



ICE LEARNING CENTER  
INTERNATIONAL CLINICAL EDUCATORS, INC.

*Stroke Help*<sup>®</sup>  
FUNCTIONAL TREATMENT

IDEAS & STRATEGIES

IN ADULT HEMIPLEGIA  
SECOND EDITION

By Jan Davis, MS, OTR/L

UNIVERSITY EDITION  
STUDENT WORKBOOK

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### **About International Clinical Educators, Inc.**

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## INTRODUCTION

This distance learning program takes the learner through a step-by-step process of how to select and use functional activities taken from real life situations to help patients be more independent. The program is designed to be interactive. Watch the videos and follow along in this Workbook. We'll go through this process as we observe four patients:



**Tom**



**Clint**



**Alice**



**Dick**

You will also see other stroke survivors during the series, each illustrating elements of evaluation and treatment.

Tom had his stroke four months ago. His upper and lower extremity movements and function are typical of many stroke survivors we see in therapy today.

Clint has made great progress since his stroke four months ago. He's functioning at a high level. He is a good example of the need to continue therapy because pain and edema are limiting his functional abilities.

Alice had her stroke ten years ago. The high tone of her right upper extremity is limiting. By using functional activities we begin to see some nice changes.

Dick illustrates how we can use functional activities to both evaluate and treat problem areas that are specific to trunk control and weight shift.

## ❖ Introduction to Observation Skills

The following information will help you to improve your observation skills, the most important skill in gathering information. Skilled observation begins the moment you see your patient for the first time and continues during every treatment session; throughout the course of therapy. The more skilled you are at observation, the better therapist you will be. Therapists with exceptional observation skills will more readily identify key problem areas as well as incremental changes in progress.

### Remove extra layers of clothing

It is much easier to identify asymmetries if you can look at bony prominences or actual creases and folds in the skin. Ask your outpatient to wear a tank top or swim suit under their clothes to make the evaluation easier. It is important to respect your patient's privacy, so the evaluation may take place in their room, behind a curtain in the therapy area or in a quiet evaluation room.



### Determine the base of support

How the patient sits or stands can affect symmetry or asymmetry throughout.

The base of support can include any contact your patient has with a weight-bearing surface.

1. Are both feet flat on the floor?
2. Is their weight evenly distributed or are they sitting or standing with their weight on one side more than the other.
3. Are they resting against the back of the chair or are they seated without a back support.
4. Do they use one or both upper extremities to support themselves?
5. Are they seated on a support surface that is firm or soft?



A more accurate assessment of symmetry in sitting is possible when the patient sits on a firm surface, such as a solid mat table or bench. A patient sitting on a soft, high hospital bed, without support through their feet will demonstrate different problem areas than a patient sitting on a mat table, with their feet flat on the floor.

A wheelchair with a solid seat will encourage more symmetry in sitting than a wheelchair with a 'slung out' seat. A seat with poor support contributes to internal rotation and adduction of the lower extremities. Soft surfaces also impair weight shifts in sitting making lateral movements difficult.



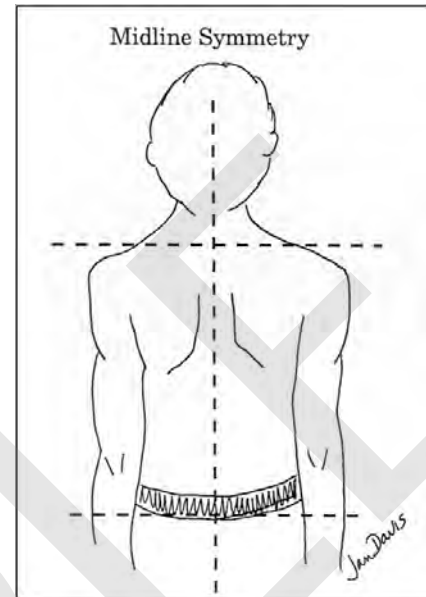
## Observations of Asymmetry

Observe the patient from the front, the side and from the back. Begin with the base of support, noting any asymmetry in weight bearing through the hips. In your mind's eye, draw three lines: one at midline, along the spine, one at the pelvis and one at the shoulders.

