

Industrial Injuries of the Hand: Mild to Mangled

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I have no relevant financial disclosures

DISCLAIMER...

Warning: Some of the following images contain graphic content. Viewer discretion is advised.

Now, my actual title slide...



The Mangled Hand From Injury to MMI

A Hand Surgeon's Perspective

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Industrial Injuries of the Hand: Mild to Mangled

AGENDA

Introduction

Definitions

Initial Management

Workplace, Transport, ER, OR

Secondary Procedures

Therapy

Mental Health / Other factors

Prostheses

Return to work / Outcomes

My Work Comp “Wish List”



Industrial Injuries of the Hand: Mild to Mangled

Introduction

- Work, home accidents, assault, MVC, GSW, Farm
- One of greatest challenges to hand surgeon
 - Variable tissue injury / loss
 - Complex reconstructions
 - Each case is different
- Limb and life altering
- Managing initial patient perception



Definitions

- Mangling/Mutilating – imprecise terms
- Mangle – French – Cut to pieces
- Mutilating – Latin – To cut or lop off, maim
- These terms indicate significant loss of tissue/function
- How bad does it have to be to be "mutilated"
- What is an "acceptable" hand?
- 1 thumb + 3 near- normal fingers w/ normal sensation???



Types of machines

Punch Press

Lathe

Tablesaw

Macerator

Conveyor Belt

Industrial Fan

Cotton Gin

Loose Clothing + _____

Initial Management

On-site

- Call 9-1-1
- Clean any gross debris if possible
- Place clean, slightly damp, loose bandage
- Direct pressure if bleeding
- If massive, uncontrolled bleeding, apply tourniquet



Initial Management Transport of Body Parts

NOT submerged in ice water

Wrap in DAMP towel/gauze

Then in plastic bag on/in ice



Initial Management

Ideally – initial management by reconstructive surgeon

- Hand surgeon often consulted after seen in ER / Transferred

Document full history

- Mechanism
- Previous hand surgeries
- Previous functional status of limb
- Hand dominance
- Other injuries?

Initial injury can be underestimated

- Crush injuries in particular
- Also high pressure injection injuries



Initial Management

Ideally – initial management by reconstructive surgeon

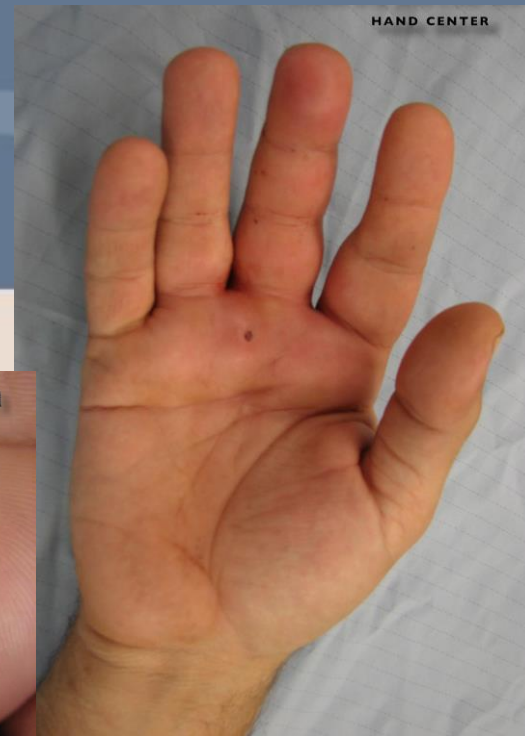
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Initial Management In the Emergency Room

