

INTRO TO PLASTIC AND RECONSTRUCTIVE SURGERY

MANAGEMENT OF HAND INJURIES


Broughton J Snell FRACS

PLASTIC AND RECONSTRUCTIVE SURGERY


- Restoration of Form and Function
- Not restricted to any particular organ or system
- Guided by principles rather than procedures

IN THE BEGINNING

Sir Harold Gillies Sir Archibald McIndoe



IN THE BEGINNING



PLASTIC AND RECONSTRUCTIVE SURGERY

- Hand Surgery
- Head and Neck Surgery
- Burns
- Breast Reconstruction
- Craniofacial Surgery
- Skin cancer surgery
- Lower limb reconstruction
- Wound management
- Complex wound management
 - Thoracic Reconstruction
 - Abdominal wall reconstruction
 - Pelvic Reconstruction

HAND SURGERY

- Hand Surgeons
 - Orthopaedic Surgeons
 - Plastic and Reconstructive Surgeons
 - General Surgeons
- Who does what?
 - Location dependent
 - Consultant dependent
- Find out what the local situation is
 - Who covers what?

PLASTIC AND RECONSTRUCTIVE SURGERY

- In order to restore form and function
- Define the defect
- Define the goals
- List the possible solutions
- Choose the simplest option
- Check for a lifeboat

PLASTIC AND RECONSTRUCTIVE SURGERY

- In the Emergency Department
- **DEFINE THE DEFECT**
 - Who?
 - What?
 - Where?
 - Why?
 - When?
 - How?
- **DEFINE THE GOALS**
 - What does the patient want?
 - Patient centered care NOT physician or hospital centered care

PLASTIC AND RECONSTRUCTIVE SURGERY

- Educational Sessions:
 - Assessment and Immediate Management of patient presenting with
 - HAND INJURIES
 - FACIAL INJURIES

TOP 5 HAND INJURIES

- **Fractures**
- **Lacerations**
- **Infections**
- **Amputations**
- **Paediatric injuries – nail bed injuries**

PATIENT ASSESSMENT

- **The Patient**
 - Put things in context – the hand belongs to a patient
- **The mechanism**
 - High energy vs low energy injury
 - Incising, vs lacerating, vs degloving, vs crushing vs avulsing force
 - Time course
- **The Anatomy**
 - Skin and appendages
 - Tendons and muscles
 - Neurovascular structures
 - Skeletal elements

EXAMINATION OF THE PATIENT

- **General appearance**
- **Examination based on anatomy**
 - Skin
 - Vascular supply
 - Sensory supply
 - Skeletal framework – passive range of motion
 - Musculotendinous elements – active motion

INVESTIGATIONS

- **Imaging**
 - Plain x-rays
 - Always include entire hand
 - 3 views
 - Anteroposterior (PA)
 - Lateral
 - Oblique
- CT - unnecessary in the immediate management

NOMENCLATURE

- **Digits**
 - Thumb, Index, Middle, Ring and Little fingers
- **Orientation**
 - Volar and Dorsal
 - Radial and Ulnar
 - Distal and proximal
- Metacarpals, proximal, middle and distal phalanges

SURFACE ANATOMY

This diagram illustrates the surface anatomy of the hand. Labels include: **CREASES** (Distal interphalangeal, Proximal interphalangeal, Palmar digital, Distal palmar, Proximal palmar, Thenar), **SEGMENTS** (Distal phalanx, Middle phalanx, Proximal phalanx), **THUMB** (Distal phalanx, Proximal phalanx), **RADIAL BORDER**, **ULNAR BORDER**, and **Wrist crease**. The logo for the American Society of Hand Surgeons (ASHS) is also present.

MUSCULO-TENDINOUS ELEMENTS

This diagram shows the musculotendinous elements of the hand. It includes labels for various muscles such as the **Proximal palmar digital nerve of thumb**, **Flexor digitorum profundus**, **Flexor digitorum superficialis**, **Extensor digitorum**, and **Extensor indicis**. It also identifies tendons like the **Proper palmar digital artery and nerve** and **Common palmar digital artery**.

