M5 Ortho Revision

Frameworks

Framework Revision - Why? ***Training***

- **Thinking** - Training you in the thought process; not adding knowledge - “Think like a surgeon”
- **Practical Knowledge** - Need to be clear what is the must-know and the no-need-to-know information
- **Safety** - Be able to manage patients and direct the OSCE/ Viva to areas of safety

Recap from M3

- **Trauma** (Closed, Open, Spine)
- **Chronic Pain** (Joint, Spine)
- **Infection** (Soft Tissue, Bone, Joint, Nec Fas, Peri-implant)

Trauma

What comes to mind?

Ortho Made Simple - Trauma Framework

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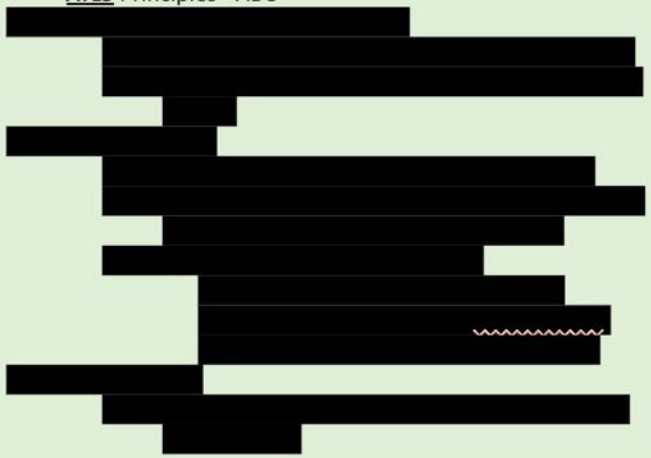
Legend: Isolated Closed Trauma/ Polytrauma/ Spine Trauma/ Open Fractures

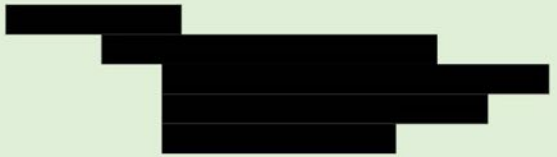
1. Stabilize

- ***ATLS*** Principles - ABC



2. History

- **General History (for all patients)** - Biodata, PMHx, Smoking, Drinking, Drug Allergy, Occupation, Sports, Handedness (UL)
- **Condition History**
  - Mechanism of injury - ***"Mechanical Fall"***
  - Ask red flags such as ***"Prodromal Pain"***
- **Risk Factor History**
  - Osteoporosis in elderly
  - Other PMHx that can result in frequent falls, brittle bones



3. Physical Exam

- Check for ***open fracture***
- Check ***neurovascular (NV) status***
  - Be specific how you check and what nerve/ vessel.
    - UL = MUR nerves, Radial Pulse
    - LL = Foot drop, DP and PT Pulses
- Check for ***compartment syndrome*** (even for Open fractures)
  - Especially for fractures at risk e.g., tibia plateau, shaft, pilon fractures.
- ***Secondary Survey*** "head to toe" for other injuries - facial, chest, pelvic compressions, long bones.

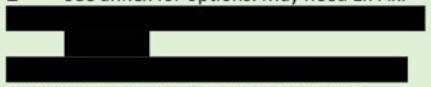
4. Initial Investigations

- ***Imaging***
  - ***Orthogonal*** views, "one joint above, one joint below"
  - Full length of fractured bone
  - Special XR views

- ***Bloods*** (only when for admitted)
  - ***Pre-Op Bloods*** - FBC, RP, PT/INR, GXM, ECG, CXR
  - ***Risk Factors*** - Vit D, Ca Pnel, TFT, LFT osteoporosis)

5. Acute Management

- ***Address Pain*** = ***Analgesia*** as per WHO pain ladder [ALL]
- ***Address Fracture***
  - ***Manipulation and Reduction*** under sedation
    - *Not all injuries require this
  - ***Temporary Stabilization***
    - See annex for options. May need Ex Fix.



  - ***Re-check*** NV after MnR and Temp Stabilization
- **Monitor for and Prevent Important Complications**
  - **Compartment syndrome** - watch for 6Ps, "Pain!". Mx = remove back slab, do not elevate, Fasciotomy
  - **Deep Vein Thrombosis** when NWB esp. in elderly hip fractures - Pharmacological and Non-P

6. Advanced Imaging

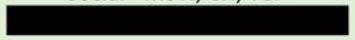
- ***CT scan***
  - Indicated when XR shows fracture near a joint = "periarticular fracture"
  - Useful for surgical planning and 3D reconstruction
- ***MRI scan*** without contrast
  - Indicated when XR is normal
  - Concerns of soft tissue injury (meniscus, cartilage, ligaments) or occult fracture
- MRI scan ***with contrast***
  - Concerns of tumor/ infection

7. Definitive Management

- ***"Operative vs Non-Operative"*** depending on
  - **Patient** factors e.g. Co-morbids, function.
  - **Injury** factors e.g. Classification
  - **Surgeon** factors e.g. choice of implants influenced by surgical training
- ***Non-Operative***
  - Continue immobilization until fracture healing (Convert back slab to full cast)
- ***Operative***
  - Closed or Open Reduction
  - With internal fixation - screws, plates, nails, wires → Dependant on each injury
  - If peri-articular fractures → Fix vs Replace

8. Post Op Review

- Assess **patient**
  - Stability and vitals
  - GA Complications
- Assess **operated limb/ site**
  - Dressings - ensure not soaked
  - Chart drain outputs (be specific)
  - Distal neurovascular
- Follow **Post Op instructions** for:
  - IV Antibiotics for ***Prophylaxis***
  - Analgesia as per WHO
  - ***DVT prophylaxis***
  - Weight bearing status
  - Range of motion
  - STO timing - usually 14 days
- Subsequent ***Multidisciplinary*** team to optimize outcomes
  - Rehab - PT/ OT, Rehab Med
  - Social - MSW, CH, TCF



2. History

- General History (All patients)
  - Handedness?
- Specific History
  - Condition history
    - Mechanism
    - Pain
    - Red Flags
  - Risk Factor History

52M
PMH: BPH

Biodata

Hide copied text

Hover for details

Came in today with Right FOOSH
Was skateboarding at home, loss his balance and fell to his right
Broke his fall with his right hand
Denies any head trauma or LOC
No nausea or vomiting
Denies any ARI Sx or fever
Otherwise well

"Mechanical Fall"

No Red Flags

3. Physical Examination

1. Open Fracture
2. Neurovascular Involvement
3. Compartment Syndrome
4. Secondary Survey

1 Stabilize	2 History	3 Physical Exam	4 Initial Invx
5 Acute/ Initial Mx	6 Advanced Imaging	7 Definitive Mx	8 Post Op Review

O/e

Vital signs:

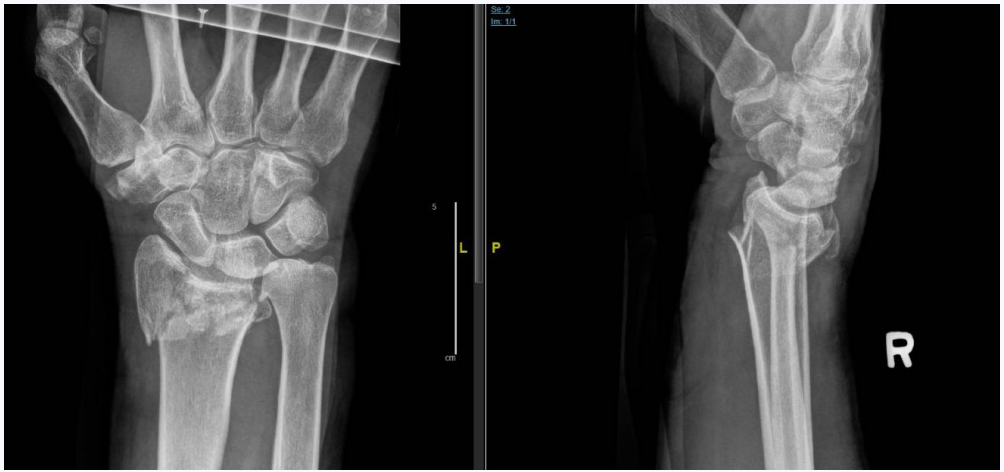
BP:	105/70
Pulse:	(!) 55
Resp:	20
Temp:	36.8 °C
SpO2:	98%

Right hand dorsal angulation
No tethering of skin
Closed deformity
Sensation intact
Pulse present
Mobility of fingers intact

4. Initial Invx

1 Stabilize	2 History	3 Physical Exam	4 Initial Invx
5 Acute/ Initial Mx	6 Advanced Imaging	7 Definitive Mx	8 Post Op Review

- ~~Bloods~~
  - ~~Pre Op - FBC, RP, PT/ INR, ECG, CXR~~
  - ~~Risk factors - Vit D, Calcium panel, TFT, LFT~~
  - ~~Stability - Lactate, ABG (mention if polytrauma)~~
- Imaging
  - Orthogonal views
  - "XR of entire bone"
  - "One joint above, one joint below"
  - Special views are bonus



5. Acute Mx

1 Stabilize	2 History	3 Physical Exam	4 Initial Invx
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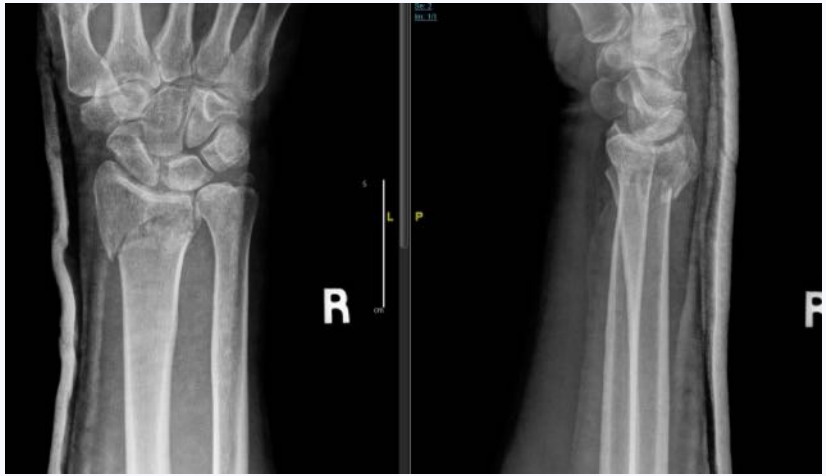
"What will you do as the primary care doctor?"