Primary cleaning

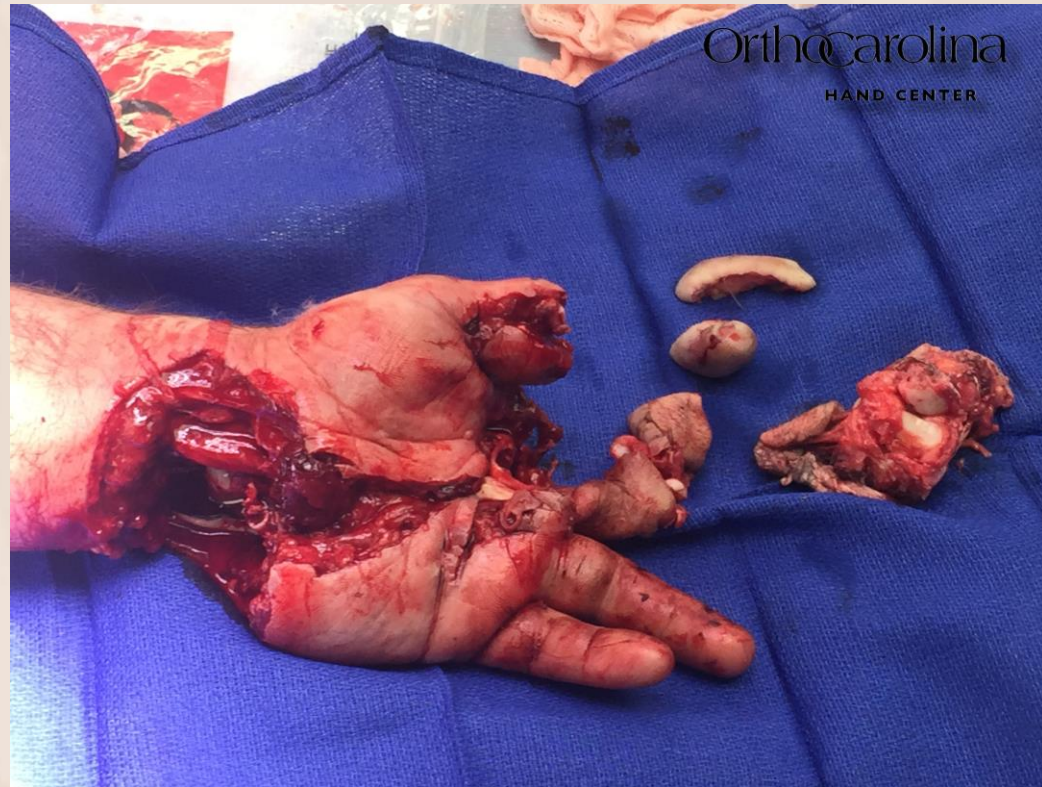
Avoid covering, uncovering, etc

Antibiotics

Pain medication

Tetanus Update

Take Photographs



Initial Management In the Emergency Room

Primary cleaning

Avoid covering, uncovering, etc.

Antibiotics

Pain medication

Tetanus Update

Take Photographs

Get to a Level 1 hospital (typically)

Don't discard potential "spare parts"

Carolinas Medical Center, Charlotte (1990)
Levine Children's Hospital

Duke University Hospital, Durham (1982)

Baptist Hospital, Winston-Salem (1982)
Brenner Children's Hospital

Vidant Medical Center, Greenville (1985)

UNC Hospitals, Chapel Hill (1982)
NC Children's Hospital

WakeMed Health and Hospitals, Raleigh ('06)

Initial Management In the Operating Room

Many Factors / Variables

Some of the things that we consider in surgery:

- What to keep, what to discard
- Preserve sensation (more important than finger length)
- Parts that can't be replanted = spare parts
- Good skin and soft tissue cover (either immediate, or planned)

- Bone and joint
- Vessel
- Nerve
- Tendons
- Skin and Soft tissue
- Single surgery or staged?



Initial Management In the Operating Room

TIME TO FIRST SURGERY CAN BE IMPORTANT!

