

POST-OPERATIVE FUNCTIONAL RECOVERY SHOULDER PROGRAM

ACTIVE ASSISTIVE RANGE OF MOTION (AAROM)

Initiated during the period of 4 to 6 weeks after surgery or at the discretion of your Physician and Rehabilitation Professional.

By definition AAROM means that your involved arm begins to participate in the production of movements. These productions of movement are still being supported by the combination of the UE Ranger and your non-injured arm. **The degree to which your involved shoulder contributes to the production of motion will vary as you re-learn new motions, gain new strength and or as you fatigue. The UE Ranger and at times your non - injured arm should be providing the necessary support of movement to insure the execution of healthy biomechanics at all times.**



Frequency of use

Due to the wide ranges of degrees of difficulty in this Phase of AAROM, your rehabilitation professional will specifically guide you as to which levels function as maintenance value for you and which levels continue to pose a challenge. A challenge level is individualized, and it can be described as your mountain top climb, whereas a maintenance level can be described as a foothills climb. Both levels require your attention to details and adherence to the guide of this manual as well as your rehabilitation professional's instructions. You can expect a greater level of fatigue in Phase Two as opposed to Phase One, as well as a greater risk of straining yourself or "overdoing it."

For these reasons it is very important to always recognize the:

- Quality and speed of your motion (Biomechanics)
- The potential for soreness one to two days after your mountain top workout
- Opportunity for gain
- Importance of continuing "foothill" efforts one to two days following a "mountain top climb." This ratio will depend upon the intensity level of your workout and your general condition among other factors

Foothills Climb - Definition:

1. Requires attention to quality of motion and speed
2. Patient will have moved, felt and seen the planes of motion in Phase One
3. Feels like a mild to moderate effort with mild fatigue and absence of significant pain
4. Always finish with an appropriate cool down

Mountain Top Climb - Definition:

1. Requires attention to quality of motion and speed
2. Patient will not have had significant prior experience of motion feel and effort in terms of intensity
3. Planes or directions of movement as well as level of range reached may be new
4. Feels like a moderate to significant effort to a point of moderate fatigue and with potentially mild levels of pain
5. Always finish with an appropriate cool down

AAROM Goals

- Preserve the integrity of the surgical repair
- Maintain resolution of pain and swelling
- Preserve the integrity of the circulatory system's role in healing and prevent capsular adhesions and or myo-fascial restrictions
- Preserve primary or diaphragm produced respiration absent of neck and shoulder bracing
- Preserve the capacity to achieve restorative sleep and minimize the need of medications with their resultant side effects
- Facilitate neuro-muscular re-education to support the reintegration of coordinated motor activity (synergistic movement productions)
- Maintain resolution of a balanced ANS, absent of the fight or flight influences (evidenced in part by balanced motor tone when at rest)
- Establish variable planes graded strengthening/endurance program free of compensatory patho-mechanics
- Efforts will continue with your rehabilitation professional to gain further PROM
- Reintegrate the shoulder girdle synergistic motor activity into the full body kinetic chain supportive system

CAUTION SHOULD BE GIVEN TO THE AMOUNT OF EFFORT THAT IS GIVEN FROM THE INVOLVED UPPER EXTREMITY IN ALL OF THE FOLLOWING PROGRESSIONS. UNTIL YOU HAVE BEEN SPECIFICALLY INSTRUCTED BY YOUR THERAPIST AND HAVE DEMONSTRATED SAFE TECHNIQUE, DO NOT ADVANCE YOURSELF IN ANY OF THE FOLLOWING LEVELS.

