretching performed by the patient is often not effective as they are unable to sustain a stretch that effectively improves range of motion.
- The elbow flexion stretch is effective for increasing elbow flexion. The patient assumes a position similar to that for a wall push-up, however the patient pulls the arms down the wall forcing the elbow into flexion.
- Another method for increasing elbow flexion is to place the patient in supine. The patient holds a weight or a plyoball. The patient relaxes allowing for the weight (plyoball) to push the elbow into a flexed position.
- For elbow extension, a towel roll is placed under the elbow and a weight is applied to the distal segment. The patient hold this position for an allotted time to achieve results.
General Considerations

- Just as the elbow is affected by immobilization, so is the forearm.
- Restoring forearm rotation can be deceiving because often patients will compensate when performing their exercises so it will appear that the motion has been restored when, in fact, it has not.
- When performing any exercise for pronation or supination, it is best to have the elbow at 90 degrees with the arm by the side as this will help to prevent compensation.

Supplies Needed for this Chapter

- Desensitization Buckets (or Bowls filled with Dried Beans, Rice, or Corn)
- Theratubing (Red or Green)
- Theraband (Red or Green)
- Wrist Roll
- Mr. Wrister
- PuttyCiser
- Velcro Board
- Dumbbell (1-2 #)
- Hammer or Crescent Wrench
- Theraband Flexbar (Red or Green)

Passive Range of Motion

- The most difficult aspect of performing passive range of motion to the forearm is hand placement.
- The most common mistake therapists make is that they hold onto the patient’s hand when performing passive supination or pronation.
- The correct hand placement for passive motion of the forearm is proximal to the wrist on the distal radius and ulna.
- Active inhibition is a technique commonly used when performing passive range of motion. It is a contract-relax technique which helps the patient to decrease guarding and/or spasms which are limiting passive motion.
Active Range of Motion

- AROM of the forearm can be performed with numerous activities.
- Tubs of media such as beans, corn, or rice can be used. Patients can use their hand to scoop the media or they can use a utensil such as a cooking spoon, ice scoop, or ice cream scoop and this will allow for simulation of the supination motion.
- Patients can use the Minnesota Rate of Manipulation or the Bolt Board for the Bennett Hand Dexterity test to perform supination and pronation. These can even be timed to establish baselines.
- A deck of cards or dominos can also be used to perform the activity in the clinic or at home.
- The Wrist-R-Ciser allows for both pronation and supination.
- The Wrist Roll can be used without weight for active supination/pronation.

Supination / Pronation with Scoop
Isotonic Strengthening

- Isotonic strengthening for the forearm should mirror the arm position used for AROM with the arm by the side and the elbow flexed, if possible.

- In the clinic and at home, a hammer or other hand tool is readily available for use for forearm strengthening. Items such as a cooking spoon, a rolling pin, a crescent wrench, or a hammer can be used to strengthen pronation or supination.

- The Theraband Flexbar can also be used strengthening. While holding the Flexbar with the palms down, the motion strengthens the supinators. While holding the Flexbar with the palms up, the motion strengthens pronation.

- The Bennett Hand Tool test can be used as well as a weight well to strengthen forearm pronation/supination.

- The Wrist Roll or Mr. Wrister can also be used to strengthen the forearm.

- The Power Web can also be used.

Pronation / Supination with Wrist Roll

Supination with Hammer

Pronation with Hammer

Demonstration

Forearm AROM Exercises
Supination with Theraband Flexbar

Supination with weight

Pronation with Theraband Flexbar

Pronation with weight

Pronation / Supination with Wrist Roll

Pronation with Theratubing
Supination with Theratubing

Isotonic Strengthening (PuttyCiser)
- The PuttyCiser is a versatile tool that can be used to strengthen the forearm.
- Different tools are available as well as different resistance levels with theraputty.

Supination / Pronation with Power Web

Supination / Pronation with PuttyCiser

Demonstration
Forearm Strengthening

Forearm Supination with PuttyCiser
Demonstration
Forearm Strengthening with PuttyCiser

Isotonic Strengthening (Velcro Board)

- The Velcro board is another tool which can be used for strengthening.
- Patients can perform pronation/supination with the long handle dowel or with the Key pinch.