- Viability of tissues, infection risk

Body parts can be brought to the operating room before the patient

Remove tissue that's not alive

-Skin, bone fragments, muscle

LOTS of irrigation

Remove Contamination

Stabilize bones

Repair and reconstruct other tissue



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Amputated Fingers

Rarely replant single fingers

“Clean slice” preferable

Multiple fingers – replant as many as possible
Not if crushed/mangled

Almost always replant the thumb

Smokers don't do as well

Replant within 6 hours if “warm”

Up to 24 hours if kept “cold”





Secondary Surgeries

I tell all patients:

”More than 1 surgery”

“There will be complications”

Types of secondary surgeries

- Skin/soft tissue coverage
- Finger lengthenings
- Tendon Reconstruction
- Nerve Reconstruction
- Infections
- Removal of implants
- Scar/contracture releases

“THERE WILL BE COMPLICATIONS”



HAND THERAPY

As important as the surgery

Close relationship between surgeon/therapist

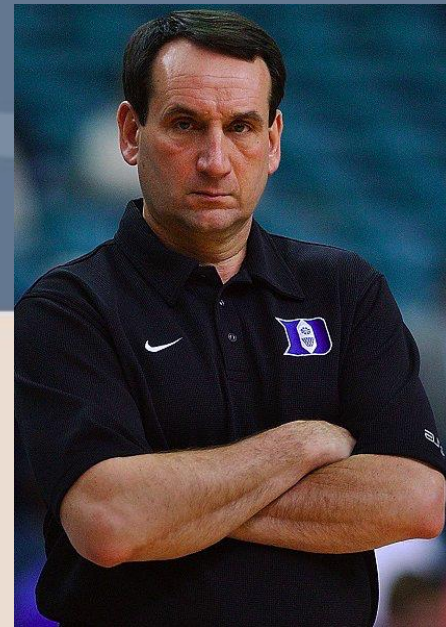
Referral often made immediately after 1st surgery

Early mobilization of *Uninjured* joints/body parts

Therapist sees patient much more frequently than MD



HAND THERAPY



ROLES OF THE HAND THERAPIST

- HANDS-ON / STRETCH / SPLINT
- TEACH TO ADAPT
- FAMILY SUPPORT (wound care, exercises)
- WOUND MONITOR / PROBLEM DETECTOR
- COUNSELOR
- MOTIVATIONAL COACH
- ADVISOR TO SURGEON
- LIASON BETWEEN PATIENT AND WORK



WHY A “CERTIFIED HAND THERAPIST”? (CHT)

- HANDS are complex
 - ANATOMY
 - VARIETY OF INJURIES / PATHOLOGY
 - COMPLEX SPLINTS/BRACES
 - MULTIPLE PROTOCOLS
- Many hand problems are WELL beyond the scope of typical PT/OR
- 5 years and 4,000 hours + test

WHY A “CERTIFIED HAND THERAPIST”? (CHT)

- Complex hand surgeries can be compromised by an under-qualified therapist
 - ACTUAL EXAMPLES
 - RUPTURE OF TENDON REPAIRS
 - INAPPROPRIATE SUTURE REMOVAL
 - LACK OF JOINT RANGE OF MOTION
 - BANDAGES TOO TIGHT → AMPUTATION
 - INEFFECTIVE SPLINTS → re-fracture
 - FAILURE TO NOTICE PROBLEMS (infection?)

55 year old male

Hand crushed between trailer-hitch and truck



55 year old male

Hand crushed between trailer-hitch and truck

POST-OP DAY 5

Arrives to office without translator

POST-OP DAY 6

”**Therapy is mandatory at this point in time**, we will initiate range of motion of all joints of all digits with the exception of the middle, ring and small finger metacarpal phalangeal joints. Swelling reduction techniques will be instituted.”

Detailed therapy prescription written.



POST-OP DAY 14

“Unfortunately, he has not started therapy despite a very clear therapy prescription, which was written on 11/08. Additionally, we have been regularly trying to contact the patient's case manager starting on Monday, November 11. We have left several messages, and we unfortunately have not yet heard back from the case manager. The patient states that he was contacted today that he has a therapy appointment set up on 11/25.”

First therapy appointment – 21 days after injury!!

Between 1-2 Months after injury
- 2-3 therapy visits per week

2 months after injury

“The pins have subsequently been removed. He has developed expected stiffness. **I recommended continued therapy**, and continued work restrictions with no use of the right hand at all”.



