

Presented by Hand to Shoulder Center of Wisconsin

2323 N. Casaloma Drive, Appleton

Satellite Offices: Green Bay & Marinette

(920) 730-8833



Shawn Hennigan, MD
Shoulder & Elbow
Surgeon



Boyd Lumsden, MD
Hand Surgeon



Scott Olvey, MD
Hand Surgeon



Tom Landowski
Judge

Navigating the Changing Landscape of Care for the Injured Worker



Stephanie Knapp
Physician Assistant



Megan Milloy
Physician Assistant



Theresa Parry
Occupational Therapist



Ann Porretto-Loerhke
Physical Therapist



Connie Simon
Occupational Therapist

February 25, 2022 8 a.m. - 3 p.m.

Fox Club at Timber Rattlers' Stadium, Appleton

www.handtoshoulderwisconsin.com

“Navigating the Changing Landscape of Care for the Injured Worker”

February 25th, 2022

Time	Presenter/Topic
7:30 – 8:00	Registration
8:00 – 8:05	Welcome
8:05 – 9:00	Shawn Hennigan, MD Common Workplace Shoulder and Elbow Injuries <i>Hand to Shoulder Center of Wisconsin</i>
9:00 – 9:30	Steph Knapp, PA-C, MPAS & Megan Milloy, PA-C, MPAS Diagnostic Ultrasound <i>Hand to Shoulder Center of Wisconsin</i>
9:30 – 9:45	Connie Simon OTR, CHT, CMTPT Chair Yoga <i>Hand to Shoulder Center of Wisconsin</i>
9:45 – 10:10	Break / Expo Tables
10:10 – 10:55	Scott Olvey, MD Emerging Role of WALANT in Hand Surgery <i>Hand to Shoulder Center of Wisconsin</i>
10:55 – 11:30	Theresa Parry OTR, CHT, COMT Evolution of Flexor Tendon Rehabilitation <i>Hand to Shoulder Center of Wisconsin</i>
11:30 – 12:00	Shawn Hennigan, MD; Megan Milloy, PA-C, MPAS; Scott Olvey, MD; Theresa Parry, OTR, CHT, COMT Morning Panel
12:00 – 12:40	Lunch / Expo Tables
12:40 – 12:50	Connie Simon OTR, CHT, COMT Chair Yoga <i>Hand to Shoulder Center of Wisconsin</i>
12:50 – 1:35	Boyd Lumsden, MD The Opioid Epidemic: How We got Here and How to Navigate our Way Forward <i>Hand to Shoulder Center of Wisconsin</i>
1:35 – 2:35	Judge Tom Landowski Hot Topics: Covid-19, Malingering Behavior and Injuries Working Remotely from Home <i>Wisconsin Department of Workforce Development / Vets Services Office</i>
2:35 – 3:00	Boyd Lumsden, MD; Judge Tom Landowski Afternoon Panel
3:00	Dismissal



Navigating the Changing Landscape of Care for the Injured Worker
Presented by Hand to Shoulder Center of Wisconsin
Fox Club at Timber Rattlers' Stadium, Appleton WI 54913
Friday, February 25th, 2022

Learning Objectives

Dr. Shawn Hennigan: Common Workplace Shoulder and Elbow Injuries

Demonstrate rotator cuff function, as well as options for treating rotator cuff disease. Discuss diagnosis and treatment of common elbow disorders.

Megan Milloy, PA-C, MPAS and Stephanie Knapp PA-C, MPAS: Diagnostic Ultrasound

Describe the role of ultrasound in the upper extremity practice and how it can improve efficiency and accuracy by having this point of care imaging modality readily available.

Dr. Scott Olvey: Emerging Role of WALANT in Hand Surgery

Ever changing dynamics of medicine leading to more surgical techniques completed Wide Awake under Local Anesthesia with No Tourniquet in the office. How this new form of surgery is cost effective with a shorter recovery time.

Theresa Parry, OTR, CHT, COMT: Evolution of Flexor Tendon Rehabilitation

Develop a discussion of the shifting trends of flexor tendon rehabilitation – how it impacts the recovery timeline and return to work

Dr. Boyd Lumsden: The Opioid Epidemic: How We Got Here and How to Navigate Our Way Forward

Develop understanding of recent trends in medication prescription with alternative methods for pain management vs. narcotics.

Judge Tom Landowski: COVID-19, Malingering Behavior and Injuries Working Remotely from Home

Impact of Covid-19 to the employee returning to work. Discuss how malingering behavior can be cost worthy to healthcare and the employer. Case scenarios deciding if a work injury from a remote worker is work related.

Navigating the Changing Landscape of Care for the Injured Worker

2022

Course Evaluation

Please evaluate each speaker and the relevance and value of their topic with 1 being least valuable and 5 being most valuable.

	<u>Least</u>			<u>Most Valuable</u>	
<u>Common Workplace Shoulder and Elbow Injuries (Shawn Hennigan, MD)</u>					
How would you rate the usefulness of the information?	1	2	3	4	5
Overall, how would you rate the presentation?	1	2	3	4	5

<u>Diagnostic Ultrasound (Stephanie Knapp, PA-C, MPAS & Megan Milloy, PA-C, MPAS)</u>					
How would you rate the usefulness of the information?	1	2	3	4	5
Overall, how would you rate the presentation?	1	2	3	4	5

<u>Emerging Role of WALANT in Hand Surgery (Scott Olvey, MD)</u>					
How would you rate the usefulness of the information?	1	2	3	4	5
Overall, how would you rate the presentation?	1	2	3	4	5

<u>Evolution of Flexor Tendon Rehabilitation (Theresa Parry, OTR, CHT, COMT)</u>					
How would you rate the usefulness of the information?	1	2	3	4	5
Overall, how would you rate the presentation?	1	2	3	4	5

<u>The Opioid Epidemic: How We Got Here and How to Navigate Our Way Forward (Boyd Lumsden, MD)</u>					
How would you rate the usefulness of the information?	1	2	3	4	5
Overall, how would you rate the presentation?	1	2	3	4	5

<u>Hot Topics: Covid-19, Malingering Behavior and Injuries Working Remotely from Home (Judge Tom Landowski)</u>					
How would you rate the usefulness of the information?	1	2	3	4	5
Overall, how would you rate the presentation?	1	2	3	4	5

<u>Overall Event Information</u>					
Was the material at or above entry level knowledge?	1	2	3	4	5
To what extent did the program meet the stated objectives?	1	2	3	4	5
To what extent did you learn new information that you could apply in your practice setting?	1	2	3	4	5
Please evaluate the food and facility.	1	2	3	4	5

Continue to backside of form

We welcome your comments on today's event, presenters, future symposium topics and potential speakers:

When finished please tear out and turn in at the attendance certificate table at the end of the day.

*From the physicians and staff at Hand to Shoulder Center of Wisconsin,
"Thank you for your attendance in today's event. We appreciate all you do and the dedicated care you provide to your clients/patients on navigating the changing landscape of care for the injured worker"*





Jon J. Cherney, MD
Boyd C. Lumsden, MD
Scott P. Olvey, MD
Joseph P. Cullen, MD
Nathan L. Van Zeeland, MD

Matthew A. Butler, MD
Blake W. Hildahl, MD, ATC
Shawn P. Hennigan, MD
Tina Sauer, CAPPM (Administrator)

TRIVIA QUESTIONS

(Turn this form completed over by the registration table
before the end of lunch for a door prize opportunity)

Hennigan (Shoulder/Elbow)

1. *True or False* Scapular positioning and stability is essential for shoulder/arm motion.
2. *True or False* A subscapularis tear is an indication for rotator cuff surgery.
3. *True or False* Guided US radial nerve injection can be used as a diagnostic tool.

Steph/Megan (US)

1. *True or False* Ultrasound machine uses sound waves to reflect off body structures and create an image.
2. *True or False* Patients are exposed to a mild amount of radiation through the US unit.
3. *True or False* US is more cost effective to diagnose carpal tunnel syndrome.

Olvey (WALANT)

1. Who is a candidate for WALANT?
 - a. CTR
 - b. tenolysis
 - c. trigger finger release
 - d. all of the above
 2. What Dr. helped develop WALANT technique?
-
3. *True or False* Repairing a flexor tendon under WALANT there's less chance of gapping or adhesion to catch in the pulley system.

Parry (Flexor Tendon Rehab)

1. *True or False* New flexor tendon protocols utilize rubber bands with their splints.
2. *True or False* Controlled stress and load is important for tendon healing after a repair.
3. *True or False* The research is clear that the modified Duran protocol is superior to others and results in better outcomes

Navigating the Changing Landscape of Care for the Injured Worker



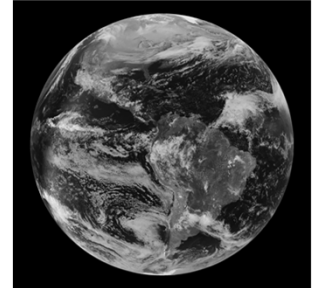
ROTATOR CUFF DISORDERS FROM SOUP TO NUTS

February 25th, 2022

1

30,000 Foot View

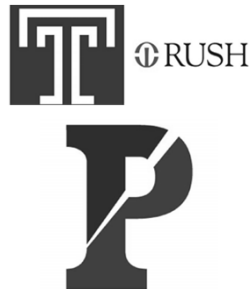
- Current trends in management of spectrum of Rotator Cuff Disorders
- Update on Lateral Epicondylitis (Epicondylitis)



2

Introduction

- Temple University School of Medicine
- Rush University
- University of Pennsylvania-Shoulder & Elbow Reconstruction



Disclosures

- Consultant with DJO
- Invited faculty
- Visiting surgeon site



3

4

Shoulder Biomechanics

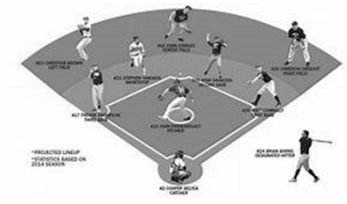
- Rotator cuff
- Deltoid
- Balance of forces



5

Function of Rotator Cuff

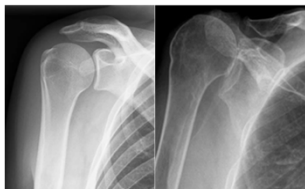
- Individual Tendons: provide action on humerus based on where they attach to the bone
- Global: Provide stable dynamic fulcrum to permit deltoid to elevate the humerus



6

Rotator Cuff Deficient Shoulder

- Rotator cuff cannot overcome deltoid
- Humeral head is driven up
- “superior instability”
- Deltoid poorly tensioned
- Loss of forward elevation
- Weakness, pain, instability
- CTA



7

Scapular muscles

- Essential to stabilize the scapula, and position the bony socket to perform the shoulder task
- Thorough evaluation must incorporate scapula motion
 - Scapular disorders commonly manifest with findings easily confused with rotator cuff dysfunction and pain



8



Scapular stability

9

Shoulder pain history

- Subdeltoid pain
- Pain at night
- Presence of associated symptoms- numbness, tingling, etc
- Subjective functional assessment (modified ASES score)



10

Shoulder pain clinical evaluation

- Inspection
- Palpation
- Range of motion-active & passive
 - Frozen shoulder
- Strength measurement
 - Presence of lag signs (passive > active)
- Provocative testing



11

Shoulder Weakness



12

Shoulder Pain Radiographic Eval

- Xrays-high quality, 4V
- Ultrasound
- MRI



13

Shoulder pain- management

- Avoid painful activities
- NSAID's
- Cold therapy
- Cortisone injection
- PT-restoration of normal shoulder motion and strength



14

Spectrum of Rotator Cuff Disease

- Tendonitis
- Tendinosis/Partial tear
- Full thickness tear
 - Small
 - Medium
 - Large
 - Massive
 - Massive, not repairable, no arthritis
 - Massive, not repairable with arthritis

15

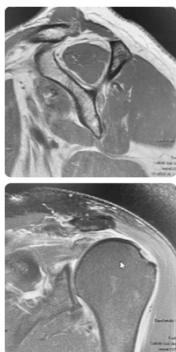
Indications for Rotator Cuff Repair Surgery

- Acute tear in young patient with weakness
- Subscapularis tear
- Persistent pain despite conservative management
 - Minimize painful activities
 - Rehab focused
 - Limited role for cortisone injection
 - NOC
 - Unable to participate in active PT because of pain
 - Recent look back studies correlate post-op risks (infection, healing) with increasing # of injections

16

What determines cuff repairability?

- In summary, the *chronicity* of the tear
- Health of muscle
 - Sagittal view MRI
- Degree of retraction
- Position of humeral head relative to glenoid (acromion)
 - Grashey view in 30 abd
 - Coronal view on MRI (pt supine)



17

Which surgery?



DO ALL RCT'S
NEED SURGERY?

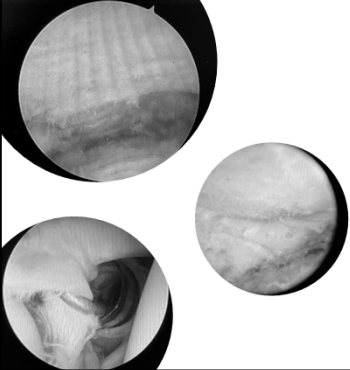


WHAT ARE THE
OPTIONS?



WHAT ARE THE
RESULTS?

