

- Measures have been taken, by the Utah Department of Health, Bureau of Health Promotions, to ensure no conflict of interest in this activity.

CNE/CEU's are available for this live webinar. You must take the pre and post tests. 80% is required on the post test to receive CNE/CEU's.

- Certificates will be emailed out to you within two weeks

# Common Musculoskeletal Complications of Diabetes

Jason Blackham MD

Internal Medicine/Sports Medicine

# Objectives

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- ❁ Diabetics have increased risk of joint and tendon problems.
- ❁ Identify what they are.
- ❁ How to treat the common problems.
- ❁ Risks of steroid injections in diabetics.

# Outline

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- ✿ Shoulder pain
- ✿ Hand
- ✿ Spine
- ✿ Joint
- ✿ Muscle
- ✿ Injections

# Shoulder pain

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- ❁ Adhesive capsulitis
  - ❁ Frozen shoulder
- ❁ Calcific tendinitis
- ❁ Tendinosis or diabetic painful shoulder

# Case 1

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- ✿ 51 yo woman with diabetes, HbA1c 7.8%
- ✿ Right shoulder pain
- ✿ No injury
- ✿ Very painful shoulder
- ✿ Worse at night
- ✿ Loss of motion
- ✿ Pain with motion

# Case 1

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- ✿ Exam
  - ✿ Tenderness anterior shoulder
  - ✿ ROM
    - ✿ Flexion 90
    - ✿ Abduction 90
    - ✿ IR 45
  - ✿ + Hawkin's and Neer's
  - ✿ Strength 5/5 throughout

# Case 1

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- ✿ Subacromial injection
  - ✿ Pain gone except at end motion
  - ✿ Motion no better
- ✿ Referral to PT
- ✿ Tramadol
- ✿ 4 week Follow-up
  - ✿ 20 degrees more motion
  - ✿ Intra-articular injection- better pain relief
- ✿ 12 Week follow-up
  - ✿ ROM only lacked 10 degrees
  - ✿ Pain gone

# Shoulder pain

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- ❁ **Adhesive capsulitis**
  - ❁ **Frozen shoulder**
- ❁ Calcific tendinitis
- ❁ Tendinosis or diabetic painful shoulder

# Adhesive capsulitis

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- ✿ Painful limited range of motion (ROM)
- ✿ Night pain
- ✿ Mean age 50, more common in women
- ✿ Thickening and contraction of joint capsule and collagen tissue around joint

# Adhesive capsulitis

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- ✿ Diabetes risk factor for frozen shoulder
  - ✿ Causitive
- ✿ Not dependent on how high BS are
- ✿ 10-38% of diabetics type I and II
- ✿ 5-10% of general population
- ✿ Glycosylation collagen
  - ✿ Joint capsule, rotator cuff

J Shoulder Elbow Surg 2013;22:e24-9

Scan J Rheumatol 2013;42:1-10

Rev Bras Reumatol 2012;52

# Adhesive capsulitis

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- ✿ 3 phases
  - ✿ 1- Painful phase
  - ✿ 2- Stiffness but pain improved
  - ✿ 3- Recovery- motion improves
- ✿ Self limited, resolution in a year

# Adhesive capsulitis

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- ✿ Diagnosis- Exam
  - ✿ Injection test
- ✿ Imaging
  - ✿ Radiographs
  - ✿ MRI
  - ✿ Rule out other causes

# Adhesive capsulitis

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- ✿ Treatment
  - ✿ NSAIDs, pain medications
  - ✿ Let it run its course
  - ✿ Physical therapy
  - ✿ Joint injection
  - ✿ PT and injection
    - ✿ 3-6 months

Disabil Rehab 2014;36:556-62

Knee Surg Sports Trumatol Arthrosc 2012;20:1947-52

Exp Clin Endocrinol Diabetes 2013;121:75-9

# Adhesive capsulitis

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- ✿ Treatment
  - ✿ Surgery or manipulation under anesthesia
    - ✿ 6-9 months
  - ✿ Manipulation
    - ✿ Diabetics more likely need it 2x,
      - ✿ 36% compared to 15% Nondiabetics