Between 3-4 months after injury **NO therapy appointments ???**

“At the last scheduled office visit, he again did not have a certified medical Spanish translator... which has been a problem in the past.

Additionally... his last therapy appointment was 3-4 weeks ago The patient reports ... the case manager “went on vacation” and further therapy was never approved.

The patient feels that “he has not made much progress in terms of flexibility and, in fact, he thinks that he has lost some over the last few weeks.”

“I am greatly disturbed and concerned ... this is dramatically compromising his potential for good function in the future. I now feel he will require surgery in the future... but aggressive and continued therapy will help to potentially minimize the need for this.”

5 months after injury:

Back to operating room for scar release

NEW CASE MANAGER

THERAPY 3x/week

7 months after injury: MMI, rate and release

“I do feel that a substantial delay in starting therapy early in the course of his treatment led to a significant long-term impairment and long-term compromise of his final result.”



HAND THERAPY

55 y.o. male

Dominant left hand
vs
Lathe



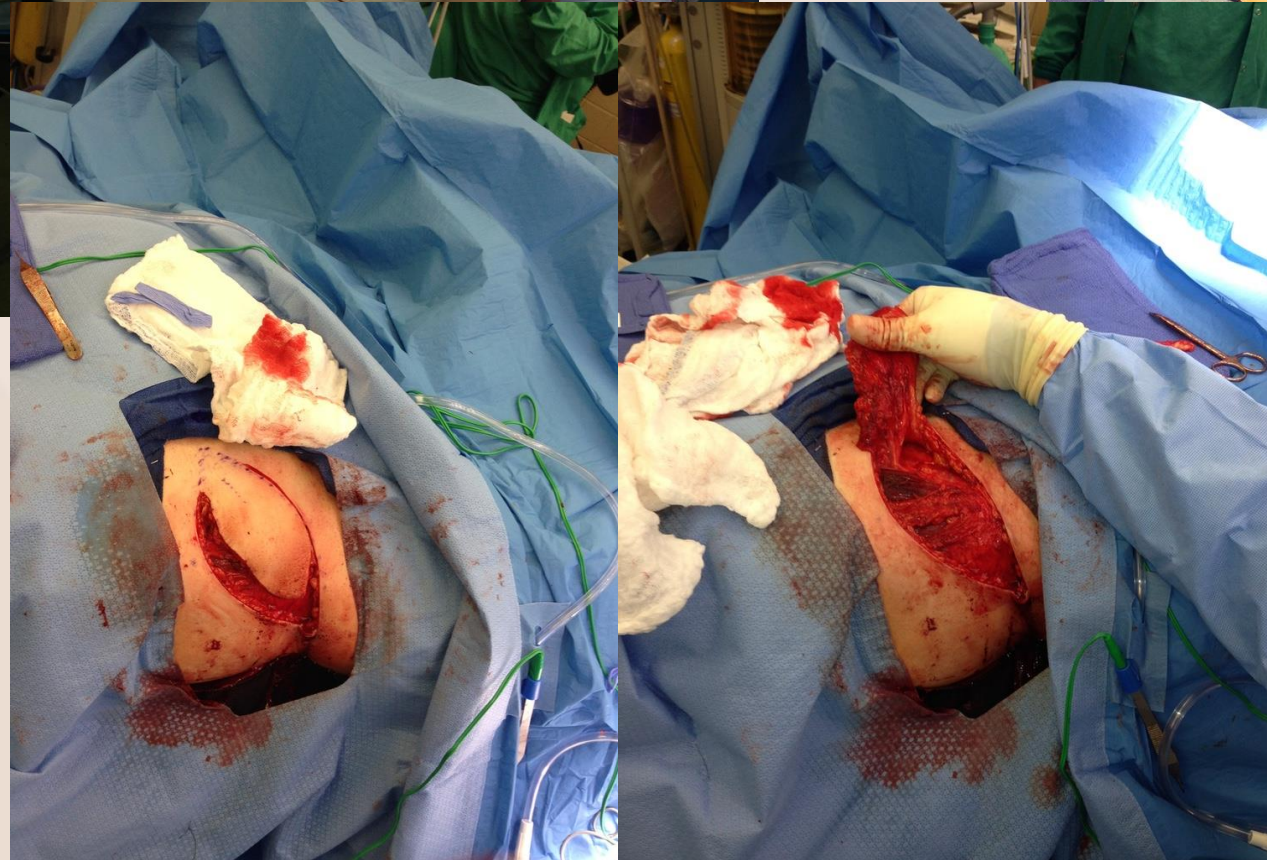
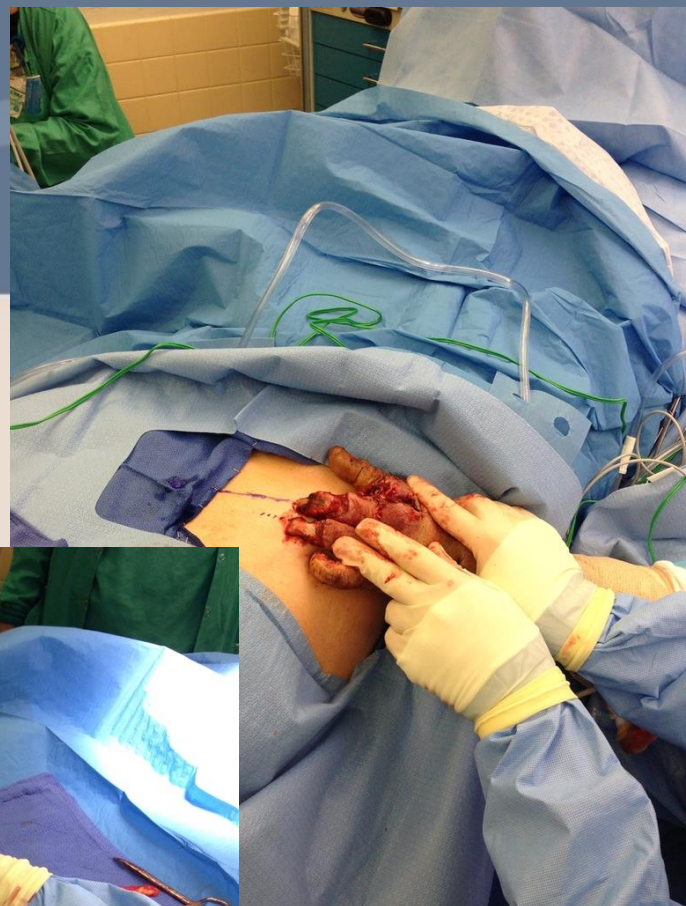
Transfer from OSH



