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Practice Matters: Screening for Upper Body Musculoskeletal Disorders in Faith Based Communities

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Musculoskeletal Disorders (MSD) are often the result of prolonged static positioning or forceful repetition of a given movement (Barr & Barbe, 2004; Goodman & Fuller, 2009). This repeated exposure to repetitive movement may cause chronic pain due to injury to soft tissue structures, including muscles, tendons, ligaments and nerves (Barr & Barbe, 2004). Work-related MSD (WRMSD) is defined by the U.S. Labor Department as a "disorder of the muscles, nerves, tendons, ligaments, joints, cartilage or spinal discs that was not caused by a slip, trip, fall, motor vehicle accident or similar accident" (U. S. Department of Labor, 2011). Faith community members may engage in occupations that require physical labor of various types (Jones & Field, n.d.). These may include small and large scale farming, supplemented by work in construction or home-business labor. All of these occupations require intermittent bouts of repetitive activity (Xiao, McCurdy, Stoecklin-Marois, Li, & Schenker, 2013). Faith Community Nurses (FCN) may be the provider of choice should these injuries occur in the community.

Objectives

After reading this article, the FCN will:

1. Be aware of the nature of MSDs that may occur in faith communities
2. Discuss various MSDs of the upper quadrant, including typical pain pattern and possible etiology
3. Understand the need for comprehensive assessment of joints proximal and distal to the region of chief complaint, as well as the importance of ruling out spinal etiology
4. Discuss best practice for comprehensive screening of neuromuscular and musculoskeletal systems involved in common MSDs
5. Suggest common solutions faith community nurse may use as a first line of treatment to try before referral

Pathogenesis of Musculoskeletal Disorders

Connective tissues within the musculoskeletal system (MSK) are viscoelastic materials that provide resistance to applied forces (Levangie & Norkin, 2011; Neumann, 2017). When applied forces exceed the tissue tolerance of the soft tissue structure, damage occurs, causing the onset of symptoms such as pain and ultimately movement dysfunction (Barr & Barbe, 2004; Goodman & Fuller, 2009). It is hypothesized that the combined effect of various risk factors may lead to surpassing the individual tissue tolerance, causing inflammation and injury. If the task continues, the injury may worsen due to attenuation of acute inflammation (Barr & Barbe, 2004). Related factors of upper limb MSDs may include task repetition, force exerted in awkward postures, exposure to continued vibration, and inflammatory response. Common work-related

musculoskeletal disorders of the upper extremity include: rotator cuff syndrome (impingement), tendinitis (rotator cuff, biceps tendon), epicondylitis, Carpal tunnel syndrome, and Cubital tunnel syndrome (ulnar nerve entrapment at the elbow) (National Institute of Occupational Safety and Health [NIOSH], 2018.

Assessment Approach

It is critical for the FCNs to obtain a thorough history before examining a patient who is complaining of pain. The findings of the history may include determining the type, timing, frequency and intensity of the pain, as well as what movements or positions makes the pain better or worse (Rempel, Harrison, & Barnhart, 1992). A primary component of the history is to exclude the presence of red flags to ascertain that the presenting symptomology is of MSK origin and not of serious medical pathology. Once it is established that the source of the pain may be of MSK origin, a thorough screening process of the upper quarter should ensue progressing from the cervical spine to the joints of the upper extremity from proximal to distal (shoulder to hand) (Magee, 2014). The screening examination is organized to include active and passive movement testing, myotome based resisted movements, dermatome based sensation testing and reflexes to differentiate orthopedic and neurologic involvement (Labbafinejad, Danesh, & Imanizade, 2017; O'Neill, Forsythe, & Stanish, 2001). The influence of posture during repetitive activities is also an important factor to include in assessment. Postural influences may place additional compressive forces on the anatomical structures at risk for work related MSDs (Novak, 2004).

Structure-Based Signs and Pain Patterns

The quality of pain varies based on the structural source of the pain. Neurogenic symptoms can range from painfree paresthesias described as numbness, pins and needles, and tingling to painful paresthesias described as burning, shooting, smarting or shock-like. While the nature of the neurogenic symptom is important to note, it is the area of distribution and constant verses intermittent occurrence that indicates the seriousness of the neurologic involvement (Cyriax, 1981; Dutton, 2016). Pain associated with tendon inflammation would occur during activation of the associated muscle, or when the structure is compressed. Likewise, muscular pain would be present when movement is initiated, particularly against resistance.