# Case 2

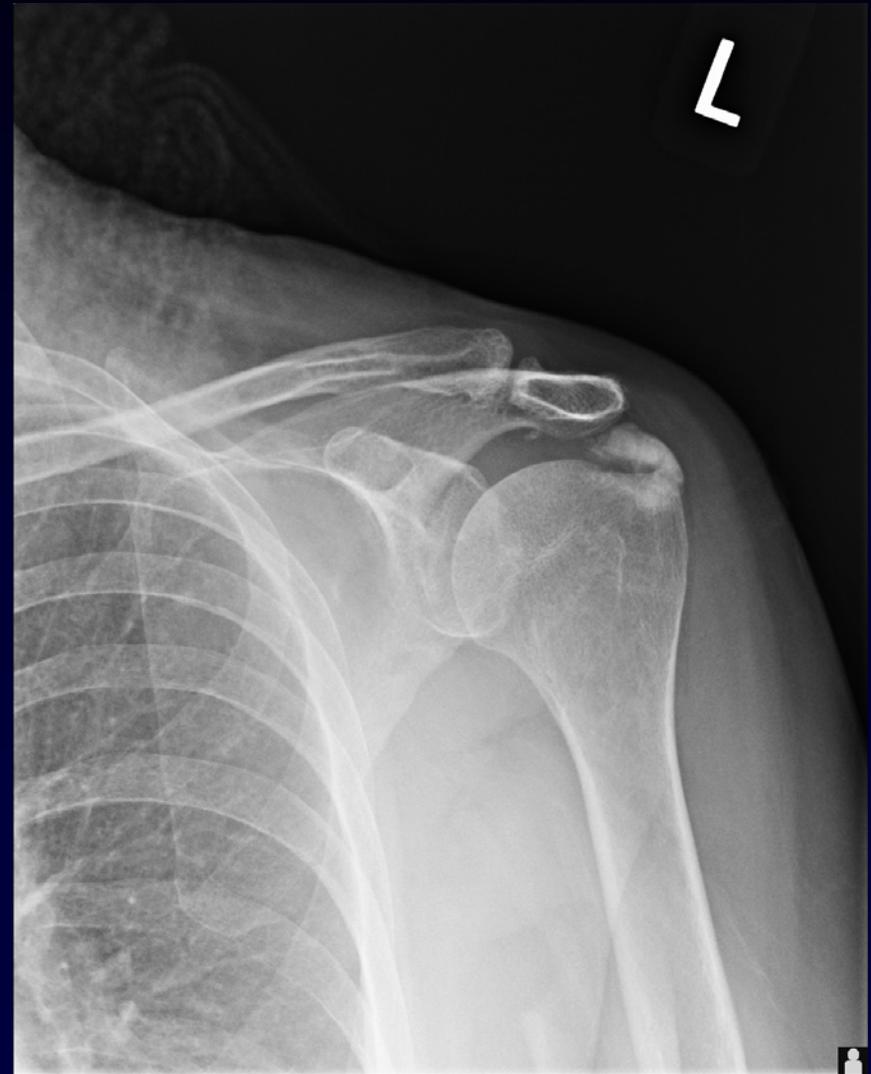
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- ✿ 52 yo man with controlled bipolar, HTN
- ✿ Hx of right shoulder calcific tendinitis
  - ✿ Numerous treatments and eventual surgery
- ✿ Now left shoulder pain
  - ✿ Similar past pain
- ✿ Pain at end motion with only 20 degrees limitation
- ✿ Strength 4/5 with flexion and abduction
  - ✿ + supraspinatus and Speed's test

# Case 2

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- ❁ Radiographs
  - ❁ Calcific tendinitis
- ❁ Lab workup
  - ❁ 2 years ago NL
  - ❁ Now Fasting BS 135
  - ❁ HbA1c 7.2%



# Shoulder pain

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- ❁ Adhesive capsulitis
  - ❁ Frozen shoulder
- ❁ **Calcific tendinitis**
- ❁ Tendinosis or diabetic painful shoulder

# Calcific tendinitis

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- ✿ Calcium hydroxyapatite deposition of tendon, bursa
- ✿ Pain, limited motion
- ✿ Resorption syndrome
  - ✿ Extreme pain, loss of motion
- ✿ 31% of diabetics
- ✿ 10% without



# Calcific tendinitis

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- ✿ Treatment
  - ✿ Pain medications
  - ✿ NSAIDs
  - ✿ PT
  - ✿ Injection
  - ✿ US guided lavage/puncture
  - ✿ Surgery