CAUTION NEVER CONTINUE MOTION IF YOU ARE EXPERIENCING ANY PROGRESSION OF PAIN. ANY PAIN STEMMING FROM USE OF THE UE RANGER COULD BE RELATED TO THE FOLLOWING REASONS:

Reasons for Pain:

- Not fully trusting your arm's weight to the support of the UE Ranger
- Going too fast
- Failure to support correct biomechanics (foundation and quality of your movement production)
- Over extending your current physical capacities

Production of Movement

Progression of Forward Reaching and Elevations

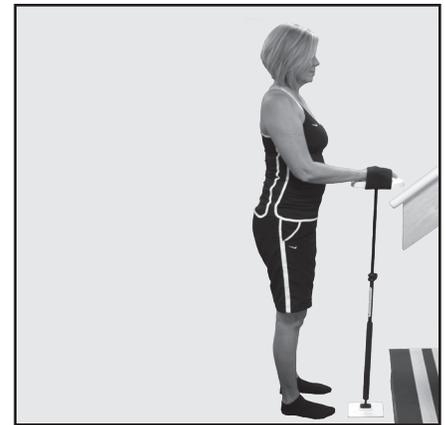
- All production of movement should be with the combined efforts of the following three criteria:
 1. Movement of the involved arm without pain and or compensations
 2. Necessary support of the UE Ranger
 3. Necessary support of the non-involved arm
- Always begin with a warm up, the base on the ground or platform, and the overall UE Ranger working height at a comfortable level.
- Progressions in degree of difficulty are described and illustrated below. As you progress, your rehabilitation professional may encourage you to perform a specific sequence of these challenges and benefits. The progressions including volumes per exercise session within each of these levels should only be initiated under the guidance of your rehabilitation professional.

Closed Kinetic Chain – Floor to Platform Support

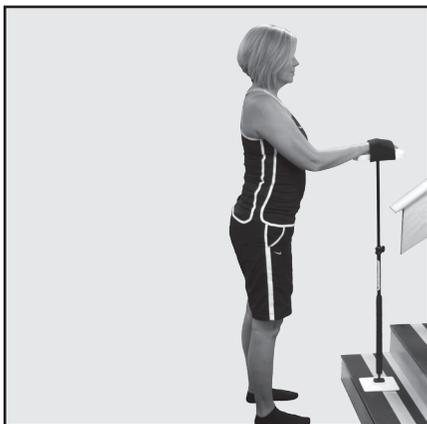
Begin by positioning the UE Ranger (adjusted to a comfortable height) under the involved upper extremity (figure 1).

You will recognize this position and subsequent progressions as those performed in the PROM phase. The difference is the only support of motion is the UE Ranger and your involved upper extremity. If needed intermittently, your non-involved hand can still participate as an external support of position and movement.

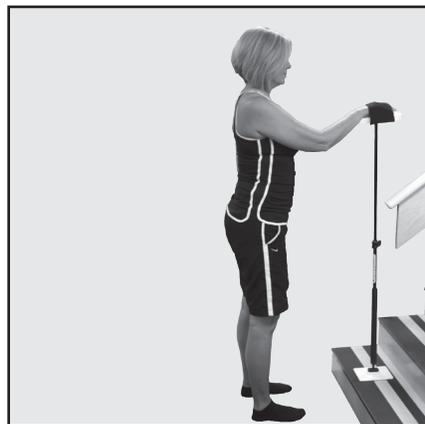
Within your capacity to produce healthy biomechanics increase your elevation heights by placing the base on progressively increasing platform heights (figures 2-6).



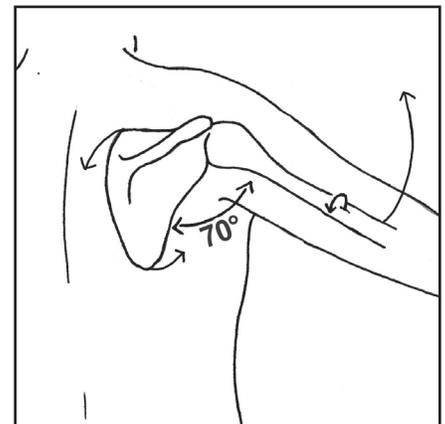
s FIGURE 1



s FIGURE 2



s FIGURE 3



s ILLUSTRATION A

Clinical Note: Within the home the first couple of standard stairs will support an appropriate progression of height intervals. However, progressing to the 3rd stair typically produces a compromise in biomechanics due to the distance away from your body. Therefore between the available adjustments in height within the UE Ranger and the necessity to improvise possibly with a foot stool or appropriate chair height will most appropriately serve your supportive requirements. At all heights which support elevation greater than 70 degrees, your therapist will instruct you in the proper execution of rolling your humeral head and shoulder blade outwards as in (Illustration A).



