The Only Constant is Change

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Disclosures

- I am a physician-owner of OrthoNebraska.
- I have no other relationships or disclosures

Learning Objectives

- Review some of the changes in hand surgery over the last 5 years
  - WALANT Procedures
  - Nerve Allograft
  - Metacarpal Screw
- Discuss potential changes coming in the next 5 years
  - OATs for OCD of the elbow
- Outline the impact of these changes on our patients

WALANT Technique

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Largest Change in the Last 5 Years

- WALANT Technique
  - The technique has been present for decades with an explosion in use over the last 5 years
- Wide
- Awake
- Local
- Anesthetic
- No
- Tourniquet

Patient Benefits

- No Nausea/Vomiting
- No urinary retention or other side effects from opiates or sedation
- No unnecessary IV insertion
- Less time
  - At the hospital
  - Off work
  - Pre-operatively
- No need for someone to stay with the patient for 24 hours after the procedure

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Patient Benefits

- No pre-operative H&P ($256)
- No pre-operative EKG ($50)
- No pre-operative Chest X-Ray
- No pre-operative blood tests

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Patient Benefits

- No need to change medication schedules
- No need to discontinue anticoagulation
- No need to fast (particularly helpful for diabetics)

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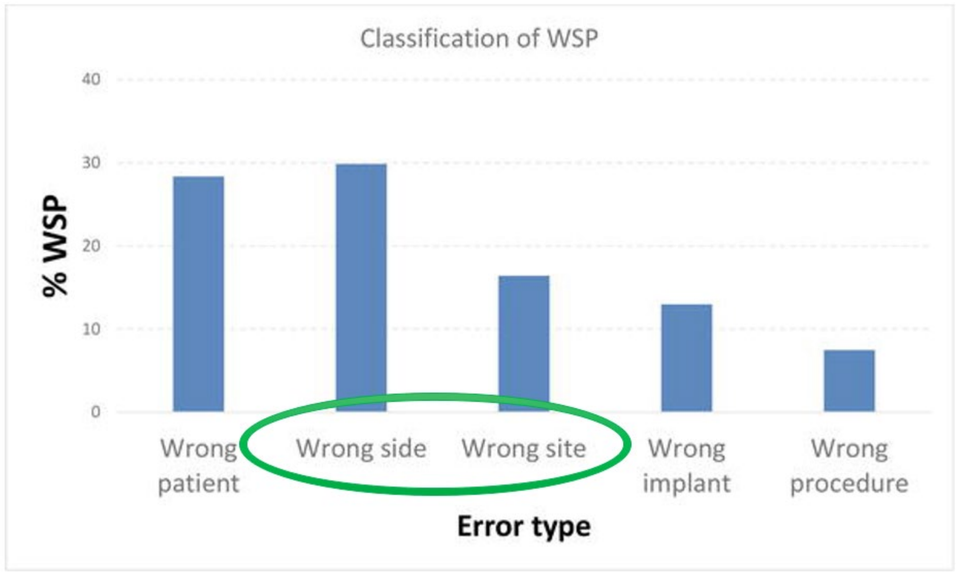
Patient/Surgeon Benefit

- Much less likely to operate on the wrong hand or the wrong finger



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Surgeon Benefits

- Intra-operative adjustments for tendon repairs, tendon transfers
- No patients admitted due to sedation complications
- No “let down” bleeding from tourniquet that requires cautery
- Can operate on patient on anti-coagulation and with multiple medical comorbidities
- No need to wait for 6-8 hours if the patient just ate

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Surgeon Benefits

- Patient education throughout the case and during closure
- Patient compliance likely improved
- Physician tells patient to keep the hand elevated and immobile at the end of surgery

- **VS**

- Nurse tells patient this in recovery while still under the influence of sedatives

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Cost Benefits

- **Patient**
- Less time away from work
- No pre-operative testing charges
- H&P ~ $256
- EKG ~ $50
- No time away from work to obtain pre-op testing
- No babysitters required while patient gets pre-op testing
- No post-operative “babysitter” required for 24 hours
- No time away from work required for babysitter = no lost wages for other family members