72 hours after initial surgery



Groin Flap



Groin Flap







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~2 weeks later



2 months
later





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Complications and Additional Procedures

5 months – Revision of fixation of forearm fracture (non-union)

11 months – Thumb fusion, Small finger contracture release, 1st webspace opening

16 months – Removal hardware from hand

18 months – MMI – medium work

Hand Therapists

- 1-5 times per week
- I request a CERTIFIED HAND THERAPIST
 - There are other options, but safest best CHT
- If not at OrthoCarolina, then with a CHT I know
- I don't hesitate to switch therapists
- All hand therapists have my cell phone number
- AS IMPORTANT AS THE SURGERY!!!! (or more!)

Workers' Compensation Authorization Form

Required By
OrthoCarolina's Hand Surgeons

Thank you for your referral to an OrthoCarolina Hand Surgeon. In order to continue to insure the high standards of treatment, quality and consistency set by the Hand Surgeons, effective August 1, 2014, the patient's Adjuster is required to agree to the following:

**ALL OCCUPATIONAL THERAPY, PHYSICAL THERAPY, EMGs, MRIs,
CUSTOMIZED SPLINTS OR DMEs
MUST BE
PERFORMED OR PROVIDED
AT AN
ORTHOCAROLINA FACILITY
OR
BY A HAND THERAPIST AT AN OUTSIDE FACILITY
APPROVED BY THE ORTHOCAROLINA HAND SURGEON**

Upon completion of this form, please fax it to 704.323.2007. A representative from OrthoCarolina's Workers' Compensation Department will call you to schedule the appointment.

