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Reducing Hemiplegic Shoulder Pain Through Practical Handling Skills

One day, as I was walking through the dining room of a rehab center, I overheard a physician tell a family member, "Shoulder pain is one of those things that goes along with having a stroke." I nearly stopped in my tracks. I was shocked and saddened at the same time. But not surprised. I used to feel the same way before I learned how to prevent shoulder pain.

Many years ago, our inpatient rehab center was experiencing the same problem. Nearly half of our clients who were recovering from stroke experienced debilitating shoulder pain at the time of discharge. We tried everything we could think of, reviewed the literature, and consulted physicians, but nothing seemed to make a difference.

Then I took courses from master clinicians who provided the in-depth knowledge and practical handling skills I needed to be successful. I learned how the structures of the shoulder were compromised following a stroke, how to prevent trauma, and specific handling methods for preparing the upper extremity for skilled function. I took meticulous notes, practiced the clinical skills in class, and returned to work to give it a try. The results were immediately evident. Not only did fewer of my clients complain of pain, but those with pain began to improve.

Guidance for occupational therapy practitioners on reducing the incidence of shoulder pain in their poststroke clients.

KNOWLEDGE + IMPROVED CLINICAL SKILLS = REDUCTION OF SHOULDER PAIN

As I shared my new skills with colleagues (occupational therapy, physical therapy, and nursing), we saw the incidence of shoulder pain decrease dramatically within our facility. Within a year, the incidence of hemiplegic shoulder pain (HSP) at our center dropped from nearly 50% to less than 15%, by just changing the way we handled, moved, and positioned our clients. Within 2 years we had almost eliminated HSP altogether. I began to wonder: Had we been contributing to HSP, unknowingly, all along? As years went by and other members of the rehab team were trained and began to use these methods, the evidence became clear: HSP can be reduced when proper handling methods are used to treat clients recovering from strokes. I am convinced that with a better understanding of the shoulder complex and improved clinical skills, other occupational therapy practitioners can also dramatically reduce the incidence of HSP in their treatment settings.



HSP INTERFERES WITH QUALITY OF LIFE

HSP is reported to affect anywhere between 7% and 88% of all persons poststroke.¹ HSP can adversely affect a client's entire therapy program as well as his or her overall quality of life.² A client with a painful shoulder may have difficulty sleeping, require pain medication, and refuse to get out of bed or get dressed.³ Poststroke clients in acute care, rehabilitation, or skilled nursing settings may choose not to participate in occupation-based activities due to the severity of their shoulder pain.⁴ Therefore, it is extremely important for occupational therapy practitioners to be up to date on current evidence, hone their clinical skills, and implement effective treatment programs to prevent hemiplegic shoulder pain.

But there is much controversy and confusion about managing the hemiplegic

shoulder. Occupational therapy practitioners today face a dilemma in trying to determine the evidence and best practice for treating HSP. A full literature review can be an overwhelming and daunting task, as it entails reading through hundreds of articles, many with opposing views and each supported with evidence. Numerous studies address questions related to HSP such as: Does subluxation cause shoulder pain? Should slings be used? What are the causes of HSP? With an abundance of research, but few practical guidelines for intervention, even well-informed therapists often look elsewhere for guidance in determining effective therapeutic treatment methods based on evidence.

I encourage occupational therapy practitioners to implement an evidence-based approach using their own clinical experiences. Sharpen your observation and handling skills. Expand your knowledge. Reevaluate your client. Do you observe any changes? At the end of every treatment session, you should be able to observe positive changes. Every practitioner should be able to see, however small, changes that demonstrate effectiveness during each treatment session. If no measurable changes are observed, then your handling methods and treatment plan must be modified. If occupational therapy practitioners are to be effective change agents in treating clients with stroke, we must have the clinical skills to make a difference.