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Cost Benefits

- **Patient (continued)**
- No anesthesia charges
  - Carpal tunnel scheduled for 30 minutes = $700 anesthesia cost
  - Flexor tendon repair for 75 minutes = $1120 anesthesia cost
- No extra medication charges
- Cefazolin 3g/30ml = ~$35
- Opiates - Oxycodone 5mg tablet x 2 = $6
- Propofol - 10mg/ml IV = ~$45/unit
- Electrolyte solution (normal saline, lactated ringers, etc)
- Anti-nausea medications

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Side Effects

- **Lidocaine**
- Seizures
- Extremely rare unless large amounts injected intravenously too quickly
- Treatment - conservative
- Cardiac Toxicity
- Rare
- Lidocaine is routinely used for cardiac arrhythmias, injected intravenously for pain control post-operatively
- Treatment – lipid emulsion (intralipid)

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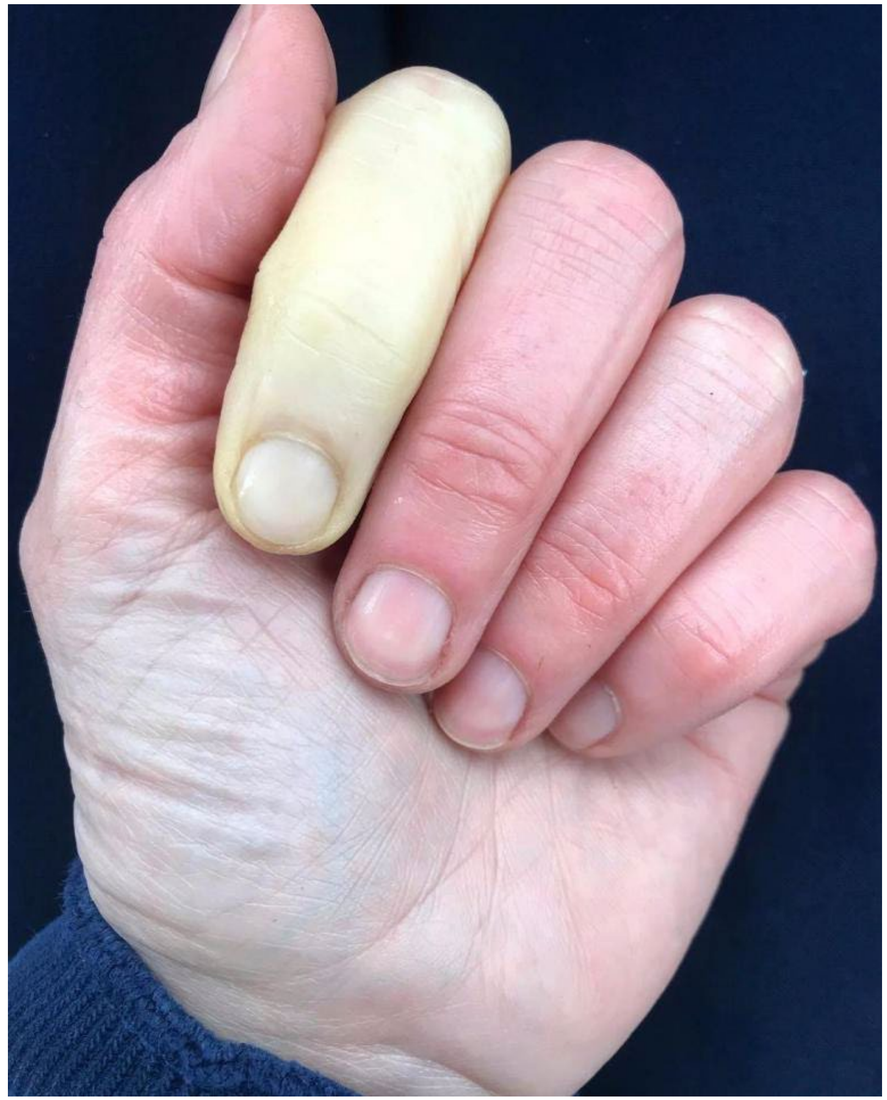
Side Effects