### Look for deviations from midline

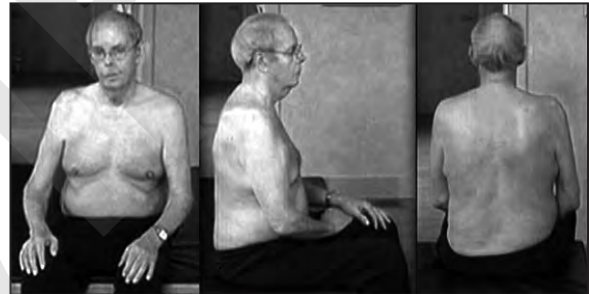
- Is the head in midline or off to one side?
- Is the medial border of the scapula equal distance to the spine on both sides?
- Is the scapula more pronounced on the involved side?

Look at the position of the pelvis and height of the shoulders to help determine asymmetries. Look for any clues or 'red flags' of asymmetries that help determine problem areas that need to be further investigated. The asymmetry doesn't tell the *cause* of the problem but it does help determine that a problem *exists*.



## Evidence of Asymmetry

- unilateral creases or skin folds
- bony prominences
- muscle atrophy
- position of head
- height of shoulders
- position of pelvis
- position of upper extremities
- position of lower extremities



## ❖ Observations of Clint

While observing Clint we can gather even more information.

- From the front, Clint looks fairly symmetrical.
- From the side, look at the position of the pelvis. It is not uncommon for stroke survivors to sit in a posterior pelvic tilt. When the pelvis is tipped posteriorly, the head and neck compensate by coming forward. This posture, although common, will affect the patient's symmetry, trunk control and ability to move from sit to stand. It can also affect their breath control, ability to swallow and vital capacity.
- Continue to observe from the back. Observe proximal to distal, noting any asymmetry in the upper or lower extremities. Are the lower extremities positioned symmetrically? Or, is it in abduction with external rotation? How is the upper extremity postured at the shoulder, elbow, forearm, wrist and hand?



### Dynamic Observations

Observations made while the patient moves are called *dynamic observations*. If your patient appears fairly symmetrical during static observation, it may be easier to see problems during dynamic observation. Continue to follow the procedure, as before. Complexity increases as more elements are added to the description of how the patient moves. When evaluating your patient during movement, look at both sides. Do they “hold” or “brace” with the non-involved side? Is there any limitation of movement?



**Look carefully as you describe your patient's movement components.**

1. Identify the starting position (sitting, standing, sidelying or supine).
2. Identify each joint and their direction of movement or combinations of movement.
3. Describe if their movement is through full range or partial range.
4. Describe the quality of movement on the non-involved side.



**Describe the quality of movement of the involved side.**

1. Does the patient move with selective, isolated control?
2. Are the movements in a pattern?
3. Describe the pattern of movement.
4. What movements or combinations of movements is the patient able to do?
5. Look proximal first and then more distal.
6. Continue to look from the front, the side and the back.
7. Ask your patient to move their sound side.
8. Compare the movement of the two sides.





# CLINICAL REASONING

## The Problem Solving Begins!

We've gathered a lot of information and now it's time to make sense of it all. With clinical reasoning the problem solving really begins! During *Clinical Reasoning* we need to identify and prioritize key problem areas. We determine the source of each problem based on our observations and interpretations, in order to develop the most effective treatment program.

## Identifying the Key Problem Areas

To treat hemiplegia most effectively, it is essential to first identify key problem areas so that the treatment is specific to the primary underlying problem. Evaluating a patient and identifying key problem areas are the equivalent of doing good detective work. Treating a person recovering from a stroke is complex and many problem areas are associated with adult hemiplegia.



Key problem areas are determined through interview, specific observations, handling and moving the patient. I make sure that I compare and contrast the patient's movement with normal movement. As a therapist, your ability to analyze normal movement and the components of normal movement within a functional context are essential to good evaluation and effective treatment. Be specific in your analysis and description of problem areas.

