FRACTURE MANAGEMENT IN THE PRIMARY CARE SETTING

When to Refer to Orthopedics

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WHO SHOULD BE HERE TODAY?

• Family Practice Providers

• Can be in the VA or Private practice
  • Can be Physicians
  • Can be Physician Assistants
  • Can be Nurse Practitioners
The Purpose of this talk today is to consider the process of Adult fracture evaluation and initial management and whether to treat or refer for advanced care.

How do we make to process smooth?
ORTHOPEDIC RELATED VISITS TO PRIMARY CARE PROVIDERS

• Orthopedic problems are over 10% of all Primary Care visits.

• 1.6% of all visits to any physician are fracture related.

• 16% of all fracture care is handled by family physicians.

• 70% of all fracture care by Orthopedist

Fracture Management for Primary Care, 2nd Edition, 2003
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<th>Fracture</th>
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<td>Finger</td>
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KEEP OR REFER? OBJECTIVES

• Sort fractures by cause and describe by classification.
• Why the Healing Process is important to us?
• Acute Fracture Management.
• The Referral, Treatment Options and Complications of treatment.
• Review Common fractures

• Words of Wisdom
DESCRIBE FRACTURE BY:

- **Cause** – Fracture Secondary to
  - Trauma
    - Macro Trauma – Single incident
    - Micro Trauma – Repetitive incident
  - Pathology - Tumor, Osteoporosis, infection

- **Classification System**
FRACTURE BY CAUSE

- **Trauma - Macro** Single Incident
  - Majority of Fractures – Our talk today
    - Accidental falls
    - MVA
    - Sports injury or Work injury,
    - Physical Abuse-Adult/Child
    - Military wartime gunshot/ explosion injuries
FRACTURE BY CAUSE

• **Trauma** - Micro Repetitive Incident

• Stress Fracture Mostly Legs/Feet

  runners, military marches.

  Calcaneus, fibula, talus, navicular, with metatarsal bones being the most common.
FRACTURE BY CAUSE

- **Pathology**
  - Tumor, Osteoporosis, Infection, Charcot (painless)
    - Fracture with low energy incident
    - Patient may have pain to the area before fracture occurs.
    - Patient may not have pain, but foot looks swollen and red.
FRACTURE CLASSIFICATION/DESCRIPTION

- Open vs closed fracture
- Anatomic location of fracture (distal, mid, proximal) and if fracture is intra-articular
- Fracture line pattern (transverse, oblique, spiral, comminuted)
- Relationship of fracture fragments (angulation, displacement, dislocation)
- Neurovascular status
FRACTURE CLASSIFICATION

Open versus closed
FRACTURE CLASSIFICATION

• **Anatomic Location of fracture** - which bone involved and location on bone
  * Rule of 3rds
  * Distal or proximal
  * Intra articular or extra articular
  * Diaphysis, Metaphysis, Epiphysis
FRACTURE CLASSIFICATION

Types of Bone Fractures

- Transverse
- Linear
- Oblique, nondisplaced
- Oblique, displaced
- Spiral
- Greenstick
- Comminuted
FRACTURE CLASSIFICATION

Fracture Line Pattern and force

- Oblique - other than 90 angle
- Transverse – 90 degree angle
- Spiral - twisting
- Green stick - 90 degree (child)
- Comminuted – longitudinal
- Segmental –
- Avulsion – by ligament or tendon
TYPES OF BONE FRACTURES

- Transverse
- Linear
- Oblique, nondisplaced
- Oblique, displaced
- Spiral
- Greenstick
- Comminuted
FRACTURE CLASSIFICATION

• **Displacement** –
  • How much bone pieces have moved
  • Describe by the distal fragment to the proximal fragment

• **Translation** – percentage of side ways movement compared to bone diameter – anterior, posterior, medial, lateral (Apposition)
FRACTURE CLASSIFICATION

DISPLACEMENT
FRACTURE CLASSIFICATION

- **Displacement**
  - **Shortening** – Amount the fracture is collapsed in Centimeters (bayonet)
  - **Rotation** – for long bone and fingers
FRACTURE CLASSIFICATION

DISPLACEMENT
FRACTURE CLASSIFICATION

Types of Bone Fractures

- Transverse
- Linear
- Oblique, nondisplaced
- Oblique, displaced
- Spiral
- Greenstick
- Comminuted
FRACTURE CLASSIFICATION

- Being able to accurately describe the fracture helps the referral process.

