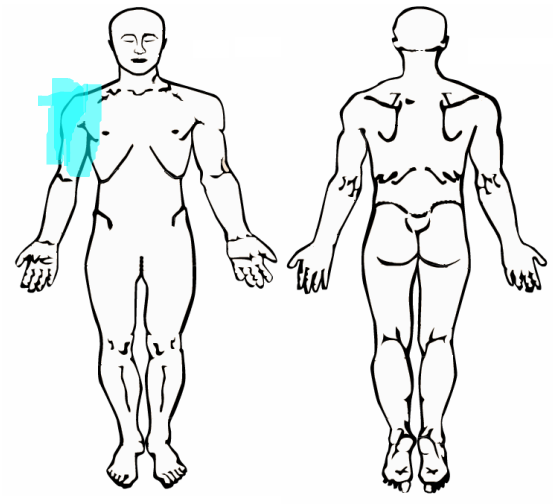
Case:

DPT 780

SCI Case #2

Patient is a 58 year-old male presenting to the outpatient physical therapy clinic with a diagnosis of "Right shoulder pain limiting function". Patient's intake history reports pain which has come on gradually for the past year and a half. Indicates pain is along outer side of right arm and down the front of the right shoulder/arm and worsens as he attempts to lift the arm overhead and most painful when attempting to serve in tennis game. It is also painful when weightbearing during transfers or pressure relief. Reports occasional snapping sensation in the right shoulder when doing difficult activities.



PMH: T8 complete SCI 30 years ago due to MVA, DM, 20 year history of smoking, but has quit, hypothyroidism, Type 2 diabetes, HBP (well controlled BP, thyroid and DM with medication)

Social History: Patient lives with his wife of 35 years in a one-story, accessible home. Utilizes a manual wheelchair for all mobility. Current wheelchair was received 6 months ago and is lighter than previous chair, to assist with the increasing shoulder pain. Patient works full-time as an accountant and plays on an adaptive tennis team. He drives independently and travels often with his wife.

Goal: To reduce pain and restore pain-free mobility in his chair.

PRELIMINARY HYPOTHESIS:

What impairments do you expect?

Multi-System	Associated Single-System(s)	WHY?
ROM	1. PROM of c-spine, bilateral shoulders, scapula, elbows, wrists a. Overpressure/end feels at end range 2. AROM of the above 3. 12 trunk movements: PROM, AROM	PROM of those joints to assess end feels, clear the c-spine that may refer pain to the shoulder, and assess involvement of associated joints. AROM bilaterally to look for restrictions, compare to PROM to hypothesize if joint of soft tissue problem, predict possible conditions like subacromial impingement, adhesive capsulitis, biceps tendon involvement, labrum, etc. Trunk movements to determine if possible contributor (due to T8 SCI) to impaired posturing and pathologic shoulder mechanics.
Strength	1. Postural Control/Shoulder/Elbow a. Type I b. Type II	Pt likely has a postural deficit leading to shoulder pain from overuse and chronic forward oriented activities. We would want to assess power generation and endurance of cervical flexors/extensor, scapular protractors/retractors/elevators/depressors, thoracic extensors/flexors, shoulder flexors/extensors. There are likely strength/length/endurance imbalances within these muscle groups leading to habitual postural deficits and overuse injuries.
Pain	1. Nociceptive pain through R UE, possibly involving C-spine 2. Neuropathic	Inflammation is likely present leading to nociceptive pain that can present in various joints due to regional interdependence and/or prolonged abnormal posturing. Neuropathic pain from peripheral nerve damage may result above T8 due to the SCI or as a result of possible radiculopathy.
Sensation	1. Paresthesia of RUE	If peripheral nerve is impinged, pt could present with paresthesias in the RUE
Motor Control	Altered scapulohumeral rhythm	Poor motor sequencing due to years of habitual movement patterns could lead to poor biomechanics and overuse injuries.

What activity limitations do you expect to see? Why?