## Prioritizing Key Problem Areas

Next, prioritize the identified problem areas. Select two or three key problems that, if remedied, would have the greatest overall impact on your patient's functional status. Determine which key problem areas can be realistically treated in your setting. Keep in mind time constraints such as the patient's tolerance to activity, length of stay and financial considerations.



Do not assume that the loss of motor control will always have the greatest impact. Sensory loss, fear, neglect or cognitive impairment also could be key problem areas. *The two most important prognostic indicators in determining my patient's ability to function are cognition and sensation.* If my patient has good cognition and good sensation, they have a much better chance at becoming independent. If my patient has good motor recovery but poor cognition and sensation, they are less likely to be safe and independent.

With the following patients we'll combine *what we see*, *what we hear* and *what we feel* and begin the clinical reasoning process.

### Interpretation: Determining Underlying Factors (Impairments)

It's important to separate interpretation from observation. All of us should have seen basically the same things when we observed Clint and Alice. However, how we interpret what we have seen can be very different. How we interpret the information we've gathered is based largely on our knowledge and experience. If you have one year of experience in the acute care hospital and seldom see a stroke patient more than one week post stroke, your interpretations will be very different from a therapist who has ten years of experience working with a stroke patient over a period of several months in inpatient, outpatient and home health.

Look at movement patterns that are deviations from normal and begin to ask yourself "Why?" The same holds true for asymmetries noted. Asymmetry tells us there's a problem but doesn't tell us the cause. We need to determine the source or the cause of each problem before we can plan an effective treatment program. The source of the problem can also be described as the underlying factor or impairment. Once underlying factors are identified it is much easier to plan our treatment strategies.

### Underlying factors or impairments related to stroke

- motor control
- sensation
- perception
- cognition
- communication
- environmental factors



Impairments that occurred prior to the stroke may include:

- surgical procedures
- previous injuries
- secondary diagnosis

### Examples of Observation and Interpretation

We noticed in the Evaluation segment that Tom's head was not in midline and that Clint had a winged scapula. I take these observations and think "why?" What could be some possible reasons? What are the underlying factors? We should all see the same problems but we may each think of different reasons why the problems exist. The answers to "Why?" help me to interpret my observations and form the basis of my clinical reasoning.

The following could be reasons why a stroke survivor's head would not be in midline:

- tightness of the upper trapezius
- compensation for visual field deficit
- neglect or disregard
- midline orientation deficit
- uneven weight bearing and the head 'rights' to one side as a result



Let's take another example of a problem that is not uncommon in hemiplegia; winging of the scapula. We've all learned in school that the most common reason for a winged scapula is weakness of the serratus anterior. This may be true of a patient with orthopedic involvement, however, in hemiplegia, winging of the scapula is often caused by increased tone of the internal rotators of the humerus. Abnormal tone of the subscapularis is a likely cause of internal rotation of the humerus resulting in winging of the scapula.



Why is it important to know the cause? It's important because how we interpret or determine the underlying factor as the source of the problem will affect the kind of therapy we do in treatment. If the patient has weakness of the serratus anterior, then we need to facilitate and strengthen that muscle. However, if the underlying factor is related more to high tone of the subscapularis, then, in therapy, we need to work on reducing tone of the subscapularis in order to be the most effective.

### Observations and Interpretations During Function

Some observations of problem areas are seen within a functional context. A patient might have difficulty standing up. The problem has already been identified, but the source of the problem hasn't. So, I begin the problem solving process again. I think "why"? If I can identify the source of the problem or the 'underlying factor', then I will have a much better idea of specifically what to do in therapy.

What are some factors which could contribute to the difficulty in coming from sit to stand?

- Is it the patient's inability to come forward?
- Are they limited in hip or trunk flexion?
- Is the patient fearful?
- Is it the position of their feet?
- Do they have limited ankle dorsiflexion? If so, what is the cause of that limitation?
- Do they have a shortened Achilles tendon? Why?
- Are they wearing an orthotic device? Is it limited to 90°, which would limit dorsiflexion?



## ⌘10 Pause and Practice:

# Opening a Tight Hand

This practice lab is an example of putting muscles on length in order to help regulate tone.

