



**Painful Conditions of the Upper Limb**

*An overview of the evaluation of common and not-so-common painful syndromes affecting the arm*

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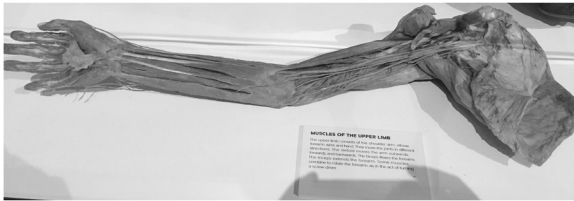
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**Disclosures**

- Will present adapted materials from my book "Painful Conditions of the Upper Limb" published in April 2021-OUP
- I work for the Department of Veterans Affairs and my presentation does not represent the views of the VA or the US Federal Government
- No conflicts of interest to disclose with ineligible companies



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**Learning Objectives**

- Compare various peripheral neurological syndromes affecting the arm using case studies
- Identify various common musculoskeletal conditions affecting the arm
- Using a case study, outline a differential diagnosis for painful arm symptoms to guide a quick physical exam and discriminatory ancillary test



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**So Let's Play "Clue"**



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**Case #1**

66 y/o R-handed male - progressive painful R shoulder "clicking and grinding"  
 Plays recreational tennis (doubles - knees also bother him)  
 Pain affecting his game mostly is generally minimal to absent when resting; AM stiffness and a "clicking" sensation with certain movements  
 ROS – no SOB, palpitations, abdominal pain, neck pain or tingling or numbness sensation in the arm  
 PMH: HTN, PUD, and BPH  
 PSH: cholecystectomy and abdominal hernia repair  
 Tx: PRN APAP and ibuprofen - minimal improvement  
 PE: no gross deformity, mild limitation in AROM, palpable crepitus, no tenderness, - impingement signs. Good distal strength / normal sensation



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**So What Do You Do Now?**

- Are these patient's symptoms related to an intrinsic or extrinsic shoulder pain generators?
- If intrinsic, is the problem at the GH joint or extra-GH structures?
- What additional history details should I seek and what additional workup should I perform at this time?




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**The Shoulder**

- 4 articular surfaces (glenohumeral [GH], acromioclavicular [AC], sternoclavicular, and scapulothoracic)
- Complex array of soft tissues, allowing for a very large degree of mobility but making it susceptible to instability
- Potential referral patterns




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**First Order of Business**

- Trauma: time course and lack of trauma effectively rules out acute traumatic causes of shoulder pain
- Extrinsic: no neuro complaints / not vague or at rest




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### Possible Causes

- Traumatic (imaging mandatory)
  - Fractures – clavicle, proximal humerus, scapula
  - Dislocations/Sprain – GH, AC, SC
- Extrinsic
  - Cervical – radiculopathy, zoster, zygoapophyseal joint arthropathy
  - Plexus and focal nerve lesions (i.e. suprascapular/axillary nerve palsy,
- TOS)
  - Visceral – diaphragmatic irritation (liver, spleen, gallbladder), cardiac
- Intrinsic
  - Extra-glenohumeral
    - AC arthritis
    - Scapulothoracic ailments
    - Biceps tendonitis/ tears
  - Glenohumeral
    - GH instability
    - Rotator cuff (tears, impingement, tendinopathy)
    - GH arthritis (OA, osteonecrosis, crystal-induced, RA)



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### Intrinsic causes

- Extra-GH causes: tendinopathy/tear of the biceps tendon and AC joint arthritis/sprain. No tenderness or deformity (Popeye Sign, scapular winging, or step deformity of AC joint) does not support these diagnoses, pointing to possible glenohumeral causes
- GH causes: rotator cuff pathology (impingement, tear, tendinopathy), adhesive capsulitis, labral tear, GH instability, and GH arthritis



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### So Where Are We?

