Improving Function & Awareness

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About the Author & Presenter
Jan Davis, MS, OTR/L, is an internationally recognized leader in educational programs developed for health care providers, families and caregivers of stroke survivors. She received her NDT training in Switzerland with Patricia Davies and Berta Bobath. She founded International Clinical Educators in 1983 and since then, over 40,000 therapists have attended her workshops and used her training materials worldwide.

About International Clinical Educators, Inc.
ICE is dedicated to providing high-quality educational programs for occupational therapists, physical therapists, nurses and assistants working with stroke survivors. All programs are designed to give practitioners practical treatment ideas that can be used in acute care, rehabilitation, skilled nursing, outpatient and home health settings.

Also available:
- Treatment Strategies in the Acute Care of Stroke Survivors
- Functional Treatment Ideas and Strategies in Adult Hemiplegia

StrokeHelp®: Improving Function and Awareness
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Occupational Therapy Program
How to Use This Learning Module

The learning module is designed to be interactive. Watch the video for each program and follow along in this text. As you watch, you’ll also be participating.

Although you may view the videos in any order, we recommend that you watch them in the order they appear within the series. While viewing each video, refer to the corresponding section in this Workbook for additional written information specifically developed for that particular program.

**Pause and Practice: Practical Lab Sessions**

There are 2 individual practice labs illustrated and identified throughout this learning module. Each is extremely important.

While viewing the video, the symbol 🌐 will appear in the lower left-hand corner of your screen. At this point, pause the program and refer to the corresponding page in the Workbook, noting the Pause and Practice boxes. Follow the directions stated in the Workbook to practice the therapeutic method illustrated.

During each practice lab, write down your observations in the space provided. It is helpful to practice each therapeutic method with a partner and try it more than once. As you practice, you will feel more comfortable with each method. After you’ve “practiced, observed, and analyzed,” continue with the video portion of the learning module.

**CEUs**

Your learning module will be complete when you have watched all of the video segments, finished all of the practice labs, and successfully taken the learning assessments.
Handling Methods
The treatment methods chosen for this learning module were carefully selected in order to provide success with the majority of your patients with hemiplegia.

In treatment, your handling should be firm but never forceful. Nothing in this series should ever hurt or be painful. If you or your patient finds any method uncomfortable, stop. If at any time you do not feel safe, stop and get assistance.

When practicing with a partner, give each other feedback. Your handling will improve as you and your partner share information.

Why We Analyze Normal Movement
Before we begin, remember that all therapeutic methods are based upon normal patterns of movement. To fully understand the therapeutic value of each treatment idea, you may want to observe your own specific movement patterns during the activity you choose for your patient.

- Notice the sequence and patterns of your movement.
- Notice the amount of trunk rotation, weight shift, and proximal control required for distal function.
- Notice the placement of your hands and wrists during activities.

The better you are at observing and analyzing, the better you will identify and treat your patient’s key problem areas.

A great variety of movements and patterns of movements are possible during activities or tasks taken from normal daily routines. Rather than say “normal,” perhaps it is better to say “typical movement patterns” or “common patterns of movement”. A variation on “normal” does not necessarily mean “abnormal”. The more observations we make of people without central nervous system dysfunction doing functional tasks, the easier it will be to identify abnormal patterns of movement typical of patients with hemiplegia.
Learning Objectives

- Describe the therapeutic benefits of this approach.
- List three benefits of positioning stroke survivors on the affected side during bed rest.
- List four treatment principles which promote improved function and awareness.
- Identify three ways to incorporate a nonfunctional upper extremity into a functional task.

Introduction to Improving Function & Awareness

There are many things we can do to help increase a stroke survivor’s potential for functional gains after a stroke. The following ideas can be used by many members of the health care team: physical therapists, occupational therapists, nurses, aides and assistants.

The more we incorporate the weak side into everyday real-life functional tasks, the more possibilities there are to maximize the highest level of recovery. Use every opportunity to help patients improve and reach their maximum potential. Help patients learn to integrate the involved side along with the non-involved side.

This program will give you basic information on how to incorporate the involved side into activities taken from real-life situations, which are best at improving function and awareness of the involved side. Examples of treatment ideas are included on the video. These are just a few ideas. You may take these same concepts, modify them and then apply them to almost any situation in your own treatment settings.

Therapeutic Benefits of this Approach

- Increased awareness of the involved side.
- Decreased fear and neglect.
- Improved use of the involved upper extremity.
- Improved joint range of motion of the involved side.
The Five Basic Treatment Principles

In order to maximize the therapeutic benefits of this treatment approach, incorporate as many of the following basic treatment principles as possible into each of your treatment sessions.