### Starting Position

- Begin with your patient in sitting; feet flat on the floor and pelvis in a neutral position.

### Handling

- Prepare the upper extremity with scapular mobilization in elevation/ depression and protraction.
- Work proximal to distal; from the shoulder to the hand.
- Move your hand from the scapular down to the epicondyles, keeping the shoulder forward. Do not allow the arm to pull into retraction.
- Slide your other hand from the patient's forearm to their hand.
- Both of your hands will maintain scapular protraction.



- Maintaining protraction of the scapula, place both of your hands on the patient's hand. One hand is firmly placed at the thenar eminence, along the base of the thumb. The other hand is placed firmly on the hyperthenar eminence. Your thumbs are aligned on the dorsum of the wrist, over the lunate. The position of your thumbs is very important. They help stabilize the lunate as the wrist is brought into extension, allowing proper alignment of the carpals.



- Next, bring the wrist up into extension. Move slowly but firmly. Do not force any structures. The higher the tone, the slower your movements will be.
- Now, with your hands firmly supporting the thenar and hyperthenar eminence slowly spread the palm, helping to release the fingers and move the thumb away from the hand.



- Slide your hand down the thumb, maintaining support at the base of the thumb. Bring the thumb away from the hand. You will often feel the tightness “release” at this point.



- Slide your other hand into theirs, supporting at the base of the MCP joints.



- Slowly open the hand, extending the fingers while supporting the base of the MCP joints. Never hang on the fingers or the thumb without giving support.



- Open the hand completely.





## Factors to Consider in Choosing an Activity

- Select an activity that elicits similar movements to those facilitated during preparation for function.
- Select an activity that is at the appropriate cognitive level for your patient.
- Select an activity that requires problem solving.
- Select an activity that is familiar to the patient.
- Select an activity that is meaningful to the patient.
- Avoid activities that require precision.
- Select an activity the patient can complete in one treatment session.



## Environmental Factors

The environment is also an important consideration. A quieter environment with fewer distractions will enable patients to focus and concentrate better. Most of us are able to screen out extraneous stimulation such as loud noises, bright lights and other distractions. But patients with perceptual-cognitive deficits may have difficulty focusing and often do better with a quiet room or environment.

The environment also provides additional information and helps patients better understand what is expected of them. Patients with language deficits or poor cognitive skills will do better if the environment (not just the therapist) helps provide this information. For example: patients will stand for a longer period of time if they are shaving in front of the bathroom sink. Patients will also be better at planning a meal if they are in the kitchen, not the clinic.

The objects selected and the materials used during functional activities are also components of the environment. The task selected should use objects that best relate to the desired movement components. For example, if your patient has high tone in finger flexion and the goal is for your patient to improve gross grasp while regulating muscle tone, select an object that is rigid (plastic or glass) rather than soft (paper or Styrofoam). A paper cup would not be the best choice for regulating muscle tone during gross grasp.



And, finally, use the real objects normally used during functional tasks.

Using real objects promotes more normal patterns of movement and stroke survivors with cognitive impairment or language deficits will better understand what is expected of them during your treatment session.

## Daily Routines

To get the best results, try selecting functional tasks that are part of your patient's normal daily routine. This routine can be the patient's routine at home (if you are doing home health) or what is now their routine within the facility (acute hospital, inpatient rehab or skilled nursing facility). Your patient will find the therapy session more meaningful and exhibit potentially greater gains when functional therapeutic tasks are "time appropriate". ADLs such as dressing should be practiced in the morning, not in the afternoon. Treatment programs related to oral motor facilitation would suggest that you schedule your therapy session before mealtime, not afterwards.

## Facilitating Motor Control During Activities

Using functional activities as a tool for improving motor control can be extremely complex. The integration of all sensory systems during a functional task is difficult for stroke survivors with cognitive, perceptual, sensory, language and motor planning deficits. Keep in mind the following suggestions as you attempt to facilitate motor control during functional activities.

- **Select a position to work in: sitting or standing.**

When making this decision, consider the patient's level of endurance, trunk and lower extremity control. Determine the movement(s) you want to facilitate and the position (sitting or standing) that would be most appropriate. Consider the movement that would normally be required for the task or activity you've chosen.