Screening the Cervical Spine

Examination of the cervical spine is recommended in all patients with upper quadrant complaints. (Novak, 2004) Observation of neck posture, as well as active movements in flexion, extension, side flexion left/right, and rotation left/right is a good starting point when screening the cervical spine (Meziat-Filho, Silvia, Coutinho, Mendonca & Santos, 2017; Nee, Vicenzino, Jull, Cleland & Coppieters, 2013). The examiner will need to assess symmetry of posture and movements, and the effect they have on the chief complaint. Passive movements may be

conducted if there is asymmetry or increase in pain. Myotome assessment of key muscles upper extremity will assess the integrity of the cervical spinal cord. These include active and resisted motions specific to nerve root levels (Goodman & Fuller, 2009). Examples include: shoulder elevation (C4), shoulder abduction (C5), elbow flexion and wrist extension (C6), elbow extension and wrist flexion (C7), thumb extension and ulnar deviation (C8) and hand intrinsic muscles (T1) (O'Sullivan, Schmitz, & Fulk, 2014). Cervical distraction with the patient sitting in upright posture (Distraction test—symptoms relieved) and cervical compression with the patient laterally flexed in both directions (Foraminal compression test—symptoms worsen) will further assess the potential for radicular pain (Cook & Hegedus, 2013).

Screening the Shoulder Complex

The shoulder is an unprotected joint with many degrees of movement in multiple planes. Repeated trauma MSDs in the shoulder are more related to completing repeated tasks in awkward positions, which may be related to the posture of the individual, or the task being performed. Common disorders include rotator cuff tendonitis, and biceps tendinitis (Goodman & Fuller, 2009). Injuries to tendons may be a result of prolonged positioning while completing a manual task using the hands. Postural deviations and a rounded shoulder may be contributing factors and should be examined as well.

Rotator cuff tendonitis is caused by inflammation due to repetitive movements, particularly overhead. These movements may cause microtrauma over time (Soto-Quijano & Rivera-Taverez, 2005). Shoulder instability and altered mechanics of the shoulder complex have been linked with impingement of the rotator cuff tendons; therefore, it is important to observe posture and general function of scapular movement for imbalances (Soto-Quijano & Rivera-Taverez, 2005). Pain associated with tendonitis would increase when the muscle is activated, particularly against resistance. There may or may not be accompanying weakness. Arthritic pain would be more constant, and may be relieved to a degree by movement.

Active range of motion in all planes of shoulder movement (forward flexion, abduction, extension, internal and external rotation), observing symmetry and pain pattern during the movements. Isometric resistance should be applied in the mid-range of these motions, with pain or weakness indicating possible inflammation of the muscle involved in the specific action being resisted. A painful arc between 60°and 120° of active shoulder abduction that is not present during passive movement is also a common finding in rotator cuff tendonitis (Buckup & Buckup, 2016). Palpation of the patient's greater tubercle of the humerus with the patient's arm internally rotated, adducted and extended (place ventral surface of the hand in the lumbar region) may be tender to touch (Biel, 2014).

Biceps tendonitis when it occurs as a work-related MSD may be a result of persistent repeated activation of the biceps muscle (shoulder and elbow flexion, forearm supination), and is less commonly seen in isolation as a work-related MSD than Rotator Cuff Tendonitis (Soto-Quijano & Rivera-Taverez, 2005). Regardless, pain would be present anteriorly and may radiate down the arm. Examination findings would include tenderness to palpation of the bicipital

groove, as well as a positive Yergason's test (pain in the tendon of LH Biceps with resisted forearm supination with elbow in 90° of flexion) (Buckup & Buckup, 2016).