18



Cuff Tendonitis (structurally intact cuff)

- Surgery is rare if isolated
- SAD shown to be helpful
- Most often, if surgery indicated, there are other issues
 - Painful AC joint
 - Labral tears
 - Biceps tendon disease/SLAP tear

19

Cuff tendinosis/ Partial tear

- See previous comments re: other concomitant diagnoses
- At surgery, if structural disease is minimal, could consider use of bio-inductive allograft implant Shown in animal models to improve appearance (and presumably function) of tendon
 - Has been shown both radiographically and histologically
 - Excellent clinical data (ASES, VAS)
 - Excellent pain relief
- If no other "repairs" needed, sling is removed and ROM begun within 1 week
- If partial tear is significant, formal repair

20



Regeneten
(bio-inductive
allograft)

21

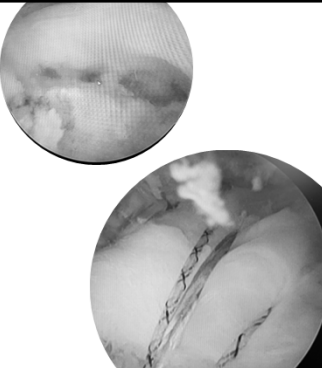
Full Thickness Rotator Cuff Tear-Spectrum

- Small (<1cm)
- Medium (1-3cm)
- Large (3-5cm)
- Massive (>5cm)
- Massive, not repairable, no GH arthritis
- Massive, not repairable, GH arthritis

22

Repairable supraspinatus tear

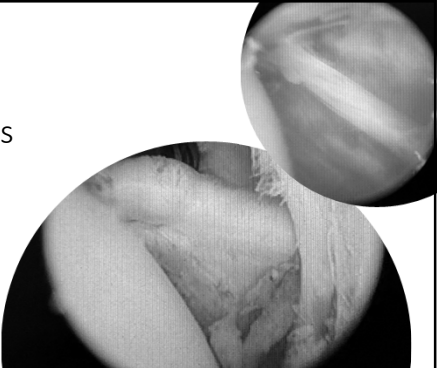
- Fix using your best technique.
 - Lots of options
 - "The surgeon is the technique"
- Generally favorable outcomes regarding healing, pain relief, and return to function
- Full recovery 6+ mos



23

Repairable Subscapularis Tear

6-9 mos recovery



24

Non-repairable RCT, no arthritis

- Based on location, patient specifics
- Many options:
 - Partial repair
 - SCR
 - LTT
 - InSpace balloon
 - Reverse TSA (select cases)



25

Non-repairable anterior cuff (subscapularis)-no arthritis

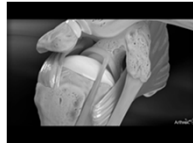
- Generally repairable, but
- Consider latissimus dorsi transfer to lesser tuberosity if tissue poor quality
- Subscapularis tendon is one of a kind. It's role in shoulder function is critical. Generally, takes longer to regain motion and function.
- Larger tears best repaired open (proximity of axillary nerve)
- Full recovery 7-9 mos



26

Non-repairable supraspinatus SCR

- Weakness in abduction, but no ER lag sign
- Consider Superior Capsular Reconstruction (SCR)
- Full recovery 9+ mos
- Early results were promising, but 5-7 year follow up showed increasing rates of failure



27

Non-repairable supraspinatus-InSpace Balloon

- Role for newly approved InSpace balloon implant
- Short surgery, rapid recovery & doesn't "burn bridges"
- Early-mid range (5 years) results are promising and may be good option for some patients
- Curr Rev Musculoskelet Med
- 2020 Oct;13(5):584-591.

Subacromial Balloon Spacer Implantation
 Melissa A Wright¹, Joseph A Abboud², Anand M Murthi²

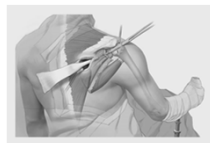


28

Non repairable posterior cuff (supra/infraspinatus)

If patient has ER lag sign, consider Lower Trapezius Transfer to greater tuberosity transfer, using Achilles tendon allograft

Approx 6-9 mos recovery



29

Lower Trapezius Tendon Transfer

- J Shoulder Elbow Surg
- . 2016 Aug;25(8):1346-53.
- doi: 10.1016/j.jse.2015.12.006.Epub 2016 Mar 8.

• Outcome of lower trapezius transfer to reconstruct massive irreparable posterior-superior rotator cuff tear

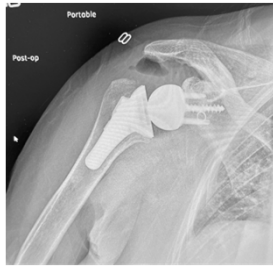
• Bassem T Elhassan¹, Eric R Wagner², Jean-David Wertheil²



30

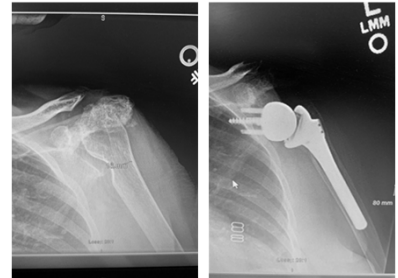
Non-repairable, with
glenohumeral arthritis

- Easier recovery for patient
- More rapid recovery of function
- Patient may have functional limitations post-op to extend longevity of replacement
- Generally, lose internal rotation



31

Reverse
Total
Shoulder
Arthroplasty



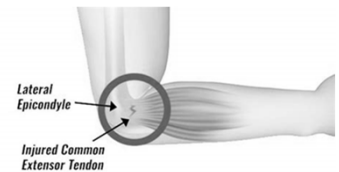
32



33

Lateral Elbow Pain

- Lateral epicondylitis
- Radial Tunnel Syndrome
- Synovial plica
- Others
 - Cervical radiculopathy
 - Arthritis



34

Patient History

- Timeline
- Location
- Exacerbating/alleviating
- Associated symptoms

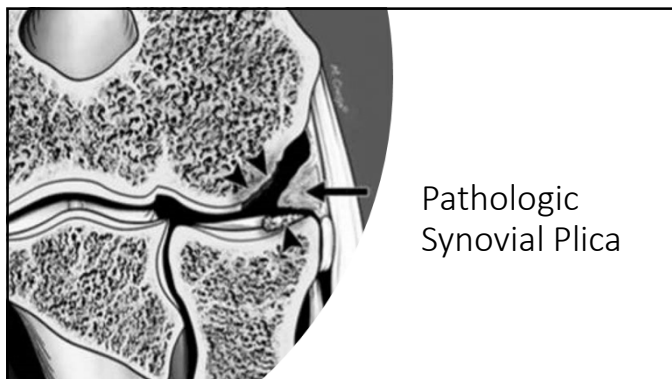


35

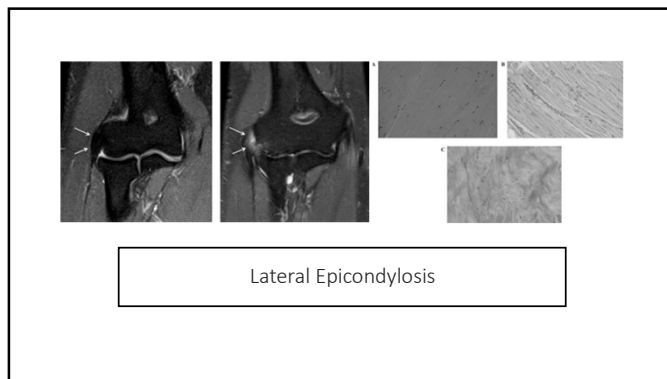
Differential
Diagnosis

- Most common diagnoses
- Lateral epicondylitis >>> radial tunnel syndrome
- Lateral ulnar collateral ligament injury
- Pathologic synovial plica
- Cervical spine

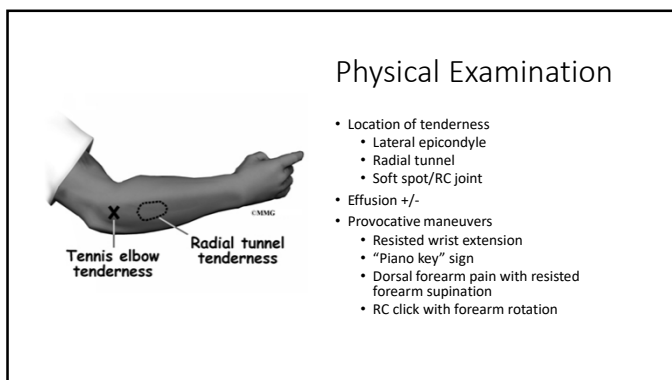
36



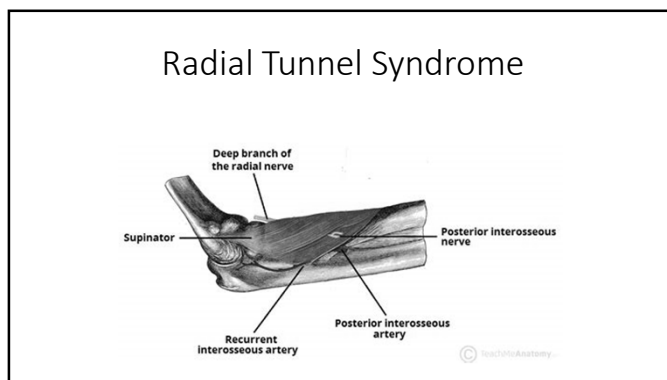
37



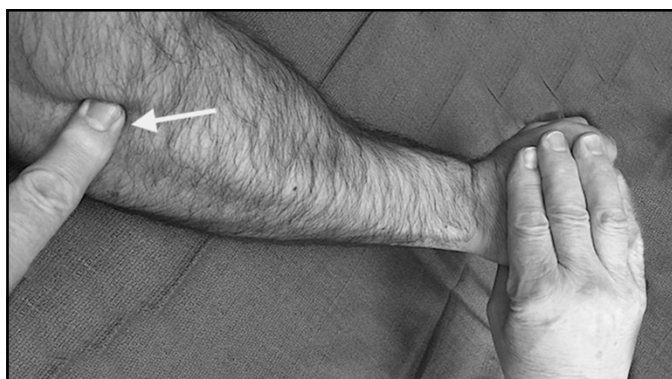
38



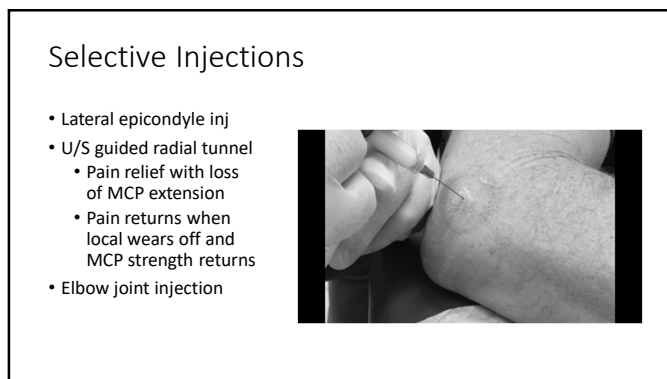
39



40



41



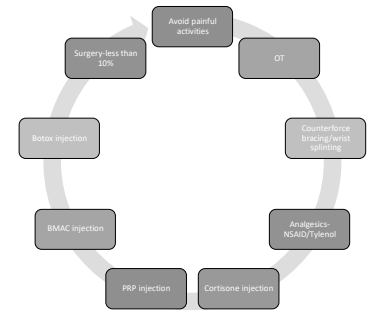
42

U/S Guided Radial Tunnel Inj



43

Treatments



44

Counterforce Brace



45

Lateral Epicondylitis

Non-op successful in >90%

Treatment aimed at symptom reduction using combinations of all modalities

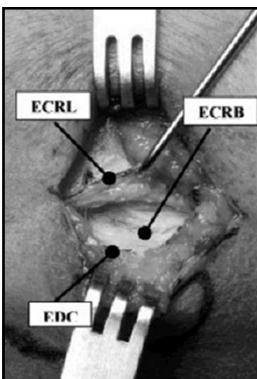
I offer 1 cortisone only

Will offer PRP if temporary response to cortisone

Surgery generally 6-9 mos of active non-op treatment, but may exceed 1+ years

46

Surgical Management



- Nirschl procedure
 - Open interval between ECRL and EDC
 - Identify ECRB origin and excise (muroid appearance)
 - Angioplasic hyperplasia
 - Drill underlying bone to vent, increase blood supply
 - Repair ECRL to EDC
- Percutaneous release
- Tenex

47



48

Navigating the Changing Landscape of Care for the Injured Worker

Use of Ultrasound in the Upper Extremity



February 25th, 2022

1

Learning Objectives

- Understand what ultrasound is and its capabilities
- Understand the use of ultrasound in the upper extremity practice
- Diagnostic and therapeutic roles
- How ultrasound improves efficiency and accuracy in treating upper extremity conditions

2

What is Ultrasound?

- A machine that uses sound waves to reflect off body structures and create an image
- Benefits:
 - Non-invasive
 - No radiation exposure
 - Real time images
- Limitations:
 - Very user-dependent
 - Limited visibility of bony and deep structures

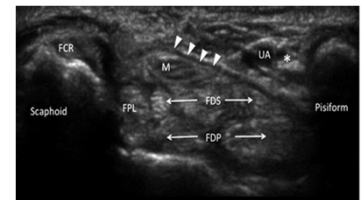


<https://www.konicaminolta.com/global-en/healthcare/products/us/index.html>

3

Ultrasound for Carpal Tunnel

- Diagnostic:
 - Measure the cross-sectional area of the median nerve at the level of the pisiform
 - >10mm²
 - 11mm – mild
 - 12mm – moderate
 - 13 mm or larger – severe
 - No difference between sexes

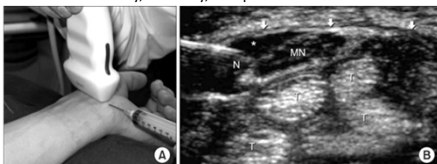


<https://aneskey.com/carpal-tunnel-injection/>

4

Ultrasound for Carpal Tunnel

- Therapeutic
 - Ultrasound Guided Injection
 - Benefits:
 - Increased safety, accuracy, and patient satisfaction

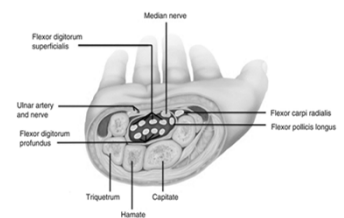


https://www.researchgate.net/figure/A-Ultrasound-guided-carpal-tunnel-injection-It-shows-transducer-position-for_fig1_261765968

5

Ultrasound for Carpal Tunnel

- Advantages over NCS-EMG
 - Less delay for surgery
 - Cost effective
 - (average 1.8 less medical visits required pre-op)
 - Less patient anxiety/pain
- Disadvantages
 - Not ideal for complex patients



Use of Ultrasound in Patients With Carpal Tunnel Syndrome: A Cost-Effective Solution to Reduce Delays in Surgical Care
Shaquille Charles, MSc, Kevin Oommen, Joshua Ong, John R. Fowler, MD
Published September 29, 2021 DOI: <https://doi.org/10.1016/j.jhsa.2021.08.008>

6

Average Costs

Ultrasound Examination

- Diagnostic:
 - \$250
- Exam of nerve with injection:
 - \$375

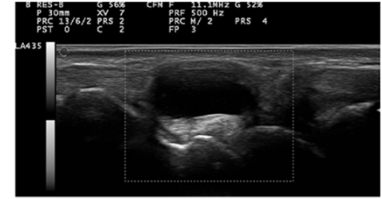
EMG-NCS

- One side:
 - \$1889

7

Evaluating “Lumps and Bumps”

- Ultrasound for diagnosing soft tissue masses
 - Cystic versus solid
 - Ganglion versus tenosynovitis
 - Identify if foreign body present



https://www.researchgate.net/figure/Ganglion-cyst-of-the-wrist-absence-of-blood-flow-at-Doppler-evaluation_fig1_265385270