- **Begin with your patient in a good starting position.**

Be exact. Look at foot placement; are the feet flat on the floor? Are the feet too far apart or too close together? Is the patient's weight evenly distributed over both feet? Observe the position of the pelvis. Is the pelvis in a neutral position or is it in a posterior pelvic tilt? How is the patient's head positioned? In midline? Position yourself on their involved side for safety.

- **Position the task to facilitate the desired movement.**

The position of the task relative to the position of the patient is one of the most important factors to consider in facilitating movement during a functional activity.

If you want to facilitate weight shift toward the involved side, place the activity on that side.

If you also want to encourage lateral trunk flexion while they are shifting weight toward the involved side, place the task lower than table height. If you want to encourage elongation of the trunk on the involved side, place the activity above table height on the involved side.

If you want to encourage trunk rotation, position different components of the activity on both sides of the patient. This can easily be done in sitting or standing.

If you want to facilitate weight shift forward, place the activity in front of the patient. To encourage trunk extension, place the task in front of the patient at table height or higher. To encourage trunk flexion, place the task in front of the patient, lower than table height.

- **Work proximal to distal.**

Begin with facilitation of trunk control. Remember, the narrower the base of support, the more trunk control is required. If your patient is functioning at a low level, frightened or unstable, broaden their base of support by weight bearing through both upper extremities and lower extremities. If your goal is to increase trunk activity, begin to decrease and eventually eliminate upper extremity weight bearing.

We also work proximal to distal when facilitating movement of the extremities. It is important to have scapular stability for better hand function and pelvic stability for lower extremity control. However, if my patient is beginning to get distal return before proximal return, I will use the movement they have to get more proximal control.





- **Incorporate the upper extremity into functional activities.**

As you take the patient through the activity, facilitate (see *Preparing for Function*), inhibit and guide as needed. Whether the involved hand is low tone, high tone or beginning to move, never miss an opportunity to incorporate the hand into the activity in one or more of the following ways.

1. **Weight bearing/Stabilizer**

Incorporating the involved hand into a functional task can be as simple as placing the arm on the table to support it in weight bearing or by stabilizing an object. Patients positioned in this way are more likely to spontaneously incorporate the involved extremity into a task.



*Benefits of weight bearing*

- facilitates weight shift toward the involved side
- encourages use of the involved side
- improves awareness of the involved side

2. **Guiding**

Guiding is very effective in improving motor control and awareness of the involved side. Guiding helps the patient better understand what is expected of them, without the need for verbal cueing. Guiding by the therapists encourages more normal movement patterns and is very effective for patients exhibiting aphasia, apraxia, motor planning problems and visual field deficits.

*Benefits of guiding*

- promotes normal sensory information
- facilitates normal patterns of movement
- encourages compensation for visual field deficits
- reduces the need for verbal cues

3. **Bilateral**

When a patient uses both hands together, at the same time, it helps improve awareness of the involved side and better integrates both sides of the body. This can begin early in the rehabilitation process.

Bilateral activities can be very effective in encouraging dynamic trunk control. When both upper extremities are used bilaterally during a task (in sitting or standing), the patient is required to activate the trunk due to a narrower base of support.

*Benefits of bilateral use of the arm*

- allows the patient to incorporate the involved UE without assistance from the therapist
- promotes symmetry
- facilitates dynamic trunk control

- **Evaluate the patient's response.**

While facilitating movement during functional activities, you may notice movement patterns that don't appear to be "normal". First, determine if the movement is abnormal (related to underlying factors found during *Clinical Reasoning* and *Evaluation*) or if the atypical movement is just a variation on normal.

If you determine that your patient's atypical movement patterns need to be modified during the task to elicit better results, try the following:

- Modify the position of the patient.
- Modify the position of the task.
- Adjust the complexity of the task.
- Take a moment to inhibit or regulate tone.

**Utilize Movement Components into Other Tasks**

It is important that your patient learns to use the movement or skill that they have practiced and developed into other situations. In order to do this, select another task that requires the same movements to improve their skill, don't just repeat the activity.