s FIGURE 4



s FIGURE 5



s FIGURE 6

As a means of securing a carryover of functional gain without the delayed onset of muscle soreness from this exercise and those to follow, it would be helpful after any challenge to your current capacities to perform one to two sets of familiar motion (figures 7 and 8) of “Pure Spin” at a lower height intensity, still within AAROM guidelines or even PROM depending on the patient’s level of fatigue or soreness.



s FIGURE 7

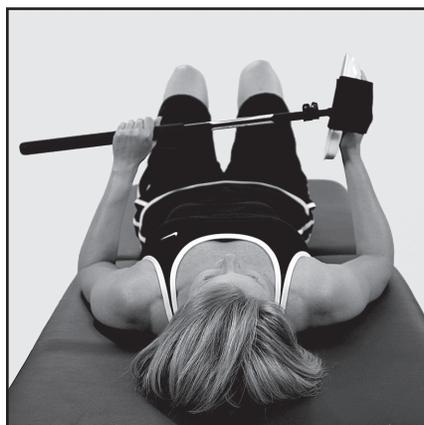


s FIGURE 8

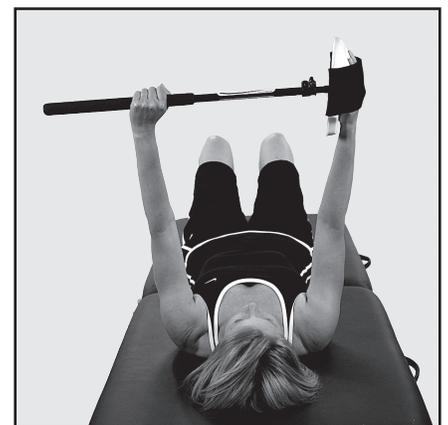
Open Kinetic Chain - Hook-lying Position

Beginning with the UE Ranger in the fully closed position (figure 9) elevate your involved upper extremity from a resting position to a vertical position or 90 degrees of flexion (figure 10).

Due to the potential strain of the shoulder muscles in the early stages of this exercise, extreme caution should be observed both in initiating this motion and returning to rest in the 0 to 90 degree range.



s FIGURE 9



s FIGURE 10

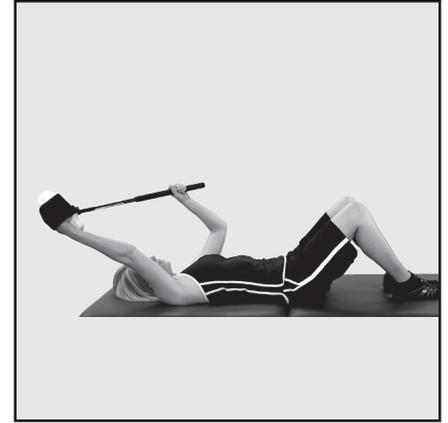
The 90 degree position can be a “home base” position for both rest, and progression of movement in varying planes (figures 11-13).



s FIGURE 11



s FIGURE 12



s FIGURE 13

For maximum support you will want to position the guidance handle above the involved shoulder to oppose gravity.