POSSIBLE CAUSES OF HEMIPLEGIC SHOULDER PAIN

Our first experience with HSP may begin with a client clutching his or her shoulder, or it may be initiated by a physician's referral. Next we're confronted with the big question, "What do I do?" For occupational therapists to determine the most effective plan of treatment, an accurate clinical diagnosis of the source of the shoulder pain should be made. Unfortunately, this is difficult for physicians to do. Multiple impairments related to stroke, such as sensory, motor, and language deficits, along with the complexity of the shoulder structures, can make it difficult to get an accurate diagnosis. Physicians typically order an x-ray,

Figure 1. Key Points to Remember

- Don't force range of motion (ROM).
- When performing passive or active ROM, range only to the point of resistance or discomfort. Any resistance against shoulder flexion or abduction can be an indication that the scapula is not gliding. Discomfort can indicate trauma or impingement to the soft tissue structures of the joint.
- Never use reciprocal overhead pulleys. The evidence strongly concludes that using reciprocal overhead pulleys markedly increases the incidence of painful shoulders.
- Do not raise the arm in flexion or abduction (past 90°) without external rotation of the humerus and scapular gliding.
- ROM is safe as long as the scapula is gliding and the humerus is in external rotation.
- Never pull on the hemiplegic arm to help move a client. Place your hand on the trunk or scapula when helping a client transfer or stand up. Pulling on the involved arm can easily cause a traction injury.
- Avoid placing your hands under the client's arms. Lifting or repositioning a client under the arms can put the shoulder structures at risk for impingement.
- Avoid static positioning of the upper extremity (UE) in internal rotation and adduction.
- The use of slings, or any device that maintains internal rotation and adduction while sitting in a chair or resting in bed, contributes to soft tissue tightness and shortened muscle length.
- Avoid strapping the UE to an arm trough. A weak arm strapped to an arm trough is at risk for impingement and traction injury. For clients attempting to stand or who have poor postural control, that "slide" down in their wheelchair while their arm is strapped to an arm trough can cause an impingement through malalignment of the glenohumeral joint.

but the results are often inconclusive. Problems involving soft tissue typically do not show up on an x-ray, and most physicians decide that expensive tests (such as MRI or arthrogram studies) are not warranted for a painful upper extremity that is also nonfunctional.

Consequently, physicians and practitioners are at a loss of how to proceed and often fall back to "old ways of practice" based on common misconceptions. For decades, the HSP spotlight has been on glenohumeral subluxation as the major source of pain, with reducing subluxation a treatment priority. In fact, no fewer than 19 studies have been published on the association between shoulder subluxation and pain (eight studies supported the role of subluxation in pain, and 11 studies did not support the role of subluxation in pain).¹

This is where a review of the most current literature can be extremely helpful. Fortunately for all of us, Robert Teasell, MD, and his team have created an excellent resource, available on the Internet (www.ebrsr.com), that reviews, summarizes, and provides conclusions based on a comprehensive

review of evidence related to stroke. Included in the review are lists of the possible sources of HSP, such as muscle imbalance, spasticity, trauma of the rotator cuff, humeral fracture, bursitis, tendonitis, glenohumeral subluxation, adhesive capsulitis, and reflex sympathetic dystrophy.¹

Contrary to what many occupational therapy practitioners have learned in the past, the evidence does not support subluxation of the glenohumeral joint as the primary source of hemiplegic shoulder pain. The strongest evidence, according to Teasell's team at www.ebrsr.com, supports the following conclusion: "Although many etiologies have been proposed for hemiplegic shoulder pain, increasingly it appears to be a consequence of spasticity and the sustained hemiplegic posture."¹

Based on the current evidence, occupational therapy practitioners should focus on the following guidelines to get a head start on reducing the incidence of shoulder pain in their setting:

1. Develop an in-depth understanding of the shoulder complex.
2. Know what to avoid.
3. Learn advanced clinical skills.

Figure 2. Protecting the Hemiplegic Shoulder

Proper Bed Positioning (1)

Although supine is the most common position, the most therapeutic position for clients poststroke is sidelying on the hemiplegic side. Make sure your client is lying on the scapula and not on the head of the humerus. A fully protracted scapula feels smooth along the thoracic wall, not “winged,” and is comfortable for the client. **Watch the video:** <http://www.icelearning-center.com/bed-positioning-involved-side>.



Proper Wheelchair Positioning (2)

Good seating allows for better alignment of the entire shoulder girdle and reduces the possibility of impingement. Use a seat insert to provide a good base of support and reduce a posterior pelvic tilt. Position the arm on a lap tray or half lap tray if your client exhibits problems of edema or neglect.



Moving In and Out of the Wheelchair (3,4)

(3,4) When transferring clients, helping them stand, or repositioning in the wheelchair, always assist through the scapula and trunk. Never pull on the involved arm.