- Closed mid shaft extra-articular transverse non-displaced right femur fracture
BONE HEALING PROCESS

• **Primary** – healing without callus as with surgery with rigid fixation with plates and screws where the bone ends are abutted.

• **Secondary** – Healing with callus when there is no rigid fixation of the fractured bone ends non-surgically as with casts and splints, fracture braces, or surgically as with external fixation, bridge plates and intramedullary nailing.
BONE HEALING PROCESS

• Healing includes a Hematoma/inflammatory phase, a reparative phase with callus, and a remodeling phase.

• The Phases are not distinct, they overlap.
BONE HEALING PROCESS

- Inflammatory Phase with Hematoma
  - starts immediately
  - shortest of the 3 phases – total time - about 2 weeks
  - Strength at fracture site is the weakest
  - Best time to surgically reduce the fracture.
BONE HEALING PROCESS

• **Repair Phase**
  • by 2-3 weeks after injury
  • Soft callus – primarily cartilage
  • Hard callus – bone replaces the cartilage
  • Fracture strength is more than the inflammatory phase but not as strong as normal bone.
  • Clinical healing occurs with lack of fracture movement with pain relief and with radiographic healing changes.
BONE HEALING PROCESS

- **Remodeling Phase**
  
  woven bone replaced by lamellar bone, excess callus reabsorbed

- Starts about 6 weeks post injury, can last several years.

- This is when the fracture healing will be the strongest.
BONE HEALING PROCESS

Factors affecting Bone Healing

• Age
• Hormone balance and nutrition
• Medications – NSAIDS, corticosteroids, ABX
• Smoking
• Diabetes
• Weight bearing
• Patient non-compliance of above.
BONE HEALING PROCESS

What may improve bone healing

- Encourage Patient Compliance
- Balanced diet with sufficient Vitamin D3, Calcium and protein intake.
- Reduce or eliminate smoking and alcohol while healing.
- Avoid NSAIDS, study results mixed.
- Bone stimulators using electromagnetics or ultrasound. Results are mixed.
BONE HEALING PROCESS

Why discuss the Bone Healing Process

• You can tell your patients that
  • Most Fractures heal in about 8 weeks
  • 3 months before they feel normal
  • Up to a year for swelling to resolve
  • Surgery best done as close to 2 weeks as possible.
ACUTE FRACTURE MANAGEMENT

• Initial Assessment –
  • DON’T HAVE TUNNEL VISION, LOOK AT THE WHOLE PATIENT!
  • History
    • Mechanism of Injury (MOI)
    • Other injuries besides the obvious
    • Previous injuries of the affected side
    • PMHX, Medications and Allergies
ACUTE FRACTURE MANAGEMENT

• **Initial Assessment**
  • Physical Exam - TOUCH THE PATIENT!
    • ABCs – Life threatening issues
    • Neurovascular status, skin breaks
    • Palpate the entire bone and joints above and below the fracture site for tenderness.
    • Mechanism of Injury(MOI) dictates what x-rays to order.
ACUTE FRACTURE MANAGEMENT

• Radiographic Studies:
  • LOOK AT THE XRAYS YOURSELF!
  • DON’T WAIT FOR THE REPORT. LEARN TO READ X-RAYS!
  • If unsure, call the radiologist or Orthopedics if in the VA system to review online with them.
ACUTE FRACTURE MANAGEMENT

• **Radiographic Studies:**
  • Do at least 2 x-rays of the fracture that differ by 90 degrees.
    - Include the entire bone unless the physical exam eliminates the need.
ACUTE FRACTURE MANAGEMENT

- Radiographic Studies:
  - Get more x-rays if exam suggests fracture even with normal exam.
  - Reserve CT scans and MRIs for the specialist to use for fracture status or surgery planning.
ACUTE FRACTURE MANAGEMENT

- **Treatment** - regardless if you keep or refer
  - **Immobilize** acute fractures with a splint
    - stabilize fracture position,
    - **protect** blood vessels, nerves and muscles
    - **provide** pain relief.