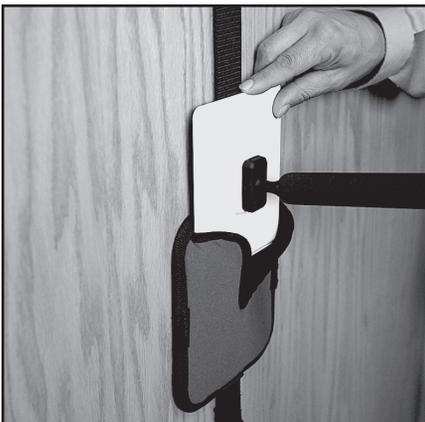
Closed Kinetic Chain - Door Mounted System

Indications:

- Execute if a person is challenged in the 70 to 110 degree range of AAROM with the base on the progression of height intervals
- Execute when a person can elevate their involved UE to 40 to 70 degrees with AROM and without compensations
- Precursor to Open Kinetic Chain Elevation – Standing Position

Set up adjustments

* Note – Be sure the door mount’s strap and buckle are appropriately tightened and secured. Completely insert the base of the UE Ranger fully into the pocket of the Home Door Mount (figure 14). With all Door Mount exercises it is necessary to keep a **slight** direct pressure through the UE Ranger against the door as shown by the arrow in (figure 15). This activates the muscles that support the initiation of the movement and also prevents the pocket from sliding to the right or left.



s FIGURE 14



s FIGURE 15

Per the guidance of your therapist, position the pocket and respective UE Ranger adjustments such that you begin your execution of elevation approximately 20 degrees of shoulder joint movement below that of where you have demonstrated the onset of either compensations and or fatigue. (If you fatigue or begin to shrug or produce any other form of compensation at 60 degrees then adjust your set up to begin the execution of elevation at 40 degrees as in (figure 16).

Within this setup, your body and the guidance tubing angle of the UE Ranger in relation to the Door Mount should be in the range to best offer both:

1. A mechanical support
2. The capacity to elevate your shoulder up to 20 degrees from your starting height, for example to 60 degrees (figure 17) from the 40 degrees in the above example



s FIGURE 16



s FIGURE 17



s FIGURE 18



s FIGURE 19

As indicated and instructed by your rehabilitation professional, you can progress yourself in the intensity level by raising the height of the pocket and or length of the UE Ranger to the recommended level and appropriate challenges (figures 18 and 19).

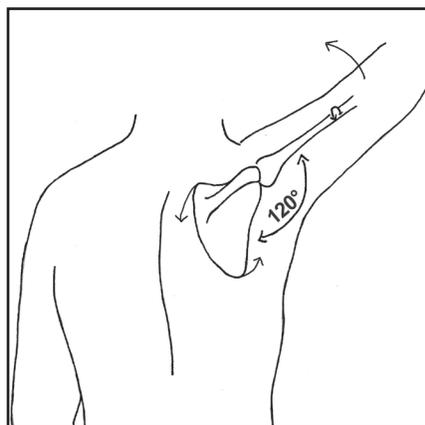
Open Kinetic Chain Elevation - Standing Position

Begin with the UE Ranger positioned under the involved upper extremity (figure 20).

Assisting as needed progress according to the proper biomechanics per (Illustration B) the involved upper extremity through the current available range of motion (figure 21). It is recommended within the safe limits of your involved shoulder to actively participate in the full execution of this motion.



s FIGURE 20



s ILLUSTRATION B



s FIGURE 21

Open Kinetic Chain External Rotation - Standing Position

Begin as described to you by your rehabilitation professional with the involved upper extremity supported in a position within the scaption plane and in a comfortable level of elevation. It is advised to maintain some form of external support for the elbow to rest on (initially that can be a family member's hand) (figure 22). Progress as needed to assist the involved upper extremity through the current available range of external rotation motion. It is recommended (within the safe limits of the involved shoulder muscles) to fully participate in the execution of this effort of motion. (figure 23).



s FIGURE 22



s FIGURE 23

It is advised however to maintain some form of external support for the elbow to rest on. Attention is advised to insure you are producing actual shoulder rotations without mistaking either elbow or forearm movements. For maximum benefit insure that your motion is opposing gravity.



s FIGURE 24



s FIGURE 25

Within the safe limits of your capacity to support healthy biomechanics, progressively elevate your upper extremity utilizing a wall for a progressive external support as illustrated (figures 24-27), or possibly an appropriate height of book shelves as appropriate.