Encourage Weight shift over the Hemiplegic Side

Weight bearing over the hemiplegic side is the most effective way of regulating tone. It also provides sensory input to the involved side through proprioception. As the patient’s awareness of the involved side improves, fear and neglect will decrease.

The positive effects of weight bearing can be observed in nearly every stage of recovery. Correct weight bearing can be as simple as positioning the patient in sidelying on the weak side in bed or as difficult as the facilitation of stance phase during gait training. When weight bearing is introduced to the patient early in the program, the benefits can be seen throughout the rehabilitation process. Even when you work with patients who are longer term post-stroke, the introduction of weight bearing into daily tasks can still be extremely beneficial.

Encourage Trunk Rotation

Trunk rotation, or dissociation of the upper and lower trunk, is another very effective way of promoting normal movement throughout the upper and lower extremities. Hemiplegic patients often move in a “blocklike” pattern, with little separation of pelvic girdle and shoulder girdle. To facilitate normal movement, the therapist should set up activities to stimulate or facilitate trunk rotation. As trunk musculature becomes activated, patients will become more stable and have better potential for upper extremity function.

Setting up the task at different heights and on each side of the patient incorporates not only the rotational components of movement but mobilizes the shoulder girdle and pelvic girdle as well. Additional benefits from activities facilitating trunk rotation include: increased sensory input to the involved side, improved awareness of the involved side, and better compensation for visual-field deficits.

Put Muscles on Length

It is common for hemiplegic patients to become “shortened” on the involved side as muscle tone increases. A common posture for some patients is scapular retraction with downward rotation while the pelvis is in retraction. This posture can eventually lead to soft-tissue tightness.

During therapeutic activities, encourage your patient to gently put muscles on length in order to prevent tightness. This can be accomplished by selecting a task or by placing the activity in such a way as to require gentle stretching of the trunk and extremities. Do not position the patient or the activity in such a way as to cause the patient to lose their balance.
Encourage Forward Flexion
Stroke survivors often have difficulty flexing forward. This is due in large part to hip extension (a strong component of lower-extremity extension synergy), posterior pelvic tilt and fear. Difficulty in flexing forward can limit functional abilities such as sit to stand, surface-to-surface transfers, and lower extremity dressing.

Patients who have learned to come forward during the first few weeks of recovery are often less fearful. In addition, encouraging forward flexion with your patients helps to break up extensor tone of the hip, resulting in better selective control of the lower extremity. It also discourages posterior pelvic tilts, allowing for more normal patterns of movement as well as better alignment of the trunk and shoulder girdle. In sitting, you might ask your patients to reach toward their feet. Or, for fearful or lower-level patients, you can modify the amount of forward flexion by using a sturdy table and having them slide their arms forward, using the table as a support.

Encourage Scapular Protraction
The musculature around the scapula plays an important role in the overall recovery of the upper extremity. Proximal stability is necessary for distal function and the stability of the scapula is critical for hand function. However, for full active voluntary control of the upper extremity, the scapula needs to have full excursion as well.

Bringing the scapula forward into protraction helps to maintain the normal excursion of the scapula and also helps to regulate abnormal flexor tone of the upper extremity. Protraction of the scapula can be incorporated during bed rest (while in sidelying on the involved side), during dressing activities (flexing forward at the hips in order to place the hand in the shirt sleeve), or while sitting (wiping off the table) or standing (washing the car).

For more specific information on mobilizing the scapula, please see StrokeHelp®: Preventing Shoulder Pain.


Improving Awareness During Bedrest

The following methods can begin as soon as the patient is first seen at the hospital or can be introduced at anytime during your therapy program.

Position of the Patient

**In Bed**

The most therapeutic position is sidelying on the weak side. Make sure this position is included on a daily basis. (The exact procedure for bed positioning is included in the course: *StrokeHelp®: Bed Positioning and Mobility*.)

There are many advantages to positioning a patient on their weak side.

- They become more aware of this side due to weight bearing and increased sensory stimulation.
- They become less fearful of putting weight on the weak side.
- It can help to prevent painful shoulders as well as reduce the increased tone in upper extremity flexion synergies, which often occurs during recovery.
- It allows the strong side to be free to reach for objects from the nightstand.

**In Sitting**

Do not allow the arm to stay in the patient’s lap. Make sure that their involved arm is well supported on a surface, in front of them. It can be placed on the bedside table, on the counter along the bathroom sink, on the wheelchair lap tray, or on the dining room table. Be careful that the arm is fully supported. Do not allow a heavy arm to rest half on and half off the table. It can not only cause discomfort but could possibly cause problems with ulnar nerve compression.