Screening the Elbow Region

The elbow is a source of injury for workers who perform repetitive tasks or who engage in forceful activities that exceed tissue tolerance. The most common work-related MSD in the elbow region is lateral epicondylitis (Soto-Quijano & Rivera-Taverez, 2005). The term tennis elbow is synonymous with lateral epicondylitis, which is an inflammation of the tissues that originate at the lateral epicondyle. It is suspected that micro trauma to the junction between muscle and bone become inflamed with overuse. The tissue lacks ample time to recover due to the need to use the muscles in everyday function, as well as the decreased vascularization in the region (Barr & Barbe, 2004). Repeated pronation and supination, as well as extension that stabilizes the wrist during gripping activities, are common motions that cause occupational MSDs (Soto-Quijano & Rivera-Taverez, 2005).

The chief complaint of an individual with lateral epicondylitis is pain in the affected area that may radiating proximally or distally. Pain may be present at rest, but intensifies when resistance is applied to wrist extension. Tenderness to palpation and edema will be present in the area around the lateral epicondyle, and pain will be present with resisted wrist extension and during grip activities. The Chair Test, in which the patient is asked to lift a chair with the elbow in extension and the forearm pronated, would elicit symptoms. Medial epicondylitis is not as common as a work-related MSD, however, affects the wrist and finger flexor muscle group originating from the medial epicondyle. Pain will be medial, and exacerbated during wrist and finger flexion, and forearm pronation (Soto-Quijano & Rivera-Taverez, 2005).

Compression Neuropathy

The median, ulnar and radial nerve travel through anatomic tunnels in specific locations between the nerve root and the terminal end point. Any space occupying edema in these tunnels can cause compression, which will affect the motor and sensory function of the affected nerve (Maher, 2007). Thus, peripheral nerves are at risk for biomechanical overload during work related tasks (Violente, et al., 2007).

Carpal Tunnel Syndrome (CTS) is among the most commonly identified work related MSDs, affecting the median nerve at the wrist. Obesity and prior non-dominant hand CTS were found to increase the risk for developing work-related CTS (Burt, et al., 2013) Specific tasks have been identified in a study of risk factors in the development of Carpal Tunnel Syndrome, which found that 83.8% of those in the study reported lifting 2 or more pounds in a job situation (Armstrong, Dale, Franzblau, & Evanoff, 2008), which is a characteristic of many tasks performed regularly in occupational settings. Symptom patterns include pain, weakness and tingling in the distribution of the median nerve in the hand, which includes the thumb, as well as the index, middle and thumb-side half of the ring finger. Pain may also radiate proximally, and

can affect the patient's ability to hold a cup. Sleeping posture can exacerbate symptoms if the patient sleeps with wrists in flexion (Simmons & Bosch, 2006). One special test suggestive of CTS is Phalen's sign, which is prolonged maintenance (1-2 minutes) of end range wrist flexion. Reproduction of hand symptoms would indicate a finding consistent with CTS (Buckup & Buckup, 2016).

The ulnar nerve is subject to entrapment at the elbow, as it passes in the cubital tunnel, a groove bordered by the medial epicondyle of the humerus and the olecranon process of the ulna (Dellon, 1999). Repeated elbow flexion and extension, trauma, and inflammatory changes in the medial epicondyle are evident. Clinical signs include numbness over the palmar surface of the hypothenar eminence, digit V, and half of digit IV, closest to digit V (Rempel, Harrison, & Barnhart, 1992). On the dorsal surface, numbness may be present in the entirety of digit IV except the tip adjacent to digit III, and digit III (excluding the tip) (Schuenke, Schulte, & Schumacher, 2014). Motor weakness of intrinsic hand muscles and grip may also be present (Dellon, 1999; Schuenke, Schulte & Schumacher, 2014).

Entrapment of the ulnar nerve distally may also occur due to constant pressure from a hammer or other tool being gripped for a prolonged period of time. The ulnar nerve travels through the Guyon's Canal in the hypothenar eminence. Signs of this type of entrapment would be numbness in the distribution of digit V and half of digit IV. Motor impairment of the hypothenar musculature may also be evident, and include weakness in opposition and grip (Buckup & Buckup, 2016; Schuenke, Schulte & Schumacher, 2014).