1. Analgesia based on WHO ladder
2. Manipulation and Reduction (if required)
3. Temporary Stabilization
    - Every injury will be temporary stabilized

Etoricoxib Tablet

Omeprazole Capsule



CT Scan

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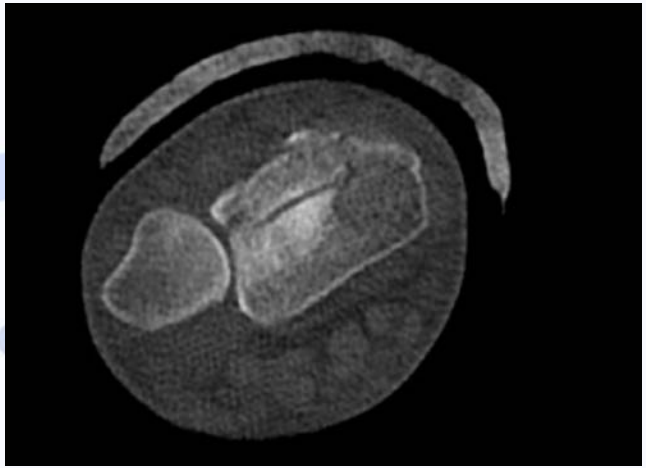
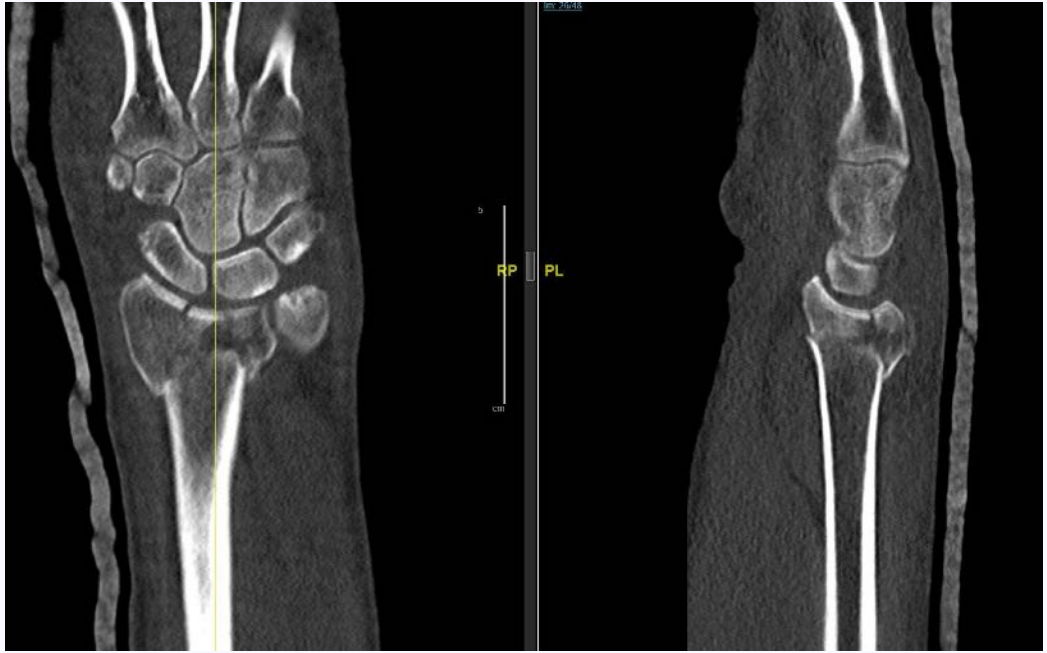
"XR can see a fracture, but not sure severity"

- Intra-articular fractures that require more precise pre-op planning





7. Definitive Mx

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- Operative vs Non Operative
  - Patient factors - Young, active patient
  - Injury factors (Classification)

8. Post Op Review

1. Assess Patient
   a. Vitals
2. Assess Operated limb/ site
   a. Dressings
   b. Neurovascular status (be specific)
   c. Drain output (if present)
3. Review Post Op Notes
   a. Prophylactic Antibiotics
   b. Weight bearing status
   c. Order post op XR
   d. Consider DVT Prophylaxis if lower limb op

pt well
having some pain over op site but manageable
keen to go home today

Hover for details

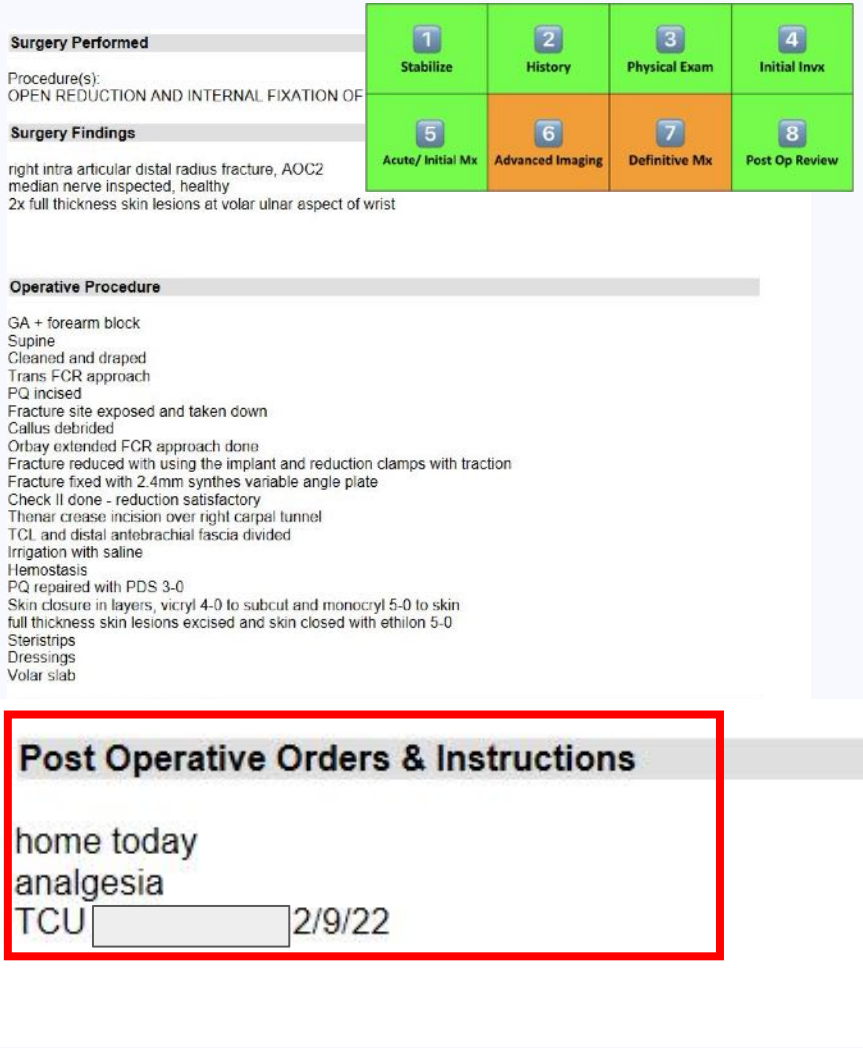
OE
right hand
- dressings dry and intact
- numbness over right MF (present pre op) - pt says improving
- sensation over rest of hand normal

plan
as per pre op notes

Op Notes

4 Components in Every Op Note

1. Surgery Performed
2. Surgical findings
3. Operative Procedure
4. Post Operative Orders and Instructions



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Surgery Performed

Procedure(s):
OPEN REDUCTION AND INTERNAL FIXATION OF

Surgery Findings

right intra articular distal radius fracture, AOC2
median nerve inspected, healthy
2x full thickness skin lesions at volar ulnar aspect of wrist

Operative Procedure

GA + forearm block
Supine
Cleaned and draped
Trans FCR approach
PQ incised
Fracture site exposed and taken down
Callus debrided
Orbay extended FCR approach done
Fracture reduced with using the implant and reduction clamps with traction
Fracture fixed with 2.4mm synthes variable angle plate
Check II done - reduction satisfactory
Thenar crease incision over right carpal tunnel
TCL and distal antebrachial fascia divided
Irrigation with saline
Hemostasis
PQ repaired with PDS 3-0
Skin closure in layers, vicryl 4-0 to subcut and monocryl 5-0 to skin
full thickness skin lesions excised and skin closed with ethilon 5-0
Steristrips
Dressings
Volar slab

Post Operative Orders & Instructions

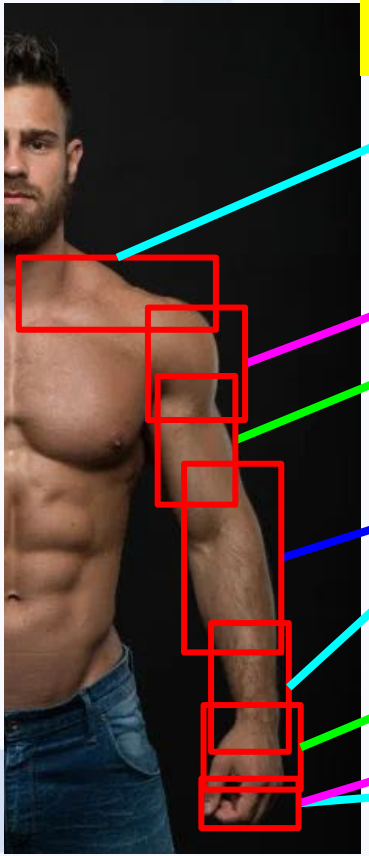
home today
analgesia
TCU [redacted] 2/9/22

Wrist Fracture Framework

1. ATLS if required	**2. Hx**
	• Same
	  • Condition hx
	  • Risk Factor Hx
	• If UL → Handedness
		3. PE
		Same – open, NV, compartment
			4. Initial Invx
			• Imaging – same
			• Bloods – Usually not required in the EMD as can be sent to Outpatient Ortho Clinic

5. Acute Mx
• Analgesia – WHO
• MnR, Temp Stabilize – Below elbow back slab
	6. Advanced Imaging
	CT scan if intra-articular
		7. Definitive Mx
		(Think of Classification here)
		• Depends on function
		  • Elderly, low demand → non op
		  • High demand → ORIF
			8. Post op
			Same

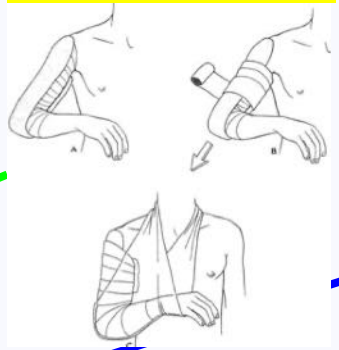
Temp. Stabilization for UL Trauma



Arm Sling
E.g. Clavicle #, GHJ dislocation, ACJ Dislocation

Collar and Cuff
E.g. Proximal Humerus #

U-Slab
E.g. Humeral Shaft #



Above Elbow Backslab
E.g. Distal humerus #, Elbow dislocation, Other elbow #, Forearm shaft #

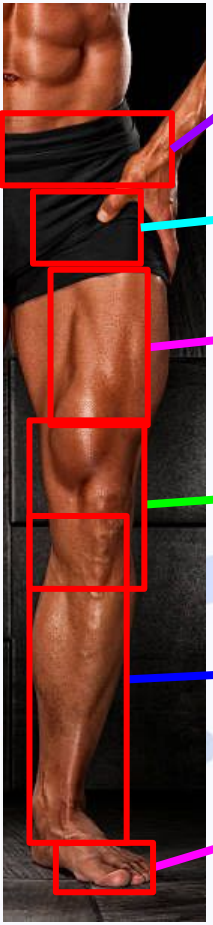
Buddy Splint
E.g. Prox, Middle Phal. #

Below Elbow Backslab
E.g. Distal Radius #

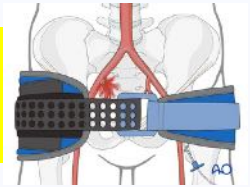
Intrinsic Plus Splint
Ulnar Gutter Splint
Thumb Spica Splint
E.g. Metacarpal #

Zimmer Splint
E.g. Middle, Distal Phal. #

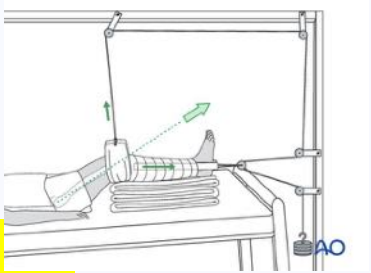
Temp. Stabilization for LL Trauma



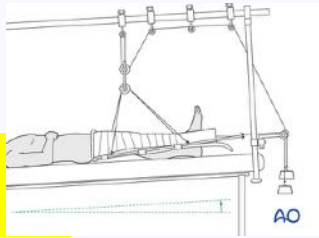
Pelvic Binder
E.g. Specific Pelvic fractures e.g. open book



Traction/ Bed Rest
E.g. Proximal Hip fractures

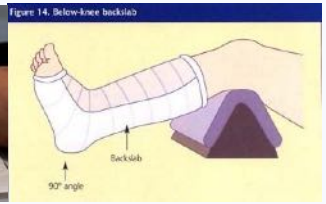


Thomas Splint
E.g. Femur Shaft #



Above Knee Back Slab
E.g. Distal Femur #, Patella #, Proximal Tibia #

Below Knee Backslab
E.g. TIbia Shaft #, Distal Tibia #, Ankle #, Foot fractures other than phalanges