UNDERSTANDING THE SHOULDER COMPLEX

The shoulder is one of the most complex structures in the human body, made up of seven joints that need to work synchronously in order to have full, pain-free range of motion.⁵ An in-depth understanding of how the shoulder structures work can help in understanding the importance of proper alignment and its role in preventing shoulder pain.

The scapula has three primary planes of motion: elevation/depression, protraction/retraction (also referred to as scapular abduction/adduction), and upward rotation/downward rotation.

Most functional movements require a combination of all three planes of motion. There are 16 muscles that attach to the scapula, and care must be taken to maintain full excursion in order to maintain mobility and avoid impingement.

Every time clients are handled, they are at risk for injury. Even well-intentioned health care providers or family members can unknowingly cause trauma to the shoulder. Moving clients incorrectly (such as taking hold of their arm to help them out of a chair) or poor positioning (an arm trapped or pinned beneath them) can contribute to impingement and HSP. Aggressive

therapies and range of motion (ROM) performed incorrectly are also sources of HSP.¹ Avoid the use of inappropriate exercise equipment, such as overhead pulleys, as there is strong evidence that they contribute to a markedly increased incidence of shoulder pain.¹ For more on proper handling, see Figures 1 and 2 on pp. 10 and 11.

LEARN ADVANCED CLINICAL SKILLS

New practitioners, afraid of hurting their clients, may avoid handling the shoulder altogether. Don't let fear keep you from using the clinical skills necessary to prevent shoulder pain. Learn how to mobilize the scapula and move the arm correctly, avoiding trauma to the shoulder and better preparing the upper extremity (UE) for functional gains. Develop sharp observation skills. Learn to evaluate tone of the UE.

Always work within a pain-free range.

As treatment begins, I ask my clients for feedback: “If anything hurts or is uncomfortable, let me know.” If your client expresses pain or discomfort, discontinue the movement and determine the source of the pain. Ask, “Is it a pulling pain or a stabbing pain?” A sharp pain may indicate an impingement or problem with alignment. A pulling pain can be more indicative of soft tissue tightness due to immobilization.³ Pain, whether caused by impingement or soft tissue limitation, can interfere with daily care activities such as brushing hair (shoulder external rotation with abduction), dressing, or any overhead activity.

Practitioners should focus on maintaining muscle length through scapular mobilization and ROM, most specifically on the muscles that contribute to spastic internal rotation and adduction of the arm: the subscapularis, pectoralis major, teres major, and latissimus dorsi. “Shortened muscles inhibit movement, reduce range of motion, and prevent other movements especially at the shoulder where external rotation of the humerus is necessary for arm abduction greater than 90°” (p. 14).¹

Your hands should be firm but never forceful. Pain or discomfort can be an indication of impingement or trauma to the shoulder structures. For optimal alignment of shoulder structures, be sure your client is in a good starting position. In sitting, position the client

Figure 3. Scapular Mobilization

Starting Position:

Position the client with the feet flat on the floor and pelvis in a neutral position (not in a posterior pelvic tilt).

Elevation and Depression: (1, 2)

1. Cup your hand and place it over the head of the humerus. Don't apply pressure on the head of the humerus; apply pressure with the heel of your hand on the pectoralis, medial to the humeral head.
2. Place your other hand along the medial and inferior border of the scapula. Use the heel of your hand, not your thumb, to cradle the inferior border of the scapula.
3. Bring your elbows down to your side. You will have more strength and protect your wrists by keeping them in good alignment.
4. Apply pressure through the heels of both hands and bring the entire shoulder girdle into elevation.
5. Elevate the scapula to end range (or the point of discomfort). Hold for a few seconds and allow it to return to a resting position. It may feel heavy or tight. With repetition the movement will get easier.

Variations: Position your patient in supine or sidelying (on the strong side) if your client is unable to sit unassisted, has poor trunk control, or has an extremely heavy arm.

Watch the video: <http://www.icelearningcenter.com/mobilizing-scapula-elevation>.

Protraction (scapular abduction) and Retraction (scapular adduction) (3)

Handling:

1. Stand in front of your client.
2. Gently take the hemiplegic arm and bring it into forward flexion of less than 90°.
3. Support the arm at the elbow and tuck it along your side. This helps to keep it in neutral and doesn't allow it to fall into internal rotation.
4. With your other hand, reach along the scapula and find the medial border. With a flat open hand, press along the medial border and glide the scapula forward into protraction. Do not hook your fingers around the scapula.
5. Maintain protraction for a few seconds and then allow the scapula to return to the resting position.
6. As the scapula returns to its resting position, allow it to follow the natural curvature of the rib cage.