- Information provided:
  - doesn't suggest rotator cuff pathology (no anterolateral pain, point tenderness, impingement signs (Neer and Hawkins Tests) and other abnormalities on exam (drop arm, specific painful arc, empty can test)
  - Adhesive capsulitis - more prevalent in diabetics / tends to affect ROM in all directions (ABduction and ER profoundly)
  - Clicking, catching, or locking sensation - most common type of labral tear (SLAP lesion) generally requires performing an MRI
    - Should we do an MRI at this point?



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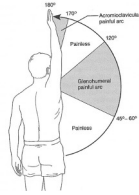
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### Not Yet.... A Couple of Additional Steps

- Additional exam – no clicking or locking, negative O'Brien's test, no instability, apprehension or sulcus sign
- Limited ROM - passive and active, mid-range in ABduction and ER



PainWeek

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### So We Order Plain Films Instead...



PainWeek

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### Key Points

- Prevalence of OA: higher in whites, males > 45 // females > 55 , overweight and inactive persons
- Use systematic approach:
  - first separate extrinsic (referred pain) and intrinsic (pain from the shoulder girdle structures) causes
  - followed by evaluation of GH vs extra-GH causes
- Evaluation of acute traumatic injury mandates imaging
- Non-traumatic history: imaging should be carefully guided by the patient's Hx and exam findings
- Management should follow a stepwise approach, from conservative to minimally invasive and lastly surgical

PainWeek

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**Case #2**

47 y/o female - gradually worsening pain in wrists for about 3 months  
Denies trauma or precipitating event  
Occasional hand paresthesias and some numbness affecting the whole hand, worse at night, occasionally waking her up; intermittent pain in the whole arm

Homemaker / slightly overweight (has gained about 8 lbs over last year)  
PMH: hypothyroidism  
PRN APAP and OTC ibuprofen - generally help; relieve some of the pain

Hands inspection: symmetric normal appearance  
Grip strength and gross sensation to light touch NL B



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**So What Do You Do Now?**

- Is this a neurological problem or a soft-tissue/musculoskeletal problems with some vague neurological symptoms?
- Could this be a focal manifestation of a systemic condition?
- What additional history details should I seek and what additional workup should I perform?



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**What comes to mind first?**

- CTS
  - Why?
    - gender, age, comorbidities, sensory symptoms, it's a horse...
  - Why not?
    - No atrophy, NL grip and sensation (signs)...
    - Whole arm painful?
- If not, what could it be?
  - Some kind of arthritis?
  - Other overuse condition? Referred (neck/elbow) / another focal nerve or plexus problem?



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**What next?**

- Palpate
- Tinel / Phalen / Carpal Compression
- Reflexes / Light touch
- Any additional studies?



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**An Important Pearl....**



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**Key Points about CTS**

- Most common entrapment neuropathy in adults; females > males
- Conditions that cause systemic neuropathies (DM, hypothyroidism) or edema (pregnancy, CRI) are risk factors. Obesity also a risk factor
- Occupations with repetitive wrist motion (secretarial work) and use of vibrating tools (some construction jobs) are considered occupational risk factors
- Mild CTS - usually symptoms with no or minor signs
- Proximal pain NOT uncommon
- EDX - only useful ancillary test to confirm; also helps to guide Tx
- Conservative followed by more invasive management methods may be used for management in a stepwise fashion



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**Case #3**

54 y/o female - diffuse pain/swelling L forearm and hand  
Started about 2 months ago-gradually worsened; denies trauma  
Pain described as deep ache and burning involving the "whole arm"

PMH: GAD, PUD, mild obesity and prediabetes  
PSH: hysterectomy; L middle trigger finger release (3 months ago)

Edema in dorsum of hand / erythema of hand and forearm  
L hand feels warmer to the touch when compared to the R  
Very guarded when you attempt to touch her hand. Well-healed surgical scar in the palm w/o signs of infection



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**So What Do You Do Now?**

- What could this be?
  - Cellulitis
  - DVT
  - Lymphedema
  - CRPS type 1 or 2 (complex regional pain syndrome)
  - Delayed surgical infection / osteomyelitis
  - Arthritic flare (i.e. gout, septic, other)



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**Next Steps**

- Imaging?
- Blood work?
- Additional physical exam?