Gradually return to lower levels and produce pure external rotation with or without support of the elbow at your side as a cool down.



s FIGURE 26

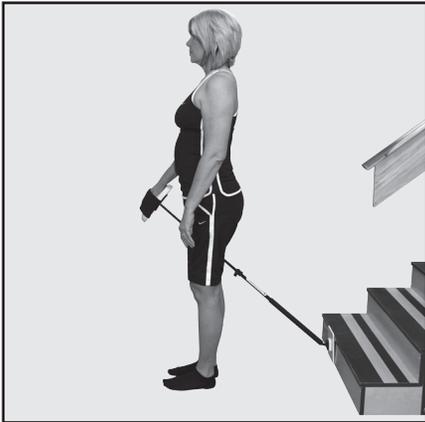


s FIGURE 27

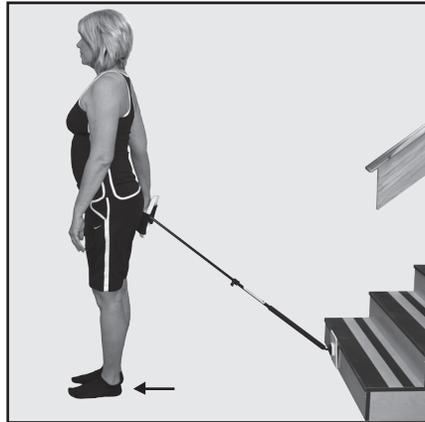
Additionally you can perform the cool down progression as you learned in Phase One.

Active Assistive Range of Motion (AAROM) Closed and Open Kinetic Chain Internal Rotation – Standing Position

Begin with your body standing approximately 3 feet away from a stair case, position the base of the UE Ranger against the vertical portion of the first or second stair. Adjust the length of the UE Ranger to support the involved upper extremity in a neutral shoulder alignment, with the elbow bent to approximately 50 degrees or sufficient to comfortably support the weight of the involved upper extremity with the hand out ahead of the body at approximately the height of your hip joint and as shown in (figure 28).



s FIGURE 28



s FIGURE 29

Begin by first actively stepping forward with your feet to the point of achieving a position of your hand slightly behind your hip as shown in (figure 29).

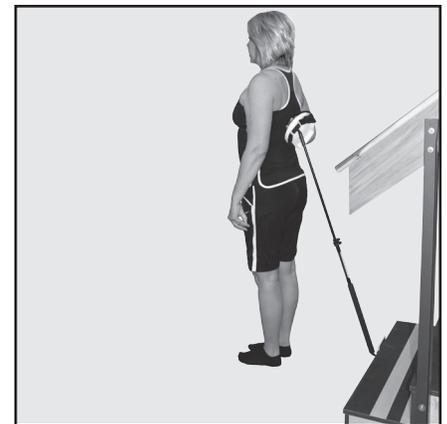
Next, while simultaneously combining a single side step toward the involved upper extremity, position your involved arm behind your back to the point of a mild stretch to your shoulder as shown in (figure 30).



s FIGURE 30



s FIGURE 31



s FIGURE 32

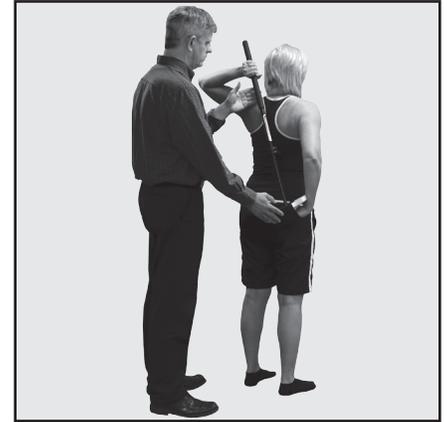
Available options in progressive order of challenge from this point are to:

- While maintaining this relaxed and supported position, sustain this position of a mild stretch for up to 30 to 40 seconds or the duration advised by your rehabilitation professional.
- Progressively step back, allowing the combination of movement production from the involved upper extremity and the support of the UE Ranger and stair to position your shoulder into combined and progressive motions as in “walking up your back” as shown in (figures 31 and 32). If advised by your rehabilitation professional, return to the previous stage and repeat this motion sequence multiple times as a means of integrating the effort through your full body.
- Repeat as described in the second bullet point, however without the involvement of your lower extremities walking back and forth. Thus with the support of the UE Ranger and stair case actively produce motions beginning as in (figure 30) above and elevate as able to your current allowable end range for example in (figure 32) above.

Open Kinetic Chain Internal Rotation – Standing Position

To position yourself utilize the assistance of a family member or friend as shown in (figure 33).

If there is no one available place the UE Ranger on a piece of furniture of the appropriate height such as a couch, kitchen table or bed. Standing with your back to the furniture place your hand in the hand support (figure 34) then turn your body so that your back is toward the UE Ranger (figure 35) and finally grasp the handle as in (figure 36) to allow for proper positioning.



s FIGURE 33



s FIGURE 34

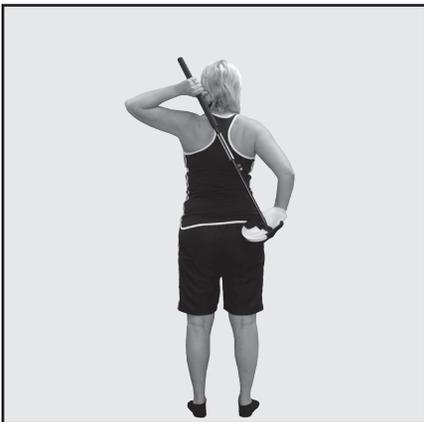


s FIGURE 35



s FIGURE 36

As a means of isolating the mobility, strength and endurance requirements associated with the dynamics of progressively “walking up the back”, it is very helpful to repetitively perform the following sequence of mobility through your progressive capacity beginning as illustrated in (figure 37) and progressing through your available range of motion as shown in (figure 38).



s FIGURE 37



s FIGURE 38

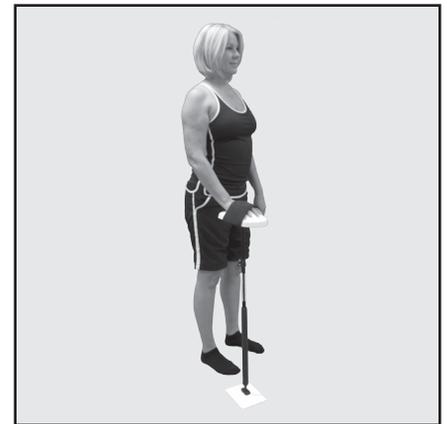
As a means of securing the intended benefits of this exercise and thus realizing a carryover of functional gain without the delayed onset of muscle soreness, it would be helpful to perform one to two sets of familiar motion of “Pure Spin” at low intensity AAROM or PROM depending on your level of fatigue or soreness.

Neuro-Muscular Re-Education: Integration of the Dynamic Scapular Stabilizers, Lower Trapezius and the Serratus Anterior Muscles with the Rotator Cuff Muscles

Recall as instructed to you by your rehabilitation professional that the intensity of your efforts within this section are to **be at a very subtle level** as to allow you to feel the intended activation of the respective muscles in need. To assist you, recall the analogy of comparing a standard on/off light switch with that of a dimmer switch. In a standard switch you have an abrupt electrical connection producing an abrupt outcome. With a dimmer switch you have an ability to grade the electrical output and thus a subtle but effective outcome. In order to progressively recruit a particular muscle, one must subtly execute (dimmer switch) the prescribed movements versus an abrupt motion (standard on/off switch) absent of either the perception of proper execution or the sensation of a favorably altering motor activity. To further assist you we have highlighted each respective muscle with hash marks as to help you know where to feel the respective muscle activities.