- **Epinephrine**
- The White Finger…
- Extreme vascoconstriction can lead to a risk of amputation
- Treatment - phentolamine (1mg per 1 mL of normal saline)
- Transient increase in heart rate and blood pressure
- Unclear of significance, even in patients with cardiac conditions



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Injection “Issues”

- **The Epinephrine “Rush”**
- Rush
- Jitteriness
- Feeling of too much coffee
- Up to ~1/3 of patients can feel this with injection
  - We warn patients before hand!!!
- Vasovagal
- Avoid the Faint – inject the patient lying down
- Managing the Faint
- Head down, feet up
- Anxious Patient

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Perceived Barriers

- **“Never inject epinephrine in the finger” = MYTH**
- Reversal agent = phentolamine
- Epinephrine effects without cardiac monitoring
- Thus far, all patients treated with WALANT had cardiac monitoring
- Dental and dermatology offices use same medications without

Perceived Barriers

- **FEAR!!!**
- Fear of the unknown
- Fear of pain
- Fear of knowing what the surgeon is doing
- Hearing operating room noises and conversations
- Claustrophobia from the drapes

Perceived Barriers

- **Surgeons Will Now Be Forced to Talk to the Patient During Surgery**
- True, however, it can be an opportunity for patient teaching which can lead to decreased postoperative complications
- Other people in the room can talk with the patient
  - Nurses
  - Physician Assistant
  - Scrub Tech
- Difficult Surgeries are More Transparent to the Patients
- May allow a patient to gain an appreciation for their difficult problem
- May make a patient more realistic in their expectations and accepting the limitations of surgery

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Perceived Barriers

- **Are Nurses Liable if a Medical Emergency Happens?**
- NO
- No more liable in the OR than they are with patients in the holding area or in the rest of the hospital

- **What Happens if the Patient Loses an Airway?**
- Patients will not lose an airway. The loss of an airway in an unmonitored setting (ie – dental office, dermatology office, plastic surgery office) is extremely rare, especially if there is no sedation

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WALANT Procedures

- The number of procedures that are being done utilizing the WALANT technique continues to expand
  - Carpal tunnel release
  - Trigger finger release
  - Ganglion cyst excision
  - First Dorsal Compartment release
  - Flexor tendon repair
  - Extensor tendon repair
  - Mucous cyst excision
  - Cubital tunnel release

???Questions???

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Nerve Allograft

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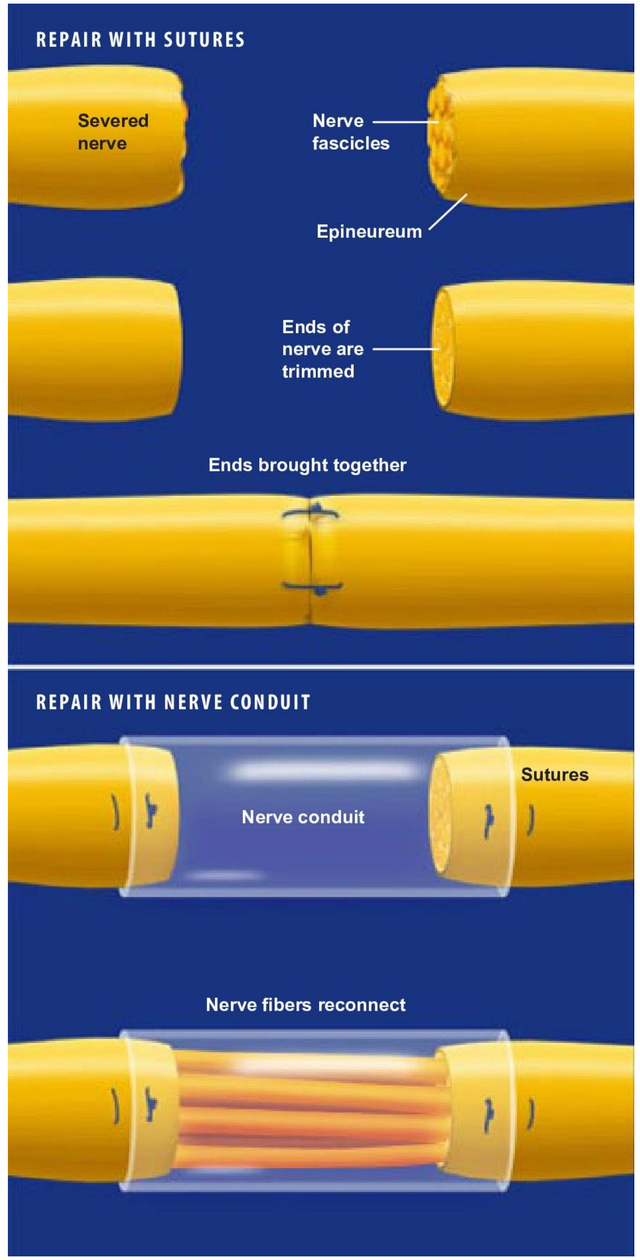
Nerve Allograft