Demonstration
Forearm Supination / Pronation Using Velcro Board Dowel Roll Attachment

Forearm Supination / Pronation Using Velcro Board Key Attachment

Chapter 5
The Wrist
General Considerations

- The wrist is concerned with extension, flexion, radial deviation, and ulnar deviation.
- Following any type of immobilization, the wrist can be affected in terms of soft tissue tightness as well as extrinsic muscle-tendon tightness.
- Exercises must target all structures involved to be effective for the wrist.
- For grip strength, the patient must have adequate wrist extension so this motion must be a focus on any treatment program.
- Strengthening of the wrist should be performed with caution initially to prevent any tendinitis or if any wrist instability is suspected.

Supplies Needed for this Chapter

- Swiss Ball
- Wobble Board
- Wrist X-R-Ciser
- Wrist Roll or Mr. Wrister
- Theratubing (Red or Green)
- Theraband (Red or Green)
- PuttyCiser
- Dumbbell (1-2 #)
- Blood Pressure Cuff
- Theraband FlexBar (Red or Green)
- Velcro Board
- Plyoball (2-4#)
- Dowel with Slotted Weights
- Small Foam or Nerf Ball (Tennis Ball Can be substituted)

Passive Range of Motion

- Passive range of the motion for the wrist can be painful following prolonged immobilization or with persistent edema due to the lack of mobility within the carpal rows. Due to this, patients often benefit from joint distraction or joint mobilization prior to passive motion.
- Passive motion of the wrist can be performed with the forearm pronation or with the forearm in a neutral position.
- Some therapists prefer to manually stabilize the proximal phalanx. Others prefer to use the edge of a treatment table or an elevation wedge. The main factor to monitor is that wrist motion is not impeded by any structure.

Active-Assist Exercises

- The Swiss Ball is an effective method for increasing wrist ROM. It is primarily used for increasing wrist extension.
- A Wobble Board is a treatment tool used mostly by Physical Therapists to treat the ankle. It can also be used to increase wrist flexion.
- When using the Wobble Board it is imperative for the forearm to maintain contact with the table during the exercise.
Wrist Extension with Swiss Ball Roll

Wrist Flexion with Wobble Board

Demonstration

• Wrist AROM with Swiss Ball

Active Range of Motion

• Active range of motion should focus on extension, flexion, radial deviation, and ulnar deviation.

• The most common response of patients when performing AROM of the wrist is to lift the forearm off of the table or wedge to compensate. Be sure to stabilize the forearm when performing exercises.

• AROM of the wrist can be affected by soft tissue tightness as well as tightness in the extrinsic extensors/flexors of the wrist.

• Due to this, patients may have greater range of motion when the extrinsics are not placed on stretch during the motion. For example, wrist flexion may have a greater measurement when the patient performs this motion with a relaxed fist versus a closed fist.
Active Range of Motion

- When performing wrist extension, patients with weak wrist extensors will compensate by using the finger extensors.
- Isolate the wrist extensors by having the patient hold a towel roll, a dowel, or a small foam ball when performing the motion.
- For radial/ulnar deviation, these exercises can be performed with the forearm in a neutral or pronated position. Find the position of greatest stretch when performing this motion.
- For AROM, the wrist roll, Mr. Wrister, and weight wells are useful tools in the clinic.

Demonstration

Wrist AROM

Isometric Strengthening

- Isometric strengthening of the wrist is often used for arthritis and also for TFCC injuries in addition to other conditions.
- Manual resistance can be applied for extension, flexion, radial deviation, and ulnar deviation but often therapists would like to quantify the force.
- Muscle myometers are available commercially for use but are expensive. Another alternative is a BP cuff. The BP cuff provides feedback to the therapist as well as the patient in regards to the amount of force being generated when performing the exercise.

Wrist AROM with Wrist-R-Ciser

Isometric Wrist Extension with BP Cuff
Demonstration

Wrist Isometrics with BP Cuff

Isotonic Strengthening - Dumbbells & Theratubing

- Isotonic wrist strengthening can focus on extension, flexion, and radial/ulnar deviation.
- With dumbbells there are options. Patients can use metal dumbbells, coated dumbbells, and even soft weights. All offer different grip sizes which makes it easy to accommodate different needs of the patient.
- Patients with arthritis or following a distal radius fracture often respond better to the soft weights because it does not require a tight grip.
- For all motions, it is important to hold the position for maximum strengthening.