8

Ultrasound for Infections

- Cellulitis versus Abscess
- Foreign body presence
- Joint Effusion/Purulent tenosynovitis

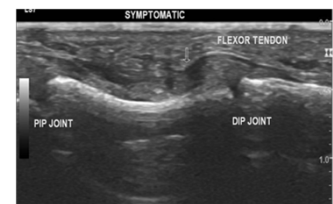


<http://www.emdocs.net/ultrasound-probe-pocus-for-flexor-tenosynovitis/>

9

Ultrasound for Flexor Tendons

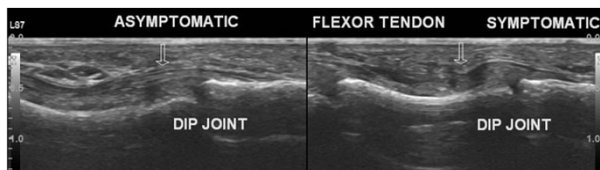
- Evaluate for “Jersey Finger” or flexor tendon laceration
- Evaluate for integrity of tendon status post surgical repair



<https://radiopaedia.org/cases/flexor-digitorum-profundus-tendon-tear-little-finger>

10

Flexor Tendon Laceration



<https://radiopaedia.org/cases/flexor-digitorum-profundus-tendon-tear-little-finger>

11

Ultrasound of the Shoulder

- Guided Injections
 - Glenohumeral
 - Subacromial
 - AC Joint
 - Biceps tendon sheath
- Diagnostic
 - Rotator cuff tear
 - Biceps tendon tear/tendonitis

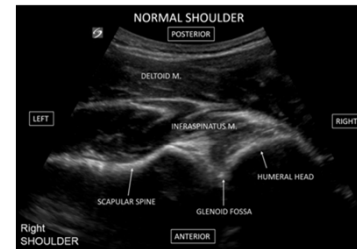
12

Advantages to Ultrasound for Injections

- Improved Accuracy
 - Sibbett et al (2009)
 - Response rate to injection 89.9% with US versus 71.6% blind
- Less procedural pain
 - Sibbett et al (2009)
 - 43% lower procedural pain with US

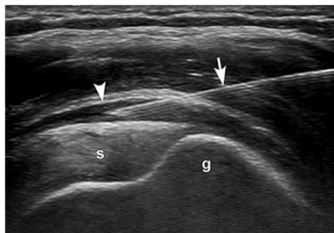
13

Ultrasound Guided Glenohumeral Injection



14

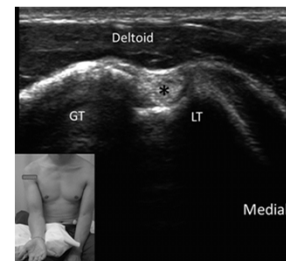
Ultrasound Guided Subacromial Injection



https://123sonography.com/usg_injection_of_the_subacromial_subdeltoid

15

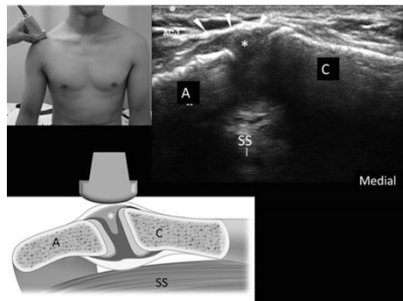
Biceps Tendon Sheath Injection



<https://aneskey.com/long-head-of-biceps-tendon/>

16

AC Joint Injection



<https://aneskey.com/acromioclavicular-joint/>

17

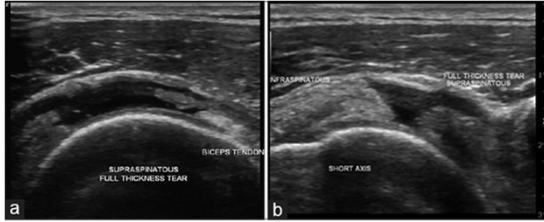
Future Goals

- Diagnostic for Shoulder Conditions
 - Rotator Cuff Tears
 - Biceps Pathology
- Barbatage for Calcific Tendonitis

18

Diagnostic Shoulder Ultrasound

- Rotator Cuff Tear



https://www.hamdanjournal.org/viewimage.asp?img=HamdanMedi_2018_11_1_13_228866_f2.jpg

Questions?

Navigating the Changing Landscape of Care for the Injured Worker



Emerging Role of WALANT in Hand Surgery

February 25th, 2022

1



2

Don Lalonde MD and WALANT



3

What is it?

- WALANT: Wide Awake Local Anesthesia No Tourniquet



4

What is it?

- Lidocaine and 1:100,000 Epinephrine
 - Two of the safest and most widely tested drugs that are used in humans
 - Billions of doses of the combination injected by Dentists since 1950

5

Epinephrine in a finger??????

-You Never do that



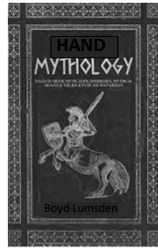
=



6

The Myth of Epinephrine and finger Necrosis

- In the days of antiquity (pre 1950) it became dogma that epinephrine should never be injected into "fingers, nose, penis, and toes"



7

The Myth of Epinephrine and finger necrosis

- Source of Myth likely from use of Procaine (Novocaine) developed in 1903. Only safe injectable local anesthetic until Lidocaine introduced in 1948
- As Procaine sits on the shelf, its PH becomes more acidic than its starting point of 3.6



8

Debunking The myth

- FDA Warning in 1948 regarding Procaine expiration (injectable expirations not mandatory until 1979) Bottles with ph of 1! were discovered headed for use
- Uri and Adler report on Procaine disintegration in 1950
- Denkler (2001) Review of 120 years of literature with no cases of epinephrine induced necrosis of the finger
- Fitzcharles-Bowe et. al. (2007) reported over 100 cases of 1:1000 epinephrine injection into fingers without any cases of necrosis (100 times usual concentration)

9

SO it's safe.....But.....

- Accidental high dose (1:1000) epinephrine may cause neuropraxia and reperfusion pain
- One reported case (Ruiter et.al. 2014 Eplasty) where epinephrine may have had a partial role in finger loss
- Always have Phentolamine available for rescue if needed



10

Why do we do it? Everybody* loves it

- Patients love it.....**most patients*
**not for everyone but for 99.9%*
- Surgeons love it
- Anesthesiologists love it ?.....**not so much at first*



11

Why Patients Love it

No sedation means.....



- No fasting
- No preoperative testing, PCP visit
- In many instances may drive themselves to and from surgery
- No need to discontinue blood thinners
- Safer surgery in patients with co-morbidities
- Less expensive
- On their way home within minutes of leaving OR/Procedure Room

12

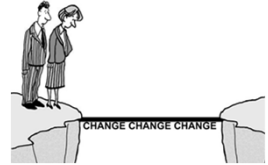
Why surgeons love it

- Better intraoperative adjustments (tendon repair, transfer, tenolysis)
- Intraoperative education for patients
- Many surgeries can be done under field sterility out of OR
- Some patients can become disinhibited with sedation (Bier block rigor-mortis)
- Less overall time in medical facility (prep-recovery) improves efficiency

13

Nursing/Anesthesia/Administrative Barriers

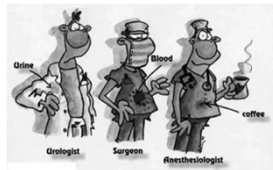
- Most stem from fear of unknown, change from the norm
- Concern for loss of income (anesthesiology)
- Culture changes of using an OR without an anesthesiologist, per policy monitoring/H&P still required (unnecessary)
- Concerns for patient satisfaction, pain control



14

Anesthesiologists Love it?

- Ultimately frees them up for larger hospital based cases (less coverage of ASC)
- In our system, after some initial hesitancy now welcomed (and maybe preferred) by pre-postop-intra-op nursing and Anesthesia



15

Main Principles

- Tumescant Anesthesia
- Painless Injection
- No Tourniquet

16

Tumescant Anesthesia.... or...everything counts in large amounts



- Large enough injected volume so that skin plumps up
- Too much is better than not enough*
 - *can have too much in fingers, for distal work, penrose will suffice for tourniquet
- Maximal dose 7mg/kg.....so in 70 kg adult, may use as much as 49 ml

17

Painless Injection

NOT AN OXYMORON



18

Lalonde's 10 rules for painless injection

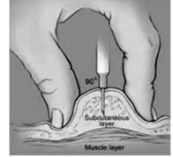


- 1. Buffer lidocaine with Sodium Bicarbonate
 - Ph of lidocaine ranges 3.3-5.5, human body is 7.4
 - 1% lido with 1:100,000 epi buffered with 10:1 8.4 % Sodium Bicarbonate
- 2. Do not use refrigerated local anesthetic
- 3. Use 27 or 30 gauge Needle
 - Bigger the needle, more the hurt

19

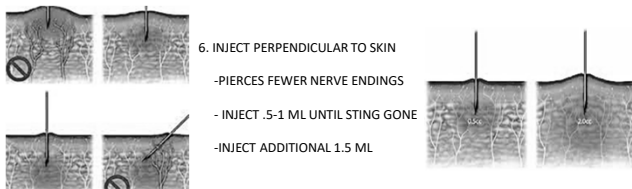
10 rules

- 4. Create Sensory noise in the area
 - press firmly on skin proximal to injection, pinch loose skin, ice skin
- 5. Stabilize the syringe with both hands to minimize movement
 - Try not to move needle in initial bleb under skin until numb (up to a minute)



20

LAST 5 RULES....*MOST IMPORTANT



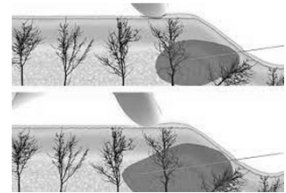
6. INJECT PERPENDICULAR TO SKIN
- PIERCES FEWER NERVE ENDINGS
 - INJECT .5-1 ML UNTIL STING GONE
 - INJECT ADDITIONAL 1.5 ML

Courtesy Don Lalonde MD

21

LAST IMPORTANT 5

- 7. BLOW SLOW BEFORE YOU GO
 - NEVER PASS YOUR NEEDLE BEYOND YOUR LOCAL



Courtesy Don Lalonde MD

22

Last important 5

- 8. Never reinsert needle into unblanched skin
- 9. Learn from each patient you inject, score your success
 - Take your time, can take 5 minutes to inject for CTR
- 10. Everything counts in Large amounts....Depeche Mode Rule



23

Adverse Reactions

- Lidocaine induced seizure, systemic toxicity
 - Exceedingly rare to non-existent with doses used in hand surgery
 - 6 cases of lidocaine anaphylaxis reported of billions of doses in past 7 years
- Epinephrine rush
 - Jitter, nervousness, shakiness for up to 20-30 minutes, education is key
- Fainting
 - Inject with patient laying down

24

“Selling” patients on Walant

- No fasting, preoperative testing or changes in medication
- No IV, “painless” injection (if done well)
- Reminder that IV sedation still requires needle stick with larger bore needle (potentially two with preop testing)
- No risk for nausea
- No tourniquet, no need to get undressed (*policies may vary)
- Can drive yourself
- For tendon or bone reconstruction can get better result by testing the work in real time
- Decreased Cost



25

Specific Procedures

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> • Finger amputation • Carpal tunnel • Cubital tunnel • Trigger release • De Quervain release • Small masses/skin lesions | <ul style="list-style-type: none"> -Flexor tendon repair -Extensor tendon repair -Flexor tendon tenolysis -Extensor tendon tenolysis -Tendon transfer -Tendon centralization -Digital nerve repair -Finger fractures -Dupuytren's contracture -PIP/ MP arthroplasty | <ul style="list-style-type: none"> -CMC arthroplasty -Distal radius fracture -Wrist arthroscopy -Open TFCC repair -Thumb MP fusion, UCL repair -really almost anything |
|---|---|--|

26

Carpal tunnel- the work horse

- Most common, easiest to start with
- Local at this point the gold standard
- May do in procedure room under field sterility
- Can discuss findings, give patients a “look”
- Key to differentiate WALANT vs Plain Local
 - can't minimize how tourniquet can hurt after a few minutes



27

Carpal tunnel surgery in a spa-like setting? It's closer than you think.

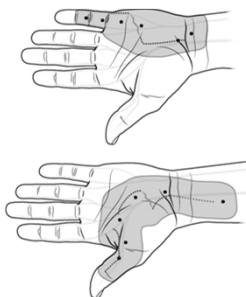
By Scott Scanlon Jun 14, 2019 Updated Jul 9, 2020



28

Flexor/extensor tendon Repair

- A game changer
- Intraoperative testing of repair can allow modifications, can help guide aggressiveness of postoperative therapy
- Can “vent” pulleys as needed to improve glide, decrease risk of adhesions



29

Flexor/extensor tendon Repair

- Allow more confidence in true active motion protocols, less immobilization for extensors
- Allows patient to observe the flexion, abilities

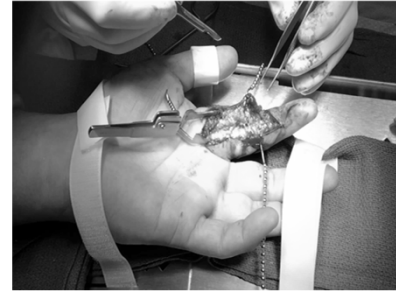


30

Flexor/ Extensor tenolysis, Capsulotomy

- Essential
- Can assess exactly where tendon is stuck
- Patient can help release adhesions, test integrity of tendon
- Patient can watch themselves move finger, helps with expectations and therapy goals
- Can assess need for pulley reconstruction

31



32



33

Pushing the envelope

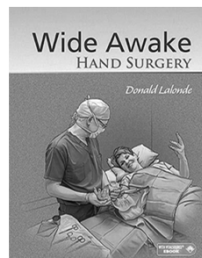
- Complex reconstructions
- Distal Radius/ forearm fractures
- CMC arthroplasty
- Wrist Arthroscopy
- *Probably best reserved for medical concerns with anesthesia



34

In summary.....WALANT technique

- Safe
- Improved Outcomes
- Cost Saving



35

Thank you!