Buddy Splint
E.g. Toe Middle, Proximal phalanges #

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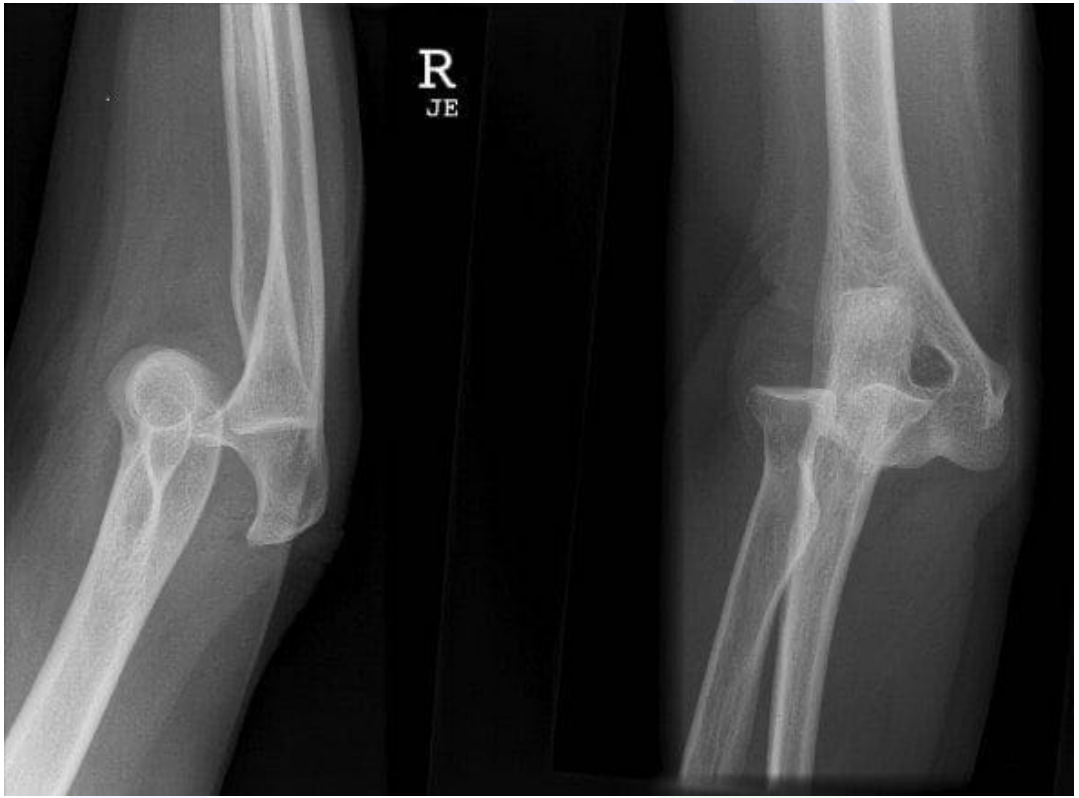
Replace with ***any*** Trauma XR



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Trauma Variation - Polytrauma

Ortho Made Simple - Trauma Framework

Updated Sept 2024
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Legend: Isolated Closed Trauma/ Polytrauma/ Spine Trauma/ Open Fractures

1. Stabilize

- ***ATLS*** Principles - ABC
- Polytrauma - expecting the worse
  - Reduce Pelvic Volume = Pelvic binder/ C-Clamp
  - Prevent spinal cord injuries = C-collar and spinal nursing

2. History

- **General History (for all patients)** - Biodata, PMHx, Smoking, Drinking, Drug Allergy, Occupation, Sports, Handedness (UL)
- **Condition History**
  - Mechanism of injury - ***"Mechanical Fall"***
  - Ask red flags such as ***"Prodromal Pain"***
- **Risk Factor History**
  - Osteoporosis in elderly
  - Other PMHx that can result in frequent falls, brittle bones
- Polytrauma
  - "AMPLE" history - Allergies, Medications, Past medical history, Last meal or other intake, and Events leading to presentation

3. Physical Exam

- Check for ***open fracture***
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  - Be specific how you check and what nerve/ vessel.
    - UL = MUR nerves, Radial Pulse
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- Check for ***compartment syndrome*** (even for Open fractures)
  - Especially for fractures at risk e.g., tibia plateau, shaft, pilon fractures.
- ***Secondary Survey*** "head to toe" for other injuries - facial, chest, pelvic compressions, long bones.
- Polytrauma/ Spine Trauma
  - Log roll with in-line traction
  - Use ASIA score for neurological exam
  - DRE TRO cauda equina syndrome

4. Initial Investigations

- ***Imaging***
  - ***Orthogonal*** views, "one joint above, one joint below"
  - Full length of fractured bone
  - Special XR views
  - Polytrauma
    - XR Trauma Series - C-spine Lateral, CXR, Pelvis AP
    - CT - CTTAP, CT Brain, CT Cervical spine
- ***Bloods*** (only when for admitted)
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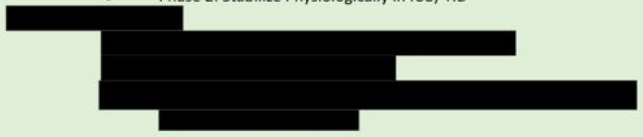
  - ***Risk Factors*** - Vit D, Ca Pnel, TFT, LFT osteoporosis)
  - Polytrauma ***Stability*** - Lactate, ABG

5. Acute Management

- ***Address Pain*** = ***Analgesia*** as per WHO pain ladder [ALL]
- ***Address Fracture***
  - ***Manipulation and Reduction*** under sedation
    - *Not all injuries require this
  - ***Temporary Stabilization***
    - See annex for options. May need Ex Fix.
    - Polytrauma - Remove pelvic binder where necessary
    - Polytrauma/ Spine - C-collar & Spinal nursing
  - ***Re-check*** NV after MnR and Temp Stabilization
- **Monitor for and Prevent Important Complications**
  - **Compartment syndrome** - watch for 6Ps, "Pain!". Mx = remove back slab, do not elevate, Fasciotomy
  - **Deep Vein Thrombosis** when NWB esp. in elderly hip fractures - Pharmacological and Non-P
- Polytrauma - Early Appropriate Care (EAC) in 3 phases
  - Phase 1: 1st Surgery - Damage Control with Ex fix
  - Phase 2: Stabilize Physiologically in ICU/ HD



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  - **Patient** factors e.g. Co-morbids, function.
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- ***Non-Operative***
  - Continue immobilization until fracture healing (Convert back slab to full cast)
- ***Operative***
  - Closed or Open Reduction
  - With internal fixation - screws, plates, nails, wires → Dependant on each injury
  - If peri-articular fractures → Fix vs Replace
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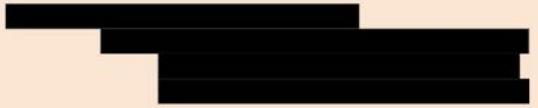
  - Phase 3: 2nd Surgery - Definitive fixation



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  - Social - MSW, CH, TCF
  - Polytrauma - Psych for PTSD

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  - Prevent spinal cord injuries = C-collar and spinal nursing
- Spine Trauma
  - Immediate application of C-collar and institute spinal nursing

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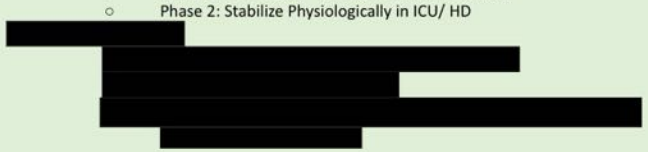
  - Phase 2: Stabilize Physiologically in ICU/ HD



6. Advanced Imaging

- ***CT scan***
  - Indicated when XR shows fracture near a joint = "periarticular fracture"
  - Useful for surgical planning and 3D reconstruction
- ***MRI scan*** without contrast
  - Indicated when XR is normal
  - Concerns of soft tissue injury (meniscus, cartilage, ligaments) or occult fracture
- MRI scan ***with contrast***
  - Concerns of tumor/ infection
- Spine Trauma
  - MRI whole spine to look for ***contiguous*** fractures, epidural hematomas
  - CT spine for fracture pattern and surgical planning

7. Definitive Management

- ***"Operative vs Non-Operative"*** depending on
  - **Patient** factors e.g. Co-morbids, function.
  - **Injury** factors e.g. Classification e.g. Spine Trauma TLICS, SLICS score
  - **Surgeon** factors e.g. choice of implants influenced by surgical training
- ***Non-Operative***
  - Continue immobilization until fracture healing (Convert back slab to full cast)
- ***Operative***
  - Closed or Open Reduction
  - With internal fixation - screws, plates, nails, wires → Dependant on each injury
  - If peri-articular fractures → Fix vs Replace
- Polytrauma - Early Appropriate Care (EAC) in 3 phases
  - Phase 3: 2nd Surgery - Definitive fixation

8. Post Op Review

- Assess **patient**
  - Stability and vitals
  - GA Complications
- Assess **operated limb/ site**
  - Dressings - ensure not soaked
  - Chart drain outputs (be specific)
  - Distal neurovascular
- Follow **Post Op instructions** for:
  - IV Antibiotics for ***Prophylaxis***
  - Analgesia as per WHO
  - ***DVT prophylaxis***
  - Weight bearing status
  - Range of motion
  - STO timing - usually 14 days
- Subsequent ***Multidisciplinary*** team to optimize outcomes
  - Rehab - PT/ OT, Rehab Med
  - Social - MSW, CH, TCF
  - Polytrauma - Psych for PTSD

Trauma Variation - Open Fracture

1 Stabilize	2 History	3 Physical Exam	4 Initial Invx
5 Acute/ Initial Mx	6 Advanced Imaging	7 Definitive Mx	8 Post Op Review

Ortho Made Simple - Trauma Framework

Updated Sept 2024
mokyingren.sg

Legend: Isolated Closed Trauma/ Polytrauma/ Spine Trauma/ Open Fractures

1. Stabilize

- ***ATLS*** Principles - ABC
- Polytrauma - expecting the worse
  - Reduce Pelvic Volume = Pelvic binder/ C-Clamp
  - Prevent spinal cord injuries = C-collar and spinal nursing
- Spine Trauma
  - Immediate application of C-collar and institute spinal nursing
- Open fractures
  - Intramuscular Anti-Tetanus Toxoid (IM ATT)
  - Immediately start IV ***Prophylactic*** Antibiotics (IV Cefazolin; if allergic give IV Clindamycin)
  - If presence of biocontamination
    - Marine - + doxycycline [Vibrio]
    - Freshwater - + Cipro [Aeoromonas]
    - Soil/ Faeces - + Flagyl [Anaerobes]

2. History

- **General History (for all patients)** - Biodata, PMHx, Smoking, Drinking, Drug Allergy, Occupation, Sports, Handedness (UL)
- **Condition History**
  - Mechanism of injury - ***"Mechanical Fall"***
  - Ask red flags such as ***"Prodromal Pain"***
- **Risk Factor History**
  - Osteoporosis in elderly
  - Other PMHx that can result in frequent falls, brittle bones
- Polytrauma
  - "AMPLE" history - Allergies, Medications, Past medical history, Last meal or other intake, and Events leading to presentation

3. Physical Exam

- Check for ***open fracture***
- Check ***neurovascular (NV) status***
  - Be specific how you check and what nerve/ vessel.
    - UL = MUR nerves, Radial Pulse
    - LL = Foot drop, DP and PT Pulses
- Check for ***compartment syndrome*** (even for Open fractures)
  - Especially for fractures at risk e.g., tibia plateau, shaft, pilon fractures.
- ***Secondary Survey*** "head to toe" for other injuries - facial, chest, pelvic compressions, long bones.
- Polytrauma/ Spine Trauma
  - Log roll with in-line traction
  - Use ASIA score for neurological exam
  - DRE TRO cauda equina syndrome