Set up adjustments

1. Initially adjust the UE Ranger to support the elbow's natural carrying angle of the involved upper extremity (the patient at rest should not feel like they are either reaching or being pushed upward) (figure 39).
2. Next standing approximately 2 foot away from your first stair, turn your body either to 10:00 o'clock for right shoulders (with respect to 12:00 o'clock being straight ahead) or to 2:00 o'clock for left shoulders (figure 40).



s FIGURE 39



s FIGURE 40



s FIGURE 41

3. Finally position the UE Ranger's base against the back vertical wall above the first step and adjust the UE Ranger such that the top of the hand support is approximately at waist level to umbilicus height. From this height, orient yourself and the UE Ranger in a most comfortable position relative to their body and the support of the stairs (figure 41). NOTE: It is necessary within this application and for each muscle's re-education to keep a slight pressure through the UE Ranger towards the direction of the base plate and against the stair. Ideally utilize a carpeted stair to prevent the base from sliding versus a tile or wooden stair case.

Production of Movement

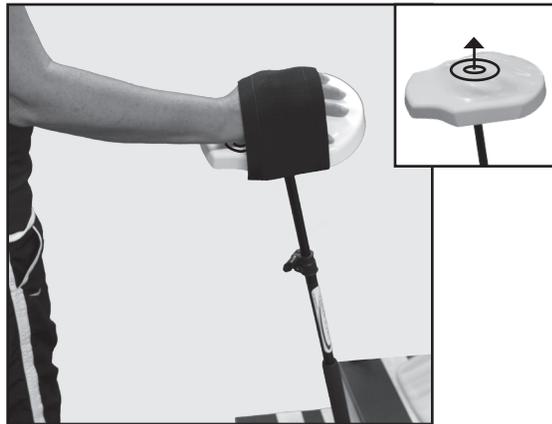
Clinical Note: If within post-surgical allowances, it is encouraged for proper strength and endurance requirements of normal ADLs that a patient establish the following sequence as able in order 1 through 5. As this becomes established it is advised, while sustaining steps 1 through 3 and adding the reciprocal alterations between steps 4 and 5.

Recall as described to you by your rehab professional to observe the awareness strategies of both the proper activations of each muscle involved. As well, being sure to stop for any of the following reasons:

1. Onset of pain
 2. Fatigue in the form of inability to facilitate intended muscle activation
 3. Onset of compensatory efforts in the form of a shoulder shrug, holding your breath, or tensing your neck and other unintended body parts
1. **As learned in the isolation of the Serratus Anterior muscle**, produce a combined movement execution of **slight** supination and **slight** radial deviation of the forearm and wrist respectfully and as shown in (figure 42). The patient should be instructed to focus a contact pressure of the hypo-thenar eminence into the hand support – not by pushing with the hand but rather the intension executed by the motions described above (figure 43 and supported by the concentric circles on the hand support as in a target). Also recall the benefit of unloading your involved arm by allowing the hand support to maintain optimal contact under the center of your palm as also illustrated in (figure 43).



s FIGURE 42



s FIGURE 43

2. **To facilitate the activation of the Lower Trapezius muscle**, while maintaining the activation of the Serratus Anterior muscle, initiate a very slight projection outward of the inferior angle of the shoulder blade.

Note the projection of the scapula's inferior angle being directed both towards the action of the Serratus Anterior and now the Lower Trapezius demonstrated by the path towards your elevating elbow as shown in (figure 44 and supported by the arrows).