Variations: If you client has poor trunk control, use a supine or sidelying position. (4)

Watch the video: <http://www.icelearningcenter.com/mobilizing-scapula-protraction>.

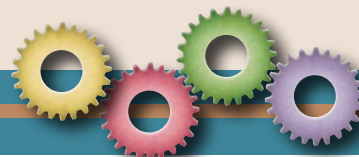
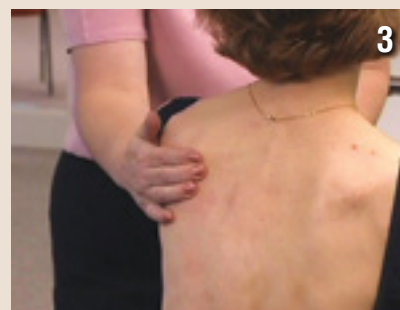
Upward Rotation (5)

Handling:

1. While the scapula is forward in protraction, slide one hand from the client's scapula to the elbow and use a lateral grip to hook onto the epicondyles. This will keep you from grasping and stimulating the biceps.
2. Slide the other hand from the elbow to the client's hand (as if you were shaking hands).
3. Put your middle finger along the base of the metacarpophalangeal joints, your index finger along the thenar eminence, and your other fingers along the client's fingers.
4. Keeping the arm in forward protraction, give a slight amount of external rotation and gently bring the arm past 90° and into forward flexion.
5. Remember: Go only to the point of resistance or discomfort and no further.
6. Carefully watch the client's facial expression for any signs of discomfort.

Tip: If your client does not have full range of motion in scapular excursion, check the other shoulder. The non-affected side may also have a loss of range that is unrelated to the stroke.

Watch the video: <http://www.icelearningcenter.com/mobilizing-scapula-upward-rotation>.



FOR MORE INFORMATION

Resources for Stroke: <http://www.aota.org/Consumers/consumers/Adults/Stroke.aspx>

Functional Treatment Ideas & Strategies in Adult Hemiplegia (2nd ed.). By J. Davis, 2009. Port Townsend, WA: International Clinical Educators. (Earn 1.5 CEUs [18.75 NBCOT PDUs/15 contact hours]). \$195. To order, call toll free 888-665-6556 or shop online at <http://www.icelearningcenter.com>.)

Teaching Independence: A Therapeutic Approach to Stroke Rehabilitation (2nd ed.). By J. Davis, 2009. Port Townsend, WA: International Clinical Educators. (Earn 1.5 CEUs [18.75 NBCOT PDUs/15 contact hours]). \$195. To order, call toll free 888-665-6556 or shop online at <http://www.icelearningcenter.com>.)

Treatment Strategies in the Acute Care of Stroke Survivors. By J. Davis, 2007. Port Townsend, WA: International Clinical Educators. (Earn 1.5 CEUs [18.75 NBCOT PDUs/15 contact hours]). \$195. To order, call toll free 888-665-6556 or shop online at <http://www.icelearningcenter.com>.)

CD Course. **ASHT Management of Upper Extremity Problems: Cadaver Demonstrations and Therapeutic Management.** By P. Bonzani, D. Kline, K. Landrieu, M. Robichaux, & H. Stokes. Mt. Laurel, NJ: American Society of Hand Therapists. (Earn .6 AOTA CEU [6 NBCOT PDUs, 6 contact hours]). \$70 for members, \$95 for nonmembers. To order, call toll free 877-404-AOTA or shop online at <http://store.aota.org/view/?SKU=4851>. Order #4851. Promo code MI)

DVD: **Basics and Beyond: Everything You Need to Know—Shoulder To Finger: Part 1 (CHT Prep Course).** By N. Falkenstein & S. Weiss, 2011. St. Petersburg, FL: Treatment2Go. (Earn 3 AOTA CEUs [30 NBCOT PDUs, 30 contact hours]). \$399 for members & nonmembers. To order, call toll free 877-404-AOTA or shop online at <http://store.aota.org/view/?SKU=4858A>. Order #4858A. Promo code MI)