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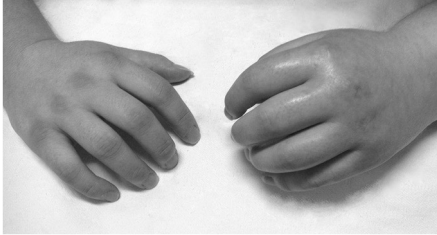
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**This is how the hands look like....**



**PainWeek**

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**The Budapest Criteria<sup>1</sup>**

Continuous pain, which is disproportionate to any inciting event

At least 1 **symptom** in 3 of the following 4 categories:

- Sensory: Reports of hyperesthesia and/or allodynia
- Vasomotor: Reports of temperature asymmetry and/or skin color changes and/or skin color asymmetry
- Sudomotor/Edema: Reports of edema and/or sweating changes and/or sweating asymmetry
- Motor/Trophic: Reports of decreased range of motion and/or motor dysfunction (weakness, tremor, dystonia) and/or trophic changes (hair, nail, skin)

**PainWeek**

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**The Budapest Criteria<sup>1</sup> (cont'd)**

At least 1 **sign** at time of evaluation in 2 of the following 4 categories:

- Sensory: Evidence of hyperalgesia (to pinprick) and/or allodynia (to light touch and/or temperature sensation and/or deep somatic pressure and/or joint movement)
- Vasomotor: Evidence of temperature asymmetry (>1 °C) and/or skin color changes and/or asymmetry
- Sudomotor/Edema: Evidence of edema and/or sweating changes and/or sweating asymmetry
- Motor/Trophic: Evidence of decreased range of motion and/or motor dysfunction (weakness, tremor, dystonia) and/or trophic changes (hair, nail, skin)

▪ There is no other diagnosis that better explains the signs and symptoms

<sup>1</sup> Harden et al. Pain Med 2007

**PainWeek**

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**Now What?**

- You are likely dealing with a very complex problem
- Referral to a pain management specialist with access to multidisciplinary / multimodality tx options desirable
- Aim is to maintain mobility, not immobilization



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**Key Points about CRPS**

- CRPS requires a multidisciplinary approach for successful management
- Pharmacologic management and interventional procedures are used on an as-needed, individualized basis and using a stepwise approach
- Main goal of these therapies is to provide some degree of analgesia that will allow the patient to tolerate graded activity and mobilization of the affected limb
- Pharmacologic management: may include NSAID's, adjuvants (anticonvulsants, antidepressants, bisphosphonates), topical analgesics, alpha-adrenergic antagonist and corticosteroids
- Prognosis is quite variable - many patients develop long-term dysfunction and long-term disability



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**Case #4**

58 y/o male - pain in the R hand associated with locking of the ring finger for the last 4-5 months  
 Denies any trauma or redness / hand has swollen occasionally

- PMH: DM type 2, HTN, mild obesity
- Inspection – calluses along several MCP joints (palmar surface)
- No open wounds / no signs of inflammation
- Sensation is normal / able to make a strong fist B: full AROM
- Slight tenderness at the base of R ring finger (over the MCP joint)
- You ask him to actively make a fist and open the hand while you palpate the tender area - slight snapping and feel a small nodule



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**So What Do You Do Now?**

What could this be?

- Trigger Finger
- Dupuytren's Disease
- Diabetic Cheiroarthropathy
- MCP joint sprain or arthritis
- Non-infectious tenosynovitis




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**He shows you the hand and it looks like this..**



but that would be too easy....