SKELETAL FRAMEWORK

This diagram shows the skeletal framework of the hand and wrist. Labels include: **phalanx** (distal, middle, proximal, proximal, distal, proximal), **metacarpus**, **trapezoid**, **trapezium**, **carpal**, **scaphoid**, **pisiform**, **lunate**, **trapezoid**, **trapezium**, **scaphoid**, **lunate**, **radius**, and **ulna**.

FRACTURES

FRACTURE MANAGEMENT

- Common mechanisms
 - Interpersonal violence
 - Metacarpals, proximal phalanges
 - Sporting Injury
 - Proximal phalanges, distal phalanges
 - Thumb - proximal phalanx

DESCRIBING A HAND FRACTURE



- Open or Closed?
- Hand: RIGHT or LEFT
- Which finger?
 - Thumb
 - Index
 - Middle
 - Ring
 - Little
- Bone?
 - Carpal bone (stop here)
 - Metacarpal
 - Proximal phalanx
 - Middle phalanx
 - Distal phalanx
- Part of the bone?
 - Basic shaft, head
- Describe the pattern
 - Transverse
 - Oblique
 - Spiral
- Describe any deformity
 - Angulated
 - Displaced
 - Impacted
- Associated Injuries

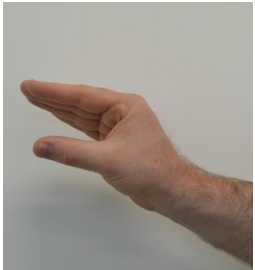
INPATIENT VS OUTPATIENT

Admission	Outpatient
<ul style="list-style-type: none"> ■ Open fractures ■ Neurovascular compromise ■ Gross deformity 	<ul style="list-style-type: none"> ■ Closed fractures ■ Mallet fingers

ACUTE MANAGEMENT

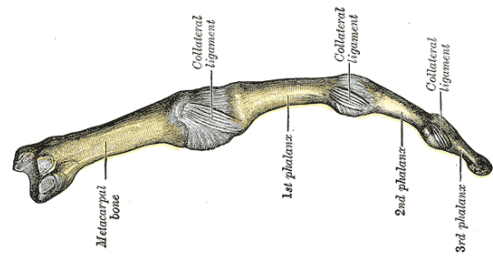
Admission	Outpatient
<ul style="list-style-type: none"> ■ Irrigate wound ■ Analgesia - nerve block? ■ Reduce ■ Splint ■ Elevate 	<ul style="list-style-type: none"> ■ Splint ■ Elevate ■ Refer

SPLINTING A HAND FRACTURE




- Wrist in Extension
- MCPJ Flexed at 90°
- PIP and DIPJ straight

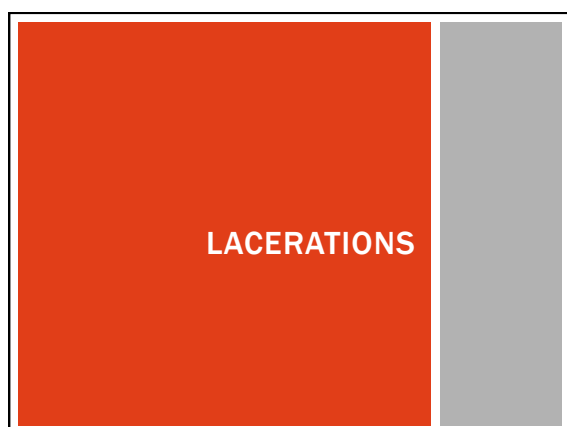
SPLINTING A HAND FRACTURE



SPLINTING A THUMB FRACTURE



- Holding a drinking cup



LACERATIONS

- Assessment is based on the following
 - The patient
 - The mechanism
 - The anatomy

FLEXOR TENDON LACERATIONS



EXTENSOR TENDON LACERATIONS



MANAGEMENT

- The Patient
- The Mechanism
- The Anatomy
 - In order to make a proper assessment CONSIDER the use of digital nerve blocks
 - Work through structures in a logical order
 - Skin – where is the laceration? How long is it? (Measure with a ruler) Is there any skin missing? What can I see?
 - Neurovascular integrity – check capillary refill
 - Skeletal framework – passive range of motion
 - Musculo-tendinous elements – active range of motion
 - FDS FDP and FPL
 - Extensor tendon
 - Wrist flexors