4. Initial Investigations

- ***Imaging***
  - ***Orthogonal*** views, "one joint above, one joint below"
  - Full length of fractured bone
  - Special XR views
  - Polytrauma
    - XR Trauma Series - C-spine Lateral, CXR, Pelvis AP
    - CT - CTTAP, CT Brain, CT Cervical spine
- ***Bloods*** (only when for admitted)
  - ***Pre-Op Bloods*** - FBC, RP, PT/INR, GXM, ECG, CXR
  - ***Risk Factors*** - Vit D, Ca Pnel, TFT, LFT osteoporosis)
  - Polytrauma ***Stability*** - Lactate, ABG

5. Acute Management

- ***Address Pain*** = ***Analgesia*** as per WHO pain ladder [ALL]
- ***Address Fracture***
  - ***Manipulation and Reduction*** under sedation
    - *Not all injuries require this
  - ***Temporary Stabilization***
    - See annex for options. May need Ex Fix.
    - Polytrauma - Remove pelvic binder where necessary
    - Polytrauma/ Spine - C-collar & spinal nursing
  - ***Re-check*** NV after MnR and Temp Stabilization
- **Monitor for and Prevent Important Complications**
  - **Compartment syndrome** - watch for 6Ps, "Pain!". Mx = remove back slab, do not elevate, Fasciotomy
  - **Deep Vein Thrombosis** when NWB esp. in elderly hip fractures - Pharmacological and Non-P
- Polytrauma - Early Appropriate Care (EAC) in 3 phases
  - Phase 1: 1st Surgery - Damage Control with Ex fix
  - Phase 2: Stabilize Physiologically in ICU/ HD
- Open fracture
  - Address ***Wound*** - take pic, moist dressing.
  - Address ***Fracture*** - as above
  - ***Inform*** Ortho senior for 1st Surgery - Debride wound, negative pressure dressing, KIV Ex Fix

6. Advanced Imaging

- ***CT scan***
  - Indicated when XR shows fracture near a joint = "periarticular fracture"
  - Useful for surgical planning and 3D reconstruction
- ***MRI scan*** without contrast
  - Indicated when XR is normal
  - Concerns of soft tissue injury (meniscus, cartilage, ligaments) or occult fracture
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- Spine Trauma
  - MRI whole spine to look for ***contiguous*** fractures, epidural hematomas
  - CT spine for fracture pattern and surgical planning

7. Definitive Management

- ***"Operative vs Non-Operative"*** depending on
  - **Patient** factors e.g. Co-morbids, function.
  - **Injury** factors e.g. Classification e.g. Spine Trauma TLICS, SLICS score
  - **Surgeon** factors e.g. choice of implants influenced by surgical training
- ***Non-Operative***
  - Continue immobilization until fracture healing (Convert back slab to full cast)
- ***Operative***
  - Closed or Open Reduction
  - With internal fixation - screws, plates, nails, wires → Dependant on each injury
  - If peri-articular fractures → Fix vs Replace
- Polytrauma - Early Appropriate Care (EAC) in 3 phases
  - Phase 3: 2nd Surgery - Definitive fixation
- Open fractures - Typically 2 Phases
  - 2nd Surgery - Internalization of fixation and achieve wound coverage with skin **graft** or **flap** *(Difference in blood supply)* if required.

8. Post Op Review

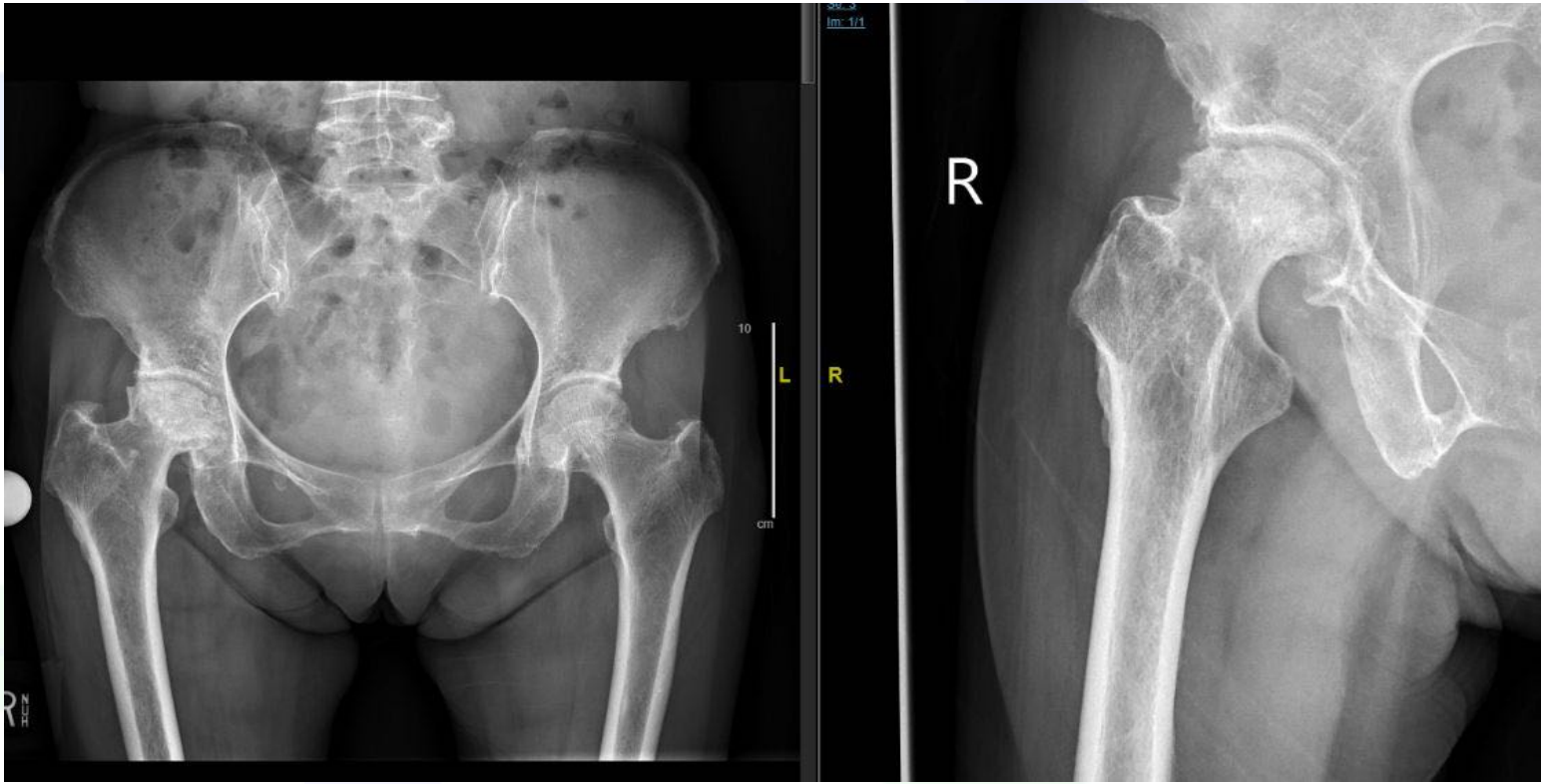
- Assess **patient**
  - Stability and vitals
  - GA Complications
- Assess **operated limb/ site**
  - Dressings - ensure not soaked
  - Chart drain outputs (be specific)
  - Distal neurovascular
- Follow **Post Op instructions** for:
  - IV Antibiotics for ***Prophylaxis***
  - Analgesia as per WHO
  - ***DVT prophylaxis***
  - Weight bearing status
  - Range of motion
  - STO timing - usually 14 days
- Subsequent ***Multidisciplinary*** team to optimize outcomes
  - Rehab - PT/ OT, Rehab Med
  - Social - MSW, CH, TCF
  - Polytrauma - Psych for PTSD

Open Fracture Journey

1 Stabilize	2 History	3 Physical Exam	4 Initial Invx
5 Acute/ Initial Mx	6 Advanced Imaging	7 Definitive Mx	8 Post Op Review

Chronic Pain

What comes to mind?



Chronic Pain/ Arthritis Framework

Updated Sept 2024
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Legend: Joints/ Cervical Spine/ Lumbar Spine

1. Stabilize

- Usually not required

2. History

- **General History (for all patients)** - Biodata, PMHx, Smoking, Drinking, Drug Allergy, Occupation, Sports, Handedness (UL)
- **Condition History**
  - **Pain (SOCRATES)** - Mechanical vs inflammatory type of pain
  - **Joint Specific Symptoms** - e.g.,
    - Knee (locking, instability)
    - Shoulder - instability, stiffness, weakness
  - **Red flags**
    - ***Tumor*** red flags - LOW, LOA
    - ***Infection*** red flags - fever, night sweats
  - **Function (4 HOCR)** - Home, Occupation, Community, Recreation
- **Risk Factor History**
  - Previous Trauma
  - Condition risk factors e.g., Hip - AVN; Frozen shoulder - DM

3. Physical Exam

- Specific Joint examination
- Always check distal ***neurovascular*** status

4. Initial Investigations

- Imaging
  - ***Orthogonal*** views
  - Features - ***LLOSS***
  - Special XRs e.g.Knee - Weight bearing XR, skyline
- ***Bloods*** (if concerned inflammatory/ infection)
  - Inflammatory - CRP, ESR, RF, Anti-CCP
  - Infection - FBC, CRP, ESR

5. Acute/ Initial Management

"What will you do at the first consult?"

- ***Pharmacological***
  - Analgesia as per WHO pain ladder
- ***Non-pharmacological***
  - Lifestyle modifications - change sports
  - ***Multidisciplinary*** - Physiotherapy, Podiatry
  - Walking aids

For many patients, this ends up being the definitive management as their symptoms improve.

6. Advanced Imaging

- Typically, not required if there are obvious OA changes on XR
- Consider ***MRI scan without contrast*** if
  - Normal XR with significant/ long duration of symptoms, concern of soft tissue injury (cartilage, meniscus, ligaments, muscles)
- ***MRI scan with contrast*** if concerns of tumor/ infection
- ***CT scan*** typically only for pre-op planning for complex replacements

7. Definitive Management

- ***"Operative vs Non-Operative"*** depending on
  - **Patient** factors e.g. Co-morbids, function.
  - **Disease** factors e.g. Classification, Severity
  - **Surgeon** factors e.g. choice of implants influenced by surgical training
- ***Non-Operative***
  - Analgesia, PT, Injections, Other adjuncts
- ***Operative*** options - Learn the common options for OA of each joint - Joint Preserving or *Joint Sacrificing* - E.g.
  - Shoulder - *TSA, RTSA*
  - Elbow - *TEA*
  - CMCJ - *Fusion, Excision (Trapeziectomy)*
  - Hip - *THA*
  - Knee - HTO, *UKA, TKA*
  - Ankle - Osteotomy, *TAR, Fusion*
  - Hallux Valgus - Osteotomy, *Fusion*
  - Spine - Decomp, *Fusion, ADR*

8. Post Op Review

- Assess **patient**
  - Stability and vitals
  - GA Complications
- Assess **operated site**
  - Dressings - ensure not soaked
  - Chart drain outputs
  - Distal neurovascular (be specific)
- Follow **Post Op instructions** for:
  - IV Antibiotics for ***prophylaxis***
  - Analgesia as per WHO
  - DVT ***prophylaxis***
  - Weight bearing status
  - Range of motion
  - STO timing - usually 14 days
- Subsequent ***Multidisciplinary*** team to optimize outcomes
  - Rehab - PT/ OT, Rehab Med
  - Social - MSW, CH, TCF

2/ 3. History, Physical Exam

General History

Specific History (Chronic Pain)

- Condition History
  - Pain - SOCRATES, Mechanical vs Inflammatory Pain
  - Joint Specific Symptoms - e.g.
    - Knee - instability, locking
    - Shoulder - instability, stiffness, weakness
  - Red flags -
    - Tumor - Night pain, Rest pain, Constitutional
    - Infection - Fever, night sweats
  - Function
    - Home, Occupation, Community, Recreation
- Risk Factor History
  - Previous trauma
  - Condition specific - e.g. Hip OA (AVN), Frozen Shoulder (DM)