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**So Let's Think This Through...**

So why not:

- Diabetic Cheiroarthropathy
  - Diabetic + but type 2; no numbness, localized, unilateral, pain, fingers not swollen
- MCP joint sprain or arthritis
  - Tender over MCP +; no trauma
- Non-infectious tenosynovitis
  - no signs of inflammation/no redness
- Dupuytren's Disease
  - DM+; EtOH?; pain; may start as tender palpable nodule
- Trigger Finger
  - Sounds like it; dynamic snapping contracture; common/+painful




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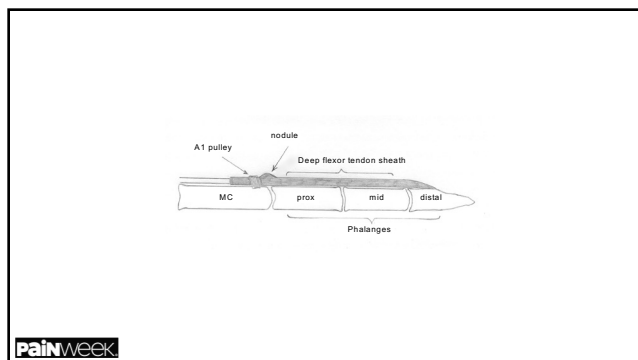
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**Key Points**

- Trigger finger:
  - one of the most common adult hand painful conditions
  - may cause a finger flexion “contracture” that is dynamic and corrected versus Dupuytren’s Disease that causes a true flexion contracture that cannot be manually corrected
- Conservative care tends to be beneficial for trigger finger but less so for Dupuytren’s disease. Both conditions may require invasive and surgical management for correction

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**Case #5**

- 27 y/o female - reports episodic hand discoloration and pain in the fingers for the last 6-8 weeks; getting progressively worse
- describes that her fingers get very white for 15 to 30 minutes followed by turning beefy red, throbbing and swelling
- PMH: occasional knee swelling but otherwise unremarkable; Uses no medications except birth control pills

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**So What Do You Do Now?**

- Does the patient have systemic problem causing all her symptoms?
- Is there a vascular problem possibly causing intermittent circulatory impairment to the hands?
- What additional physical exam tests could we perform in order to formulate a presumptive diagnosis?
- Should we order any imaging or laboratory tests to better evaluate this patient?

**PainWeek**

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**Exam**

- Hands have normal color but the tips of her left middle and index fingers are very dry and slightly pitted
- Ulnar and radial pulses are normal
- Capillary refill in all fingers (except thumbs) is very sluggish
- Some of her MCP and PIP joints are tender to palpation
- Hand sensation appears to be intact
- Grip strength is good but reports some pain at some MCP's when gripping
- Knees appear slightly swollen and warm to the touch

**PainWeek**

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**So now what?**

- Sluggish cap refill – vascular problem?
- Fingertips dry and pitted – something chronic?
- Tender/painful/inflamed joints in young female-rheumatological?
- NL neuro – less likely neurological

**PainWeek**

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Dead giveaway if hands looked like this....

..... but they don't



**PainWeek**

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**Most likely scenario...**

- Patient may be suffering from an underlying connective tissue disorder and that the Raynaud's seen in her case could be secondary to such disorder
- Pattern of joint complaints and findings on exam suggest the possible presence of RA.
- Therefore, imaging studies and laboratory tests (Rheumatoid Factor, ESR, ANA, etc.) along with a referral to a rheumatologist appear to be in order

**PainWeek**

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**Key Points**

- Raynaud's is a vascular condition that may be idiopathic (primary) or a manifestation of a systemic disease (secondary)
- Secondary Raynaud's - primarily managed by treating the underlying cause and avoiding triggers
- Raynaud's can be very disabling and painful, leading to finger and toe amputations in extreme/severe cases