MANAGEMENT OF LACERATIONS

- Assess – patient, mechanism, anatomy
- Immediate management
 - Analgesia - ?nerve block
 - Irrigation – copious amounts of normal saline
 - Dress with jelonet, gauze, crepe
 - Elevate in a Gallow's sling
- If no:
 - Neurovascular injury
 - Functional disability
 - Soft tissue defect
- Repair the wound – 5/0 nylon
- Jelonet, gauze, crepe, get them moving!!

INFECTIONS

SOFT TISSUE INFECTIONS



SOFT TISSUE INFECTIONS

- Patient
 - All ages
 - Manual laborers, children, elderly, diabetics, IVDU
- Mechanism
 - Animal bites
 - Dogs and Cats (+/- horses)
 - Human bites
 - "Fight bite"
 - Idiopathic
 - IVDU – injection sites
- Location (Anatomy)
 - Skin and subcutaneous tissue

SOFT TISSUE INFECTIONS

Tissue Element	Pathologic Process
Skin and subcutaneous tissue	Cellulitis/phelon
Nail bed	Paronychia
Tendon sheath	Tenosynovitis
Bone	Osteomyelitis
Joint	Septic Arthritis

SOFT TISSUE INFECTIONS

- Management
 - Analgesia
 - Nerve blocks – the best way to provide comfort for your patient, and the easiest way to avoid unnecessary use of narcotic analgesia
 - Digital nerve block – ANY DOCTOR
 - Proximal nerve blocks (ulnar, median and superficial radial) – EXPERIENCED DOCTOR
 - Incise, drain, TAKE A SWAB, Elevate
 - Dress – jelonet, normal saline soaked gauze, crepe
 - Splint – resting hand splint
 - Elevate – Gallow's sling

AMPUTATIONS

AMPUTATIONS

- The patient
- The mechanism
- The anatomy

STORING THE AMPUTATE

- Finger in specimen bag – NO SALINE OR WATER – clear
- Specimen bag in vessel of iced water
- Do NOT put finger in SALINE OR WATER

AMPUTATION

- Replantation vs revascularisation
- Revascularisation – nearly always
- Replantation
 - Children – anytime, any level
 - Adults
 - Single digit amputations distal to the insertion of FDS
 - Multiple amputations
 - Thumb

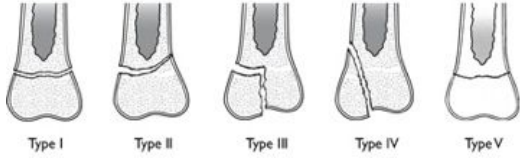
CHILDREN

PAEDIATRIC HAND INJURIES

- The patient
- The mechanism
- The anatomy
- Fractures of the base of the proximal phalanx
- Nail bed injuries
- Tip amputations