Wrist Flexion with Weights

Wrist Radial Deviation with Weight

Wrist Extension with weights

Wrist Extension with Theratubing
**Demonstration**

Wrist Isotonic Strengthening
Dumbbells / TheraTube

**Isotonic Strengthening - TheraBand Flexbar & Wrist Roll**

- Exercises with the Flexbar can be performed with the elbows bent or fully extended depending on the difficulty of the exercise.
- The unaffected hand stabilizes the Flexbar while the patient grasps the Flexbar and completes the exercise. For extension, the patient should reach and grasp the Flexbar in a slightly flexed posture and then twist into extension. The patient should see the lines on the Flexbar move for feedback.
- There are different colors of Flexbars which coincide with the different resistance levels.
- The Wrist Roll and Mr. Wrister are performed in the same manner as the Flexbar, however a weight is added for resistance.
Demonstration

Wrist Isotonic Strengthening
Flexbar / Wrist Roll

Isotonic Strengthening -
PuttyCiser

- The PuttyCiser offers a variety of options.
- There are numerous tools available for exercise and the different colors of theraputty provide variations in resistance.
- Exercises with the PuttyCiser can be isometric or isotonic and this can be dictated by changes in the putty resistance.
- The only limitation with the PuttyCiser are with people suffering from arthritis. The grip required can sometimes aggravate their arthritis so it is important to monitor the patient for pain/swelling.

Wrist Flexion with PuttyCiser

Wrist ulnar Deviation
with PuttyCiser

Wrist Extension with PuttyCiser

Wrist Radial/Ulnar Deviation
with PuttyCiser
Wrist Ulnar Deviation with PuttyCiser

Wrist Flexion with Velcro Board

Demonstration
Wrist Isotonic Strengthening PuttyCiser

Wrist Extension with Velcro Board

Isotonic Strengthening - Velcro Board
- The Velcro Board offers another option for resistance training.
- There are 2 lines of velcro hook on the board, a narrow and a wide. The wider strip provides an increased level of resistance.
- For wrist flexion and extension, the roller with dowel handle is used. For patients who have a limited grip, a piece of pipe insulation can be added to increase the handle size. Coban can also be added to the handle to improve the texture of the handle to increase grip capability.
- The exercise can be graded differently. For instance, 1 pass forward and back is considered 1 repetition. The patient can perform 5-10 repetitions.

Demonstration
Wrist Isotonic Strengthening Velcro Board
Isotonic Strengthening - Plyoball

- The plyoball can be used for wrist strengthening but it does require the patient have acceptable grip strength in order to manage the plyoball.
- Most commonly, the 2 or 4 lbs. plyoball are used.
- For wrist extension, the patient can perform a plyoball hold with the forearm pronated. They can perform 3-10 repetitions holding the plyoball for 15-60 seconds.
- For flexion, the patient will supinate the forearm and perform a plyoball toss. Usually 10-20 repetitions will fatigue the patient.
- The exercise can also be graded lower using items such as a Nerf ball, tennis ball, or baseball.
- Patient can also use a basketball to dribble for wrist flexion. For wrist extension, patients can hold a football.

Demonstration

Wrist Isotonic Strengthening
Plyoball

Isotonic Strengthening -
Eccentric Extension / Flexion

- Some patients will require eccentric strengthening of the wrist. For diagnoses such as epicondylitis or TFCC injuries, these exercises are often better tolerated by the patient without increasing pain.
- For eccentric strengthening, the muscle being targeted is placed in a shortening position and the patient slowly lengthens the muscle to strengthen.
- For use with the Flexbar, the patient will stabilize the Flexbar with the affected hand and then twist the Flexbar with the unaffected hand. At that point, the patient’s affected hand will eccentrically allow the Flexbar to return to its resting position.
- For flexion, the unaffected hand will twist the Flexbar into extension, once the position is achieved, the affected hand will slowly allow the Flexbar to return to its resting state. This provides for eccentric wrist flexion. For extension it is the opposite.