Risk Factors for AVN

66 yr old woman

had high doses of pred at onset of illness in 2014

s/p surgical decompression of R hip (30/9/19)

C/O right sided hip pain - mainly when getting up from sitting position

Still able to walk 1-2 bus stops

No night pain

Red Flags

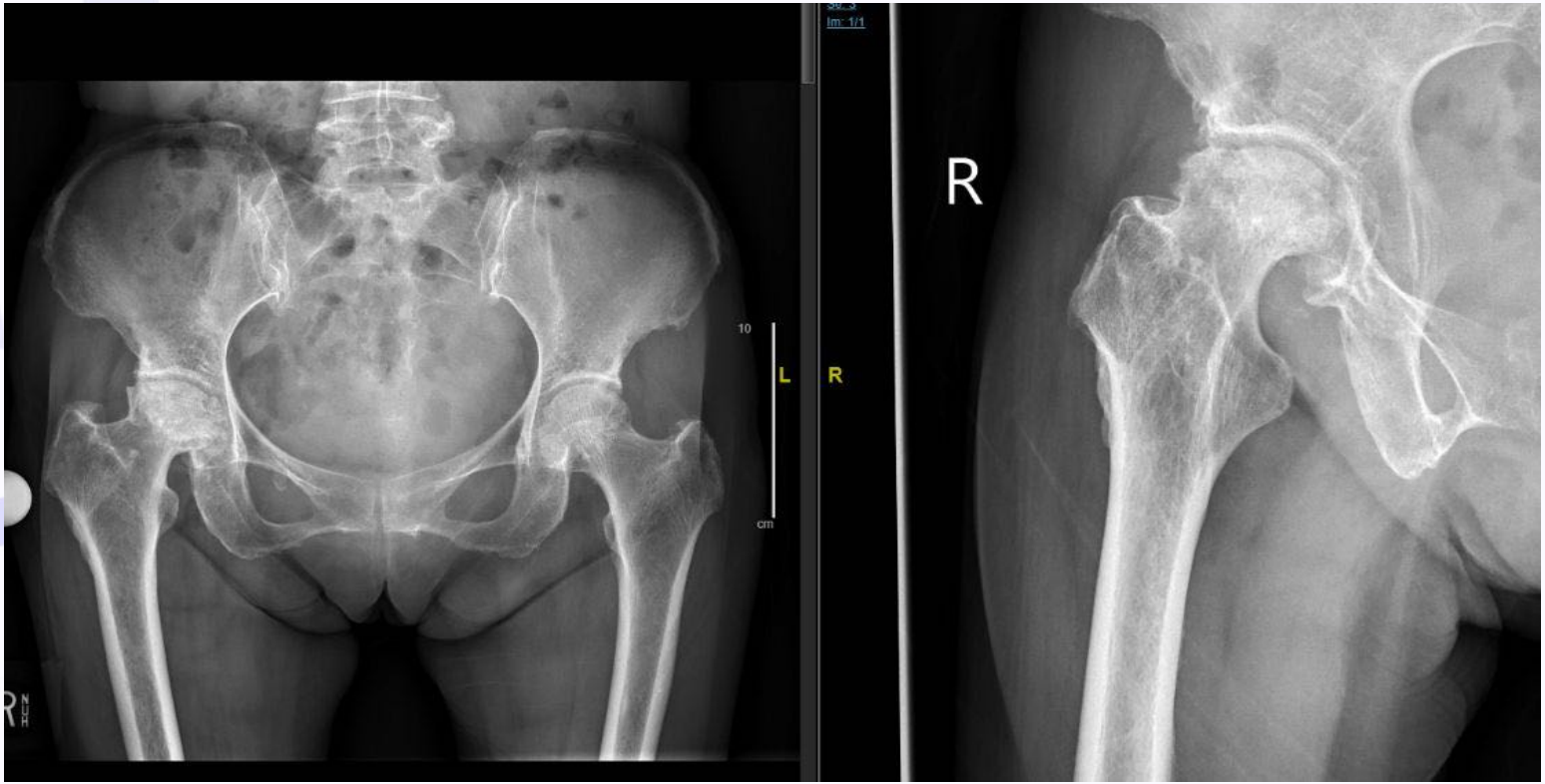
Pain

Left hip pain minimal.

rom unchanged from May hip flex 100. abd 30 adduction 20
Internal rotation 10degrees but has fixed external rotation of 10 degrees
ext rot rom 10-30 degrees

Standard Hip Exam

4. XR



5. Initial Management

"What will you do at the first clinic visit?"

- Pharmacological
  - Analgesia based on WHO ladder
- Non-Pharmacological
  - Lifestyle modifications - reduce painful activities
  - Physiotherapy for muscle strengthening
  - Walking aids

For most patients, this is the definitive management and they need no further treatment

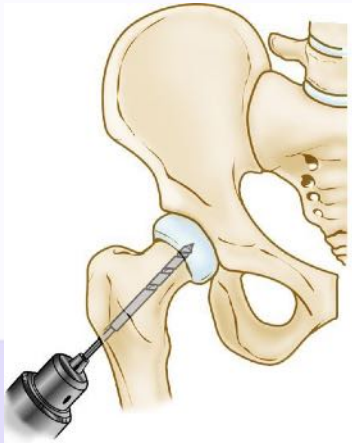
PLAN
Cont physio, use walking stick

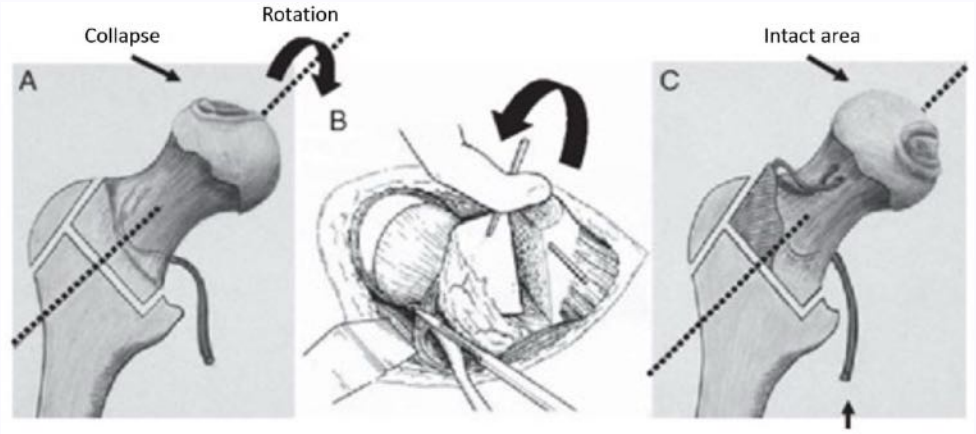
Care Plan
review in 6 months
xoa if symptoms are worsening

Will you do MRI Scan?

Role of MRI in AVN Hip

- Useful in Early AVN where XR is normal
- Helps in prognostication - i.e. “what are the chances this AVN hip will collapse?”
- Can allow for Hip-preservation surgery e.g. osteotomies, core- decompression





1 Stabilize	2 History	3 Physical Exam	4 Initial Invx
5 Acute/ Initial Mx	6 Advanced Imaging	7 Definitive Mx	8 Post Op Review

7. Definitive Management

- Operative vs Non Operative
- Operative thought process:
  - Entire joint is Arthritic - option is Total Hip Replacement

8. Post Op Review

1. Assess Patient
   a. Vitals
2. Assess Operated limb/ site
   a. Dressings
   b. Neurovascular status (be specific)
   c. Drain output (if present)
3. Review Post Op Notes
   a. Prophylactic Antibiotics
   b. Weight bearing status
   c. Order post op XR
   d. Consider DVT Prophylaxis if lower limb op

1 Stabilize | 2 History | 3 Physical Exam | 4 Initial Invx
5 Acute/ Initial Mx | 6 Advanced Imaging | 7 Definitive Mx | 8 Post Op Review

===Ortho PORV===

POD0 S/P right total hip replacement

> IOF:

Ga
Cef
Extensive AVN changes
Head sent for histology

Not in respiratory distress
Not toxic looking

Heart S1S2
Lungs clear anteriorly
Abdo SNT BS+
Calves supple, non-edematous

Dressings and NV

Moving 4 limbs equally

R LL
CRT <2s
Nil foot drop
Dressings clean, not soaking through

===Plans===
As per op note

Post Operative Orders & Instructions

Normal diet
Routine circulation charting
Routine analgesia
Cef x 2 doses
2 weeks aspirin VTE prophylaxis
Check AP pelvis and lateral right hip when comfortable
Moblise FWB today with PT
TCU [ ] 2 weeks

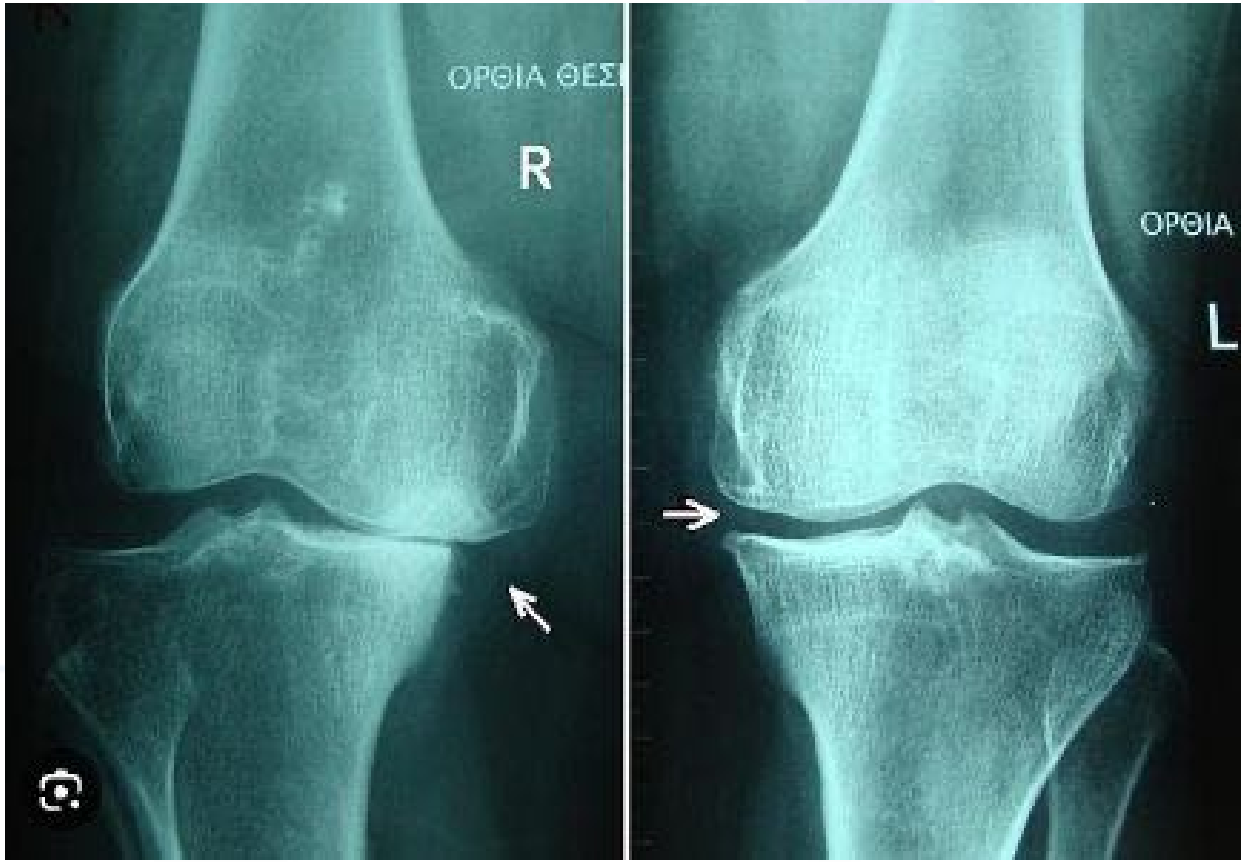
Framework for Hip AVN

~~1. Stabilize~~	**2. Hx** • General hx • Red flags • Function - HOCR • Pain SOCRATES. Mechanical vs Inflammatory • Hip Risk factor for AVN!	**3. PE** Standard Hip – NV!	**4. Initial Invx** • Imaging – AP/ Lateral hip • Bloods – if inflammatory!