36

Navigating the Changing Landscape of Care for the Injured Worker



Evolution of Flexor Tendon Rehabilitation

February 25th, 2022

1

Objectives

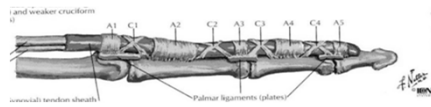
- Explore the history of flexor tendon rehab
- Identify changes in tendon rehab in recent years focused on improving outcomes and reducing the need for subsequent procedures
- Explore the current literature available on flexor tendon rehab

2

Flexor Tendons

Flexor Digitorum Superficialis

- Important for end stage of a full fist
- Responsible for flexion the PIP joint
- Ends at the middle phalanx
- FDS absent in 21% of SFs, asymmetry in 26%



3

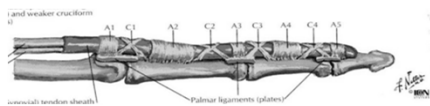
Flexor Digitorum Superficialis



4

Flexor Tendons

- Flexor Digitorum Profundus - responsible for flexing the tip of the finger
- Primary flexor of the fingers
- Shared muscle belly for all digits



5

Flexor Digitorum Profundus



6

Flexor Tendon Injuries

- Result in significant functional deficit
- Prevalence-based cost of illness model
- Flexor tendon lacerations incur an estimated cost of up to 409.1 million annually
- Total direct costs per injury \$13,725 and indirect costs up to \$112,888



Mehrzhad, 2019

7

Flexor Tendon Injuries

- Recovery is 'slow'
- Requires surgical intervention and significant rehabilitation to follow
- Requires protective orthosis following repair
- No use of the injured hand for minimum of 6 weeks
- Need for frequent exercise, every 1-2 waking hours



8

History – 1960's

Immobilization

- Primary repair – immobilized for 3-6 weeks as they believed in extrinsic healing prior to movement
- Significant stiffness and poor function

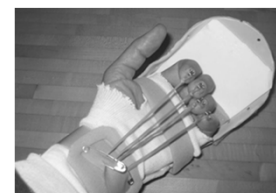


9

History – 1970's

KLEINERT protocol

- 0-3 weeks Postop
 - Orthosis in 45 degrees wrist flexion and MP's in 10-20 degrees of flexion
 - Rubber band tension on the fingers
- Exercise every hour: active extension then allowing the rubber bands to pull into flexion

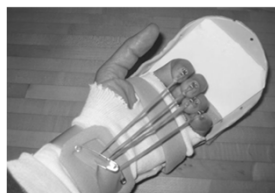


10

History – 1970's

KLEINERT protocol

- Predictable outcomes with low rupture rate
- PIP flexion contractures
- Challenging for patients to wear orthosis



11

History – 1970's

DURAN Protocol

- 0-4.5 weeks Postop
 - Orthosis in 20 degrees flexion and MP's in relaxed flexion
- 3-5 mm of glide was necessary to prevent tendon adhesion, this was achieved with PROM



12

History – 1980's

- **Washington** - Chow, 1987; Dovel, 1989
- **Allen/Loma Linda** - Allen, 1987
- **Modified Kleinert** - Slattery & McGrouther, 1984; Wertz, 1989
- **CPM Use** - Gelberman et al., 1989
- **Synergistic Wrist Splint** - Cooney et al., 1989
- **Belfast Early Active Motion** - Small et al., 1989
- **Controlled Active Motion Modification of Small** - Cullen et al., 1989

13

History – 1990's

Early Active Motion Protocols

- Allen, Fryman, et al., 1987
- Cullen et al., 1989
- Small, Brennan et al., 1989
- Cannon, 1993
- Evans and Thompson, 1993
- Gratton, 1993
- Bainbridge et al., 1994
- Elliott, 1994
- Silfverskoild and May, 1994
- Sandow and McMahon, 1996
- Kitsis et al., 1998
- Steelman, 1999

14

Overview of protocols

- Dorsal blocking Splint for a total of 6 weeks
- Initial exercise varies from passive – place and hold – active
- Initiation of very light resistance at 8 weeks
- Full use at 12 weeks



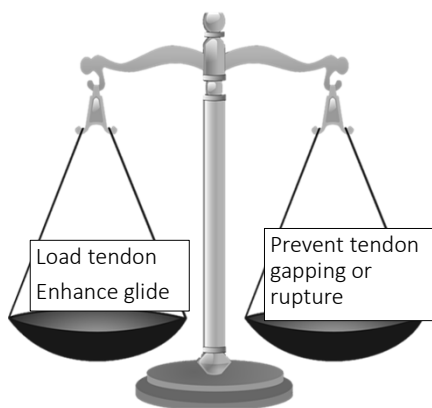
15

Change in focus

- Management continues to evolve
- Biological and biomechanical studies
- How do we restore motion and function while minimizing risk of complication and rupture?
- Promote intrinsic tendon healing, minimize extrinsic scar



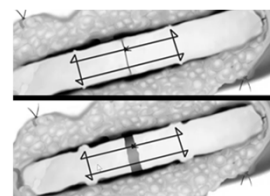
16



17

Controlled Stress

- Reported rupture rates following repair vary from 3-18% (Koehler, 2021)
- Enough force to induce excursion of the tendon without gap formation



Higgins & LaLonde 2016

18

Timing

PHASES OF HEALING

- 0-5 DAYS - Cell proliferation
 - Little intrinsic strength as very little healing in the tendon has occurred, dependent on suture strength during motion so it is safe to start gentle motion
- 5-28 days - Fibroblastic proliferation with disorganized collagen
 - Strength is variable, tendon is 21 days old 15% of strength is back. Need to be cautious
- 28+ days, collagen starts to organize

19

Timing - Tensile Strength

- Decreases during the first week – depending on suture
- Progressive increase in strength after the two to three weeks
- Increase in strength is proportional to the stress applied
- Immediate controlled stress has been shown to reduce in the initial weakening process
- Maximum collagen synthesis occurs at 3 weeks, ~15% of normal strength

20

Controlled Stress – Physiological importance

- Improves tensile strength
- Improves nutrition from synovial fluid
- Reorganization, elongation, and reorientation of extrinsic scar
- Promote intrinsic healing of the tendon
 - Decrease the need for extrinsic formation
- Encourage longitudinal formation of the scar

Evans 2012

21

Controlled Stress - Force

- Measured in newtons (N)
- Applied with both PROM and AROM
- Minimal force to provide excursion to prevent adhesion
- 5 N of force produces 2mm of glide which may be enough to prevent adhesion



22

Controlled Stress - Force

Early Flexor Tendon Repair

Safe Zone: 5-10 N (10+ N can lead to gapping)



Edsfeldt 2015

23

Controlled Stress – Force



24

Controlled Stress - Force

- Higher forces noted when the wrist is at 30 degrees flexion (6 N) compared to neutral (5 N)
- Wrist position impacts the work of flexion

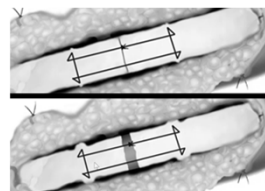
Edsfeldt 2015



25

Controlled Stress

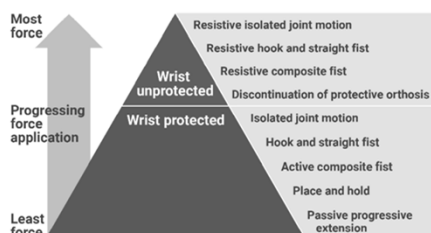
- Importance in considering the surgical technique



26

Controlled Stress - Force

Pyramid of Progressive Forces



Groth, 1992

27

Adhesion Grading

- Absent: Less than 5 degrees of discrepancy between active and passive flexion
- Resolution: At least 10% resolution of lag between therapy sessions
- Unresponsive: At most 10% resolution of lag between therapy sessions

Groth, 1992

*Measure active and passive ROM every visit



28

St. John Protocol - 2016

- In combination with WALANT repair
- Start with wrist in extension and complete immediate active flexion to a half fist
- Reduce to Manchester Short splint at 2 weeks post op.



29

St. John Protocol - 2016

- Progressing to full fist by 6 weeks
- Out of the splint at 5-6 weeks
- Reduce the need for subsequent procedure



30

Systematic Review 2018

- Purpose of review: to determine whether there is evidence to support one type of exercise regimen as superior for producing safe and maximal range of motion of the digits following flexor tendon repair – Early passive – Place and hold – True active
- Early active motion and combined Kleinert and Duran protocols result in low rates of tendon rupture and acceptable ROM

Neiduski & Powell (2018)

31

Systematic Review 2018

- No RCTs
- No recommendations on one protocol over the other

Neiduski & Powell (2018)

32

Cochrane Review 2021

Authors' conclusions: There is a lack of evidence from RCTs on most of the rehabilitation interventions used following surgery for flexor tendon injuries of the hand.

Peters et al. 2021

33

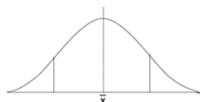
One size fits all?

Imperative to monitor active and passive motion at every visit and progress exercise, frequency of exercise and orthosis use accordingly!

34

Progression of Rehab

- No consensus on gold standard protocol
- Guided heavily by a skilled therapist within the protocol
- Fluid - based on clinical evidence of adherence
- Progression to higher load exercise if lag is increasing
- Lower load exercise if active motion is excellent



35

Progression of Rehab - Trends

- Trend continues to move toward early active motion
- Wrist in extension or neutral to reduce work of flexion
- Decrease external work of flexion by addressing edema and dressing size

36

Progression of Rehab - Considerations

- Concomitant injuries associated with the repair
- Strength/tension of repair
- Multiple tendon repairs
- Other hand trauma
- Quality of the tendon

37

Progression of Rehab - Considerations

- Wellness of injured worker
- Nutrition, diabetes
- Compliance
- Work Tasks

38



39



40



41



42

Takeaways

- Trending away from PROM protocols that place the wrist in flexion and towards active protocols that place the wrist in extension
- Advancements with surgical technique and biomechanical knowledge have coincided with protocol and exercise changes
- Important to understand the load that each exercise applies to a tendon
- Presentation trumps protocol in the hands of a skilled therapist and surgeon
- Literature does not resoundingly support any specific protocol
- Consider patient, tendon quality, and surgical technique when choosing a protocol

43

REFERENCES

- Chesney A., Chauhan A., Kattan A., et al. Systematic review of flexor tendon rehabilitation protocols in zone II of the hand. *Plast Reconstr Surg* 2011; 127: pp. 1585-1592
- Edsfield S, Rempel D, Kurs K, Diao E, Lattanza L. In vivo flexor tendon forces generated during different rehabilitation exercises. *J Hand Surg Eur Vol*. 2015;40(7):705-710. doi:10.1177/1753193415591491
- Evans RB. Managing the injured tendon: current concepts. *Journal of Hand Therapy* 2012;25(2):173-89.
- Groth, G. (2004). Pyramid of progressive force exercises to the injured flexor tendon. *Journal of Hand Therapy*, 17(1), 31-42
- Higgins, A. & Lalonde, D. (2016). Flexor Tendon Repair Postoperative Rehabilitation: The Saint John Protocol. *Plastic Reconstructive Surgery Global Open*, 4(11), e1143. doi: 10.1097/GOX.00000000000001143
- Ibrahim MS, Khan MA, Rostom M, Platt A. Rupture rate following primary flexor tendon repair of the hand with potential contributing risk factors. *Surg Technol Int*. 2014;24:363-367.
- Kleiner, H.E., Kutz, J.E., Cohen, M.J. (1975). Primary repair of zone 2 flexor tendon lacerations. In AAOS symposium on tendon surgery I the hand. St. Louis: Mosby
- Koehliar SV, Sauerbier M, Terzis A. Rupture Rate, Functional Outcome and Patient Satisfaction after Primary Flexor Tendon Repair with the Modified 4-Strand Core Suture Technique by Tsuge and Using the Arthrex FiberLoop® with Early Motion Rehabilitation. *J Clin Med*. 2021;10(19):4538. Published 2021 Sep 30. doi:10.3390/jcm10194538
- Peters SE, Zha B, Ross M. Rehabilitation following surgery for flexor tendon injuries of the hand. *Cochrane Database Syst Rev*. 2021;1[1]:CD012479. Published 2021 Jan 13. doi:10.1002/14651858.CD012479.pub2
- Tang, J., Zhou, X., Pan, Z.J., Qing, J., Gong, K.T., Chen, J. (2017). Strong Digital Flexor Tendon Repair, Extension-Flexion Test, and Early Active Flexion: Experience in 300 Tendons. *Hand Clinics*, 33, 455-463.
- Trumble, L., Vedder, N., Seiler, J.G., Hanel, D.P., Diao, E., Patron, S. (2010). Zone II Flexor Tendon Repair: A Randomized Prospective Trial of Active Pacing and Hold Therapy Compared with Passive Motion Therapy. *Journal of Bone and Joint Surgery*, 92, 1381-1389
- Wu YF, Tang JB. Recent developments in flexor tendon repair techniques and factors influencing strength of the tendon repair. *J Hand Surg Eur*. 2014;39:6-19.
- Zhao, C., Amadio, P.C., Pallard P, et al. (2004). Digital resistance and tendon strength during the first week after flexor digitorum profundus tendon repair in a canine model in vivo. *Journal of Bone and Joint Surgery (Am)*, 86, 320-327

44

Navigating the Changing Landscape of Care for the Injured Worker



Boyd Lumsden, MD
Hand Surgeon

The Opioid Epidemic: How We Got Here and How to Navigate Our Way Forward

February 25th, 2022

1

1

The Problem

- The US in midst of epidemic of opioid use, misuse, and abuse
- US consumes 80% of global opioid supply
- In US from 2008 to 2011 opioid prescriptions increased 100%