Wrist Extension with Plyoball Hold

Wrist Flexion with Plyoball toss

Eccentric Wrist Extension with Flexbar
Eccentric Wrist Flexion with Flexbar

Demonstration
Wrist Eccentric Strengthening

Eccentric Wrist Extension with Dumbbell

Low-Load Stretch for the Wrist

Wrist Extension Stretch

- For wrist extension, the patient is placed with the wrist over the edge of a table, bed, or wedge and the forearm is stabilized.
- A weight is applied to provide the stretch into an extended position while the patient "attempts" to relax.
- In the picture, a cuff weight is attached to a piece of TheraBand to provide increased resistance and it is also easier to place on the patient for this stretch.
- Usually this stretch begins at 1 minute and is progressed.
Wrist Flexion Stretch

- For wrist flexion, the patient is placed with the wrist over the edge of a table, bed, or wedge and the forearm is stabilized.
- A weight is applied to provide the stretch into an flexed position while the patient “attempts” to relax.
- In the picture, a cuff weight is attached to a piece of Theraband to provide increased resistance and it is also easier to place on the patient for this stretch. Patients can also simply hold a dumbbell.
- Usually this stretch begins at 1 minute and is progressed.

Supplies Needed for this Chapter

- Dowel or Highlighter
- Finger Crutch and Finger Platter
- Theraband (Red or Green)
- Rubber band
- Hand Helper
- Cando Via Hand Exerciser
- DIGIFLEX (3-5#)
- Calibrated Spring Loaded Grip
- Velcro Board
- Plyoball (2-4#)
- Dowel with Slotted Weights
- Theraband Flexbar (Red or Green)
- PuttyCiser
- Theraputty (Soft or Medium)

Chapter 6

The Hand

General Considerations

- For the hand, numerous structures can be involved with an injury or surgery. Before proceeding with any type of exercise, it is imperative to know all structures involved.
- Exercises for the hand can target the intrinsics, extrinsics, nerves, and also soft tissue structures.
- Passive motion of the hand should include individual joints (MCP/PIP/DIP), composite motion, and the intrinsics.
- Strengthening of the hand can be performed but therapists must monitor the CMC of the thumb as well as the IP joints of the fingers for any type of inflammatory response as this could be a sign of joint instability or arthritis.

Passive Range of Motion

- When stretching a joint, the hand or joint should be positioned to eliminate resistive force from surrounding muscle-tendon systems.
- The segment proximal to the joint being mobilized should be stabilized while the corrective force should be applied to the segment distal to the joint being mobilized.
- As a general rule, the corrective force should be applied to the most distal portion of the segment distal to the joint being mobilized as this will provide a longer lever arm and increase the amount of force that can be transmitted to joint structures.
- Passive motion should be be slow with the structure being placed on stretch and held in the position for 5-10 seconds with each repetition.
Exploring Hand Therapy

1. Intrinsic Passive Stretching

2. Extrinsic Flexor Stretch with foam roll

Extrinsic Flexor Stretch using Swiss ball

Extrinsic Extensor Stretch

Active Range of Motion

Extrinsic Flexor Stretch

Option A

Option B
**Flexor Tendon Mobilization**

- Place-hold is the form of active exercise that applies the least amount of force on the tendon while producing the same tendon excursion as would occur with active motion.
- The fingers are passively placed in a position of flexion and the patient is asked to “hold” this position.
- The wrist should be in neutral.
- Demo

**Blocking Exercises**

- Blocking exercises can be used to isolate motion of a joint or tendon.
- Blocking exercises can be performed for the flexor or extensor tendons.
- Blocking exercises do impart a certain amount of stress so they should only be used when repaired structures can withstand increased stress.
- Blocking can be performed with manual blocking or the use of an object such as the edge of a table, a pencil/pen, a dowel, or a Finger Crutch or Finger Platter.
- The Finger Platter is excellent for use with blocking exercises in the clinic or for home programs.

**Place-Hold Exercise**

- Place-hold is a form of active exercise that applies the least amount of force on the tendon while producing the same tendon excursion as would occur with active motion.
- The fingers are passively placed in a position of flexion and the patient is asked to “hold” this position.
- The wrist should be in neutral.
- Demo

**Blocking**

- Block just proximal the PIP and have the patient actively flex.