Thank you in advance for your cooperation.

Adjuster's Name _____ (please print)

Adjuster's Signature _____

Date _____

Insurance Carrier _____

Patient's Name _____

Date of Birth _____

Insurance Carrier's Address _____

Insurance Carrier's Telephone _____

Insurance Carrier's Fax _____

Adjuster's E-mail Address _____

Claim Number _____

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- Adjustment disorders, depression, PTSD
- Important to recognize/identify
- Critical factor in patient recovery and outcome
 - Short and long-term
- Men have more difficulty expressing
- Referral to mental health professional when appropriate
 - Part of the overall care of the injured patient

Often overlooked or under-appreciated

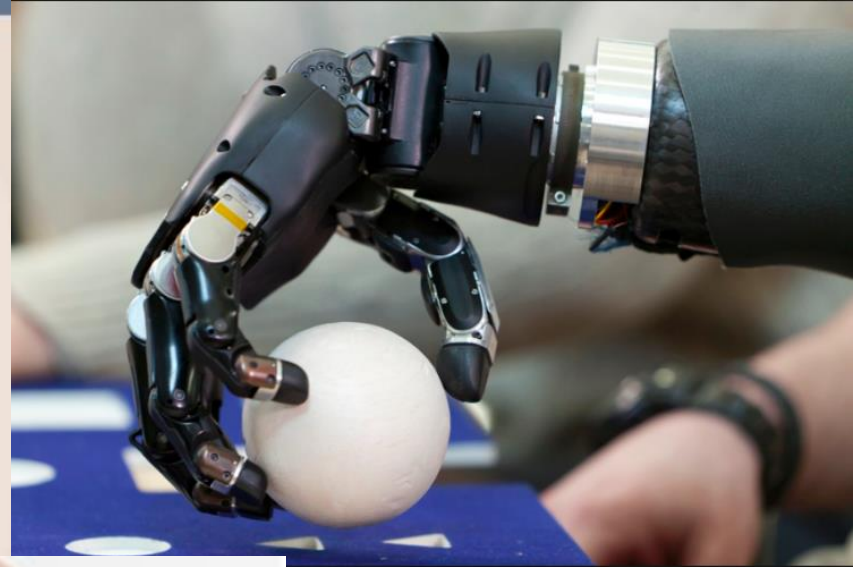
Depression and anxiety play role in pain, outcomes

I ask many/most patients about it



Prostheses

- Important aspect of care
- Often overlooked
- Can provide function
 - grasp, pinch, hold
- Many different types



Prostheses

- Immediate fit improves outcome
- Can improve body image/confidence
- Encourages patient to use hand
- I like prosthetist visit day 1!
- Acceptance is important
- Costly
- Wear and tear
- Replacements needed (lifespan)