**PainWeek**

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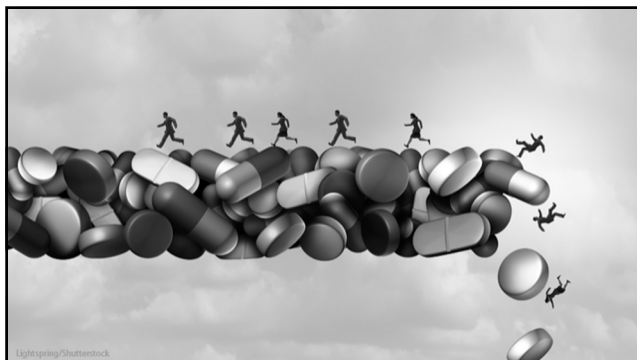
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**Case #6**

- 67 y/o woman with insidious-onset deep ache and burning with weakness of her right shoulder over the last 2 weeks
- Rest, ice and acetaminophen have not helped
- Also noticed difficulty lifting her arm and occasional “twitching “ over the deltoid
- Denies other neurological symptom except burning of her thumb
- PMH: right mastectomy and radiation therapy 6 years ago

**PainWeek**

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**So What Do You Do Now?**

- Examine her:
  - mastectomy scar looks intact with mild hyperpigmentation of skin over her right axilla
  - very mild R arm edema (she reports as chronic/unchanged since shortly after her mastectomy)
  - Spurling’s test: negative // negative impingement maneuvers
  - PROM of shoulders is normal; no focal tenderness
  - Strength is 4/5 in shoulder ABduction, elbow flexion, and wrist extension but otherwise intact
  - Decreased sensation to light touch over the deltoid region, lateral forearm, and thumb. Right brachioradialis reflex – absent; other reflexes are normal

**PainWeek**

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**And now what?**

- Here are the facts:
  - No trauma reported (only remote surgery)
  - No improvement with rest and initial measures
  - “patchy” neurological deficits
    - Burning finger – C6 / median/radial N
    - Decreased sensation over deltoid region, lateral forearm, and thumb
      - Axillary, Lat antebrachial cut, C5-6
    - Absent BR reflex – C6 / radial
    - Decreased strength in shoulder Abduction (C5-6), elbow flexion (C5-6/musculocutaneous, radial), and wrist extension (radial)

So, is there a common theme?




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**Other Factors**

- Denies neck pain and Spurling’s test for cervical compression is negative
- Important consideration here:
  - Pain with objective patchy neurological complaints
- Sounds like a neuropathic condition?
  - Compression neuropathy like CTS/axillary?
  - How about a brachial plexopathy?
    - idiopathic, radiation-induced, compression from local mass effect (neoplastic)




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**What would you do now?**

- Plain Films
- PET/CT
- MRI
- EMG/NCS




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**Differentiating Brachial Plexopathies**

	Radiation-Induced	Idiopathic	Neoplastic
<b>Plexus trunk affected</b>	Upper	Upper	Lower
<b>Presenting symptom</b>	Dysesthesia + weakness	Severe pain	Severe pain
<b>Best diagnostic modality</b>	EMG	Exclusion	MRI/PET
<b>Causes</b>	Radiation for breast CA	Physical/emotional stressor	Metastatic breast / lung CA

**PainWeek**

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**Key Points**

- Radiation-Induced and Idiopathic Brachial Plexitis usually affect the upper trunk.
- Neoplastic usually affects the lower trunk.
- Radiation-Induced usually presents with dysesthesias and weakness
- Idiopathic and Neoplastic usually presents with intense pain followed by weakness
- Symptoms of Radiation-Induced may not be present for several years (average 6) after the last dose of radiation
- EMG studies may show myokymic discharges, an abnormal spontaneous activity, which can differentiate radiation-induced brachial plexopathy from neoplastic and idiopathic plexopathies

**PainWeek**

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**So, what was the point of this exercise?**

- Think rationally and algorithmically
- Use a good Hx and focused PE as your main tools.
- Look for horses, not zebras
- Testing is only secondary and to confirm / rule out – not to screen and diagnose

**PainWeek**

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**Thanks!**



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