5. Initial Mx
• Pharm - Analgesia – WHO
• Non Pharm - PT, lifestyle
	6. Advanced Imaging
	Usually no need for obvious OA Hip
	
	MRI if early AVN with no collapse
		7. Definitive Mx
		(Think of Classification here)
		• Non op if asymptomatic
		• Op if symptoms. FICAT classification
		  • Pre-collapse – core decompression, osteotomy
		  • Collapsed - THR
			8. Post op
			
			Same

1 Stabilize	2 History	3 Physical Exam	4 Initial Invx
5 Acute/ Initial Mx	6 Advanced Imaging	7 Definitive Mx	8 Post Op Review

Replace with ***any*** Arthritic XR with LLOSS



Chronic Pain Variation - Cervical Spine

1 Stabilize	2 History	3 Physical Exam	4 Initial Invx
5 Acute/ Initial Mx	6 Advanced Imaging	7 Definitive Mx	8 Post Op Review

Chronic Pain/ Arthritis Framework

Updated Sept 2024
mokyingren.sg

Legend: Joints/ Cervical Spine/ Lumbar Spine

1. Stabilize

- Usually not required

2. History

- **General History (for all patients)** - Biodata, PMHx, Smoking, Drinking, Drug Allergy, Occupation, Sports, Handedness (UL)
- **Condition History**
  - **Pain (SOCRATES)** - Mechanical vs inflammatory type of pain
  - **Joint Specific Symptoms** - e.g.,
    - Knee (locking, instability)
    - Shoulder - instability, stiffness, weakness
    - Cervical spine - myelopathy, radiculopathy
  - **Red flags**
    - ***Tumor*** red flags - LOW, LOA
    - ***Infection*** red flags - fever, night sweats
    - ***Spine*** - PU BO
  - **Function (4 HOCR)** - Home, Occupation, Community, Recreation
- **Risk Factor History**
  - Previous Trauma
  - Condition risk factors e.g., Hip - AVN; Frozen shoulder - DM

3. Physical Exam

- Specific Joint examination
- Always check distal ***neurovascular*** status

- Cervical Spine
  - Look for ***myelopathic*** features
  - Look for ***radiculopathy***

4. Initial Investigations

- Imaging
  - ***Orthogonal*** views
  - Features - ***LLOSS***
  - Special XRs e.g.Knee - Weight bearing XR, skyline
- ***Bloods*** (if concerned inflammatory/ infection)
  - Inflammatory - CRP, ESR, RF, Anti-CCP
  - Infection - FBC, CRP, ESR

- Cervical and Lumbar Spine
  - ***Flexion Extension XR*** views (dynamic instability)
  - Consider MRI scan at first consult if significant neurology

5. Acute/ Initial Management

"What will you do at the first consult?"

- ***Pharmacological***
  - Analgesia as per WHO pain ladder
- ***Non-pharmacological***
  - Lifestyle modifications - change sports
  - ***Multidisciplinary*** - Physiotherapy, Podiatry
  - Walking aids

For many patients, this ends up being the definitive management as their symptoms improve.

6. Advanced Imaging

- Typically, not required if there are obvious OA changes on XR

- Consider ***MRI scan without contrast*** if
  - Normal XR with significant/ long duration of symptoms, concern of soft tissue injury (cartilage, meniscus, ligaments, muscles)
  - Presence of unexpected neurovascular deficits
- ***MRI scan with contrast*** if concerns of tumor/ infection
- ***CT scan*** typically only for pre-op planning for complex replacements

- Cervical and Lumbar Spine
  - Consider order ***MRI scan*** at first consult if significant neurology/ myelopathic features
  - C-Spine - ***CT scan*** if for op to look for OPLL as cause of myelopathy

7. Definitive Management

- ***"Operative vs Non-Operative"*** depending on
  - **Patient** factors e.g. Co-morbids, function.
  - **Disease** factors e.g. Classification, Severity (e.g. Spine - ***NID*** - Neurology, Instability, Deformity)
  - **Surgeon** factors e.g. choice of implants influenced by surgical training
- ***Non-Operative***
  - Analgesia, PT, Injections, Other adjuncts
  - Cervical and Lumbar spine - Nerve root injections for radiculopathy
- ***Operative*** options - Learn the common options for OA of each joint - Joint Preserving or *Joint Sacrificing* - E.g.
  - Shoulder - *TSA, RTSA*
  - Elbow - *TEA*
  - CMCJ - *Fusion, Excision (Trapeziectomy)*
  - Hip - *THA*
  - Knee - HTO, *UKA, TKA*
  - Ankle - Osteotomy, *TAR, Fusion*
  - Hallux Valgus - Osteotomy, *Fusion*
  - Spine - Decomp, *Fusion, ADR*

8. Post Op Review

- Assess **patient**
  - Stability and vitals
  - GA Complications
- Assess **operated site**
  - Dressings - ensure not soaked
  - Chart drain outputs
  - Distal neurovascular (be specific)
- Follow **Post Op instructions** for:
  - IV Antibiotics for ***prophylaxis***
  - Analgesia as per WHO
  - DVT ***prophylaxis***
  - Weight bearing status
  - Range of motion
  - STO timing - usually 14 days
- Subsequent ***Multidisciplinary*** team to optimize outcomes
  - Rehab - PT/ OT, Rehab Med
  - Social - MSW, CH, TCF

Chronic Pain Variation - Lumbar Spine

1 Stabilize	2 History	3 Physical Exam	4 Initial Invx
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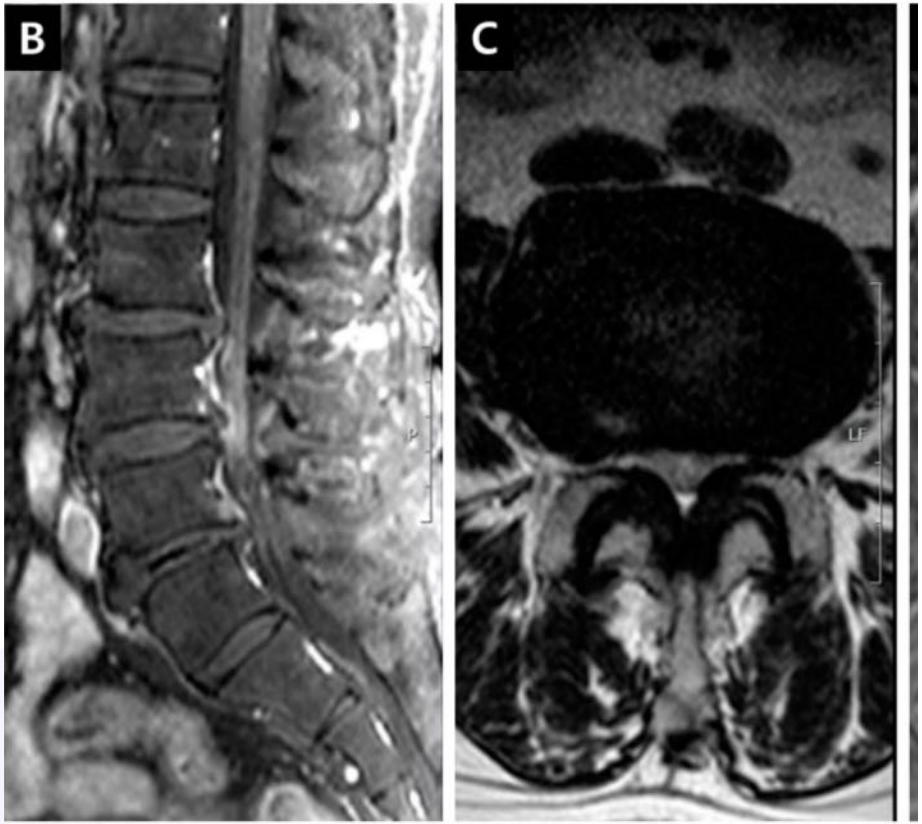

Chronic Pain/ Arthritis Framework

Updated Sept 2024
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  - **Pain (SOCRATES)** - Mechanical vs inflammatory type of pain
  - **Joint Specific Symptoms** - e.g.,
    - Knee (locking, instability)
    - Shoulder - instability, stiffness, weakness
    - Cervical spine - myelopathy, radiculopathy
    - Lumbar spine - claudication (vascular vs neurological), radiculopathy
  - **Red flags**
    - ***Tumor*** red flags - LOW, LOA
    - ***Infection*** red flags - fever, night sweats
    - ***Spine*** - PU BO
  - **Function (4 HOCR)** - Home, Occupation, Community, Recreation
- **Risk Factor History**
  - Previous Trauma
  - Condition risk factors e.g., Hip - AVN; Frozen shoulder - DM

3. Physical Exam

- Specific Joint examination
- Always check distal ***neurovascular*** status

- Cervical Spine
  - Look for ***myelopathic*** features
  - Look for ***radiculopathy***

- Lumbar Spine
  - Look for ***radiculopathy***
  - Check LL pulses (TRO vascular claudication), offer DRE TRO cauda equina

4. Initial Investigations

- Imaging
  - ***Orthogonal*** views
  - Features - ***LLOSS***
  - Special XRs e.g.Knee - Weight bearing XR, skyline
- ***Bloods*** (if concerned inflammatory/ infection)
  - Inflammatory - CRP, ESR, RF, Anti-CCP
  - Infection - FBC, CRP, ESR

- **Cervical and Lumbar Spine**
  - ***Flexion Extension XR*** views (dynamic instability)
  - Consider MRI scan at first consult if significant neurology

5. Acute/ Initial Management

"What will you do at the first consult?"

- ***Pharmacological***
  - Analgesia as per WHO pain ladder

- ***Non-pharmacological***
  - Lifestyle modifications - change sports
  - ***Multidisciplinary*** - Physiotherapy, Podiatry
  - Walking aids

For many patients, this ends up being the definitive management as their symptoms improve.

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- Cervical and Lumbar Spine
  - Consider order ***MRI scan*** at first consult if significant neurology/ myelopathic features
  - C-Spine - ***CT scan*** if for op to look for OPLL as cause of myelopathy
  - L-Spine - ***CT scan*** if for op for surgical planning (e.g., length of pedicle screws)

7. Definitive Management

- ***"Operative vs Non-Operative"*** depending on
  - **Patient** factors e.g. Co-morbids, function.
  - **Disease** factors e.g. Classification, Severity (e.g. Spine - ***NID*** - Neurology, Instability, Deformity)
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  - Ankle - Osteotomy, *TAR, Fusion*
  - Hallux Valgus - Osteotomy, *Fusion*
  - Spine - Decomp, *Fusion, ADR*

8. Post Op Review

- Assess **patient**
  - Stability and vitals
  - GA Complications
- Assess **operated site**
  - Dressings - ensure not soaked
  - Chart drain outputs
  - Distal neurovascular (be specific)
- Follow **Post Op instructions** for:
  - IV Antibiotics for ***prophylaxis***
  - Analgesia as per WHO
  - DVT ***prophylaxis***
  - Weight bearing status
  - Range of motion
  - STO timing - usually 14 days
- Subsequent ***Multidisciplinary*** team to optimize outcomes
  - Rehab - PT/ OT, Rehab Med
  - Social - MSW, CH, TCF

Infection

What comes to mind?