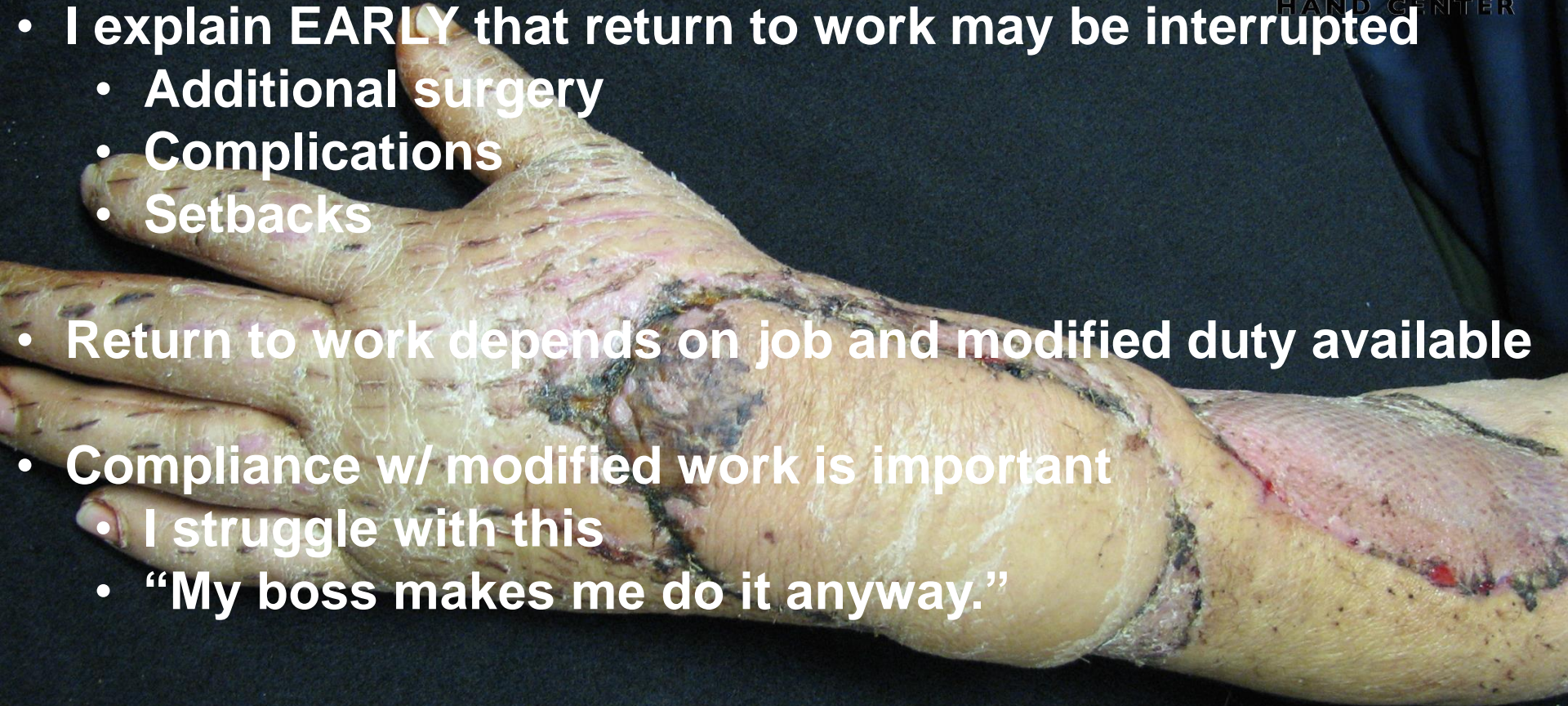
Return to work

- **Generally, no work until:**
 - Acute pain resolved
 - Acute swelling resolved
 - Early wound healing
- **I advocate early return to work when reasonable**
 - **“Deskwork”**
 - **Allows for limb elevation on desk**
- **Important to set/adjust expectations/motivation**

Return to work

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- I explain EARLY the diff. b/w “restriction” and “disability”
- I explain EARLY that return to work may be interrupted
 - Additional surgery
 - Complications
 - Setbacks
- Return to work depends on job and modified duty available
- Compliance w/ modified work is important
 - I struggle with this
 - “My boss makes me do it anyway.”



OUTCOMES

- Multiple factors:
 - Injury related
 - Treatment related
- Patient factors:
 - Age
 - Health
 - Hand dominance
 - Occupation
 - **PSYCHOLOGICAL MAKE-UP AND MOTIVATION**

OUTCOMES

- There is no good standardized assessment system
- Severity of original injury plays huge role
- An experienced reconstructive hand surgeon is essential
- THERAPY THERAPY THERAPY

My Work Comp Wish List for the “Mangled Hand”

- Basic understanding of complexity of injury
- No delay in therapy, immediate referral to CHT
 - Encourage patient to attend and participate
 - THIS WILL DECREASE TOTAL DURATION OF TREATMENT AND PERIOD OF DISABILITY
- Working with me to understand job situation
- Expect complications and additional surgery
- Awareness of psycho-social aspects

THANK YOU