Arth Rheum 2009;60:2978-84

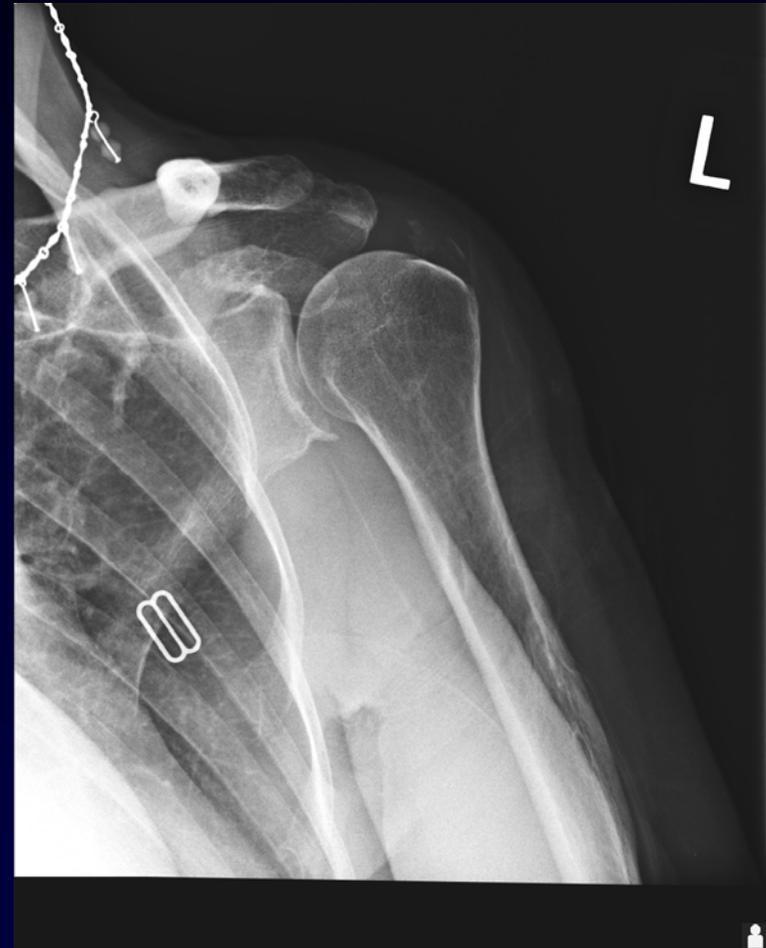
Joint Bone Spine 2010;77:258-63

Ultrasound Med Biol 2001;27:735-43

# Calcific tendinitis

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- ✿ 70 % good to excellent results
  - ✿ No matter which treatment
  - ✿ 1-5 years
- ✿ 50% have complete resolution



Arth Rheum 2009;60:2978-84  
Joint Bone Spine 2010;77:258-63  
Ultrasound Med Biol 2001;27:735-43

# Video

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# Video

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# Case 3

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- ✿ 57 yo man with Type II diabetes, HbA1c 8.9%
- ✿ Left shoulder pain for 3 months
- ✿ Gradually worsening
- ✿ Pain inside shoulder
- ✿ Worse at night, use, motion

# Case 3

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- ✿ Exam
  - ✿ ROM painful but not limited
  - ✿ Strength 4/5 with flexion and abduction
  - ✿ + subscapularis, supraspinatus and Speed's tests
- ✿ Radiographs- mild AC joint arthrosis
- ✿ MRI- supraspinatus thickening and tendinosis
- ✿ Physical therapy
- ✿ Returned in 6 weeks with mild improvement
  - ✿ HbA1c 8.4%
  - ✿ Injection

# Shoulder pain

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- ❁ Adhesive capsulitis
  - ❁ Frozen shoulder
- ❁ Calcific tendinitis
- ❁ **Tendinosis or diabetic painful shoulder**

# Rotator Cuff Tendinosis

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- ✿ Type II Diabetes 2x more likely to have joint pain
- ✿ 63% of Diabetics shoulder pain
- ✿ Women

Diabetes Res Clin Pract 2012;96:135-40

Physiotherapy 2014 Sept 19

Diabet Med 2015 Jan 23

Arg Bras Endocrinol Metabol 2012;56:233-7

# Rotator Cuff Tendinosis

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- ✿ Changes in collagen in rotator cuff
- ✿ Worse with higher HbA1c or higher BS
- ✿ Thickening
- ✿ Better control of BS helps
- ✿ Probably more prolonged course

# Tendinosis

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- ✿ Also more common in Achilles, tennis elbow, greater trochanter, ankle
- ✿ Physical therapy
- ✿ Better BS control
- ✿ Injections, but not Achilles, tibial
- ✿ Nitro patch
- ✿ Needle tenotomy
- ✿ Surgery