There are many advantages to supporting the involved arm on a surface while sitting.

- It helps to support the trunk in a more symmetrical position, reducing flexion of the trunk.
- The arm is in their visual field, helping to reduce neglect.
- They are more likely to spontaneously use the hand, even as an assist or stabilizer.
- It helps to prevent dependent edema of the hand.
Environmental Factors: Position of the Patient in the Room

In addition to bed positioning of the patient, the actual placement of the furniture in the room can increase function and awareness of the weak side. Have the bed situated so the patient’s weak side is toward the door. This encourages staff, as well as family and friends, to approach the patient from the weak side as they care for and visit them. This helps improve awareness of that side. Have the nightstand positioned on the weak side so it encourages the patient to turn in that direction. Each time the patient reaches for the phone or water, trunk rotation with weight bearing on the involved side will be facilitated. The added stimulation on the weak side helps your patient to turn toward that side, decreasing neglect and helping them learn to compensate in the case of a visual-field cut.

The only exception: Make sure that the call light for the nurse is on the strong side, in the visual field, so the patient can reach it easily and quickly.
Improving Upper Extremity Function & Awareness

Three Ways to Include a Nonfunctional Upper Extremity into a Task

Even before movement returns to the nonfunctional extremity, you can encourage the patient to incorporate the involved hand into daily functional activities. Therapists should always include the nonfunctional upper extremity during functional tasks in one of the three ways described: weight bearing, guided movement or bilaterally. Each and every opportunity, large or small, can help the overall recovery of the patient by improving their potential for recovery.

1. Weight bearing/Stabilizer

Movement often begins within the context of a functional task, even before an exercise program begins. Incorporating the involved hand can be as simple as placing the arm on the table to support it in weight bearing or by holding or stabilizing an object.

Patients, who are positioned in this way, with the arm supported and used as a stabilizer, are more likely to spontaneously include that extremity into everyday tasks.

2. Guided Movement

Guiding is another method which can be used to help improve function and awareness of the hemiplegic side. It is incredibly effective. Guiding a patient during a task reduces the need for verbal cueing. In addition to encouraging more normal movement patterns, it is also very effective for patients with aphasia, apraxia, motor planning problems, and hemionopsia.

Guiding is best described as the therapist placing her hand over the patient’s hand in order to carry out the correct manipulation of objects during a task.

- Place your hand over their hand, down to the fingertips.
- Try to move with them in as normal a movement pattern as possible.
- Minimize talking, allowing feedback to come from the activity.
- Stand or sit where your movements are similar to theirs.
- Be sensitive to your patient’s movements; move with them and in a normal movement sequence.
- Guide both hands when possible (not just the weak hand).

**1 Pause and Practice with a Partner**

Select a simple task and following the above directions, guide your partner’s hands to experience this therapeutic method.
3. Bilateral

When patients use both hands together, at the same time, it helps improve awareness of the involved side and better integrates the involved side with the non-involved side. This can begin early in the rehabilitation process.

Teaching patients to clasp their hands together. Helps them remember the weak hand. For example, as they roll over in bed, keeping the hands together helps them avoid rolling onto the glenohumeral joint of the involved arm, which could cause impingement and subsequent pain.

Bilateral use of the upper extremities can also help patients inhibit their own abnormal patterns of movement. By clasping the hands together in order to take the foot on and off the footrest of the wheelchair, the patient brings the scapula forward, reducing flexor tone of the upper extremity and, at the same time, incorporating the involved hand into the task.

Bilateral use of the upper extremities can also facilitate dynamic trunk control. A patient’s base of support becomes narrower when the upper extremities are removed from weight bearing and used bilaterally during tasks in sitting or standing. Therefore, bilateral use of the upper extremities during tasks activates more dynamic trunk control.
Functional Treatment Ideas

Examples of Guiding, Weight bearing, and Bilateral Use During Function

This functional activity illustrates the three methods of including the nonfunctional upper extremity into everyday tasks: weight bearing, guiding, and bilateral. As the patient cuts the orange*, squeezes the juice and drinks from the cup, the involved upper extremity can be utilized throughout the activity. The glass juicer is especially good for patients exhibiting increased tone in finger flexion. The size is perfect for positioning the hand in slight finger flexion. The glass is rigid and keeps the fingers in the proper position.

Guiding can be unilateral or bilateral. Guiding is most commonly done with the involved hand, but there may be times during the activity when you will be guiding both hands. If your patient has bilateral weakness or if your patient has motor-planning problems, you may need to guide both hands.