Management of Musculoskeletal Disorders

The FCN can assist with the management of MSDs in three distinct areas. The first is in promoting symptom control, including rest and ice if necessary, along with passive and range of motion of affected and adjacent joints to maintain flexibility during this phase. In elbow and wrist MSDs, splinting may be effective in offloading excessive or repetitive forces, which in effect will provide "rest" to the injured area while enabling the completion of some tasks of the job (Novak, 2004). FCNS can also advise patients to break up the stress to body tissues is to institute the practice of "micro-breaks" every 15-30 minutes, during which an alternative activity is briefly performed that uses different movement patterns than those required of the job (Henning, Jaques, Kissel, Sullivan, & Altras-Webb, 1997). Low impact strengthening may be introduced to help manage symptoms as well.

The second area to consider will be the effects of the work station or task. Matching the task to the worker will require a working knowledge of the job in order to achieve. There is also an opportunity to match the worker to the task through the addition of a strengthening program designed to improve the strength of the muscles around the affected area.

The third area to consider is prevention of flare ups by strengthening postural muscles and instituting micro breaks. Patient education is an important factor in all areas of management; however, patients who understand the connection between the symptoms of MSD and the nature

of faulty underlying habitual postures, not just during work, may be more motivated to make the changes required to set them up for better outcomes when they are on-the-job (Novak, 2004). Referral to other healthcare professionals for specific exercise prescription or more invasive medical management may be warranted, particularly in the cases of nerve entrapment, prolonged impairment, or in cases of recurrent injury.

Conclusion

Rural and faith farming communities engage in occupations that may make members susceptible to MSDs. Faith community nurses are well positioned to serve as first-line screeners when these injuries are identified. Thus, comprehensive screening methods and initial conservative management strategies in early stages of MSDs may be enough to prevent the need for more invasive care. Identifying those cases in which referral to another healthcare provider will also help management of MSDs in these communities.

References

Armstrong, T., Dale, A. M., Franzblau, A., & Evanoff, B. A. (2008, December). Risk factors for Carpal Tunnel Syndrome and Median Nerve Neuropathy in a working population. *Journal of Occupational and Environmental Medicine, 50*(12), 1355-1363.

Barr, A. E., & Barbe, M. F. (2004). Inflammation reduces physiological tissue tolerance in the development of work-related musculoskeletal disorders. *Journal of Electromyography and Kinesiology, 14*, 77-85.

Biel, A. (2014). *Trailguide to the Body* (Fifth ed.). Boulder: Books of Discovery.

Buckup, K., & Buckup, J. (2016). *Clinical Tests for the Musculoskeletal System: Examinations-Signs-Phenomena* (Third ed.). (A. Wiser, Trans.) New York: Thieme.

Burt, S., Deddens, J. A., Crombie, K., Tin, Y., Wurzelbacher, S., & Ramsey. (2013). A prospective study of carpal tunnel syndrome: Workplace and individual risk factors. *Occupational and Environmental Medicine*, 568-574.

Cook, C. E., & Hegedus, E. J. (2013). *Orthopedic Physical Examination Tests* (Second ed.). Upper Saddle River, NJ: Pearson.

Cyriax, J. H. (1981). *Textbook of Orthopedic Medicine: Vol. 1: Diagnosis of Soft Tissue Lesions* (Eighth ed.). Tindall.

Dellon, A. L. (1999, November). Management of Peripheral Nerve Problems in the upper and lower extremity using quantitative sensory testing. *Hand Clinics, 15*(4), 697-715.

Dutton, M. (2016). *Dutton's Orthopaedic Examination, Evaluation and Intervention* (Fourth ed.). New York City: McGraw Hill Professional.

Goodman, C. C., & Fuller, K. S. (2009). *Pathology Implications for the Physical Therapist, 3rd Edition* (3 ed.). St. Louis: Saunders-Elsevier.

Henning, R. A., Jaques, P., Kissel, G., Sullivan, A., & Altras-Webb, S. (1997). Frequent Short Rest Breaks from Computer Work: Effects on Productivity and Well-Being at Two Field Sites. *Ergonomics, 40*(1), 78-91.

Jensen, T. S., & Baron, R. (2003, March). Translation of symptoms and signs into mechanisms in neuropathic pain. *Pain, 102*(1), 1-8.