Activity Limitation	To What Degree (Level of assist)	WHY?
W/C Propulsion	Indep but potentially Mod I due to slower speed limited by pain	He is independent and active with his manual WC, but his shoulder positioning (add, IR, ext, scap elevation) during propulsion and chronic overuse may be contributing to his pain, thereby continually increasing pain, and increasing pathological compensations.
Pressure relief/boost transfers	Indep but limited by pain, may need mod assist for pressure relief/boost transfer	It's possible that his scapular depressors are weak, contributing to his reported pain pattern. Pain may limit his ability to press up from the w/c, or the frequency with which he does.
Overhead motions	Min A, Indep. in tennis	His limiting factor is pain with overhead activities, where the humeral head and acromion space narrows and there is anterior translation of the humerus with altered scapulohumeral mechanics. 75% of the time, he will probably be able to reach most things but requires his wife's help with greater shoulder flexion. Indep. in tennis right now because he is still participating, but performance is compromised.

SUBJECTIVE QUESTIONS:

1. Can you recall if a specific event occurred that began your shoulder pain?
2. Does the pain stop when you stop the painful activity?
3. Can you describe the pain? Shooting, burning, aching..?
4. Have you had recent chest pain, shortness of breath, or nausea?
5. Do you have any numbness or tingling in your arms/hands?
6. Have you had previous injuries to your UE bones or joints before or after your SCI?
7. Do you sit at a desk for most of the workday? Can you tell me/show me roughly the height of your chair, the desk, and your keyboard?

SCREENS:

SYSTEM TO SCREEN	What will you screen (or write "all")	Why?
MSK	1. Cervical spine: AROM (followed by PROM if noted deficits) of B	The C-spine can refer pain to the shoulder or it can be concurrently involved, in which case a more thorough exam would occur. Because is

	rotation, SB, flexion, extension, MMT of available ranges 2. Elbows AROM, PROM of bilateral flexion, extension, pronation, supination, MMT of available ranges 3. Wrists/hands: AROM, PROM of bilateral flexion, extension, gripping, MMT of available ranges 4. Ribs: inspired or expired rib 5. Upper limb tension test: radial nerve	a T8 SCI, there is some loss of abdominal innervations and loss of scalenes, leading to some pulmonary compromise. So by the principle of regional interdependence, he may have altered mechanics of the ribs during breathing contributing to pain in his shoulder. Due to the pain pattern, there could be peripheral nerve entrapment of the radial nerve.
Sensation	1. Light touch of all UE dermatomes	His pain has been ongoing for 1.5 years, so this can clue us into possible central sensitization. In addition, peripheral nerve involvement may result in altered sensation.
Pain	1. Palpation: ACJ, SCJ, just distal to lateral epicondyle 2. NPRS	Assessment of TTP distal to the lateral epicondyle can rule in/out radial nerve entrapment. TTP of the ACJ and SCJ can provide info about impingement and hyper-/hypomobility.

EXAMINATIONS:

SYSTEM TO EXAMINE	**What will you examine? (Or write "all")**	**WHY?**
MSK	1. B AROM and PROM of all shoulder movements: flex/ext/IR/ER/abd/add 2. R Shoulder Special Tests: Neer, Hawkins-Kennedy, Biceps Load II, Empty Can 3. Postural observation 4. Joint play of B shoulders: sulcus sign, GHJ A-P glides	Because his shoulder is adducted, internally rotated, and elevated when propelling his w/c, he may present with symptoms of impingement. However, reports of snapping and continual anterior translation of the humeral head with w/c propulsion makes us want to consider labral involvement and shoulder instability as well. Chronic positioning in his wheelchair over 30 years with weakened abdominals from the level of injury has

		likely resulted in abnormal posturing, contributing to poor biomechanics.
Endurance	1. Muscular 2. Cardiovascular	Poor type I postural control as a result of decreased abdominal innervation from SCI. If abnormal posturing is noted, altered length-tension of trunk and UE muscles will result in overuse and fatigue. Chicken or the egg scenario of CV: If decreased aerobic capacity may result in mechanical compensations contributing to his present condition or his shoulder pain limits mobility, leading to reduced CV endurance. Important to document baseline
CNS	1. Motor Control: Scapulohumeral rhythm	If the shoulder does not have a solid platform to move upon, the humeral head will translate more anteriorly than anteroposterior during active flexion and weight bearing, resulting in impingement signs.