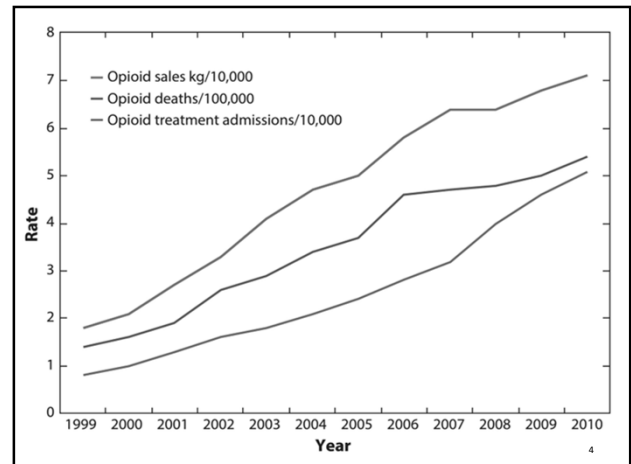
2

2



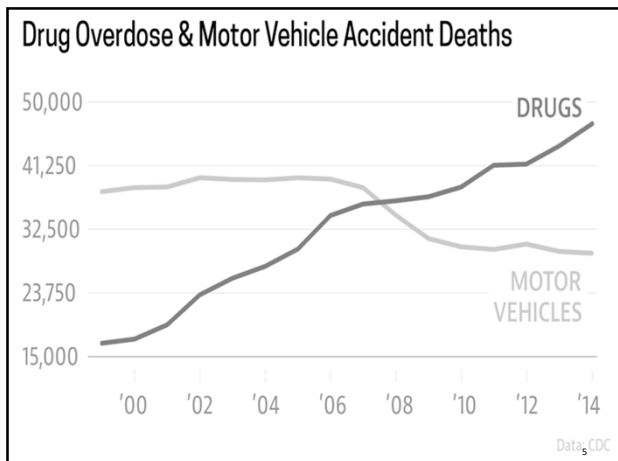
3

3



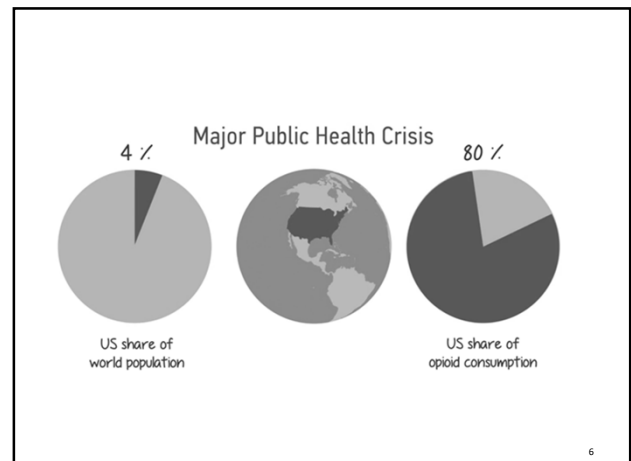
4

4



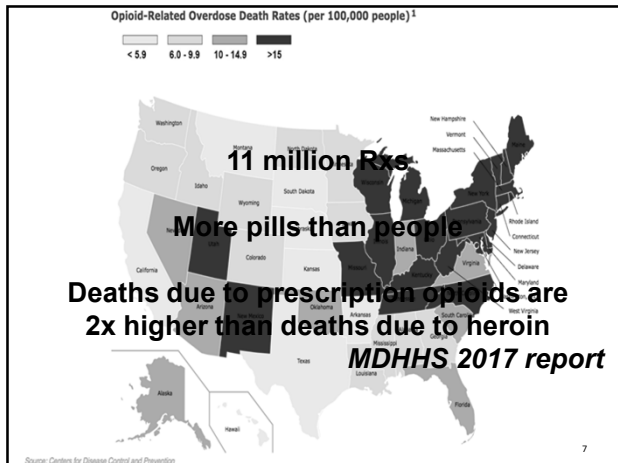
Data: CDC

5

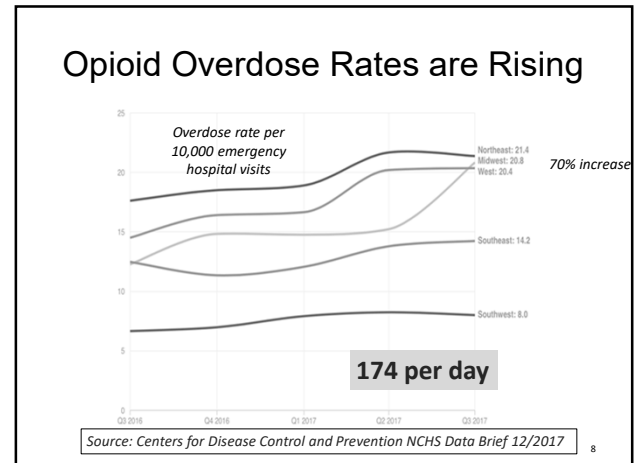


6

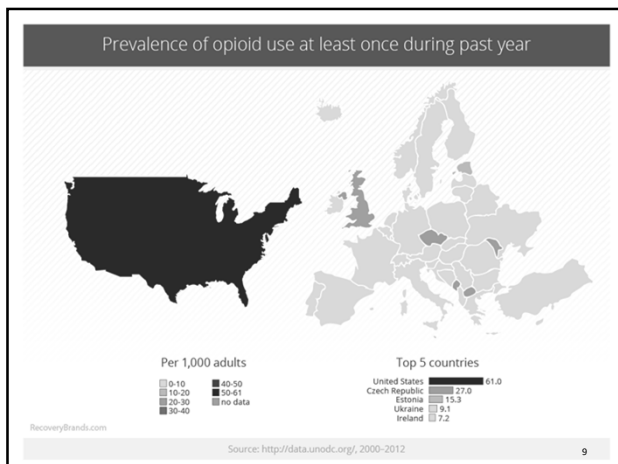
6



7



8



9

The Problem is Spreading

- Mostly has been a North American problem
- Evidence is suggesting Europe may unfortunately be following our "lead"

10

THE BONE & JOINT JOURNAL

INSTRUCTIONAL REVIEW

An epidemic of the use, misuse and overdose of opioids and deaths due to overdose, in the United States and Canada

IS EUROPE NEXT?

The United States and Canada are in the midst of an epidemic of the use, misuse and overdose of opioids, and deaths related to overdose. This is the direct result of overstatement of the benefits and understatement of the risks of using opioids by advocates and pharmaceutical companies. Massive amounts of prescription opioids entered the community and were often diverted and misused. Most other parts of the world achieve comparable pain relief using fewer opioids.

The misconceptions about opioids that created this epidemic are finding their way around the world. There is particular evidence of the increased prescription of strong opioids in Europe.

Opioids are addictive and dangerous. Evidence is mounting that the best pain relief is obtained through resilience. Opioids are often prescribed when treatments to increase resilience would be more effective.

Cite this article: *Bone Joint J* 2017;99-B:856-64.

G. T. T. Helmerhorst, T. Teunis, S. J. Janssen, D. Ring

From The University of Texas at Austin, Texas, United States

11

It's not all doom and gloom. We are finally making progress.

Opioid total dosage filled declined 12% from 2016 to 2017
 This is the biggest single year drop in 25 years

Other Key Findings

- All 50 states & D.C. had declines over 5%
- 8.9% average drop nationwide in number of opioid prescriptions
- 7.8% decline in new patients starting opioids
- 16% decline for prescriptions for 90+ MME/day

Source: AP & IQVIA's Institute for Human Data Science
 SOURCE: CDC

12

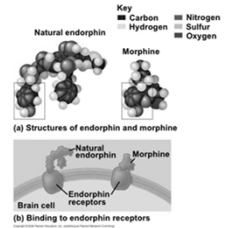
What is pain?

- Nociception vs pain
- Cultural differences
- Large differences in pain perceptions, misconceptions, expectations.
 - Psychosocial differences account for differences in symptoms not pathophysiology
 - CMC arthritis
 - Hurt vs harm
- Don't undermine resilience

13

13

What is an Opioid?



14

14

Opioids

- Tramadol
- Codeine
- Hydrocodone
- Oxycodone
- Morphine
- Hydromorphone
- Fentanyl

15

15

How Did We Get Here?



16

16

Letter to the editor JAMA

January 1980

"Porter and Jick"

ADDITION RARE IN PATIENTS TREATED WITH NARCOTICS

To the Editor: Recently, we examined our current files to determine the incidence of narcotic addiction in 39,946 hospitalized medical patients¹ who were monitored consecutively. Although there were 11,882 patients who received at least one narcotic preparation, there were only four cases of reasonably well documented addiction in patients who had no history of addiction. The addiction was considered major in only one instance. The drugs implicated were meperidine in two patients,² Percodan in one, and hydromorphone in one. We conclude that despite widespread use of narcotic drugs in hospitals, the development of addiction is rare in medical patients with no history of addiction.

JANE PORTER
HERSHEL JICK, M.D.
Boston Collaborative Drug
Surveillance Program
Waltham, MA 02154 Boston University Medical Center

17

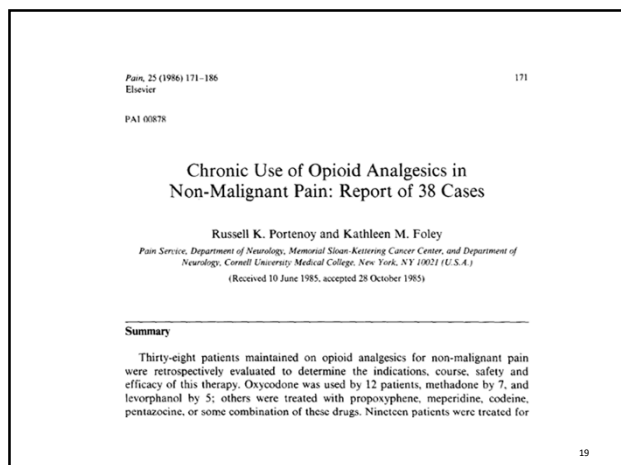
17

Porter and Jick

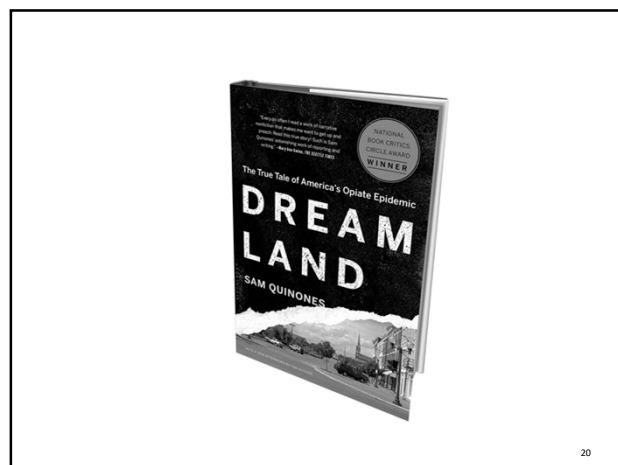
- Inappropriately cited as though it was a study
- The study referenced in the letter had nothing to do with outpatient narcotic prescriptions
- Conclusions drawn and myth perpetuated
- Message: Narcotics are safe and addiction is rare

18

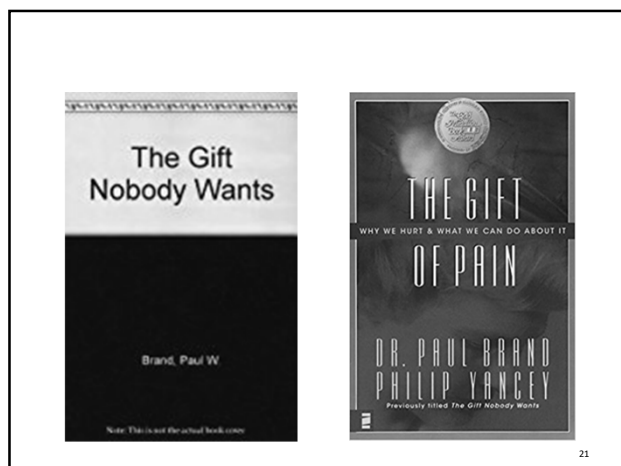
18



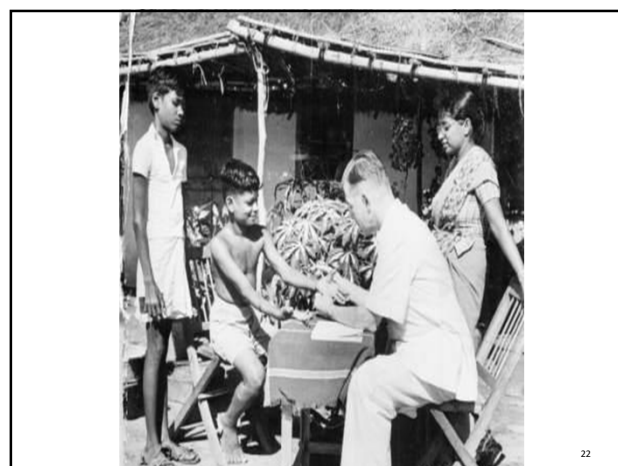
19



20



21



22

Opioid Epidemic

Patients want to have little postop pain

- International Association for the Study of Pain (IASP)
- Veterans Administration 1999 "fifth vital sign"
- JCAHO 2001— rigorous pain standards
- Physicians responded by prescribing opioids

Hydrocodone (Vicodin) most widely prescribed drug in the US

- 100 million prescriptions per year 2007

Legal prescription opioids kill more Americans than heroin or cocaine (CDC data)

23

JACHO (Now the Joint Commission)

- 2000 release standards on pain management
 - Do not mention opioids
- Released pain CME booklet sponsored by Purdue that said:

"Some clinicians have inaccurate and exaggerated concerns" about addiction, tolerance and risk of death, the guide said. "This attitude prevails despite the fact there is no evidence that addiction is a significant issue when persons are given opioids for pain control."

24

Iatrogenic & Advocatogenic

- You undertreat pain
- You over-worry addiction
- Media made worse
 - 60 minutes
- Patient satisfaction scores tied to physician reimbursement
- Perfect storm

25

25

Where Have We Been?