# Hand

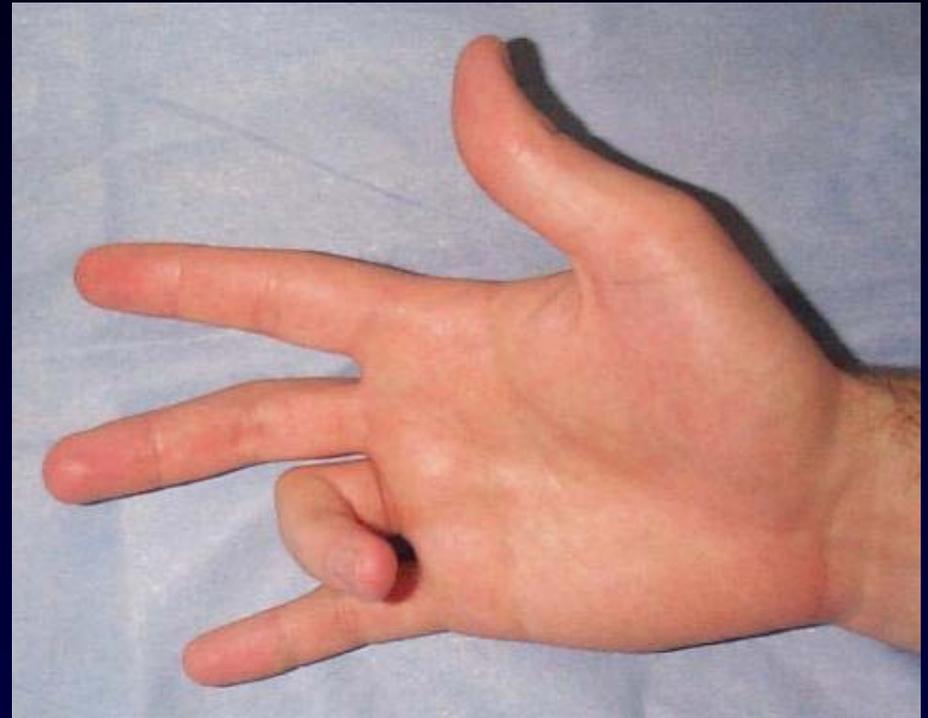
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- ✿ **Trigger finger**
  - ✿ **Flexor tenosynovitis**
- ✿ Dupuytren's contracture
- ✿ Diabetic stiff hand syndrome
  - ✿ Cheiroarthropathy
- ✿ Carpal tunnel syndrome

# Case 4

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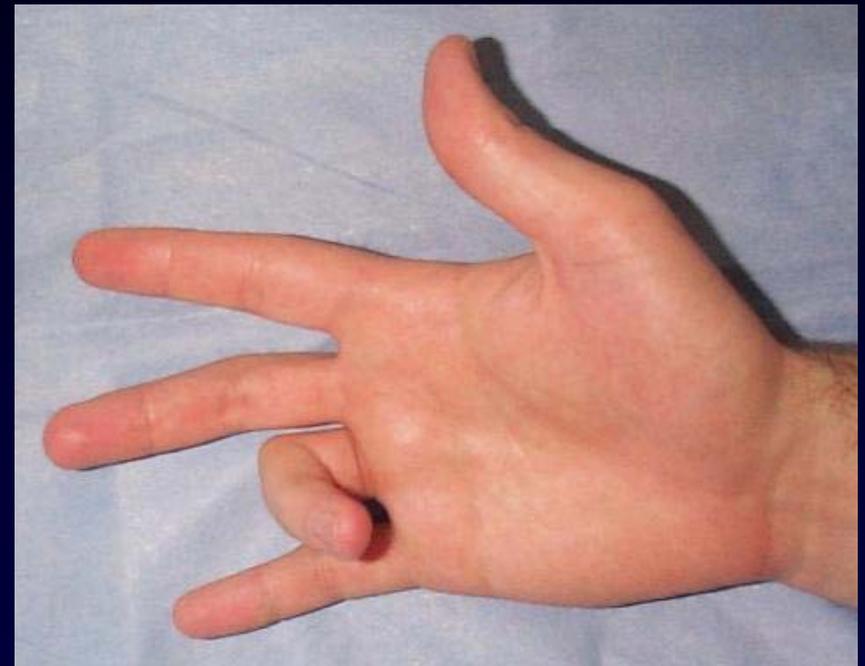
- ❁ 67 yo woman with Type II diabetes, HbA1c 7.3%
- ❁ Painful 4<sup>th</sup> finger that gets stuck
- ❁ Triggers
- ❁ Better after injection