FUNCTIONAL TASKS:

Functional Task you will assess	**WHY?**
W/C Propulsion	To assess mechanics, posture, and pain level with this activity. The pt has been in a chair for 30 years and has had chronic shoulder pain increasing over a period of months. His activities are becoming limited. It is expected that his mechanics/posture could be contributing to an overuse injury and his strength/endurance could be impaired as well.
Tricep press up	To assess pain, technique, muscle sequencing, strength, and ability to pressure relieve and transfers. The pt has stated that this in particular is a limited activity, so a task analysis should be performed to assess quality of movement and limitations in an effort to fully recover this activity.
Overhead reach	To assess pain, posture, motor control/scapulohumeral rhythm, and ability to perform ADLs. He is an overhead athlete. We know that poor motor sequencing and impaired scapulohumeral rhythm can lead to improper overhead mechanics and impinge or degrade soft tissue structures around the shoulder joint. One of his goals is to return to this sport so qualitative assessment of this task should be conducted in order to guide intervention plan.

OUTCOME MEASURES:

Outcome Measure Chosen	Why?	ICF Level
SPADI	To assess his perception of pain and disability related to his shoulder on ADL's, mobility, participation, pain, ROM, and UE function. This will carry over into designing goals for reduced pain during w/c propulsion and ability to play tennis	Body function, Activity
Single Arm Seated Shot Put Test	This OM gives us info about his ability to generate power in shoulder flexion for serving in tennis. Additionally, it gives info about his ability to load the GHJ in the flexed position, which is when he reports the most pain. Despite his SCI, he is active, and we should be treating him that way.	Body function, Activity, Participation
Timed W/C Propulsion Test	To assess both muscular and cardiovascular endurance for mobility and tennis playing	Body s/f

EDUCATIONAL NEEDS:

Person Being Educated	What education is needed?	Why is this education needed?
Pt	Prognosis- Since he relies on his UEs so much, it will take more time and effort to correct. Posture and mechanical correction, activity modification, and compliance will be needed.	He needs to know what to expect from PT and how his compliance with the plan is key to success.
Pt	Comorbidities: Though they are medically controlled, we need to educate about delayed phases of healing due to these pathological processes, in addition to natural degenerative changes with aging.	To give him a realistic timeline, earn his trust when he doesn't think he is progressing quickly enough, and to deliver a holistic treatment approach.

WHAT IS THE ROLE OF PT FOR THIS PATIENT?

ROLE OF PT	Explain your plan related to the topic (if not part of plan put "not needed")	What resources will you or the patient need to accomplish this?
# of visits	2 xs/week for 6 weeks	Insurance approval
Equipment	Depends on the diagnosis deduced from the eval. Everything should be available in the outpatient clinic. Have him bring his tennis racket to show his serving technique and at which point he experiences pain.	Clinic equipment, tennis racket
Community Resources	Adaptive yoga classes for posture if that's a contributing factor, as well as accessible aquatics to maintain CV endurance for return to tennis	Community pool with handicap lift. Community outreach and networking to find suitable yoga class with knowledgeable instructor
Home exercise program	Highly dependent on impairments and stage of healing but likely will prescribe 3-4 exercises of active or passive ROM of cervical spine, AAROM of shoulder either with dowel or use of towel on wall, or maintenance of surrounding joints that may not be immediately impacted, i.e. elbow and wrist.	HEP handout, practice of the exercises with me to ensure proper form and his understanding