At the end of the task, wiping off the table is a perfect example of bilateral use of the upper extremities. Place the involved hand on the cloth or sponge and the non-involved hand over the weak hand. This method of bilateral activity encourages trunk rotation and weight shift toward both sides. It is simple and easy to do. It is not contrived but realistic and appropriate for patients to clean up their own spills. *Never spill something on the table just to have the patient do this bilateral task!*

This is a good activity for lower-level patients. It is simple, inexpensive, and can be accomplished within 30 minutes in any setting: acute care, rehabilitation, skilled nursing, or home health. You don’t need expensive equipment or even a kitchen. For higher functioning patients, you could increase the complexity while working in standing and even include ambulation while gathering the supplies needed. Making orange juice with your patient is purposeful and gives them a sense of accomplishment.

*A Safety Tip About Using Sharp Knives*

A fairly sharp knife is necessary for this task, but safety is a concern. The safest method is to place the knife in the patient’s involved hand and then guide their hand to cut the fruit. This way you control the movements of the hand holding the knife. As your patient stabilizes the object with their other hand, place your other hand over theirs for additional safety.
Summary of Benefits of Weight bearing, Guiding, and Bilateral
Incorporating the nonfunctional upper extremity in weight bearing or as a stabilizer

• Facilitates weight bearing over the involved side.
• Encourages use of the involved side.
• Improves awareness.

Guiding the involved upper extremity

• Promotes normal sensory information.
• Facilitates normal patterns of movement.
• Encourages compensation for visual-field cut.

Bilateral use of both upper extremities

• Allows the patient to incorporate the involved side without assistance from the therapist.
• Promotes symmetry.
• Facilitates dynamic trunk control.

Functional Treatment Ideas in Standing
Standing with your patients during functional activities is often more effective than standing in the therapy gym “just for practice”. Patients involved in a task often initiate more trunk control, have greater weight shift toward the involved side, and exhibit improved endurance.

When standing your patient, provide a solid surface in front of them. This can be a heavy, solid table, a bathroom sink, or a kitchen counter. Avoid unstable surfaces such as a bedside table.

Stand slightly behind your patient, on their involved side. Position yourself close to your patient so that your trunk and their hip make contact. Place your hands on each side of their pelvis, not their waist, for better control. Place their wheelchair (or chair) behind them in case they need to sit down quickly.

During the activity, incorporate the involved upper extremity and hand in the three ways previously mentioned: weight bearing, guiding, and bilateral. Begin activating dynamic trunk control. Have your patient reach for objects from different height surfaces to encourage trunk elongation and/or lateral trunk flexion.

Be sensitive to your patient’s response to standing. Observe breathing patterns, skin color, and temperature for signs of fatigue. Ask your patient if they need to sit down before it becomes urgent.
Standing with Fearful Patients During Function

Patients may become very fearful during standing. Providing a secure environment is the most effective way to help decrease this fear. A patient once told me, “Standing in the middle of a room feels like standing on the edge of a cliff!”

Full contact along solid, stable surfaces is extremely effective in decreasing fear in a stroke survivor. Also, finding an activity that shifts their focus away from standing and onto the task at hand is also very effective. Once the patient has become less fearful, slowly begin to shift their weight toward the weak side and onto the involved lower extremity.

I have found that patients will increase their weight bearing over the involved side if they initiate the movement and I don’t pull them toward that side.

Remember: Provide a wide base of support. A narrow base of support requires more dynamic trunk control.

If your patient is functioning at a low level or fearful, begin with a broad base of support. Pay close attention to the placement of their feet, hands and trunk. Position their feet approximately shoulder width apart. Provide contact with a solid surface in front of your patient and position both of their hands on the table surface. Your patient will feel more secure as they experience the stability of the environment. With your hands provide additional support as needed.

As your patient improves, begin to narrow their base of support. For example, allow one hand to remain in weight bearing and free the other hand to begin the task. Or, to encourage even greater dynamic trunk control, do an activity that requires bilateral use of the upper extremities, narrowing their base of support.
Home Exercise Program

Patients should be instructed in a home exercise program before leaving your facility. Instruct your patients to do this program at least once a day. Since it is easiest to do at a table, your patients could routinely do this program as they wait for a meal. The program takes only 10 or 15 minutes.

The exercises are done in sitting, but some can be modified to be done in supine.

- Start with a good base of support, feet flat on the floor and trunk forward (out of a posterior pelvic tilt) with arms resting on the table.
- Work proximal to distal, beginning with the trunk and shoulders before working with the wrist and fingers.
- Do the exercises in the same sequence, 10 repetitions each. This makes it easier for patients to remember.

The following exercises should never be painful. A patient should stop if any discomfort is noted. In rare cases pain may signify a malalignment of structures and impingement could occur.