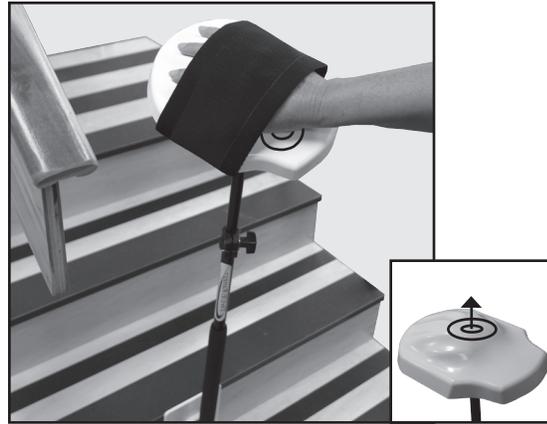
s FIGURE 44

3. **As learned in the isolation of the Supraspinatus muscle** while maintaining the activation of the Serratus Anterior and Lower Trapezius muscles, produce with the intention of giving a partial “thumbs down” as shown in (figure 45).

The patient should be instructed to focus a contact pressure of the thenar eminence into the hand support – not by pushing with the hand but rather the intension executed by the motions described above (figure 46 and supported by the concentric circles on the hand support as in a target). Also recall the benefit of unloading your involved arm by allowing the hand support to maintain optimal contact under the center of your palm as also illustrated in (figure 46).

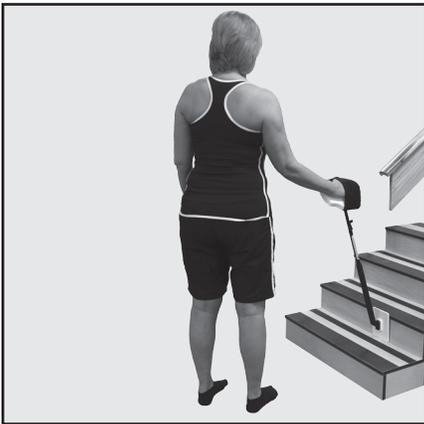


s FIGURE 45



s FIGURE 46

4. **As learned in the isolation of the External Rotator muscles**, initiate movement into the transverse plane via a combined movement execution of external rotation of the shoulder and slight supination of the forearm as shown in (figure 47).



s FIGURE 47



s FIGURE 48

5. **To facilitate the activation of the Internal Rotator muscles**, while maintaining the activation of the Scapular stabilizers and the Supraspinatus, initiate movement into the transverse plane via a combined movement execution of internal rotation of the shoulder and slight pronation of the forearm as shown in (figure 48).

Clinical Note: If within post-surgical allowances, it is encouraged for proper strength and endurance requirements of normal ADLs that a patient establish the above sequence as able in order 1 through 5. As this becomes established it is advised, while sustaining steps 1 through 3 and adding the reciprocal alterations between steps 4 and 5.

Return to the starting position and repeat the above executions up to the amount prescribed by your rehabilitation professional, stopping for any of the following reasons:

1. Onset of pain
2. Fatigue in the form of inability to facilitate intended muscle activation
3. Onset of compensatory efforts in the form of a shoulder shrug, holding your breath, or tensing your neck and other unintended body parts

Clinical Note: Still within the support of the UE Ranger and either the Door Mount or appropriate substitution, it is recommended that as you successfully facilitate the desired muscle(s) that you immediately utilize this new activity within the execution of an appropriate functional replication such as forward reaching as in (figures 49 and 50) and or progressive elevations with the thought of reaching for progressive shelf heights as demonstrated in (figures 51 and 52). Remember to progressively involve the strength support of your core and legs as your task replications become of greater and greater demand. With respect to reintegrating these desired new participation of muscular coordinations, it is encouraged to produce up to 12-15 repetitions and up to 2 sets being sure to stop at the onset of pain and or any sign of fatigue such that movement quality resorts to compensations.



s FIGURE 49



s FIGURE 50



s FIGURE 51



s FIGURE 52



s FIGURE 53



s FIGURE 54

As a means of securing the intended benefits of this exercise and thus realizing a carryover of functional gain without the delayed onset of muscle soreness, it would be helpful to perform one to two sets of familiar motion (figures 53 and 54) of “Pure Spin” at a lower height intensity, still within AAROM guidelines or even PROM depending on the patient’s level of fatigue or soreness.