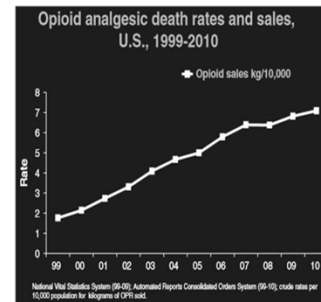
- ❖ No training in pain
- ❖ Our mentors never had any training in pain

26

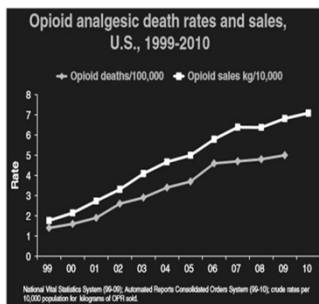
Other Groups Were Studying Pain

- Primarily anesthesiologists
- Basic science
- Clinical research
- Publishing results

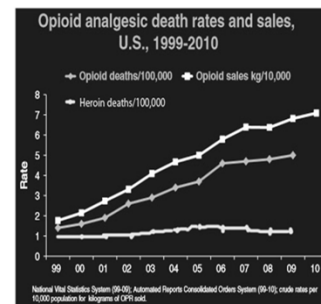
27



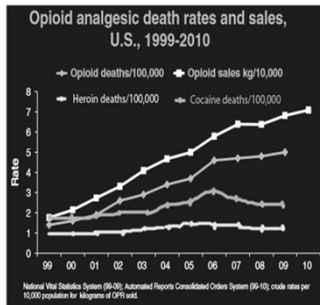
28



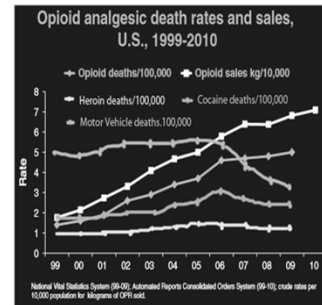
29



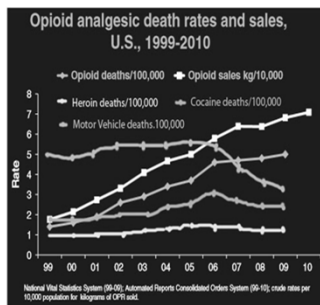
30



31



32



33

Myth: Opioids Give Better Pain Relief

Prospective clinical studies have shown that orthopedic patients given just opioids do not have better pain relief and are not happier than a proper, multimodal non-opioid perioperative pain management program

34

Myth: Opioids Give Better Pain Relief

1. Hip and Ankle Fractures: US vs Netherlands J Trauma 2009
2. Pain Relief Satisfaction After Ankle Fractures Injury 2012
3. Opioid Use After Fracture Surgery CORR 2014
4. Pain Relief After Operative Treatment of Extremity Fx JBJS 2017
5. Distal Radius ORIF and Multimodal Pain Mgmt 72% took 0 opioids

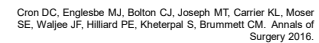
35

Myth: Opioids Give Better Pain Relief

- ❖ Lower pain relief
- ❖ Opioid-induced hyperalgesia
- ❖ Constipation
- ❖ Sedation
- ❖ Diversion

36

37



38

38

39

- ORIF ankle fracture
- NL: Acetaminophen or tramadol
- USA: Oxycodone
- Equal pain intensity
- Equal satisfaction with pain relief

39

40

- 40

41

Preoperative Opioid Use as a Predictor of Adverse Postoperative Self-Reported Outcomes in Patients Undergoing Spinal Surgery

David L. Lissman, MD, PhD, David C. Shum, MD, PhD, David C. Mendenhall, MD, PhD

ABSTRACT

OBJECTIVE: Opioids are commonly used for preoperative pain management in patients undergoing spinal surgery. The objective of this investigation was to assess whether preoperative opioid use predicts worse self-reported outcomes in patients undergoing spinal surgery.

DESIGN: A retrospective cohort study and eighty-three patients undergoing lumbar, thoracic, or cervical spine surgery by a single clinician were included in this prospective cohort study. Self-reported preoperative opioid consumption data was obtained at the preoperative visit and self-reported outcomes were assessed at 12 weeks postoperative. The primary outcome was the EuroQoL-5D, a validated, self-administered, health-related quality of life (HRQL) instrument. Secondary outcomes included the Oswestry Disability Index (ODI), the Short-Form 36 (SF-36), and the Visual Analog Scale (VAS).

RESULTS: At preoperative visit, 30% of the 83 patients used 100 mg, 150 mg, 200 mg, or greater degree of opioid per day. Multivariate analysis controlling for age, sex, diabetes, smoking, insurance, revision surgery, preoperative Modified Sickness Perception Questionnaire (MSPQ) score, and preoperative ODI revealed that patients who had increased preoperative opioid use had increased postoperative opioid use (odds ratio = 2.05) and decreased 12-week Short-Form Health Survey (SF-36) Mental Component Score (MCS) and SF-36 Physical Component Score (PCS) ($p < 0.05$) and increased 12-week Oswestry Disability Index (ODI) ($p < 0.05$). There were no change between patients who had increased preoperative opioid use and increased 12-week VAS ($p = 0.15$) or increased 12-week EuroQoL-5D ($p = 0.13$). There were no change between patients who had increased preoperative opioid use and increased 12-week MCS ($p = 0.13$) and increased 12-week PCS ($p = 0.13$). There were no change between patients who had increased preoperative opioid use and increased 12-week ODI ($p = 0.13$). There were no change between patients who had increased preoperative opioid use and increased 12-week VAS ($p = 0.15$).

CONCLUSIONS: Increased preoperative opioid consumption, Modified Sickness Perception Questionnaire (MSPQ) score, and Zung Depression Index score were predictors of worse self-reported outcomes in patients undergoing spinal surgery. This suggests the potential benefit of psychological and behavioral interventions to reduce preoperative opioid consumption.

KEY WORDS: Opioid, Preoperative Pain, Self-Reported Outcomes, Spinal Surgery, Postoperative Pain

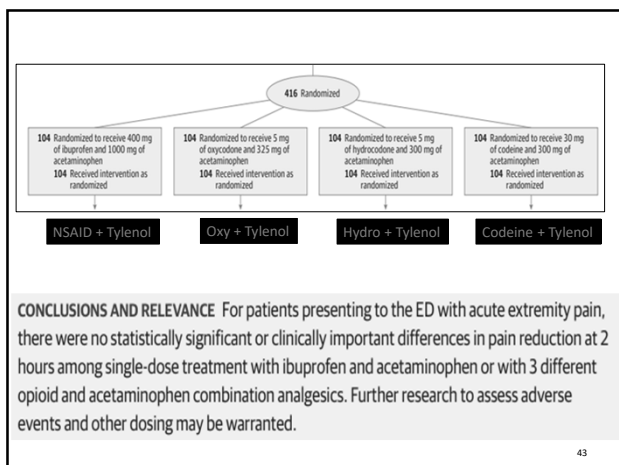
Copyright © 2014 by The Journal of Bone and Joint Surgery, Inc.

41

42

Andrew K. Chang, MD, MS; Polly E. Bijur, PhD; David Esses, MD; Douglas P. Barnaby, MD, MS; Jesse Baer, MD

42



43

Where do the drugs come from?

How do our patients get them?

44

MIKE



45

Where did Mike get the drugs?

us

46



47



48

How Did He Get Them From Us?

- ❖ We were taught to control surgical pain with narcotics
- ❖ Started our careers with what we were taught
- ❖ In clinical practice, when we found that this was not enough, we increased the quantity or strength of med

Giving enough narcotics so that no one asked for more
We were giving **all** patients more than **any** patient needed

49

Rodgers JHS

- ❖ Five person hand surgery group
- ❖ Giving 30 hydrocodone (Vicodin)
- ❖ Nine months, asked how many used
- ❖ 50% of patients stopped after 2 days
- ❖ Average number taken 10
- ❖ 66% unused
- ❖ Review paper Lee JHS 2018: 3-5X more are given

50

For Whom Do We Prescribe?



51

Opioid naive Chronic 8%



Intermittent 30%

52

Why do surgeons prescribe too much?



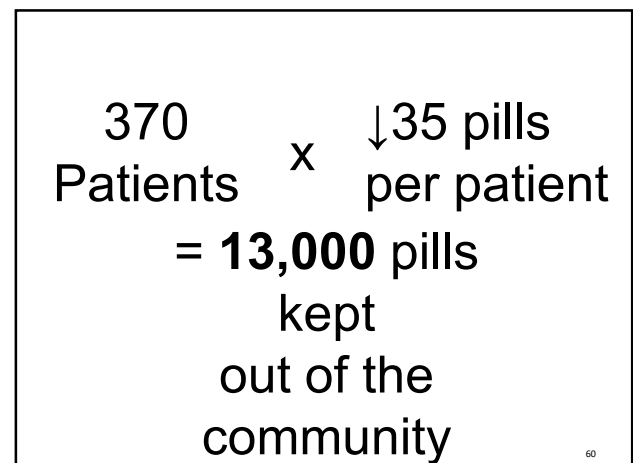
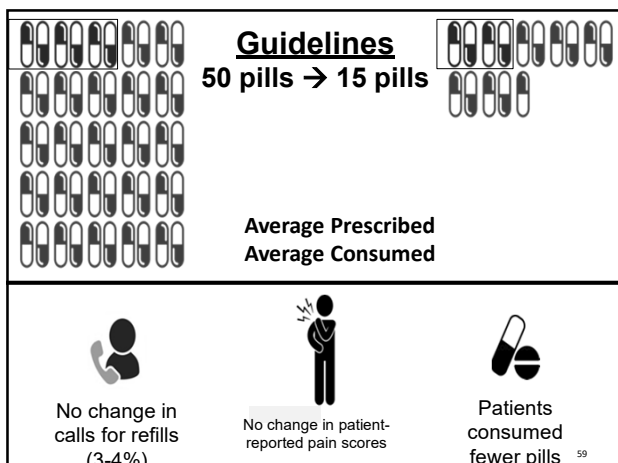
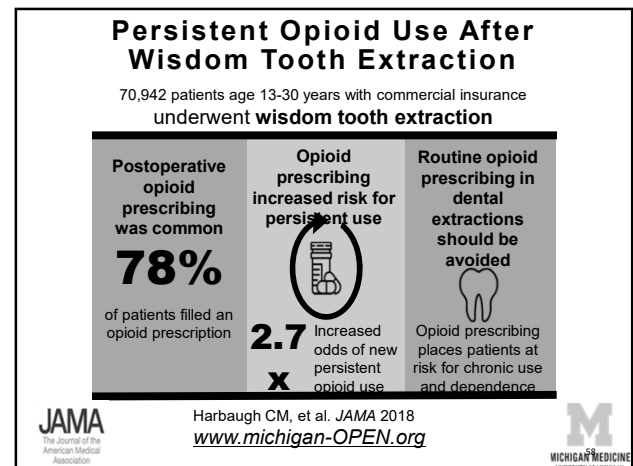
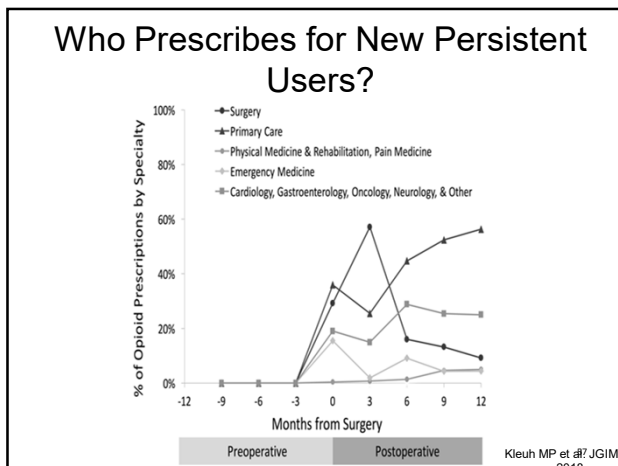
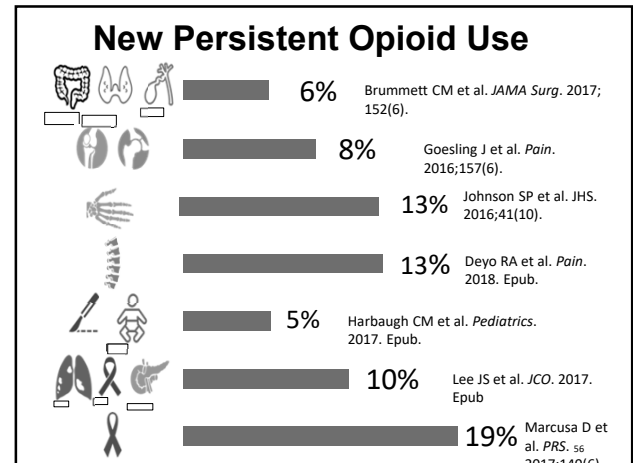
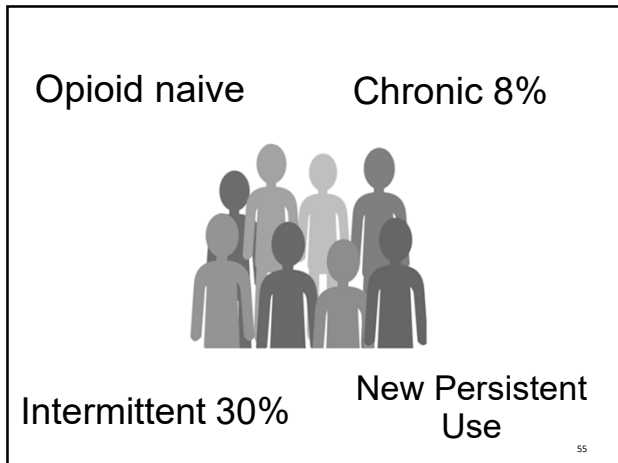
53

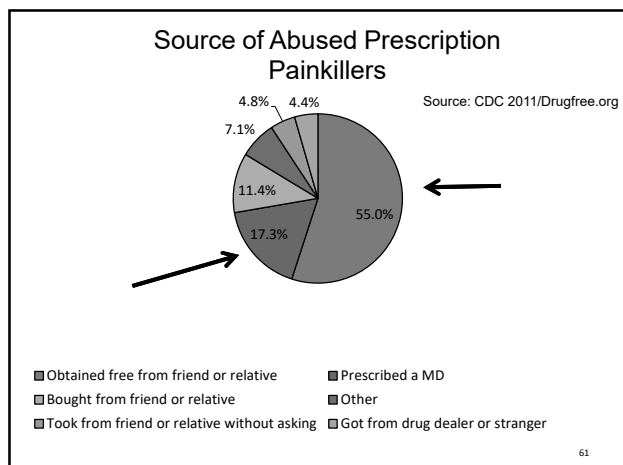
The amount of opioid prescribed after surgery was not associated with patient satisfaction or refill rate



Lee JS, et al. JAMA 2017; Sekhri S, et al. Ann Surg 2017

54





SAFE Use, Storage, and Disposal of Prescription Opioid Medicines

Prescription drug abuse is a serious public health issue. Opioids reduce pain for a short time, but can be dangerous if used improperly.

Safe Use

Improper use of pain medicine is a leading cause of accidental death.

- Combining opioids with alcohol or other drugs increases the risk of death.
- Take medications only as prescribed.
 - Never take more than instructed.
 - Never give or sell your medicine to someone else.
- Combining opioids with medicines used to calm anxiety can result in overdose.
- Using opioids for something other than pain (anxiety, sleep, fear of pain, to feel good) can cause a harmful dependency/addiction.

Safe Storage

Unused medicines in your home are at risk for inappropriate use.

- Pain relievers are a leading cause of serious poisoning of children and pets when they are left where others can get them.
- Hide or lock up opioid medications to avoid access by family, friends, or houseguests.
- Keep prescription medications in their original packaging so it is clear for whom the medications were prescribed and to save the directions for appropriate use.

Safe Disposal

Return unused opioids to the pharmacy (disposal site at MGH Outpatient Pharmacy).

Find a disposal site near you at this website:
<https://www.deaaddressin.usdoj.gov/po3bdispsearch>

If no medicine take-back program is available in your area, you can flush them down the toilet or follow these simple steps to dispose of most most medicines in the household trash.