1 Stabilize	2 History	3 Physical Exam	4 Initial Invx
5 Acute/ Initial Mx	6 Advanced Imaging	7 Definitive Mx	8 Post Op Review

Ortho Made Simple - Infection Framework

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Legend: Soft Tissue Infection/ Osteomyelitis/ Mono-arthritis/ Necrotizing Fasciitis/ Peri-implant infection

1. Stabilize

- Resuscitate patient if in ***septic shock***

2. History

- **General History** (for all patients) - Biodata, PMHx, Smoking, Drinking, Drug Allergy, Occupation, Sports
- **Condition History**
  - **Severity** of infection - Pain (SOCRATES), duration, systemic symptoms
  - **Source** of infection - direct inoculation/ hematological from other sites

- **Risk Factor History**
  - DM, PVD, Immunosuppression

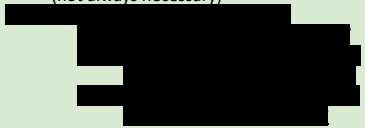
3. Physical Exam

- **Condition** Examination
  - Local severity
    - Extent of collection
    - Involvement of adjacent joint (septic arthritis)
    - Special signs e.g., Kanavel's signs for finger
  - Systemic severity
    - Vitals; chills and rigors
- **Risk Factors** Assessment
  - Diabetic Dermopathy, peripheral neuropathy
  - Poor pulses (peripheral vascular disease)

4. Initial Investigations

- Imaging
  - ***Orthogonal*** views
  - To look for ***osteomyelitis***

- Bloods
  - ***Pre-Op*** Bloods - FBC, RP, PT/INR, GXM, ECG, CXR
  - ***Severity*** - FBC, CRP, ESR, Blood c/s if febrile
  - ***Stability*** - Lactate, ABG
  - ***Risk factors*** - HBA1c, Arterial studies
- Special
  - **Wound swab** c/s if open, infected wound (not always necessary)



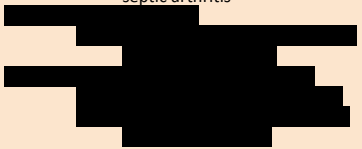
5. Acute Management

- ***Analgesia*** as per WHO pain ladder
- Diet - Keep ***NBM*** or as per discussion with senior, depending on OT availability
- ***Empirical*** Antibiotics (in certain simple soft tissue infection, can be started without c/s)

** If infection is superficial, patient may be discharged with antibiotics and follow up.*

6. Advanced Imaging

- Most do not need advanced imaging. But ***MRI scan with contrast*** can be considered if:
  - **Unsure** if infection - e.g., differentiating acute Charcot's vs Osteomyelitis
  - **Delineate** extent of infection for surgical planning
  - **Evaluate** adjacent joints for septic arthritis



7. Definitive Management

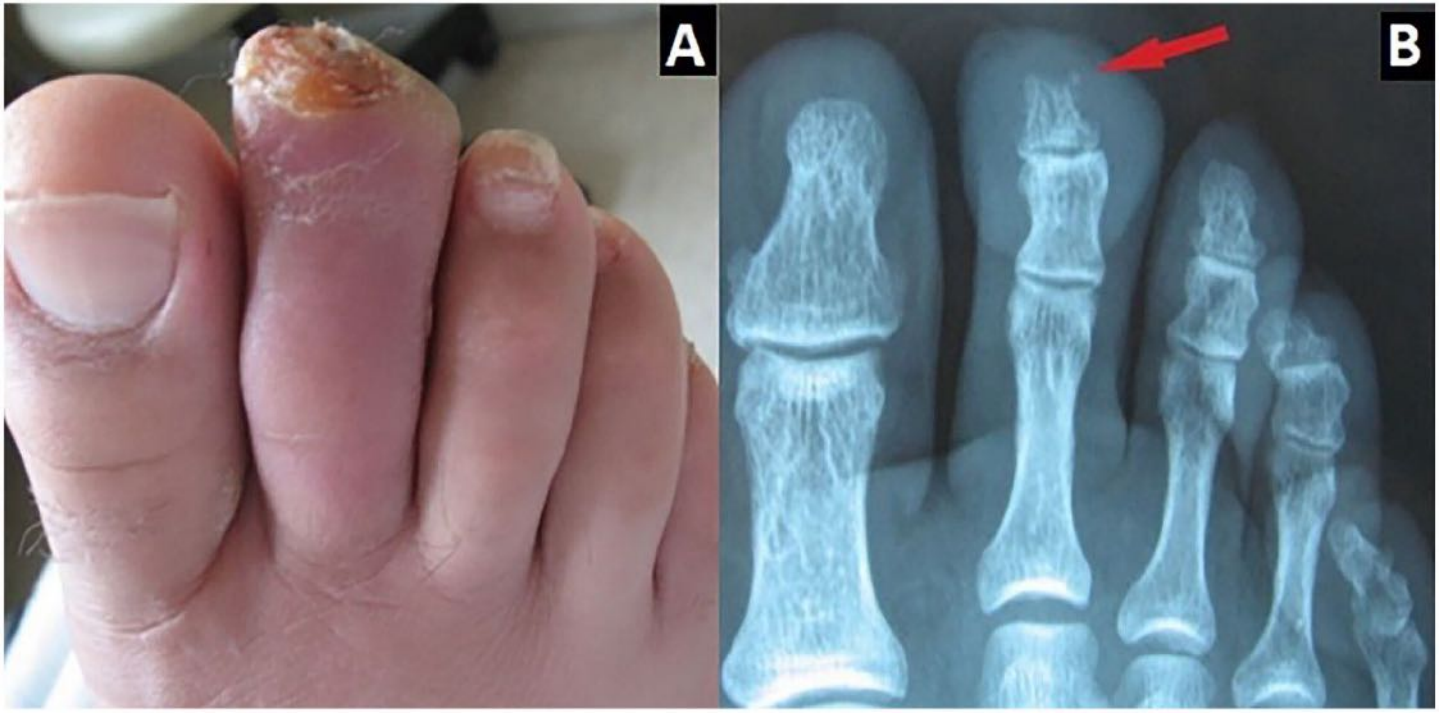
- ***"Operative vs Non-Op"*** depending on
  - **Patient** factors e.g. Co-morbids
  - **Disease** factors e.g. Severity
- **Non-Operative (Rare)**
  - Long term antibiotic suppression
- **Operative general options**
  - ***Debridement*** (= removal of unhealthy tissue)
    - ***Incision and drainage*** for abscess
    - ***Saucerization*** for carbuncles
    - ***Amputation*** - DDD

8. Post Op Review

- Assess **patient**
  - Stability and vitals
  - GA Complications
- Assess **operated site**
  - Dressings - ensure not soaked
  - Chart drain outputs
  - Distal neurovascular (be specific)
- Follow **post Op instructions** for:
  - Continue ***empirical*** antibiotics
  - Trace post-operative cultures and convert to ***culture directed antibiotics***
    - May need **multidisciplinary** ID on board for PICC, OPAT.
  - Analgesia as per WHO

1 Stabilize	2 History	3 Physical Exam	4 Initial Invx
5 Acute/ Initial Mx	6 Advanced Imaging	7 Definitive Mx	8 Post Op Review

Infection Variation - Osteomyelitis



Ortho Made Simple - Infection Framework

Legend: Soft Tissue Infection/ Osteomyelitis/ Mono-arthritis/ Necrotizing Fasciitis/ Peri-implant infection

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1. Stabilize

- Resuscitate patient if in ***septic shock***

2. History

- **General History** (for all patients) - Biodata, PMHx, Smoking, Drinking, Drug Allergy, Occupation, Sports
- **Condition History**
  - **Severity** of infection - Pain (SOCRATES), duration, systemic symptoms
  - **Source** of infection - direct inoculation/ hematological from other sites

- **Risk Factor History**
  - DM, PVD, Immunosuppression

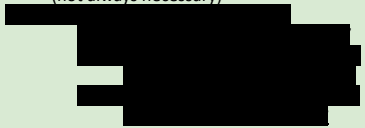
3. Physical Exam

- **Condition** Examination
  - Local severity
    - Extent of collection
    - Involvement of adjacent joint (septic arthritis)
    - Special signs e.g., Kanavel's signs for finger
  - Systemic severity
    - Vitals; chills and rigors
- **Risk Factors** Assessment
  - Diabetic Dermopathy, peripheral neuropathy
  - Poor pulses (peripheral vascular disease)

4. Initial Investigations

- Imaging
  - ***Orthogonal*** views
  - To look for ***osteomyelitis***

- Bloods
  - ***Pre-Op*** Bloods - FBC, RP, PT/INR, GXM, ECG, CXR
  - ***Severity*** - FBC, CRP, ESR, Blood c/s if febrile
  - ***Stability*** - Lactate, ABG
  - ***Risk factors*** - HBA1c, Arterial studies
- Special
  - **Wound swab** c/s if open, infected wound (not always necessary)



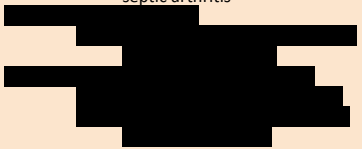
5. Acute Management

- ***Analgesia*** as per WHO pain ladder
- Diet - Keep ***NBM*** or as per discussion with senior, depending on OT availability
- ***Empirical*** Antibiotics (in certain simple soft tissue infection, can be started without c/s)

** If infection is superficial, patient may be discharged with antibiotics and follow up.*

6. Advanced Imaging

- Most do not need advanced imaging. But ***MRI scan with contrast*** can be considered if:
  - **Unsure** if infection - e.g., differentiating acute Charcot's vs Osteomyelitis
  - **Delineate** extent of infection for surgical planning
  - **Evaluate** adjacent joints for septic arthritis



7. Definitive Management

- ***"Operative vs Non-Op"*** depending on
  - **Patient** factors e.g. Co-morbids
  - **Disease** factors e.g. Severity
- **Non-Operative (Rare)**
  - Long term antibiotic suppression
- **Operative general options**
  - ***Debridement*** (= removal of unhealthy tissue)
    - ***Incision and drainage*** for abscess
    - ***Saucerization*** for carbuncles
    - ***Amputation*** - DDD
  - Osteomyelitis - debridement of infected bone/ amputation

8. Post Op Review

- Assess **patient**
  - Stability and vitals
  - GA Complications
- Assess **operated site**
  - Dressings - ensure not soaked
  - Chart drain outputs
  - Distal neurovascular (be specific)
- Follow **post Op instructions** for:
  - Continue ***empirical*** antibiotics
  - Trace post-operative cultures and convert to ***culture directed antibiotics***
    - May need **multidisciplinary** ID on board for PICC, OPAT.
  - Analgesia as per WHO

1 Stabilize	2 History	3 Physical Exam	4 Initial Invx
5 Acute/ Initial Mx	6 Advanced Imaging	7 Definitive Mx	8 Post Op Review

Variation of Infection - Monoarthritis

Ortho Made Simple - Infection Framework

Updated Sept 2024
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Legend: Soft Tissue Infection/ Osteomyelitis/ Mono-arthritis/ Necrotizing Fasciitis/ Peri-implant infection

1. Stabilize

- Resuscitate patient if in ***septic shock***

[redacted]

2. History

- **General History** (for all patients) - Biodata, PMHx, Smoking, Drinking, Drug Allergy, Occupation, Sports
- **Condition History**
  - **Severity** of infection - Pain (SOCRATES), duration, systemic symptoms
  - **Source** of infection - direct inoculation/ hematological from other sites

[redacted]

- **Risk Factor History**
  - DM, PVD, Immunosuppression

3. Physical Exam

- **Condition** Examination
  - Local severity
    - Extent of collection
    - Involvement of adjacent joint (septic arthritis)
    - Special signs e.g., Kanavel's signs for finger
  - Systemic severity
    - Vitals; chills and rigors
- **Risk Factors** Assessment
  - Diabetic Dermopathy, peripheral neuropathy
  - Poor pulses (peripheral vascular disease)

4. Initial Investigations

- Imaging
  - ***Orthogonal*** views
  - To look for ***osteomyelitis***

[redacted]

- Bloods
  - ***Pre-Op*** Bloods - FBC, RP, PT/INR, GXM, ECG, CXR
  - ***Severity*** - FBC, CRP, ESR, Blood c/s if febrile
  - ***Stability*** - Lactate, ABG
  - ***Risk factors*** - HBA1c, Arterial studies
- Special
  - **Wound swab** c/s if open, infected wound (not always necessary)
  - Mono-arthritis: **Joint aspiration**
    - ***"Therapeutic and diagnostic"***
    - **Gram stain**, **cell count**, crystals, cultures (bacteria, fungal, AFB)

[redacted]

5. Acute Management

- ***Analgesia*** as per WHO pain ladder
- Diet - Keep ***NBM*** or as per discussion with senior, depending on OT availability
- ***Empirical*** Antibiotics (in certain simple soft tissue infection, can be started without c/s)
- Mono-arthritis
  - Post aspiration - "NBM until gram stain, cell count results out"
  - ***Empirical*** Abx ONLY after c/s taken!