PROXIMAL PHALANX FRACTURES

Salter-Harris Classification



Type I Type II Type III Type IV Type V

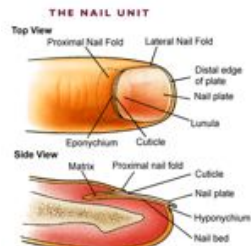
PROXIMAL PHALANX FRACTURES



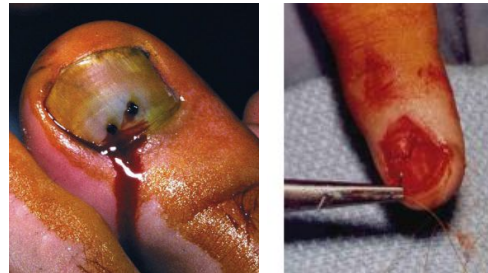
PROXIMAL PHALANX FRACTURES

- Sedation
- Digital nerve block – 1% xylocaine
- Closed reduction
- Buddy strap

NAIL BED INJURIES



NAIL BED INJURIES



FINGER TIP AMPUTATION



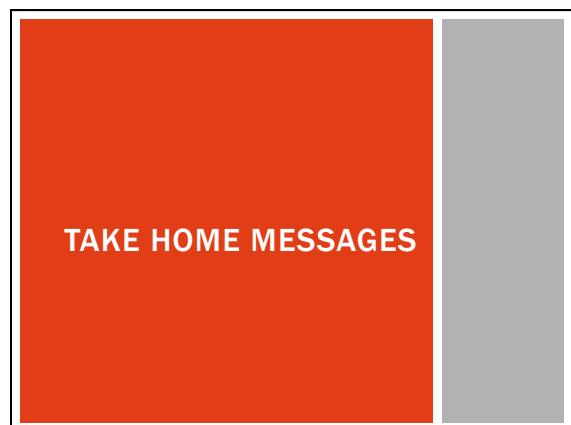
MUTILATING HAND INJURIES

MUTILATING HAND INJURIES

- The patient
- The mechanism
- The anatomy

MUTILATING HAND INJURY

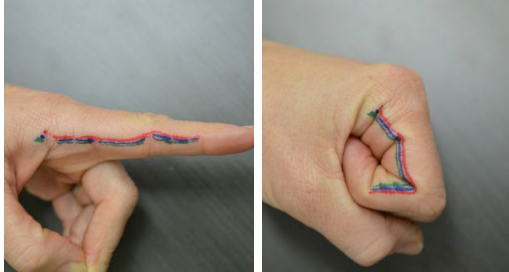
- The patient
 - Follow EMST protocol
 - ABCDE, etc
 - Resuscitate appropriately
 - Manage analgesia – wrist blocks of all nerves where possible
 - Irrigate with copious amounts of normal saline once hand is numb
- The mechanism
 - Document time, place, and management at the scene
- The anatomy
 - Document what you CAN see – sometimes easier
- Then
 - X-ray
 - Ivabx
 - Jelonet, betadine soaked gauze packing, crepe, elevate



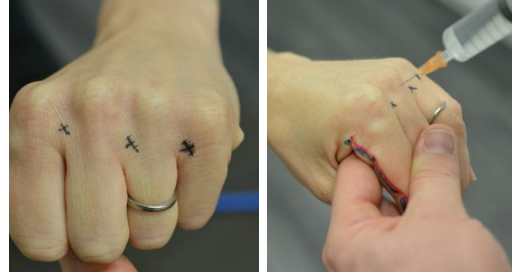
- TAKE HOME MESSAGE (1):
- The patient
 - The mechanism
 - The anatomy



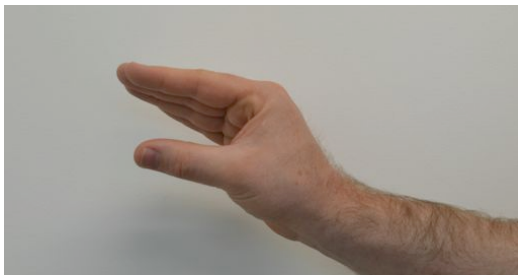
TAKE HOME FACT (3): DIGITAL BLOCKS



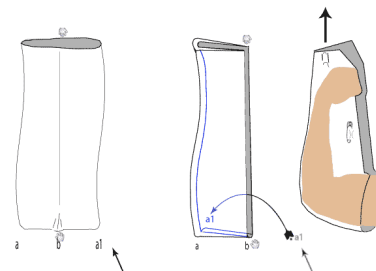
TAKE HOME FACT (3): DIGITAL BLOCKS



TAKE HOME FACT (4): RESTING HAND SPLINT



TAKE HOME FACT (5): GALLOW'S SLING



REFERRAL TO PLASTIC SURGERY

- Plastic and Reconstructive Surgery at Bendigo Health
 - Mr Broughton Snell
- Public patients
 - Outpatient clinic at Bendigo Health - Weeks 2 and 4 Friday AM
 - Elective Operating Session - Week 1 Tuesday AM
 - Emergency/AH operating - PRN
- Private and Workcover Patients
 - Call (03)5443 0294
 - Fax referral to: (03)5443 0817
 - Email referral to: info@sandhurstplasticsurgery.com.au
 - Online referral: www.sandhurstplasticsurgery.com.au