THE INFLUENCE OF CONCOMITANT DIAGNOSIS WHEN TREATING THE OLDER UPPER EXTREMITY AMPUTEE

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When evaluating the older upper extremity amputee, there are often concomitant diagnoses that may influence rehabilitation goals. These conditions may either be ipsilateral or contralateral to the amputation, and significantly influence the amputee’s tolerance to prosthetic fitting and training.

Decreasing strength and endurance are normal in the aging process and are usually obvious during an initial evaluation. There are other orthopedic conditions concomitant with amputation, which may be less obvious.

Some of the most common conditions affecting goals and training are (1) osteoarthritis of the thumb, (2) lateral epicondylitis, and (3) shoulder pain. A brief discussion of these conditions will explain their affect on amputee rehabilitation.

According to Alfred B. Swanson, “Almost 100% of the population is susceptible to some form of arthritis, and if an individual lives long enough, he is almost certain to develop one type or another.”[1] “Approximately 8% of all adults are estimated to have moderate-to-severe clinical symptoms of osteoarthritis of the hands and feet.”[2]

Osteoarthritis of the thumb (also known as CMC arthritis and basilar joint arthritis) generally starts after the age of 40 and is more common in women than men. It is a wearing away of the cartilage between the first metacarpal and the trapezoid. Symptoms occur when performing tight or sustained pinching and gripping. The thumb has a loss of bone contour and develops a “squaring of” appearance. Radiographs show degenerative changes.

Painful grip or pinch associated with CMC arthritis creates significant problems for our upper extremity amputees during a variety of functional tasks. For example, tight pinching is required while using a pull sock and donning a snug anatomical socket. Alternate donning techniques may be required.

Another problem that occurs contralateral to the amputation is lateral epicondylitis, better known as tennis elbow. Priest reports, “the problem frequently occurs between the third and fifth decade of life in the inexperienced [tennis] player.”[3]

Tennis is not always the offending factor; lateral epicondylitis can be caused by many activities requiring powerful gripping and repetitive use of the wrist extensors.

Lateral epicondylitis is not well understood, but it is generally agreed that the cause of this pain is inflammation of the wrist extensor tendons and microscopic tears at the insertion of the extensor carpi radialis brevis. Conservative treatment includes anti-
inflammatory medication, a counterforce brace, sometimes a static wrist splint, and rest. Clinically, it takes a long time to heal and in the more chronic cases a moderate reoccurrence rate.

As with CMC arthritis, lateral epicondylitis makes donning the prosthesis more difficult. Wrist extension involved in doffing the prosthesis also elicits pain. Alternative methods for donning and doffing the prosthesis may prove helpful in decreasing pain during these tasks.

Shoulder pain often interferes with prosthetic fit and function. The American Academy of Orthopedic Surgeons states that nearly six million people a year seek medical care for shoulder problems.[4] Pain on either the amputated side or contralateral side is equally problematic.

Shoulder pain, with its associated loss of strength and range of motion, makes it difficult to operate many prosthetic control schemes. It dictates prosthetic design, and if ignored, can cause the amputee to abandon the use of the prosthesis.

The most common shoulder challenges encountered with amputees include myofascial trigger points, acromioclavicular arthritis, subacromial impingement, and rotator cuff tears.

Janet G. Travell, M.D. defines, “Active myofascial trigger point: a focus of hyperirritability in a muscle or its fascia that is symptomatic with respect to pain; it refers a pattern of pain at rest and/or on motion that is specific for the muscle. An active trigger point is always tender, prevents full lengthening of the muscle, weakens the muscle, usually refers pain on direct compression,...”[5] In other words, trigger points are tender spots with palpable hardness that refer pain to other areas. The upper trapezius, supraspinatus, and teres minor can refer pain to the shoulder area, causing pain and limiting motion. Trigger points can become more intense during fitting, early periods of training, and after unusually hard periods of work. Therapy to treat trigger points during expedited fitting often facilitates the rehabilitation process.

For people over the age of 50, a common occurrence is acromioclavicular arthritis. This is a degenerative condition that destroys the cartilage between the clavicle and acromion, causing the joint space to narrow. Patients with acromioclavicular pathology have point tenderness over the joint and decreased range of motion, especially in horizontal abduction, and rotation.

And finally, the rotator cuff is another cause of pain and loss of function. The rotator cuff is comprised of four tendons and muscles that surround the head of the humerus and work together to stabilize the glenohumeral joint and allow smooth motion.

The two most frequently noted conditions in the rotator cuff are subacromial impingement and rotator cuff tear. Subacromial impingement is a narrowing of the subacromial space; it is caused by a variety of clinical entities. This narrowing causes
compression of the supraspinatus tendon, resulting in pain and loss of shoulder motion. The second problem is rotator cuff tears. While rotator cuff tears can occur with a single event, more often in people over 40, it is a gradual attritional wear of the rotator cuff tendons by impingement. This gradual wear may ultimately result in a full-thickness tear. It is important to note that not all rotator cuff tears require surgery; not all rotator cuff tears can be repaired by surgery.

Patients with impingement or tears of the rotator cuff present with pain. The pain is worse when the arm is dangling at the side, when sitting unsupported, or when trying to sleep. They have loss of motion especially in horizontal adduction, external rotation, and abduction. In severe cases, independent performance of activities of daily living or even self-care is impossible.

Therapy can help. For example, heat modalities, trigger point massage, and stretching help decrease myofascial trigger points. Strengthening posterior shoulder girdle musculature often decreases pain associated with subacromial impingement and rotator cuff tears. And simple things, such as making sure a patient is seated in a chair with arms or providing a pillow for arm support, can increase patient comfort and extend the amount of time the prosthetist can work with the patient. Training in alternate methods of donning and doffing the prosthesis as well as educating the patient in good ergonomic principles for activities of daily living will also improve the amputee’s ability to use the prosthesis more comfortably for daily tasks.

Concomitant orthopedic conditions common in the older adult significantly influence our treatment of upper extremity amputees. We should consider the possibility of these problems when evaluating and setting goals for the older amputee. Pain in the hand, elbow, and shoulder can affect fitting, tolerance to the prosthesis, and functional use. With a thorough evaluation, appropriate goal setting and treatment intervention, we can help all of our amputees increase their rehab potential and become as independent as possible.
REFERENCES