# Trigger finger

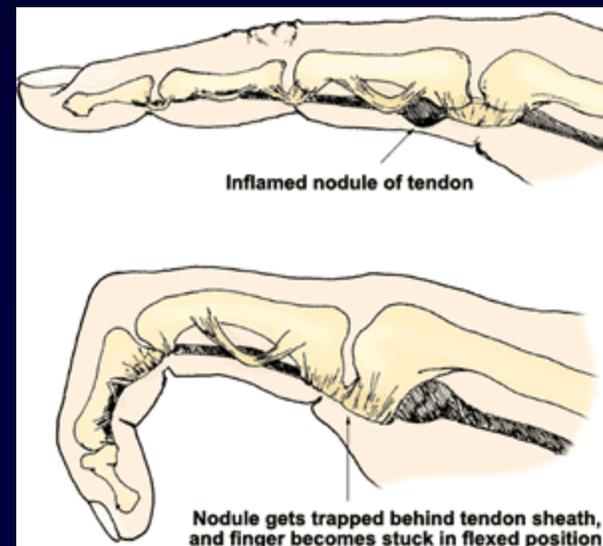
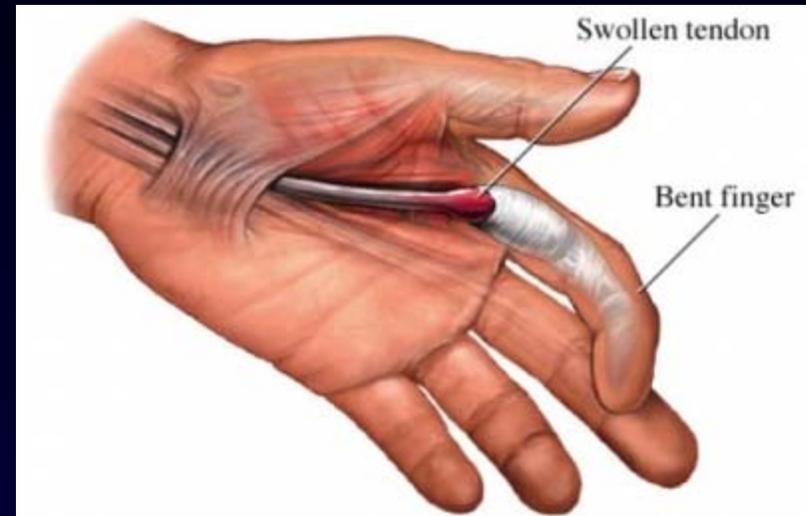
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- ✿ Flexor tenosynovitis
  - ✿ Tendons that flex fingers
  - ✿ At level of MCP joint at palm
  - ✿ Finger gets stuck or triggers



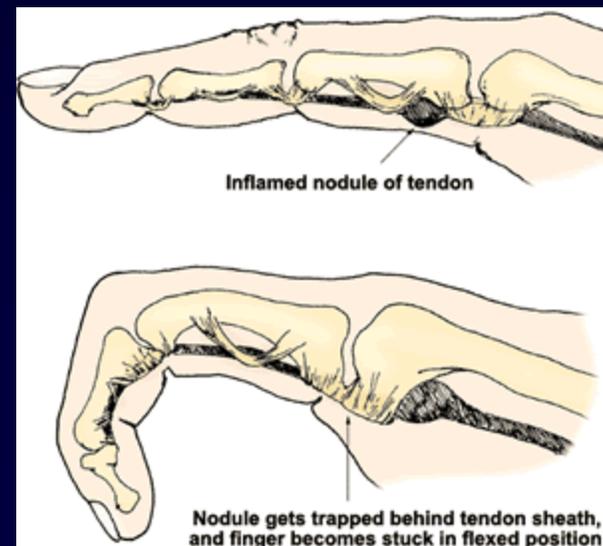
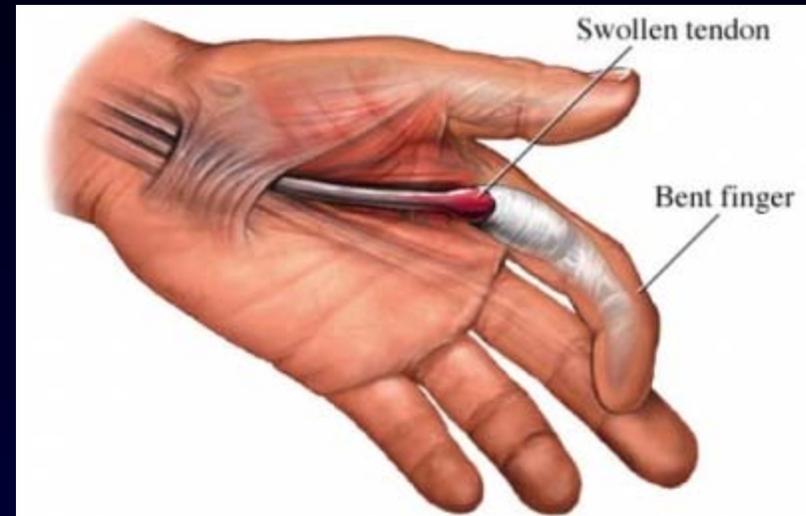
# Trigger finger