CD: **Basics and Beyond: Everything You Need to Know—Shoulder To Finger: Part 2 (CHT Prep Course).** By N. Falkenstein & S. Weiss, 2011. St. Petersburg, FL: Treatment2Go. (Earn 2.5 AOTA CEUs [25 NBCOT PDUs, 25 contact hours]). \$349 for members & nonmembers. To order, call toll free 877-404-AOTA or shop online at <http://store.aota.org/view/?SKU=4858B>. Order #4858B. Promo code MI)

CD: **Basics and Beyond: Everything You Need to Know—Shoulder To Finger: Part 1 & 2 (CHT Prep Course).** By N. Falkenstein & S. Weiss, 2011. St. Petersburg, FL: Treatment2Go. (Earn 5.5 AOTA CEUs [55 NBCOT PDUs, 55 contact hours]). \$649 for members & nonmembers. To order, call toll free 877-404-AOTA or shop online at <http://store.aota.org/view/?SKU=4858>. Order #4858. Promo code MI)

DVD: **Cumulative Trauma Disorders: An Evidence-Based Approach.** By P. Bonzani. St. Petersburg, FL: Treatment2Go. (Earn 1.2 AOTA CEUs [12 NBCOT PDUs, 12 contact hours]). \$359 for members and nonmembers. To order, call toll free 877-404-AOTA or shop online at <http://store.aota.org/view/?SKU=4863>. Order #4863. Promo code MI)

Hand and Upper Extremity Rehabilitation: A Practical Guide, 3rd Edition. Edited by S. Burke, J. Higgins, M. McClinton, R. Saunders, & L. Valdata, 2006. St. Louis, MO: Elsevier. (\$93.95 for members, \$133.50 for nonmembers. To order, call toll free 877-404-AOTA or shop online at <http://store.aota.org/view/?SKU=1348>. Order #1348. Promo code MI)

Occupational Therapy Practice Guidelines for Adults With Stroke. By J. Sabari, 2008. Bethesda, MD: AOTA Press. (\$59 for members, \$84 for nonmembers. To order, call toll free 877-404-AOTA or shop online at <http://store.aota.org/view/?SKU=2211>. Order #2211. Promo code MI)

DVD: **Orthotics: Creative Mobilization Splinting—Dynamic & Static Progressive Splinting (SPS)** By D. Schwartz, 2011. St. Petersburg, FL: Treatment2Go. (Earn .9 AOTA CEU [9 NBCOT PDUs, 9 contact hours]). \$299 for members & nonmembers. To order, call toll free 877-404-AOTA or shop online at <http://store.aota.org/view/?SKU=4857>. Order #4857. Promo code MI)

DVD: **Orthotics: Creative Static Splinting Made Simple.** By D. Schwartz, 2011. St. Petersburg, FL: Treatment2Go. (Earn .7 AOTA CEU [7 NBCOT PDUs, 7 contact hours]). \$249 for members & nonmembers. To order, call toll free 877-404-AOTA or shop online at <http://store.aota.org/view/?SKU=4856>. Order #4856. Promo code MI)

CONNECTIONS

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with the feet flat on the floor and pelvis in a neutral position (not in a posterior pelvic tilt).

Mobilization begins with scapular elevation—it is safe, does not cause impingement, and helps you evaluate excursion of the scapula. Is there any resistance? A scapula that has been immobilized may feel tight and, if there is an increase in tone, you may feel resistance against movement. In con-

trast, a flaccid or low tone arm will feel heavy but the scapula will glide easily.³

After the scapula is gliding in elevation, carefully bring the arm into forward flexion, no more than 90°. With your hand on the scapula, glide the scapula forward into protraction. Never pull on the humerus to bring the scapula forward; use only the scapula. With repetition, the scapula will begin to glide more easily. Mobilizing the

scapula in upward rotation, the third plane of motion, is last. Only when the scapula has been prepared and glides in elevation/depression and protraction/retraction can upward rotation of the scapula be attempted. For step-by-step instructions, see Figure 3 on p. 12.

SUMMARY

The incidence of shoulder pain in clients who have had a stroke can be dramatically reduced. Clients who are managed correctly can avoid many of the painful syndromes that frequently occur during recovery, allowing for greater participation in activities of daily living (ADLs) and instrumental ADLs and improved quality of life. Each and every person working with the client, including all practitioners, nurses, family members, and caregivers, should be trained in protecting the shoulder from injury. Occupational therapy practitioners, with skilled expertise and an in-depth knowledge of the shoulder complex, can take the lead in training staff, educating families, and empowering patients in properly managing and caring for the hemiplegic shoulder. ■

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