- Mix medicines (for both drugs, tablets or capsules) with an unpalatable substance such as kitty litter or used coffee grounds.
- Place the mixture in a container such as a sealed plastic bag, and
- Throw the container in your household trash.
- Before throwing out your empty pill bottle or other empty medicine packaging, remember to scratch out all information on the label or make it unreadable.

62



What can we do? Solutions...

- Rethink the approach
- Move away from opioid centric strategies
 - Public education
 - Counseling/compassion/empathy
 - Preop education
 - Address preop narcotics
 - Preop psychosocial screening
 - Psychosocial factors
 - Postsurgical phone calls
 - State and Federal monitoring programs
 - Use your "gut"

64

Pain Relief

- Depersonalize it: stick to the strategy
 - Reasonable maximum amount of opioids
- Mindset:
 - Compassion, trust
 - Stress, distress, effective coping strategies

65

Peri-Op Pain Management in Orthopedic Surgery

How Can I Start?

- First step: Accept that we have a problem
- Second step: Decide how much to Rx
- Third step: Change your Rx habits
- Fourth step: Start asking your patients how much they actually use
- Fifth step: Learn about pain management

66

Psychology:

Opioid Use 1-2 months after Skeletal Trauma

- Symptoms of
 - PTSD
 - Depression
 - Anxiety
- Less effective coping strategies (catastrophic thinking)

Not: Age, sex, fracture location or severity, number of fractures

67

67

Psychology:

Inpatients after Orthopedic Surgery

Greater pain intensity / lower satisfaction:

- More opioids (oral morphine equivalents)

Lower pain intensity / higher satisfaction:

- Fewer symptoms of depression
- Greater self-efficacy

68

68

Orthopedic Pain Relief Strategy

- Coordination
 - Single provider
 - Suboxone, methadone, daily opioids
 - Check prescription monitoring program
 - Maximum amount of opioids for a given problem
- No
 - Opioids for new patients
 - Opioids for chronic pain
 - Extended release opioids

69

69

Orthopedic Pain Relief Strategy

- Coordination
 - Single provider
 - Suboxone, methadone, daily opioids
 - Check prescription monitoring program
 - Maximum amount of opioids for a given problem
- No
 - Opioids for new patients
 - Opioids for chronic pain
 - Extended release opioids

70

70

Future

- Pain education part of every training program
- Multimodal pain management
- Each surgeon will develop their own
- Know how many our patients take
- Continuous improvement
- Goal is not “no opioids”

The goal is optimum pain relief with a minimum of opioids

71



72

72

AAOS AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS
AMERICAN ASSOCIATION OF ORTHOPAEDIC SURGEONS

News Calendar Patient Education Find an Orthopaedist

Search

My AAOS Log In My Cart

Annual Meeting Periodicals Education Quality Research Advocacy Membership Store

About

Home Quality Patient Safety

Quality

Navigation

- Clinical Practice Guidelines
- Performance Measures
- Patient Safety
 - Clinician Checklists
 - Outcomes Instruments
 - Patient Safety Resources for Clinicians
 - Patient Safety Resources for Patients
 - Patient Safety Quality Newsletter
 - Appropriate Use

Pain Relief Toolkit

Preoperative Pain Relief Discussion
Help prepare patients for what to expect and make a plan for pain relief.

Postoperative Pain Relief
Pain is part of the healing process and knowing what to expect will help patients achieve peace of mind.

Preoperative Screening Questionnaire
Determine your patients' risk for opioid dependence.

Emergency Opioid Strategy
Strategies for relief of musculoskeletal pain in the Emergency Department.

Orthopedic Opioid Service Strategies
Having a prescribing policy in place, such as requiring prescriptions from one provider or limiting the number of pills prescribed, will reduce the number of pills that can.

Safe Use, Storage, and Disposal
Strategies for safely using, storing and disposing of opioids.

73

73

COMPLEXITY ASSESSMENT FOR HAND SURGERY

MEDICAL/SOCIAL COMPLEXITY

	YES	NO
Latex Allergy		
Pacemaker/ Internal cardiac defibrillator		
Infection Precautions (e.g. MRSA)		
Difficult Airway		
Difficult IV Access		
Anticoagulation		
Malignant Hyperthermia		
Language Barrier: Requiring Interpreter Services		
Consent Issues, Incompetent to Give Consent, Dementia etc. DNR Orders		
Social Factors: Lack of Support at Home, etc.		

PLAN: _____
(Full PATA, Social Services Consult, Cardiac Work Ups, etc.)

SURGICAL COMPLEXITY

	YES	NO
Special equipment		
Timing issues		
Bone graft, etc.		
Specific tests or information needed		

PLAN: _____

PAIN MANAGEMENT DISCUSSED Yes No

PROMIS pain interference: _____

PROMIS depression: _____

Opioid risk tool: _____

Daily opioid use Methadone Suboxone

PLAN: _____

74

74

SURGICAL COMPLEXITY

	YES	NO
Special equipment		
Timing issues		
Bone graft, etc.		
Specific tests or information needed		

PLAN: _____

PAIN MANAGEMENT DISCUSSED Yes No

PROMIS pain interference: _____

PROMIS depression: _____

Opioid risk tool: _____

Daily opioid use Methadone Suboxone

PLAN: _____

75

75

Pain Management Protocol

Dr. David Nelson, MD

- Preop counselling regarding pain
 - Face-to-face discussion
 - Handout
 - Webpages with didactic material and patient statements
- Long-acting acetaminophen + NSAID AM of surgery
- Pre-incision block with lido + epi
- Post-surgical block with bupivacaine + epi
- Long-acting acetaminophen + NSAID BID x 2 then prn
- Hydrocodone/acetaminophen for breakthrough pain
- Post-Op Day 1 follow-up telephone call

76

EastBayHand Medical Center

Pain Management Protocol

Following this protocol has been shown to be superior to addictive opioid medications for orthopedic injuries in the acute setting.

- From your local pharmacy, purchase the following over-the-counter medications:
 - Aleve 220 mg
 - Tylenol Arthritis 650mg
- Start by taking Aleve 220 mg in the morning and afternoon, for about 2-3 days after the surgery you can stop two days after surgery if your injury stops hurting.
- If your pain is severe, add Tylenol Arthritis for any brand of acetaminophen 8-hour, every eight hours, with a maximum dose of 3000 mg per day.
 - The maximum amount of Tylenol is 3000 mg per day, which is the same as 4 of the 650-mg pills. Remember don't substitute any other medication for the Tylenol: don't take Motrin, Aspirin, or any other over the counter medication.

Tylenol Arthritis plus Aleve is a case of 1+1=3, not 2.
That is, they work together as a team to make each other stronger. Remember as well that Tylenol Arthritis is taken every 8 hours, the Aleve is twice a day.
- If you were prescribed Naprox, Vioxx, or Percocet these should be taken to assist with sleeping at night, only if needed, for the first week. You may be given a written prescription, but many patients find they do not need to take these. Remember that opioid pain medication can lead to addiction, respiratory sedation, and death. In 2013 over 17,500 American died from opioid overdoses and we don't want this to happen to you.

With this protocol, you can expect your pain to be very manageable. The worst pain pills last for the first 48 hours and improves significantly after that. By the time you see your doctor for your next visit you probably will no longer require any pain medication on a daily basis.

77

77

SET EXPECTATIONS: "Some pain is normal. You should be able to walk and do light activity, but may be sore for a few days. This will gradually get better."

SET NORMS: "Half of patients who have this procedure take under 10-15 pills."

NON-OPIOIDS: "Take acetaminophen and ibuprofen around the clock, and use the stronger pain pills only as needed for breakthrough pain."

Avoid NSAIDs in patients with peptic ulcer disease and associated risk factors (smoking, drinking), bleeding disorders, renal disease, and specific operations at surgeon discretion.

APPROPRIATE USE: "These pills are for pain from your surgery, and should not be used to treat pain from other conditions."

ADVERSE AFFECTS: "We are careful about opioids because they have been shown to be addictive, cause you harm, and even cause overdose if used incorrectly or abused."

SAFE DISPOSAL "Disposing of these pills prevents others, including children, from accidentally overdosing. You can take pills to an approved collector (including police stations), or mix pills with kitty litter in a bag and throw them in the trash."

78

78

Phone Call Scripts

Strategy: Empathize; normalize the pain; rule out problems; strategize, be available.

Scenario 1: Inadequate pain control

One at a time with pauses between. Listen more than speak.

- "Does the surgery hurt more than you expected?"
- "Pain can feel like something is wrong." And maybe a follow-up with:
"There's not a lot that can go wrong at this point" depending on what a patient says. (Rule out compartment syndrome)
- "Your body needs time to heal"

"Are you using all of the pain management strategies?"

Pain management strategies

If you are having trouble getting comfortable the night of your surgery try one or more of these strategies:

- Take the oxycodone every three hours for the next three doses.
- Add Tylenol - either 2 extra strength every 6 hours around the clock or 2 regular strength every four hours around the clock for two days.
- Add ibuprofen 600mg (three over the counter pills) every 6 hours around the clock for two days.
- Stagger the Tylenol and ibuprofen so that you're taking one or the other every three hours.
- Elevate
- Apply ice (bag of ice wrapped in a towel; 10 minutes on, 5 minutes off, repeat)

"We'll call you in the morning and see how you're doing. You can page us through the main hospital operator if you think something is wrong"

"Can you repeat back our plan?"

"Do you have any questions?"

79

Nursing Education

- Pain is Normal
 - Worst pain is in first 24 hours
 - Reduces by 50% after 48 hours
 - After 72 hrs it should be manageable
 - *Don't use the pain scale (if possible)
- Encourage distractions
 - Talk to friends/family
 - Walk around the hospital, cafeteria, go outside
 - Play games / watch sports
- Breakthrough medications are strictly for
 - Assistance with sleep
 - Pre-/Post-therapy exacerbation



80

Thank You!!

81

HOT TOPICS IN WORKER'S COMPENSATION LAW: WORK-RELATED COVID-19 CASES, MALINGERING, AND WORKING REMOTELY FROM HOME.

By: Thomas M. Landowski

Administrative Law Judge

Office of Worker's Compensation Hearings

Wisconsin Division of Hearings and Appeals

February 25, 2022

I.

A COVID-19 ILLNESS: ESTABLISHING WORK-RELATEDNESS.

- A. Statutory Rebuttable Presumption for First Responders: Sec. 102.02(6) and 102.565(6) Wis. Stats.

Sec. 102.02(6).

- (a) In this subsection, "first responder" means an employee of or volunteer for an employer that provides firefighting, law enforcement, or medical treatment of COVID-19, and who has regular, direct contact with, or is regularly in close proximity to, patients or other members of the public requiring emergency services, within the scope of the individual's work for the employer.
- (b) For the purpose of benefits under this chapter, where an injury to a first responder is found to be caused by COVID-19 during the public health emergency declared by the governor under s. 323.10 on March 12, 2020, by executive order 72, and ending 30 days after the termination of the order, and where the employee has been exposed to persons with confirmed cases of COVID-19 in the course of employment, the injury is presumed to be caused by the individual's employment.
- (c) An injury claimed under par. (b) must be accompanied by a specific diagnosis by a physician or by a positive COVID-19 test.

- (d) An injury claimed under par. (b) may be rebutted by specific evidence that the injury was caused by exposure to COVID-19 outside of the first responder's work for the employer. [Effective March 12, 2020]

Sec. 102.656(6).

This section does not apply to an employee whose claim of injury is presumed to be caused by employment under s. 102.03 (6).

B. In All Other Cases, Work-Relatedness is Proven by a Combination of Medical and Circumstantial Evidence.

1. A medical opinion is required, but it is "often impossible to find the source from which a germ causing disease has come". *Pfister & Vogel L. Co. v. Industrial Commission*, 194 Wis. 131 (1927).
2. The *Pfister* court addressed this dilemma by creating the rule of "preponderance of probabilities". A preponderance of probabilities is met when the medical evidence along with the other evidence would lead a person to believe that it is more likely that the applicant contracted the virus from exposure at work than from another source.
3. The medical opinion will be based upon circumstantial and medical evidence.

II.

A TEMPLATE FOR THE TREATING DOCTOR'S MEDICAL OPINION IN A COVID-19 CASE.

See Appendix A.

III.

USING CIRCUMSTANTIAL EVIDENCE TO PROVE THAT A DEATH

CAUSED BY COVID-19 WAS WORK-RELATED

Maria hires Attorney Hamilton, a worker's compensation attorney, in November 2021. She informs him that her husband, Jose, died from Covid-19 on Sunday, October 3, 2021.

Jose worked at a meat packing plant in Green Bay. Maria believes that Jose contracted the disease at the plant. As his dependent, Maria wants to file a worker's compensation claim for death benefits.

Information from Maria, the surviving spouse.

- Jose worked with his friend Sam.
- Jose did not have hobbies, did not travel, and was pretty much a homebody.

- Jose was a family man, and he spent his evenings and weekends with Maria and their 4 kids.
- Jose was sick on Thursday, September 30, 2021, and did not go to work. He was hospitalized later that same day.
- Jose died 3 days later on Sunday, October 3, 2021.
- No one else in the immediate family had Covid-19.

Information from Attorney Hamilton.

- Hamilton is aware from local news reports that Covid-19 swept through the meat packing plant, in September 2021, and he saves articles from the local newspaper on the subject.
- Hamilton obtains all of Jose's medical records for the last five years.
- Hamilton obtains a copy of Jose's personnel file from the meat packing plant.
- Hamilton obtains medical research and treatises on Covid-19
- Hamilton interviews Sam.

Information from Sam, Jose's Friend and Co-worker.

- Jose worked on the trim line at workstation #16.
- Sam worked to his immediate right at station #17.
- Even before Jose got sick, there were other workers in the plant who had contracted Covid-19.
- Tim, who also worked on the same trim line at station #20, contracted Covid-19 and left work sick on Monday, September 27, 2021, just three days before Jose got sick.
- The week before Tim and Jose got sick, there had been a lot of coughing in the break room where Jose and Sam sometimes ate lunch.
- Most of the plant workers wore masks, including Jose.
- Hamilton provides all the above information to Jose's family doctor.

Information from Jose's Family Doctor, Dr. Sanders.

- Dr. Sanders reviews all the information received from attorney Hamilton and concludes that Jose contracted Covid-19 as the result of a substantial exposure to the virus at the meat packing plant.
- He completes a WKC-16-B form in support of Maria's worker's compensation claim.

Information from the WC Carrier.