- **Provide Initial Fracture treatment with**
  - **Analgesia** – avoid NSAIDS, use Acetaminophen
  - **Elevation** and **Ice** – to avoid swelling.
  - Keep or refer
ACUTE FRACTURE MANAGEMENT

- **Splinting**
  - Check neurovascular before / after splint
  - Apply dressing over skin breaks
  - Apply padding
  - Immobilize joint above and below fracture
ACUTE FRACTURE MANAGEMENT

• Other conservative treatment and support options –
  • casting, braces (hard soled shoes, fracture boots, wrist braces, Sarmiento brace)
  • Support fractures with slings (standard and cuff and collar), crutches (standard and forearm), wheel chairs with leg elevators, walker
  • Don’t send patients away without proper support.
ACUTE FRACTURE MANAGEMENT

• **Supplies for Splinting**
  
  • Plaster gauze, fiber glass-backed padded roll, Plus Stockinet sleeve, roll padding, tape, bandage scissors, water basin with room temperature water, Non-vinyl gloves and elastic bandages.
ACUTE FRACTURE MANAGEMENT

• **Complications of Casts or Splints**
  • Compartment syndrome
  • Ischemia
  • Heat injuries
  • Pressure sores and skin breakdown
  • Infections, Dermatitis
  • Joint Stiffness and Neurologic injury.
ACUTE FRACTURE MANAGEMENT

• Advantages of splinting
  • Faster, easier to apply, allows for swelling, minimizes pressure complications.
  • Are easier to remove than cast for exam
ACUTE FRACTURE MANAGEMENT

• Disadvantages of splinting
  • Patients can remove
  • Unstable fractures not as immobilized.
  • Splints good for initial treatment but not good for definitive care.
  • Splints have high risk of complication if not applied correctly.
ACUTE FRACTURE MANAGEMENT

- Casts provide better immobilization but require training and skill to minimize complications.

- BEFORE YOU APPLY CASTS OR SPLINTS BECOME TRAINED.

- YOUR PATIENT WILL BENEFIT AND THE TIME AND MONEY WILL BE WELL SPENT.
REFERRAL DECISIONS

Why refer?

- Patient injury beyond provider experience.
- Complicated fractures
- Non-compliant patients
REFERRAL DECISIONS

• Referral: When?
  • immediate – Now!
  • Within the week
  • Discuss with referring Orthopedist
REFERRAL DECISIONS

• **Urgent referral** – **immediate** – **NOW!**
• May Need Ambulance to the ER.
  Most patients will be seen in the Emergency Room.
  BUT don’t be surprised by what walks in your office front door!
• Why by Ambulance?
  • For patient condition
  • For condition of Family/ Driver
Urgent referral – immediate

- Significant soft tissue injury
- Life threatening injuries – hemorrhage, fat or pulmonary embolism, gas gangrene, tetanus.
- Arterial or Nerve injury
- Open fractures
REFERRAL DECISIONS

- **Urgent Referrals** – Ambulance to ER
- Compartment Syndrome – elevated pressures in rigid fascial muscle compartments.
- 5 Ps – pain, pallor, paresthesia, paralysis, pulseless – Late sign
- Tenting of skin - concern for open fracture
REFERRAL DECISIONS

• **Urgent Referral Ambulance to ER?**
  • **Complicated Fractures to refer**
    • Fractures needing to reduce
    • Multiple Fractures
    • Intra articular fractures
    • Fracture Dislocations
    • Epiphyseal plate fractures
    • Fractures with tendon injuries
THE REFERRAL

- When you have decided to refer to an orthopedist,
  - Learn the process to refer within the VA.
  - If outside of the VA, learn the referral process in your community. Get to know the orthopedists that you refer to.
  - Have the information gathered in your exam including history, medications, allergies, exam finding and changes, imaging CD and report and last I/O.
IF YOU KEEP YOUR PATIENT

• Stabilize the fracture with a splint
• Provide a written explanation of fracture care to patient including care of splint, use of ice, elevation, pain medication and avoidance of smoking and alcohol
• Advise patient to look for sudden changes in pain, sensation loss and swelling and know who to call with questions.
IF YOU KEEP YOUR PATIENT

• Situations change, if you have to refer, explain why to the patient.

• Consider braces, buddy taping, hard soled shoes, fracture boots.

• Don’t forget support appliances - slings, crutches, wheel chairs, knee walkers.
IF YOU KEEP YOUR PATIENT

• Schedule a Follow up in a week with x-rays
• Consider cast if swelling under control.
• Future follow up visit can be in 2 to 4 weeks if fracture is stable and patient is compliant.
IF YOU KEEP YOUR PATIENT

• Discuss rehabilitation as part of the process.

• Get to know your local VA Therapy department. Central vs CBOC Therapy.
  • OR

• the Therapists in your area for Veterans with the Choice Program or if you are a Non VA provider.
IF YOU KEEP YOUR PATIENT OR NOT

- Treat Fractures according to your level of experience.

- Remember, whether you Keep or Refer your patient, you are NOT alone.

- Please contact the Orthopedics Department in the VA with questions. Central or CBOC.