- ❁ Related to collagen changes
- ❁ Related to duration of diabetes but not level of control
- ❁ Diabetics more likely to have > 1 finger



# Trigger finger

- ❁ > Type I
- ❁ 5-36% in Diabetics
- ❁ 2% nondiabetics
- ❁ 10% of people with it not yet diagnosed have diabetes



# Hand

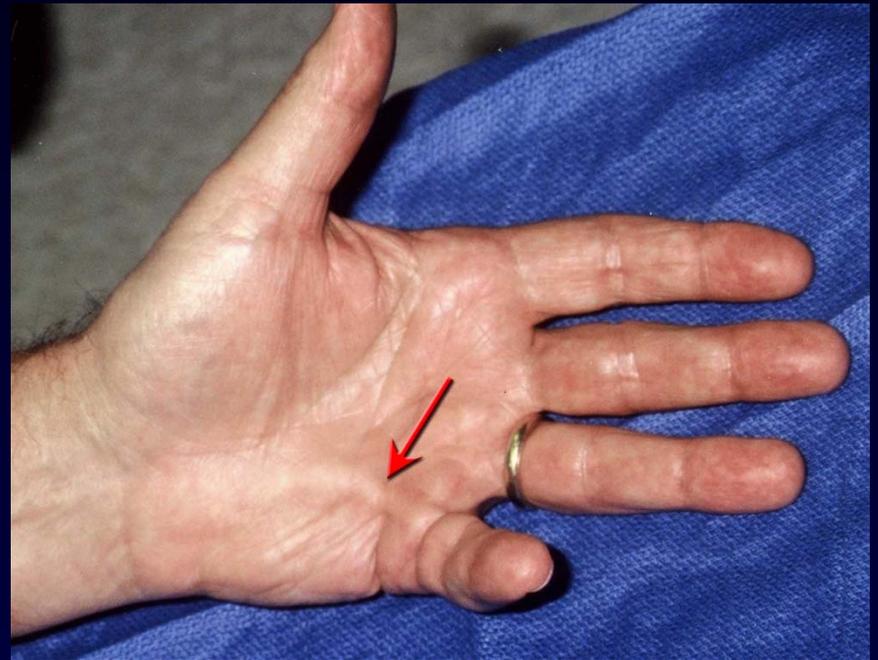
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- ✿ Trigger finger
  - ✿ Flexor tenosynovitis
- ✿ **Dupuytren's contracture**
- ✿ Diabetic stiff hand syndrome
  - ✿ Cheiroarthropathy
- ✿ Carpal tunnel syndrome

# Dupuytren's Contracture

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- ❁ Fibrosis, collagen changes and nodules of palmar fascia
- ❁ Thickening, flexion contracture
- ❁ 16-42% of diabetics
- ❁ Longer history but not severity



# Dupuytren's Contracture

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- ✿ 5-21% of diabetics
- ✿ 3-9% general population
- ✿ If no diagnosis of diabetes
  - ✿ 13-39% with contracture have diabetes
- ✿ Men
- ✿ Bilateral
- ✿ Hand surgeon



# Hand

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- ✿ Trigger finger
  - ✿ Flexor tenosynovitis
- ✿ Dupuytren's contracture
- ✿ **Diabetic stiff hand syndrome**
  - ✿ **Cheiroarthropathy**
- ✿ Carpal tunnel syndrome

# Cheiroarthropathy

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- ❁ Limited joint mobility of hand
- ❁ *Stiff hand syndrome*
- ❁ Sclerodactyly
- ❁ Thickening and waxiness of skin
- ❁ Prayer sign
- ❁ Table top sign



UpToDate 2015

# Cheiroarthropathy

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- ✿ More common in Type I long standing
- ✿ 38-58%
- ✿ 8-76% Type II
- ✿ Length of diabetes
- ✿ Glycosolation of collagen
- ✿ Collagen cross links
- ✿ Treatment
  - ✿ Better glycemcic control
  - ✿ Hand therapy