[redacted]

** If infection is superficial, patient may be discharged with antibiotics and follow up.*

6. Advanced Imaging

- Most do not need advanced imaging. But ***MRI scan with contrast*** can be considered if:
  - **Unsure** if infection - e.g., differentiating acute Charcot's vs Osteomyelitis
  - **Delineate** extent of infection for surgical planning
  - **Evaluate** adjacent joints for septic arthritis

[redacted]

7. Definitive Management

- ***"Operative vs Non-Op"*** depending on
  - **Patient** factors e.g. Co-morbids
  - **Disease** factors e.g. Severity
- **Non-Operative (Rare)**
  - Long term antibiotic suppression
- **Operative general options**
  - ***Debridement*** (= removal of unhealthy tissue)
    - ***Incision and drainage*** for abscess
    - ***Saucerization*** for carbuncles
    - ***Amputation*** - DDD
  - Osteomyelitis - debridement of infected bone/ amputation
  - Septic Arthritis - joint washout

[redacted]

8. Post Op Review

- Assess **patient**
  - Stability and vitals
  - GA Complications
- Assess **operated site**
  - Dressings - ensure not soaked
  - Chart drain outputs
  - Distal neurovascular (be specific)
- Follow **post Op instructions** for:
  - Continue ***empirical*** antibiotics
  - Trace post-operative cultures and convert to ***culture directed antibiotics***
    - May need **multidisciplinary** ID on board for PICC, OPAT.
  - Analgesia as per WHO

Variation of Infection - Necrotising Fasciitis

Ortho Made Simple - Infection Framework

Updated Sept 2024
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Legend: Soft Tissue Infection/ Osteomyelitis/ Mono-arthritis/ Necrotizing Fasciitis/ Peri-implant infection

1. Stabilize

- Resuscitate patient if in ***septic shock***

- Necrotizing Fasciitis
  - Start ***empirical*** triple antibiotics immediately - IV Benzylpenicillin, Ceftazidime, Clindamycin

2. History

- **General History** (for all patients) - Biodata, PMHx, Smoking, Drinking, Drug Allergy, Occupation, Sports
- **Condition History**
  - **Severity** of infection - Pain (SOCRATES), duration, systemic symptoms
  - **Source** of infection - direct inoculation/ hematological from other sites
- **Risk Factor History**
  - DM, PVD, Immunosuppression

3. Physical Exam

- **Condition** Examination
  - Local severity
    - Extent of collection
    - Involvement of adjacent joint (septic arthritis)
    - Special signs e.g., Kanavel's signs for finger
  - Systemic severity
    - Vitals; chills and rigors
- **Risk Factors** Assessment
  - Diabetic Dermopathy, peripheral neuropathy
  - Poor pulses (peripheral vascular disease)

4. Initial Investigations

- Imaging
  - ***Orthogonal*** views
  - To look for ***osteomyelitis***
- Bloods
  - ***Pre-Op*** Bloods - FBC, RP, PT/INR, GXM, ECG, CXR
  - ***Severity*** - FBC, CRP, ESR, Blood c/s if febrile
  - ***Stability*** - Lactate, ABG
  - ***Risk factors*** - HBA1c, Arterial studies
- Special
  - **Wound swab** c/s if open, infected wound (not always necessary)
  - Mono-arthritis: **Joint aspiration**
    - ***"Therapeutic and diagnostic"***
    - **Gram stain**, **cell count**, crystals, cultures (bacteria, fungal, AFB)

5. Acute Management

- ***Analgesia*** as per WHO pain ladder
- Diet - Keep ***NBM*** or as per discussion with senior, depending on OT availability
- ***Empirical*** Antibiotics (in certain simple soft tissue infection, can be started without c/s)
- Mono-arthritis
  - Post aspiration - "NBM until gram stain, cell count results out"
  - ***Empirical*** Abx ONLY after c/s taken!
- Necrotizing Fasciitis
  - Inform senior immediately for urgent surgical debridement and ***fasciectomy***

** If infection is superficial, patient may be discharged with antibiotics and follow up.*

6. Advanced Imaging

- Most do not need advanced imaging. But ***MRI scan with contrast*** can be considered if:
  - **Unsure** if infection - e.g., differentiating acute Charcot's vs Osteomyelitis
  - **Delineate** extent of infection for surgical planning
  - **Evaluate** adjacent joints for septic arthritis
- Necrotizing Fasciitis
  - This is a ***clinical diagnosis***; MRI should not delay op.

7. Definitive Management

- ***"Operative vs Non-Op"*** depending on
  - **Patient** factors e.g. Co-morbids
  - **Disease** factors e.g. Severity
- **Non-Operative (Rare)**
  - Long term antibiotic suppression
- **Operative general options**
  - ***Debridement*** (= removal of unhealthy tissue)
    - ***Incision and drainage*** for abscess
    - ***Saucerization*** for carbuncles
    - ***Amputation*** - DDD
  - Osteomyelitis - debridement of infected bone/ amputation
  - Septic Arthritis - joint washout
  - Necrotizing Fasciitis - multiple debridement till clean/ amputation

8. Post Op Review

- Assess **patient**
  - Stability and vitals
  - GA Complications
- Assess **operated site**
  - Dressings - ensure not soaked
  - Chart drain outputs
  - Distal neurovascular (be specific)
- Follow **post Op instructions** for:
  - Continue ***empirical*** antibiotics
  - Trace post-operative cultures and convert to ***culture directed antibiotics***
    - May need **multidisciplinary** ID on board for PICC, OPAT.
  - Analgesia as per WHO

Necrotising Fasciitis - Spot Diagnosis

Variation of Infection - Peri-implant Infxn

1 Stabilize	2 History	3 Physical Exam	4 Initial Invx
5 Acute/ Initial Mx	6 Advanced Imaging	7 Definitive Mx	8 Post Op Review

Ortho Made Simple - Infection Framework

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Legend: Soft Tissue Infection/ Osteomyelitis/ Mono-arthritis/ Necrotizing Fasciitis/ Peri-implant infection

1. Stabilize

- Resuscitate patient if in ***septic shock***

- Necrotizing Fasciitis
  - Start ***empirical*** triple antibiotics immediately - IV Benzylpenicillin, Ceftazidime, Clindamycin

2. History

- **General History** (for all patients) - Biodata, PMHx, Smoking, Drinking, Drug Allergy, Occupation, Sports
- **Condition History**
  - **Severity** of infection - Pain (SOCRATES), duration, systemic symptoms
  - **Source** of infection - direct inoculation/ hematological from other sites
  - Peri-implant infection - ask about previous surgery - when? Had infection?
- **Risk Factor History**
  - DM, PVD, Immunosuppression

3. Physical Exam

- **Condition** Examination
  - Local severity
    - Extent of collection
    - Involvement of adjacent joint (septic arthritis)
    - Special signs e.g., Kanavel's signs for finger
  - Systemic severity
    - Vitals; chills and rigors
- **Risk Factors** Assessment
  - Diabetic Dermopathy, peripheral neuropathy
  - Poor pulses (peripheral vascular disease)

4. Initial Investigations

- Imaging
  - ***Orthogonal*** views
  - To look for ***osteomyelitis***
  - Peri-implant - Look for loosening
- Bloods
  - ***Pre-Op*** Bloods - FBC, RP, PT/INR, GXM, ECG, CXR
  - ***Severity*** - FBC, CRP, ESR, Blood c/s if febrile
  - ***Stability*** - Lactate, ABG
  - ***Risk factors*** - HBA1c, Arterial studies
- Special
  - **Wound swab** c/s if open, infected wound (not always necessary)
  - Mono-arthritis: **Joint aspiration**
    - ***"Therapeutic and diagnostic"***
    - **Gram stain**, **cell count**, crystals, cultures (bacteria, fungal, AFB)
    - Peri-implant Joint Replacement infection - **Aspiration in OT**

5. Acute Management

- ***Analgesia*** as per WHO pain ladder
- Diet - Keep ***NBM*** or as per discussion with senior, depending on OT availability
- ***Empirical*** Antibiotics (in certain simple soft tissue infection, can be started without c/s)
- Mono-arthritis
  - Post aspiration - "NBM until gram stain, cell count results out"
  - ***Empirical*** Abx ONLY after c/s taken!
- Necrotizing Fasciitis
  - Inform senior immediately for urgent surgical debridement and ***fasciectomy***
- Peri-implant infection
  - ***Empirical*** Abx ONLY after c/s taken!

** If infection is superficial, patient may be discharged with antibiotics and follow up.*

6. Advanced Imaging

- Most do not need advanced imaging. But ***MRI scan with contrast*** can be considered if:
  - **Unsure** if infection - e.g., differentiating acute Charcot's vs Osteomyelitis
  - **Delineate** extent of infection for surgical planning
  - **Evaluate** adjacent joints for septic arthritis
- Necrotizing Fasciitis
  - This is a ***clinical diagnosis***; MRI should not delay op.
- Peri-Implant Infection can consider
  - ***CT scan*** to evaluate for union
  - ***MRI with contrast*** to evaluate for deep collections

7. Definitive Management

- ***"Operative vs Non-Op"*** depending on
  - **Patient** factors e.g. Co-morbids
  - **Disease** factors e.g. Severity
- **Non-Operative (Rare)**
  - Long term antibiotic suppression
- **Operative general options**
  - ***Debridement*** (= removal of unhealthy tissue)
    - ***Incision and drainage*** for abscess
    - ***Saucerization*** for carbuncles
    - ***Amputation*** - DDD
  - Osteomyelitis - debridement of infected bone/ amputation
  - Septic Arthritis - joint washout
  - Necrotizing Fasciitis - multiple debridement till clean/ amputation
  - Peri-implant - Debride/ Revision

8. Post Op Review

- Assess **patient**
  - Stability and vitals
  - GA Complications
- Assess **operated site**
  - Dressings - ensure not soaked
  - Chart drain outputs
  - Distal neurovascular (be specific)
- Follow **post Op instructions** for:
  - Continue ***empirical*** antibiotics
  - Trace post-operative cultures and convert to ***culture directed antibiotics***
    - May need **multidisciplinary** ID on board for PICC, OPAT.
  - Analgesia as per WHO

Peri-Implant Infection - Spot Diagnosis

What you should do next

- **Train** - Apply the framework to real life cases in the wards and test yourself verbally
- **Check** - Review casenotes to check your answers
- **Build** - Add and build up on the framework for each condition's peculiarities

Consolidate your Knowledge!

- Post Lecture Quiz for Frameworks Revision

https://docs.google.com/forms/d/e/1FAIpQLSfTmINc5gMXYAfvIn8Iv-YKGMlPc91q_BgG-ptP7gU73qtKYA/viewform?usp=sf_link

M5 Frameworks Revision