**Place and Hold**

- When using a prop, the patient is instructed to gently maintain contact but to not strain or squeeze in an attempt to hold the object. A styrofoam cup is excellent.

**PIP Blocking with Finger Crutch and Finger Platter**
DIP Blocking

- Block just proximal the DIP
- Patient flexes DIP

DIP Blocking with Finger Crutch and Finger Platter

Flexor Tendon Glides

- Flexor tendon glides are a useful form of active motion exercises.
- They are commonly used following tendon repairs, fractures, trigger finger release, and carpal tunnel release surgeries due to their ability to effectively mobilize the flexor tendons and prevent adhesion formation.
- With the hook position, maximum gliding is achieved between the FDS/FDP tendons.
- With the full fist position, the FDP achieves maximum gliding with respect to sheath and bone as well as a substantial amount of gliding over the FDS tendon.
- With the straight fist position, there is maximum glide of the FDS with respect to the flexor sheath and bone.

Flexor Tendon Glides

- Maximum FPL gliding is obtained by flexing the IP and MP joints of the thumb fully
- Once the patient is able to perform the exercises with the wrist in neutral, instruct them to perform the same exercises with the wrist in extension to produce maximum total excursion.

Demonstration

Blocking Exercises

Straight Fist Position
Exploring Hand Therapy

Isolated FDS Glide
- The muscle bellies of the FDS tendons are independent, allowing independent PIP flexion of each digit.
- Isolated FDS exercises are done by flexing one finger at a time at the PIP joint, with the uninvolved hand keeping the other fingers in extension.
- This exercise produces gliding of the superficialis tendons not only with respect to other superficialis tendons, but also with respect to the profundus tendon which is rendered inactive when the other 3 profundus tendons are held in extension.
- Demo

Extensor Tendon Mobilization
- Restoration of normal tendon glide in the extensor tendons presents a unique challenge.
- At the finger level, the EDC, interossei, and lumbrical tendons form a complex extensor mechanism.
- Adhesions can form at any point along the system, limiting active and passive finger flexion as well as active finger extension.
- The specific exercise selected to facilitate extensor tendon glide depends on the location of the adhesions.
- Lack of full active extension at the MP joint indicates an adhesion of the EDC, which is the sole extensor of the MP.
- An extensor lag present at the PIP and DIP joints indicates adhesion of the extensor expansion, composed of the EDC, interossei, and lumbricals.
- Demo
Exploring Hand Therapy

EDC Glide

The patient grasps an object to isolate the MCP.

EDC Glide with Dowel

Patient actively extends the MCP.

Reverse Blocking

The patient grasps an object to isolate the MCP.

Reverse Blocking with Finger Platter

Patient actively extends the MCP.

Strengthening

Strengthening - Flexor Tendons

- When strengthening the flexor tendons, the focus of a specific tendon depends on motion at a specific joint level.
- For the FDS, the exercise focuses on the PIP joint while the FDP focuses on the DIP joint.
- Strengthening of the flexor tendons can be accomplished by manual resistance from the therapist but it can also be accomplished from tools such as Theraputty, DigiFlex, CanDo Via Exerciser, Hand Helper, ArchXerciser, Velcro Board, Clothespins, Power Web, and the PuttyCiser.
- Demo
FDS Strengthening with Clothespin

FDP Training with object pickup in cylinder

FDS Strengthening with Velcro Board

FDS Strengthening with Digiflex

FDP Strengthening with Velcro Board

FDP Strengthening with Digiflex
Exploring Hand Therapy

FDP Strengthening with Cando Via Exerciser

FDS Strengthening with Archxerciser

FDP Strengthening with Hand Helper

FDS Strengthening with Theraputty

FDP Strengthening using Archxerciser

FDP Strengthening with Theraputty
FDP Strengthening with Theraputty Marble pull

FDS/FDP Strengthening with PuttyCiser

FDS/FDP Strengthening with PuttyCiser

FDS/FDP Strengthening using puttyciser

FDS/FDP Strengthening with PuttyCiser

FDS/FDP Strengthening with Theraputty cone twist
**FDS/FDP Strengthening with Power Web**