**Stretching Forward with Scapular Protraction**
Have your patient clasp their hands together and slide them forward on the table surface. This encourages the patient to come forward out of a posterior pelvic tilt and also encourages scapular protraction. Repeat 10 times.

**Scapular Protraction with Weight bearing**
With the shoulder in full protraction, have the patient roll over onto the shoulder. This encourages weight bearing over the involved side, facilitation of dynamic trunk control, and trunk elongation. Repeat 10 times.

**Shoulder Flexion in Sitting**
With clasped hands, have your patient bring their arms up overhead. Instruct them to go only to the point of discomfort or to the point they feel resistance, and no further. If they follow these guidelines, this exercise will be safe. *Never force range or move beyond the point of pain.* Repeat 10 times.

**Shoulder Flexion in Supine**
If your patient has a heavy arm, has difficulty bringing it overhead, or has poor scapular gliding, have them do this exercise in supine.
Forearm Supination and Pronation
Have your patient sit with forearms on the table. Ask them to keep their elbows on the table and bring their hands palm side up and palm side down. This will promote forearm supination and pronation. If their elbows come off of the table, they may be substituting with trunk movements or internal and external rotation at the shoulder. Repeat 10 times.

Wrist Flexion and Extension
With hands clasped and elbows on the table, flex the elbows and ask the patient to bring the involved wrist into extension. It is okay for the non-involved arm to come off of the table, if the patient has tightness at the wrist. Repeat 10 times.

Finger Extension
At the end of the program, have the patient stretch one more time all the way forward on the table. Slowly release the strong hand from the involved hand. Have the patient lay their weak hand as flat and relaxed as possible on the table. Only once is necessary.

2 Pause and Practice with a Partner
Practice each of the above exercises with a partner. Help your partner with corrections and/or modifications as necessary.
Evidence Report for: “Teaching Independence: A Therapeutic Approach”

Evidence based practice (EBP) includes a review of current research results and is a part of our overall critical thinking process. EBP also includes use of creativity and reflection on previous experiences.

The research report below is not meant to be an all-inclusive, systematic review of the literature. Information is provided to promote evidence-based practice and strengthen our research discussion. Database searches will be expanded and additional resources will be added in future versions of this product.

Improving Function and Awareness

Improving Function
Research indicates that quality of movement and function can be improved in the hemiplegic upper extremity through focusing on meaningful tasks. Meaningful tasks in the research are based on goals, incorporate sensory motor techniques, and provide repeated and intensive task practice. This information is described in the following studies:

- Intensive task practice focused on preventing compensatory trunk movements while promoting the coordination of shoulder flexion-elbow extension may reinforce the development of “normal” reach patterns post-stroke (Woodbury, et al., 2009)
- Sensory motor training for persons 6 months to 7 years post stroke can lead to improved function and better quality movement. (Byl, N. N., Roderick, J., Mohammed, O., Hanny, M., Kotler, J., Smith, A., Tank, M., & Abrams, G., 2003)
- Using relevant, goal-directed tasks when addressing reaching skills promotes more typical patterns of movements than non-goal directed reaching tasks. (Urton, M. L., Kohia, M., Davis, J., & Neill, M. R., 2007; Ma, H. & Trombl, C. A., 2002)

Improving Awareness
Encouraging repeated and consistent attention to neglected space through use of activities within that space, can lead to improved cognitive-perceptual abilities for those who have had a stroke, as in the study below:

- Forced use of the neglected space, task-specific practice, and consistent interventions can lead to improved cognitive-perceptual abilities. (Ma, H. & Trombly, C. A., 2002)

Bilateral Activities
Research strongly supports the use of both the involved and the uninvolved upper extremities in a coordinated, task-based manner to improve movement, as noted in the studies listed below:


Home Exercise Programs
Researchers recommend providing support materials such as video, written or illustrated instructions to promote compliance with home range of motion exercise. The research from the following studies indicates range of motion exercise can lead to better outcomes

- A home exercise program that is designed to be self-administered, graded and repetitive can be an effective treatment method for improving arm recovery following stroke. (Harris. J. E., Eng, J. J., Miller, W. C. & Dawson, A. S., 2009)
- A range of motion exercise for bedridden older persons who have had a stroke may improve mental and physical functioning. (Tseng, C. N., Chen, C. H., Wu, S. C. & Lin, L. C., 2007)
- Use of video to support and reinforce home exercise programs tends to produce better adherence. (Kingston, G., Gray, M. A. & Williams, G., 2010)
- Home exercise program that are written and illustrated can lead to better movement of a hemiplegic arm over time. (Ma, H., & Trombly, C. A., 2002)