Jones, P., & Field, W. E. (n.d.). *National Ag Safety Database*. Retrieved from Farm Safety Issues in Old Order Anabaptist Communities: Unique Aspects and Innovative Intervention Strategies: http://nasdonline.org/static_content/documents/1819/d001763.pdf

Labbafinejad, Y., Danesh, H., & Imanizade, Z. (2017). Assessment of upper limb musculoskeletal pain and posture in workers of packaging units of pharamaceutical industries. *Work, 56*, 337-344.

Levangie, P. K., & Norkin, C. C. (2011). *Joint Structure and Function: A Comprehensive Analysis* (Fifth ed.). Philadelphia: F. A. Davis.

Magee, D. J. (2014). Orthopedic Physical Assessment. In D. J. Magee, *Orthopedic Physical Assessment* (p. Chapter 1). Elsevier.

Maher, H. K. (2007). Carpal Tunnel Syndrome: An update. *American Association of Occupational Health Nurses*, 216.

Meziat-Filho, N., Silvia, G. A., Coutinho, E. S., Mendonca, R., & Santos, V. (2017). Association between home posture habits and neck pain in high school adolescents. *Journal of Back and Musculoskeletal Rehabilitation, 30*, 467-475.

Nee, R. J., Vicenzino, B., Jull, G. A., Cleland, J. A., & Coppieters, M. W. (2013, June). Baseline characteristics of patients with nerve-related neck and arm pain predict the likely response to neural tissue management. *Journal of Orthopaedic & Sports Physical Therapy, 43*(6), 379-391.

Neumann, D. A. (2017). *Kinesiology of the Musculoskeletal System Foundations for Rehabilitation* (Third ed.). St. Louis: Elsevier.

NIOSH. (2018, 07 27). *Centers for Disease Control and Prevention: National Institute for Occupational Safety and Health*. Retrieved 10 23, 2018, from Centers for Disease Control and Prevention: https://www.cdc.gov/niosh/topics/ergonomics/upperlimb.html

Novak, C. (2004). Upper Extremity Work-Related Musculoskeletal Disorders: A Treatment Perspective. *Journal of Orthopaedic & Sports Physical Therapy, 34*(10), 628-637.

O'Neill, B. A., Forsythe, M. E., & Stanish, W. D. (2001, February). Chronic occupational repetitive strain injury. *Canadian Family Physician, 47*, 311-316.

Osborne, N. R., Anastakis, D. J., & Davis, K. D. (2017). Peripheral nerve injuries, pain, and neuroplasticity. *Journal of Hand Therapy, 31*, 184-194.

O'Sullivan, S. B., Schmitz, T. J., & Fulk, G. D. (2014). *Physical Rehabilitation* (Sixth ed.). Philadelphia: F.A. Davis Company.

Rempel, D. M., Harrison, R. J., & Barnhart, S. (1992). Work-related cumulative trauma disorders of the upper extremity. *Journal of the American Medical Association, 276*(6), 838-842.

Schuenke, M., Schulte, E., & Schumacher, U. (2014). *Atlas of Anatomy General Anatomy and Musculoskeletal System.* New York: Thieme.

Simmons, B., & Bosch, J. (2006). *Hands: Strategies for strong pain-free hands*. Retrieved October 23, 2018, from Harvard Health Publishing: Harvard Medical School: https://www.health.harvard.edu/pain/healthy-hands-strategies-for-strong-pain-free-hands

Soto-Quijano, D. A., & Rivera-Taverez, C. E. (2005). Work-Related Musculoskeletal Disorders of the upper extremity. *Critical Reviews in Physical and Rehabilitation Medicine, 17*(1), 65-82.

U. S. Department of Labor. (2011, May 6). *OSHA National News Rlease*. Retrieved from OSHA.

Violente, F. S., Armstrong, T. J., Fiorentini, C., Graziosi, F., Risi, A., Venturi, S., . . . Mattioli, S. (2007, November). Carpal Tunnel Syndrome and manual work: A longitudinal study. *Journal of Occupational and Environmental Medicine, 49*(11), 1189-1196.

Xiao, H., McCurdy, S. A., Stoecklin-Marois, M., Li, C.-S., & Schenker, M. B. (2013). Agricultural work and chronic musculoskeletal pain among Latino farm workers: The MICASA Study. *American Journal of Industrial Medicine* , 216-225.