- Allograft nerve is another large change in the hand surgery landscape over the last 5 years
  - The "gold standard" prior to the advent of nerve allograft was autograft nerve or vein graft
  - Donor site morbidity was an issue
- Nerve allograft was made available in the early 2000s
  - Initially, it was very expensive and had limited testing
  - Over time, the cost has come down quite a bit and increased testing has indicated that it is as good or better than autograft nerve (without the donor site morbidity)

Nerve Allograft

- Nerve repair is a delicate procedure
  - Must trim nerve back to healthy nerve tissue prior to repair
  - Nerve does not heal well under tension
  - Nerve does not heal well with a mismatched repair
  - Nerve does not heal well with a “gap”
- Nerve repair must be done with minimal tension and with as close to perfect alignment as possible



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Nerve Allograft

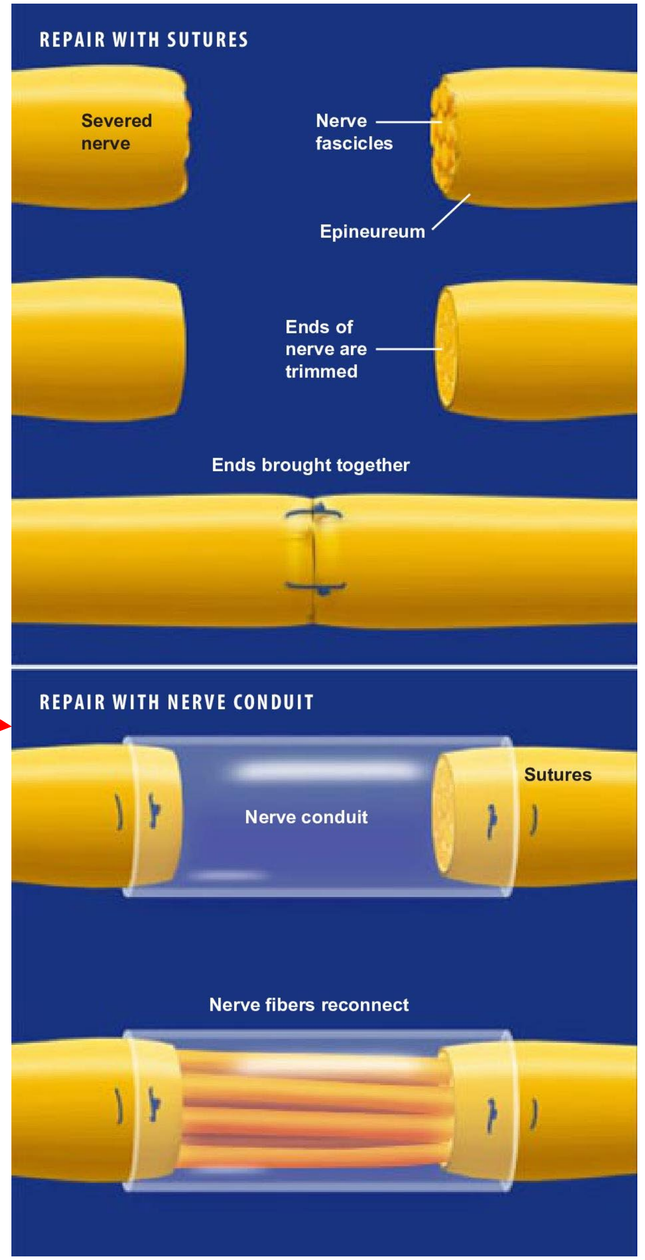
- Nerve repair options
  - Nerve conduit
  - Autograft nerve
  - Autograft vein
  - Allograft nerve