- Or Contact your local referral Orthopedist if unsure how to proceed.
THE REFERRAL

- Don’t forget the patient!
- Explain that you are referring him/her to an orthopedist to be evaluated for further treatment that may require surgery.
- While transport to an orthopedist’s office do not require ambulance transport, urgent patients transported to an ER may.
- Your Orthopedist should provide guidance.
COMMON FRACTURES

• Clavicle Fracture
  • Usually safe if mid clavicular shaft fracture
  • Lateral and medial shaft: concerning
  • Treat with sling and pain control
  • Consult if lateral or medial shaft fracture
    • Within a week
  • Consult if nonunion for surgery evaluation
    • With 12 to 16 weeks
  • Heals in 4 weeks, immobilize for 6 weeks
CLAVICLE FRACTURE
COMMON FRACTURES

• Distal Radius
  • Non/Min displaced
    • Splint/cast for 6-8 weeks
    • Follow up in 1 week for x-ray and cast
  • Displaced
    • Check Neuro/Vasc status – median nerve
    • Splint and refer within the 1st week.
    • Acute Carpal Tunnel Syndrome – emergency
    • Can also present late in healing process.
  • Healing 6 weeks Immobilize 6 weeks
DISTAL RADIUS FRACTURE
COMMON FRACTURES

• **Scaphoid Fracture** - Most common carpal fracture
  • Pain to snuff box with negative x-rays
  • Thumb spica splint, x-ray in 10-14 days
  • If fracture on initial x-ray or follow up
    • Refer to Orthopedist even if still painful with negative x-rays. Consider CT or MRI.
• Healing 8 weeks Immobilize - 12 weeks
SCAPHOID FRACTURE
COMMON FRACTURES

• Metacarpal Fracture
  • No significant angulation, dislocation or rotation
    • Splint with MCP joint at 70-90 degrees and fingers PIP/DIP joints flexed at 5-10 degrees
    • Transition to buddy taped fingers
  • With angulation, dislocation or rotation
    • Splint and refer for possible surgery
  • Heals in 5 weeks, splint 4 weeks then buddy tape for 2 weeks
METACARPAL FRACTURES
COMMON FRACTURES

- Judging rotation for finger or Metacarpal fractures
- Have patient slowly close fingers on both hand and compare.
- Fingers should point to same spot of distal radius and should not overlap
COMMON FRACTURES

• **Boxer’s Fracture** – 5\(^{\text{th}}\) Metacarpal fracture
  • Check rotation and fracture angle
  • Check for teeth marks and treat with
    • antibiotics if appropriate
    • Splint with ulnar gutter splint
  • With angulation, dislocation or rotation
    • Splint and refer for possible surgery
  • Heals in 5 weeks, splint 4 weeks then buddy tape for 2 weeks
BOXER’S FRACTURE
COMMON FRACTURES

• **Phalanx Fracture**
  • Check shaft – refer if rotation
  • Check joints – refer if displacement/ fx
  • Check Avulsion – refer
  • Splint in position to minimize tension on ligaments and tendons.
  • Refer hand fractures within 1 week for surgical evaluation
  • Healing of nondisplaced fracture
    4 weeks, immobilize for 3-4 weeks then buddy tape for 2-3 more weeks.
PHALANX FRACTURE
COMMON FRACTURES

- **Metatarsal / Phalange fractures (Toes)**
- **Keep**
  - Minimal/non displaced fractures
  - Short leg cast NWB Metatarsal fx
  - Fracture boot/hard sole shoe, buddy tape, WBAT, Toe fx
  - Toe heals 4 weeks immobilize 6 weeks
  - Metatarsal heals 6 weeks, immobilize 6
METATARSAL FRACTURE
SMALL TOE FRACTURE
COMMON FRACTURES

- Metatarsal / Phalange fractures
- Refer
  - Lis Franc Injury, Jones Fracture
  - Displaced Metatarsal shaft fracture
  - Intra-articular fracture
  - Multiple fractures
  - Apply short leg splint NWB
  - Refer in a week
LIS FRANC INJURY
JONES FRACTURE
METATARSAL FRACTURES
OTHER FRACTURES

• Refer the remainder of these fractures after initial evaluation, immobilization NWB and Immediate Orthopedic consult. Your Orthopedist will advise.

• Calcaneus and Talus
• Tibia Shaft
• Femoral Shaft
• Hip Fracture
• Humerus
• Ankle
AND IF UNSURE

• Remember these Words of Advice.
REFERENCES