**FDS/FDP Strengthening with dowel & slotted weights**

**Strengthening - Extensor Tendons**

- When strengthening the extensor mechanism, the focus depends on motion at a specific joint level.
- For the EDC, the exercise focuses on extension of the MCP joint with the IPs flexed.
- For the intrinsic muscles of the extensor mechanism, the exercises focus on extension of the PIP and DIP joints and are most effective with the MCP in flexion.
- Strengthening of the extensor can be accomplished by manual resistance from the therapist but it can also be accomplished from tools such as Theraputty, Velcro Board, Finger Weights, and the Digi-Extend.
- The Digi-Extend is excellent for use in the clinic and for home program use.
- **Demo**

**EDC Strengthening with velcro board**

**EDC Strengthening using theraband**

**EDC Glide using Finger Weights**
Strengthening - Grip

- Strengthening of grip can be accomplished from tools such as Theraputty, Velcro Board, Eggserciser, Foam Ball, Hand Helper, DigiExt, CanDo Via, Stovall Calibrated Hand Grip, Plyoball, and Dowel with Slotted Weights.
- When choosing an exercise for increasing grip strength, the therapist must consider the amount of finger flexion available, grip comfort, presence of arthritis or joint instability, and the amount of grip desired.
- For patients with arthritis, grip strengthening should be done with the least amount of stress to the joints of the hand.
- Demo
Exploring Hand Therapy

Grip using Eggsercizer
(Different Resistance Levels Available)

Grip using Rolyan
Ergonomic Hand Exerciser

Gross Grip with Theraputty

Grip Using Digiflex

Grip Using Hand Helper

Grip using Cando Via Hand and Finger Exercisers
Chapter 7 -- Strengthening - Intrinsic

- Strengthening of the intrinsic can be accomplished from tools such as Theraputty, Eggeserciser, Hand Helper, Stovall Calibrated Hand Grip, PuttyCiser, Clothespins, Power Web, and Rubberbands.
- Demo
Exploring Hand Therapy

Intrinsic Strengthening with PuttyCiser

Intrinsic Strengthening with PuttyCiser

Intrinsic Strengthening with PuttyCiser

Intrinsic Strengthening with Theraputty Drag

Intrinsic Strengthening with PuttyCiser

Intrinsic Strengthening with Theraputty
Intrinsic Strengthening with Rubberband

Intrinsic Strengthening with Clothespin

Intrinsic Strengthening with Rubberband

Intrinsic Strengthening with Clothespin

Intrinsic Strengthening with Rubberband

Intrinsic Strengthening with Theraputty
Intrinsic Strengthening with Power Web

Radial Abduction with Rubberband

**Strengthening - Thumb**

- Strengthening of the intrinsics can be accomplished from tools such as Theraputty, Hand Helper, Stovall Calibrated Hand Grip, PuttyCiser, Clothespins, Digi-Extend, Ice Cream Scoop, Power Web, and Rubberbands.
- Demo

Lateral Pinch with Clothespin

Thumb Strengthening with Calibrated Hand Grip

Thumb Adduction with Calibrated Hand Grip
Thumb Abduction and Extension with Digi-Extend

Thumb Flexion / Adduction with Puttyciser

Thumb Strengthening with Flexbar

Thumb Strengthening with Puttyciser

Thumb Flexion / Adduction with Puttyciser

Thumb Strengthening with Puttyciser

Thumb Strengthening with Puttyciser
Exploring Hand Therapy

THUMB ADDUCTION WITH PUTTYCISER

LATERAL PINCH WITH PUTTYCISER

LATERAL PINCH WITH ICE CREAM SCOOP

TRIPOD PINCH WITH THERAPUTTY

PINCH WITH OBJECT PICKUP USING TWEEZERS

TIP PINCH WITH THERAPUTTY
Chapter 9
FINE MOTOR
OBJECT MANIPULATION

SINGLE OBJECT PICK UP

SQUARE BLOCK MANIPULATION

OBJECT PICK UP

SPHERICAL MANIPULATION

GROSS GRASP AND
Manipulation of Media
Chapter 10
Tips from the Field

Answers to Common Questions

How do you choose which exercise to perform?