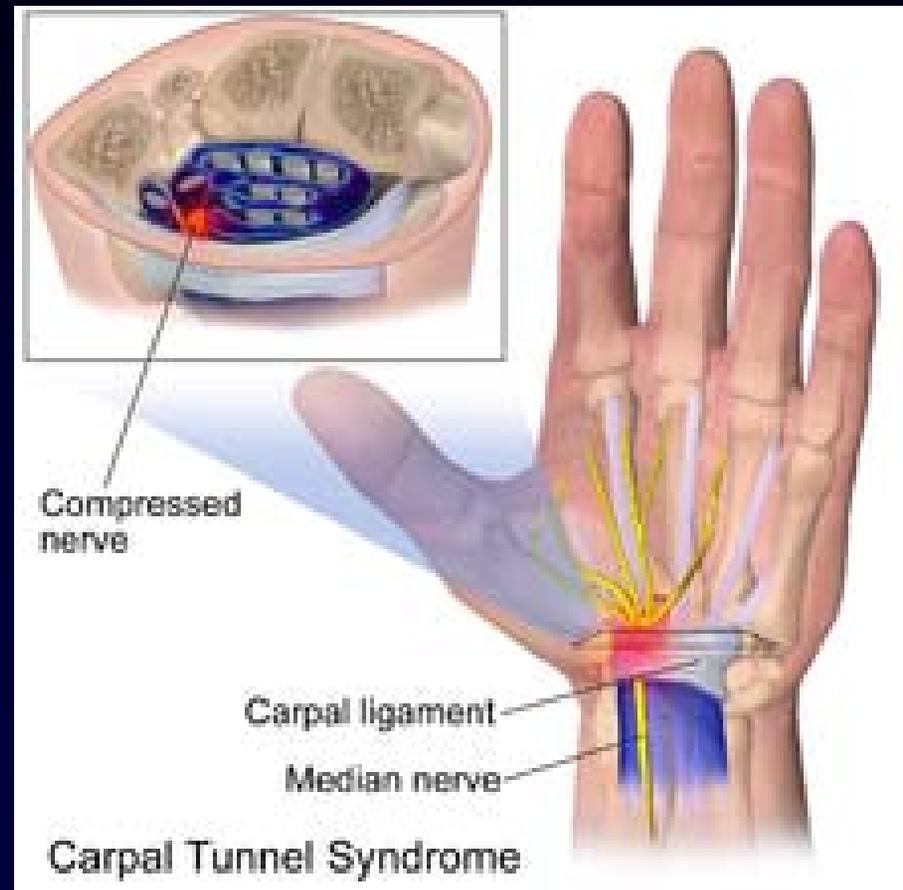
# Hand

---

- ✿ Trigger finger
  - ✿ Flexor tenosynovitis
- ✿ Dupuytren's contracture
- ✿ Diabetic stiff hand syndrome
  - ✿ Cheiroarthropathy
- ✿ **Carpal tunnel syndrome**

# Carpal Tunnel Syndrome

- ✿ Association with diabetes
- ✿ ? Obesity
- ✿ Pain and numbness in thumb and 2-4<sup>th</sup> fingers
- ✿ Compression of medial nerve in carpal tunnel of wrist
- ✿ Diabetics do just as well with surgery as those without diabetes



# Outline

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- ❁ Shoulder pain
- ❁ Hand
- ❁ **Spine**
- ❁ Joint
- ❁ Muscle
- ❁ Injections

# Case 5

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- ✿ 58 yo man with Type II Diabetes
  - ✿ HbA1c 7.8%
- ✿ Back and neck stiffness
- ✿ Ache pain in mid spine
- ✿ Gradually worsening over a year
- ✿ Not limiting

# Case 5

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- ❁ Exam
  - ❁ Decreased back motion
  - ❁ Mild tenderness along spine and paraspinal muscles
  - ❁ Normal neuro exam
- ❁ Radiographs
  - ❁ DISH



# DISH

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- ✿ Diffuse idiopathic skeletal hyperostosis
- ✿ Calcification of ligaments and tendons
  - ✿ Mostly thoracic spine
- ✿ Starts painless, loss of motion
- ✿ Bridges the vertebrae
- ✿ 13-49% of diabetics
  - ✿ 1-13% nondiabetics
- ✿ 19% of DISH have diabetes
- ✿ Men, Type II

# DISH

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- ❁ ? Mechanism
- ❁ Not correlated with length of diabetes
- ❁ Diagnosis
  - ❁ Radiographs
- ❁ Treatment
  - ❁ NSAIDs
  - ❁ Physical therapy



# Outline

---

- ❁ Shoulder pain
- ❁ Hand
- ❁ Spine
- ❁ **Joint**
- ❁ Muscle
- ❁ Injections

# Joint

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- ✿ **Charcot joint**
- ✿ Limited joint mobility

# Charcot Joint

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- ✿ Diabetic neuropathic arthropathy
- ✿ Complication of diabetic neuropathy
- ✿ Progressive joint destruction
- ✿ Painless
  - ✿ Swollen
  - ✿ Deformed joint
  - ✿ Redness
  - ✿ Instability
  - ✿ Arch collapse