Nerve Allograft

- Autograft Nerve/vein
  - Harvesting requires an additional surgical procedure and surgical time
    - Increases cost and length of procedure
    - Increases the chances of infection
  - Morbidity of donor site
    - Sensory deficit with nerve harvest
    - Swelling with vein graft
    - Scarring at graft site
    - Increased risk of neuroma at the donor site

Nerve Allograft

- Nerve conduit
  - Limited in the size of defect that can be repaired
  - May be limited in mixed motor/sensory defects



Nerve Allograft

- Allograft nerve
  - Multiple studies proving
    - Decreased operative time
    - Equal results in nerve sensory and motor function versus autograft nerve in defects up to 7cm
  - Equal cost of autograft an allograft nerve
    - Total cost
    - Allograft has increased cost secondary to graft
    - Autograft has increased cost secondary to harvest time

Nerve Transfers

- Nerve Transfers
  - Nerve transfer with allograft nerve are becoming an increasingly popular for nerve injuries
    - Previously tendon transfers were one of the only ways to recover from a proximal nerve injury
    - A full discussion of nerve transfers is beyond the scope of this talk

???Questions???

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Metacarpal Screw

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Metacarpal Screw (IM Fixation)

- Options for metacarpal fracture treatment
  - Immobilization
  - Closed reduction and pinning
    - Less stable than IM fixation
  - Open reduction and internal fixation
    - Increased soft tissue stripping compared to IM fixation
- Metacarpal screw placement

Metacarpal Fracture Fixation

- Reasons for metacarpal fixation
  - Malangulation
    - Flexion is the most common malangulation
  - Shortening
  - Malrotation
  - Open fracture
  - Polytrauma
  - Segmental bone loss

Metacarpal Screw

- Benefits of metacarpal screws
  - Improved stability
  - Early ROM without immobilization
  - Earlier return to sporting and work activities

Metacarpal Screw

- Concerns of Metacarpal Screw Fixation
  - Articular cartilage damage with placement of the screw
    - The screw is placed in the superior aspect of the metacarpal head which has limited articulation with the proximal phalanx during ROM
  - Increased cost of implant
    - The decreased utilization of immobilization and the faster return to work/sporting activities balance out the cost of the implant
    - Decreased operative time as compared to plate fixation also decreases the cost
- Fracture displacement for oblique or spiral fractures
  - A non-compression screw has been created and can be utilized for this type of fracture to prevent any displacement with fixation

Metacarpal Screw

- Metacarpal Screw Fixation
  - Has been shown to be more stable than wire fixation
  - Total cost is equal to open reduction and plate fixation as well as wire fixation as a result of decreased operative time and decreased time off of work

Metacarpal Screw

- Metacarpal Screw Fixation
  - Personal experience
    - I utilize this procedure significantly more than I ever thought I would

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Where do I think we are headed in the future

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The next 5 years

- I personally believe in the next 5 years we will see increasing advances in the following
  - OATs of the elbow for osteochondral defects
  - Continued progression of nerve surgery and nerve allograft
  - Increased utilization of arthroscopy for complex hand/wrist/elbow problems
  - Further procedural expansion of WALANT procedures
  - Further technological advances in prosthetics which will allow for better targeted muscle renervation

???Questions???

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Thank you for your time and attention!

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