- Following the initial assessment, a problem list is formed based on the objective findings and patient complaints.
- Based on the patient's diagnosis, related precautions, medical history, objective findings, and unique functional status, exercises are selected.
- Each exercise should be selected to target a specific limitation. If an exercise has no purpose or no longer contributes to the patient's progression then it should no longer be performed.

Does the order of exercises matter?

- When formulating the exercise program consider the role of each exercise selected.
- If the exercise is for ROM or stretching, the exercises should proceed in the progression of the targeted structures. For example, in the hand intrinsic stretching could be performed before passive or active motion at the individual IP joints of the hand in order to contribute to more effective composite motion.
- In the shoulder, stretching exercises should be performed before A/A/AROM exercises. These exercises would be performed before strengthening exercises.

Does it help to apply heat or ice before exercises?

- Heat can be applied but with caution. Heat applied for longer than 10 minutes can decrease muscle endurance causing early fatigue with exercise.
- Due to this, if the goal of exercise is to increase strength, heat may not be indicated in order to achieve maximum results. If the goal of exercise is for stretching or passive motion, heat may be beneficial.
- If the goal of exercise is to increase ROM and heat is applied, the exercise needs to be performed during or immediately following the heat in order to be effective.
- Ice applied for 5 minutes has been shown to increase muscle strength during exercises, however, ice applied for >5 minutes has been shown to limit the effectiveness of exercises for strengthening.
- Heat should also be used with caution when pain is present or there is an acute inflammatory response as this could aggravate patient's symptoms or place them at a greater risk for tissue injury.

Should passive range of motion be performed before or after other exercises?

- If active range of motion or strengthening exercises are to be performed as part of the exercise program, then passive range of motion should be performed first to be the most beneficial.
- If the patient has muscle spasms, guarding, or pain, then they would most likely benefit from passive range of motion at the end of the therapy session as other exercises or modalities could decrease symptoms and make passive motion more tolerable and effective.
- If edema is present, measures to address edema should be performed first followed by active motion (if allowed) followed by passive range of motion.
- In some circumstances passive range of motion can be performed at the start and end of the therapy session.
How do you determine the amount of sets and repetitions for an exercise?

- Much depends on the tolerance of the patient. Whether the exercise is for range or for strengthening, the patient’s tolerance should be assessed. Another factor to consider is the purpose of the exercise: range of motion, passive stretching, low-load stretching, or strengthening.

- For range of motion and passive stretching consider the stage of healing, status of affected tissues, and the focus of the exercise. For delicate structures, therapists may for 2 sets of 5 repetitions or simply 1 set of 10 repetitions. If more aggressive stretching is needed, the sets and reps may be increased to 2-3 sets of 10-15 repetitions.

- For strengthening, the intent of the exercise is to fatigue the target muscle(s). Because of this, an exercise may cause fatigue with 1 set of 15 repetitions or it may not occur until 3 sets of 15 repetitions.

- For low-load stretching, the exercise should be performed for a minimum of 30 second intervals to be effective. The maximum for a low-load stretch depends heavily on the amount of force.

When should exercise(s) be stopped, placed on hold, or discontinued?

- Exercises that are causing increased pain or edema should be stopped.

- Exercises that cannot be performed due to joint instability should be stopped.

- Exercises that are not effective for their intended purpose should be stopped or discontinued.

- If a patient has a change in status reporting increased pain, swelling, or instability with exercises or following treatment then exercises should be stopped and revised.

- If a patient’s pain level increases, exercises should be placed on hold until the patient’s pain is able to be managed.

Does the speed of exercise performance matter?

- For all exercises to be effective, they need to be slow and controlled.

- Passive range of motion or stretching exercises should take the target tissue to the point of stretch and be held in this position for 10 seconds.

- Active range of motion and strengthening exercises should be performed slowly and held for 3-7 seconds to achieve maximum muscle contraction and build strength and endurance.

- Endurance training requires a consistent speed in order to be effective.

- Plyometric training is the only exception to this and it requires quick motions.

FINAL Thoughts...

Should exercises be painful?

- No exercise should ever be painful.

- The old saying of “No pain, no gain” is no longer considered valid.

- Exercises may elicit soreness, muscle spasms, cramping, or a tightness which can be uncomfortable but they should never be considered PAINFUL.

- Be sure to explain the difference between soreness and pain to the patient.

References


- www.wikipedia.org