# Charcot Joint

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- ❁ Increased blood flow
  - ❁ Bone resorption
- ❁ Repeated trauma
  - ❁ Ligament looseness
  - ❁ Joint instability
- ❁ Inflammation
  - ❁ Cytokines
- ❁ After resorption get hypertrophic bone formation



# Charcot Joint

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- ✿ Forefoot and Midfoot joints
- ✿ Ankle
- ✿ Rare 1-5%
- ✿ Rule out osteomyelitis
- ✿ Treatment
  - ✿ Custom shoes
  - ✿ Cast
  - ✿ Nonweightbearing
  - ✿ Bisphosphonates
  - ✿ Surgery



# Joint

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- ✿ Charcot joint
- ✿ **Limited joint mobility**

# Limited Joint Mobility

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- ✿ Hands
- ✿ Feet
- ✿ Large Joints
- ✿ Painless loss of motion
- ✿ Joint feels stiff

# Limited Joint Mobility

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- ✿ > Type I
- ✿ 8-58% Diabetics
- ✿ 0-26% population
- ✿ Collagen cross links
  - ✿ Glycosolation
- ✿ Treatment
  - ✿ Physical therapy
  - ✿ Dynasplint

# Outline

---

- ✿ Shoulder pain
- ✿ Hand
- ✿ Spine
- ✿ Joint
- ✿ **Muscle**
- ✿ Injections

# Muscle

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- ✿ Diabetic muscle infarction
- ✿ Lumbosacral plexopathy
  - ✿ Diabetic amyotrophy

# Diabetic Muscle Infarction

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- ✿ Spontaneous ischemic infarction
- ✿ Not from occlusion of vessels
- ✿ Microvascular
- ✿ Rare
- ✿ Longstanding diabetics >15 yrs
- ✿ Other microvascular complications
- ✿ > Type I

# Diabetic Muscle Infarction

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- ✿ Nontraumatic pain, swelling, tenderness of thigh or calf
- ✿ MRI shows muscle edema T2, subfascial edema on T1
- ✿ Resolves spontaneously 4-8 weeks
  - ✿ Recurrent 50%
- ✿ NSAIDs and ASA, rest

# Diabetic lumbosacral plexopathy

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- ✿ Diabetic amyotrophy
- ✿ Acute onset of pain and weakness in proximal leg
  - ✿ Can progress to distal leg
  - ✿ Starts in one leg then progresses to other
- ✿ Weight loss
- ✿ Autonomic failure
  - ✿ Bowel and bladder dysfunction
  - ✿ Orthostasis

# Diabetic lumbosacral plexopathy

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- ✿ Type II
- ✿ Before diagnosis 21%
  - ✿ Recently diagnosed
- ✿ Good control
- ✿ Microvascular injury or vasculitis

# Diabetic lumbosacral plexopathy

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- ✿ NCV/EMG
  - ✿ Axonal degeneration
  - ✿ Lumbar sacral roots and plexus
- ✿ MRI rules out other etiologies
  - ✿ Nerve root, disc
  - ✿ Lesions of plexus
  - ✿ May show T2 signal, enlargement of plexus, nerve roots
- ✿ Mixed data on prednisone
- ✿ Treat symptoms
- ✿ Improves in 1-2 years but may not have complete recovery

# Outline

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- ✿ Shoulder pain
- ✿ Hand
- ✿ Spine
- ✿ Joint
- ✿ Muscle
- ✿ **Injections**

# Steroid injections

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- ❁ Use for pain relief
  - ❁ Last 3-9 months
- ❁ Not a fix
- ❁ Bursitis- cure



# Steroid injections

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- ✿ Common side effects
  - ✿ 1:10,000 infection/bleeding
  - ✿ Steroid reaction- increase in pain
  - ✿ Flushing reaction
  - ✿ Fat atrophy,
  - ✿ Skin pigmentation changes
  - ✿ Tendon rupture 1-3%

# Steroid injections

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- ✿ In diabetics
  - ✿ BS elevation for 3-7 days but can be up to 2 weeks
  - ✿ Increased risk of infection 1-3 % to 1:1000
  - ✿ Worse elevations in brittle diabetic and uncontrolled
- ✿ Therefore
  - ✿ Relative contraindication in patients with uncontrolled BS or HbA1c > 8.5%
  - ✿ Wait until BS better controlled
  - ✿ Adjust insulin/meds

# Key points

- ❁ Look for the discussed conditions in diabetic patients.
- ❁ If have the conditions discussed, screen for diabetes.
- ❁ Careful with injections in diabetics.