- The carrier is served with the hearing application and a copy of the WKC-16-B.
- The carrier assigns the file to Clyde, an adjuster.
- Clyde starts his investigation by calling Mark, the safety director at the meat packing plant. He asks Mark to send over all the information that he can obtain about occurrences of Covid-19 in the plant, Jose's job duties, Jose's payroll records, Jose's personnel file and any other pertinent information.
- Through authorizations signed by Jose's personal representative, Clyde also obtains a complete set of Jose's medical records.
- Clyde hires Nancy, a nurse case manager, to review Jose's medical records and to talk to Jose's family doctor.

Information from Nancy, the Case Manager.

- Nancy reviews Jose's medical records.
- According to the history and physical taken upon Jose's admission to the hospital on Thursday, September 30, 2021, Jose started feeling ill the day before, on Wednesday, September 29, 2021.
- Among the hospital's admission documents, Nancy also finds a note taken by the intake nurse that Jose had been to a wedding the previous Saturday. Nancy immediately provides this information to Clyde and Mark.
- After talking to Dr. Sanders, Nancy learns that Dr. Sanders was not aware that Jose had attended a wedding just five days before he was hospitalized.

Information from Mark, the Safety Director.

- Mark reports back to Clyde that in the two weeks before Jose left work, there were 10 other plant employees who called in sick with Covid-19, and in the two weeks after Jose left the plant, there were 6 more employees who called in sick with Covid-19.
- Of these 16 employees who contracted Covid-19, Tim worked the closest to Jose's workstation, about 22 feet away.
- Mark talks to some of Jose's co-workers to learn if they knew anything about the wedding, and he discovers that Sam and Tim also attended the wedding.
- Sam informs Mark that the three of them sat at the same table during the reception dinner.

Information from the Independent Medical Examiner.

- Clyde hires an independent medical examiner and sends him all the information he has gathered.
- The IME doctor opines that it is doubtful that Jose contracted Covid-19 at work. He further opines that it is more likely than not that Jose contracted the virus at the wedding.

Information from the Hearing Testimony.

- The case is hotly contested and goes to hearing.
- Sam testifies on Maria's behalf that the reception tables at the wedding were long and narrow, that Tim sat at one end of the table more than 8 feet away from Jose, and that most people at the wedding wore masks.
- Mark, the safety director, testified that at Clyde's request, he did some investigating on social media and found a wedding photo showing Sam, Tim and Jose posing should-to-shoulder, with wide smiles and beer glasses in their hands.
- On rebuttal, Maria testified that she and Jose left immediately after the reception dinner and did not stick around for the dance because Jose was not feeling well.

IV.

MALINGERING AND SYMPTOM MAGNIFICATION

A. Beware of the Independent Medical Examiner Who Frequently Finds that the Injured Worker Is Malingering or Engaged in Symptom Magnification.

1. Malingering is not an easy thing to prove.
 - a. It is based largely on subjective factors and observations.
 - b. It is more reliable if made by someone familiar with the patient.
 - c. It involves the patient's state of mind.
2. If the independent medical examiner frequently finds that injured workers are malingering, it may diminish the independent medical examiner's credibility.

B. Factors the ALJ Considers When Deciding Whether the Injured Worker is Malingering.

1. Do any of the treating healthcare providers also opine that the injured worker is malingering or is the independent medical examiner the only one?
2. If a person believes the injured worker is malingering, how familiar is that person with the injured worker?
3. What is the basis for the opinion of malingering?
 - Observations?
 - Test results?
 - Surveillance videos?
 - Physical examination?
 - Other corroborating evidence?

V.

EMPLOYEES WORKING REMOTELY FROM HOME: A SAFETY MANAGER'S NIGHTMARE

A. How Does the Employer Make the Home Environment Safe and Thus Control Risk?

1. Ergonomic workstations.
2. Floors and stairs.
3. Periodic Inspections by video.

B. How Does the Employer Investigate Accidents?

1. Greater use of photos.
2. More detailed accident reports.
3. More thorough recorded statements.

4. Dealing with the Personal Comfort Doctrine.

APPENDIX A.

A SAMPLE LETTER FROM THE TREATING PHYSICIAN IN A COVID-19 CASE.

(This letter was developed by doctors, for doctors and was used at IAIABC conventions. In Wisconsin, it must be attached to a standard WKC-16-B form)

“Health Evaluation of (Name and DOB)”

Context: This report is submitted as requested to the offices of (law firm name), in the context of a workers’ compensation claim filed for (client name) in relationship to her/his employment at (employer name) and the development of COVID-19 illness.

I. Work History

A. Past Work History

In this section, list jobs held chronologically over recent years. Be specific about job titles and job duties.

B. Recent Work History

This section is designed to focus on 2-3 months prior to onset of COVID-19 illness. The key issues are a description of the workplace and the nature of regular job duties of the client.

- Include any information about the occurrence of COVID-9 cases at the workplace.

- List Any inspections by state or federal agencies.
- Provide information from employer illness reports in the OSHA 300 log of workplace cases of COVID-19 if available.

C. Specific Work History during 2 weeks prior to disease onset (as in medical history below)

This section is very important in that the incubation period for COVID-19 ranges from 4-14 days. Therefore, a very detailed work history for that period is essential.

- Provide as much detail as possible about contact with other potentially infected persons during the normal performance of job duties.
- Focus primarily on person-to-person contact occurring within 6 feet of a potentially infected person. If possible, estimate the number of times such contact would have occurred during a typical workday (i.e., contact episodes).
- Provide information on the use of masks and other forms of personal protective equipment (PPE).

II. Other Possible Exposure Sources

This section is designed to provide comparable information about potential contact with individuals outside the workplace who could have been sources of COVID exposure. Focus specifically on the 2 weeks immediately prior to onset of illness.

- Family members

- Participation in public gatherings (particularly indoors or in confined spaces).
- As in Section III above, attempt to estimate the number of contact episodes during the 2 weeks prior to disease onset.

III. Medical History

A. Past medical history

- List medical diagnoses here.

B. Recent medical history

- List detailed medical history including basis of COVID-19 diagnosis including test results. Describe dates of symptom onset including dates when client was unable to work due to illness or quarantine.
- Provide any information on long term health problems (i.e., “Long COVID syndrome”):

Persistent pulmonary dysfunction.

Hypercoagulability.

Cognitive impairment.

Fatigue and exercise intolerance.

Other symptoms – including current review of systems.

IV. Related Medical Literature – References No.1 – No. 7.

A. Transmission of the COVID-19 virus occurs by 3 routes (CED 2020 [Referenced No.1]): contact, droplet and airborne:

- **“Contact transmission** is infection spread through direct contact with an infectious person (e.g., touching during a handshake) or with an article or surface that has become contaminated. The latter is sometimes referred to as ‘fomite transmission.’
- **Droplet transmission** is infection spread through exposure to virus-containing respiratory droplets (i.e., larger and smaller droplets and particles) exhaled by an infectious person. Transmission is most likely to occur when someone is close to the infectious person, generally within about 6 feet.
- **Airborne transmission** is infection spread through exposure to those virus-containing respiratory droplets comprised of small droplets and articles that can remain suspended in the air over long distances (usually greater than 6 feet) and time (typically hours).”

B. Nursing homes and extended care facilities (optional)

Nursing homes and extended care facilities are sites in which these modes of transmission have been noted and related to outbreaks of COVID-19 illness since the first outbreak was reported in March 2020 (see Reference No. 2 below). Residents and staff in these long-term care facilities have developed COVID-19 illness during the pandemic at alarmingly high rates across the nation. Deaths due to COVID-19 have impacted residents of these facilities disproportionately. As a result, CDC and state agencies have issued detailed guidance to nursing homes and extended care facilities to reduce disease transmission to residents and staff (CDC, 2020 [Reference No. 3])

C. Clinical feature of COVID-19 disease [References No. 1 – No. 7]

1. Individuals who are asymptomatic can transmit COVID-19 to others with whom they are in contact; those who ultimately become symptomatic may also transmit the infection during their pre-symptomatic stage.

2. Infected individuals can transmit the virus about 4 to 10 days after becoming infected.
3. The incubation period (time from exposure to disease onset) is up to 14 days with a median of 4-5 days from exposure to symptom onset.
4. Viral load and level of infectivity are highest at symptom onset or in the first week of infection.
5. Presenting symptoms typically include cough, fever, chills, shortness of breath, fatigue, muscle aches, headache, loss of taste or smell and other symptoms.
6. Although many of those who are infected have mild illness some have more severe illness – risk factors for more severe illness (and death) include age over 65 and pre-existing illness. Illness may range in severity from mild to severe.
7. Severe disease is associated with kidney injury, pneumonia, cardiac arrhythmia, cardiomyopathy, and neuropathy (see Reference No.5 and figure).
8. Hypercoagulability has been seen in COVID-19 patients resulting in increased risk of arterial and venous thrombosis (CDC – Nov. 2020). Guidelines to manage hypercoagulability in COVID-19 has been developed by the National Institutes of Health and the American Society of Hematology.
9. Persistent symptoms and health-related quality of life reduction have been noted to occur more than 100 days after hospital admission in a study of 120 COVID-19 hospitalized cases (see Reference No. 6 below). Persistent symptoms included fatigue (55%), shortness of breath (42%), loss of memory (34%), concentration difficulty (28%), and sleep disorders (31%). Another study (Reference No.7) showed similar results.
10. Studies of long term sequelae of COVID-19 disease have shown that, in one study, only 13% were symptom free after 60 days (mean) after disease onset (Up to Date, 2020 [Reference No. 8]). Most common persistent symptoms were fatigue (53%), shortness of breath (43%), joint pain and chest pain. Individuals with mild initial infections also were found to have persistent symptoms of cough and fatigue weeks after the infection occurred.

V. Sources of information

A. Medical records – list records reviewed

B. Interviews with (client name) – list date

C. Medical literature review

D. State and federal agency reports and documents

E. OSHA 300 COVID report log

F. Other sources (e.g., news reports)

VI. Conclusions

(This section is a redacted set of conclusions taken from a real case. It is provided with details as an example. Obviously, each case is unique. The key issue here is to make a comparison between workplace and nonworkplace contact with potentially infected persons to establish the most likely source of Covid-19 infection)

A. (Client name) developed COVID-19 disease in late June 2020; she manifested typical initial symptoms of COVID-19 disease including cough, chills, chest tightness, anosmia, facial pain, and mild difficulty breathing. She has also developed longer term sequelae of COVID-19 illness including:

- Hypercoagulability which caused a thrombosis of the anterior division of the left renal artery leading to an infarct of the anterior portion of her left kidney.
- Severe hypertension which is currently being managed.
- Cognitive impairment manifest as difficulty with concentrating; processing information and maintaining focus.
- Cardiac arrhythmia.
- Pulmonary impairment.

- Dermatologic manifestations (livedo reticularis). And
- Fatigue and general physical deconditioning.

She also has experienced dental problems which may be attributable to work stress experienced over recent months.

B. I conclude that, to a reasonable degree of medical certainty, that (client name) contracted COVID-19 disease as a direct result of her personal contact with infected residents in the (employer). She probably contracted the disease as a direct result of **droplet transmission**, which is infection spread through exposure to virus-containing respiratory droplets (i.e., larger and small droplets and particles) exhaled by an infectious person. Transmission is most likely to occur when someone is close to the infectious person, generally within about 6 feet. She also probably was exposed as a result of **airborne transmission**, which is infection spread through exposure to those virus-containing respiratory droplets comprised of smaller droplets and particles that can remain suspended in the air over long distances (usually greater than 6 feet) and time (typically hours). Airborne transmission would have occurred as a result of her work in resident rooms and other areas in which residents were present. She also was probably exposed to the COVID-19 virus as a result of **contact transmission** with contaminated surfaces.

Her exposure to infected individuals probably occurred during the period June 15-26, 2020. During this period, she experienced numerous episodes of exposure to potentially infected residents as a result of her working in resident rooms, actively being involved in resident relocation, delivering meals into resident rooms, participating in resident testing programs, and other activities which placed her in direct personal contact with residents leading to droplet transmission of the virus. She was also exposed during this period to airborne and contact transmission of COVID-19virus.

C. She has experienced numerous medical conditions as a result of her COVID-19 infection. As noted above, these include, but are not limited to, renal infarct due to thrombosis of anterior portion of left renal artery due to hypercoagulable state, hypertension, cardiac arrhythmia, a dermatologic disorder, pulmonary dysfunction and cognitive impairment. She will require ongoing medical follow-up for these conditions to include hematology, nephrology, dermatology, physical therapy and general medical care for her cognitive difficulties, hypertension, anxiety and depression. She will probably continue to experience these conditions which are attributable to her COVID-

19 illness for some time to come. Her symptoms are likely to persist for months as has been reported in the medical literature for other hospitalized persons who are recovering from COVID-19 (see references 6 and 7 below).

- D. She is currently unable to perform work duties in her job at the (employer) due to fatigue and inability to accurately process information. Further she is experiencing both mental and physical fatigue which impair her ability to perform her regular work activities.

I offer these opinions to a reasonable degree of medical certainty. I reserve the right to revise this report as more information is made available to me.

Signed and Dated

References:

1. Centers for Disease Control and Prevention. Coronavirus Disease – Clinical Care Guidance. CDC 2020 Accessed on November 21, 2020, at https://www.cdc.gov/coronavirus/2019-ncov/hcg/clinical_guidance_management-patients.html.
2. McMichael TM et al. Epidemiology of COVID-19 in a Long-Term Care Facility in King County Washington. NEJM382: 2005-2011. May 2020.
3. Centers for Disease Control and Prevention. Coronavirus Disease. Responding to COVID-19 in Nursing Homes. CDC 2020. Accessed on November 21, 2020, at <https://www.cdc.gov/coronavirus/2019-ncov/hcp/nursing-homes-respondent.html>.
4. Korownyk, C. et al. Rapid Review of COVID-19. Canadian Family Physician. 66: 429. June 2020.
5. Siddiqi HK and Mehra MR COVID-19 illness-A clinical-therapeutic Staging Model. J Heart Lung Transplant 2020. 39 (5), 405 407. Garrigues E et al. Post-discharge persistent symptoms and health-related quality of life after hospitalization for COVID-19. J infect. 2020 Aug Published on line August 2020.

6. Halpin SJ et al. Post discharge symptoms and rehabilitation needs in survivors of COVID-19 infection. J Med Virol. 2020 Jul 30. Published on line.
7. Garrigues E et al. Post-discharge persistent symptoms and health-related quality of life after hospitalization for COVID-19. J Infect. 2020. Aug Published on line August 2020.
8. Up to Date. COVID-1. 2020 Accessed on Nov 21,2020 at <https://www.uptodate.com/contents/coronavirus-disease-2019-cvid-19-epidemiology-virology-and-prevention#H3392906512>.”