Scaphoid Fracture

Description: The scaphoid is the most frequently fractured carpal bone, accounting for 71% of all carpal bone fractures, and 5% of all wrist injuries. Scaphoid fractures often occur in young and middle-aged adults, typically those aged 15-60 years. Men aged 20 to 30 years are most often affected. With particular reference to athletes, contact sports often yield higher rates of this type of injury. The importance of scaphoid fracture diagnosis is clear when one realizes that 90% of all acute scaphoid fractures heal if treated early. There are no specific risks or diseases that increase the chance of having a scaphoid fracture.

Etiology: The primary mechanism of injury to the scaphoid bone is a fall on an outstretched hand with resulting pain and swelling in the radial side of the wrist. Compression injury occurs with a longitudinal impaction or load of the wrist which leads to fracture without displacement. A displaced fracture results from a hyperextension injury where tensile stresses applied to the wrist exceed bone strength. Failure to diagnose scaphoid fractures, which can be well treated acutely, may result in delayed or non-union (with subsequent osteoarthritis) and deformity at a later date. Additional complications include avascular necrosis, and development of osteoarthritis of the radiocarpal joint.

Nonoperative versus Operative Management:
Typically, the initial course of conservative management is cast immobilization for 6-20 weeks. Surgical intervention is indicated if there are any signs that the fracture will not heal through simple immobilization.

Surgical Procedure:
Surgical procedure varies depending on the location of the fracture and whether the injury is acute or chronic. Kirschner wires, AO screws, Herbert screws, or staples may be used for fixation. Bone grafts, either vascularized or non vascularized may also be indicated. Central, acute, non-displaced or minimally displaced fractures: closed reduction and fixation with K-wires is often utilized. Acute or chronic fracture: bone grafts may be utilized with both types of fracture.

Preoperative Rehabilitation:
Preoperative rehabilitation may include temporary splinting and/or casting. Additional preoperative care includes patient education and instruction in post operative care and rehabilitation goals/expectations.

<u>Acute Stage / Severe Condition</u>: Physical Examinations Findings (Key Impairments)

ICF Body Functions code: **b7101.3** SEVERE impairment of mobility of several joints

- Swelling and ecchymosis around the distal radiocarpal may be present
- Limited wrist flexion and/or extension active and passive mobility
- Limited forearm supination and/or pronation active and passive mobility
- Limited thumb active and passive mobility
- Pain at mid range of limited motions
- Severe tenderness in the anatomical snuffbox and over the scaphoid tubercle

- Severe pain on axial compression of the CMC joint

Sub Acute Stage / Moderate Condition: Physical Examinations Findings (Key Impairments)
ICF Body Functions code: **b7101.2** MODERATE impairment of mobility of several joints

As above, except:

- Pain at end range of limited motions
- Moderate tenderness in the anatomical snuffbox and over the scaphoid tubercle
- Moderate pain on axial compression of the CMC joint
- Hypomobile radiocarpal, ulnomensico-triquetral, distal radioulnar, and/or intercarpal accessory movement tests

Settled Stage / Mild Condition: Physical Examinations Findings (Key Impairments)
ICF Body Functions code: **b7101.1** MILD impairment of mobility of several joints

As above, except:

- Mild pain at end range of with overpressure of writs flexion and/or extension motions
- Mild pain at end range of with overpressure of forearm supination and/or pronation motions
- Mild tenderness in the anatomical snuffbox and over the scaphoid tubercle
- Mild pain on axial compression of the CMC joint

Intervention Approaches / Strategies

Non-operative Rehabilitation

Acute Stage / Severe Condition: Immediately following injury to Week 2

Goals: Protection with short-arm cast
Control pain and edema
Maintain range in uninvolved joints (fingers, elbow, shoulder)
Incorporate basic activities of daily living (ADLs)

- Active range of motion (AROM) and passive range of motion (PROM) to the digits, except the thumb, which is immobilized
- AROM and active-assisted range of motion (AAROM) exercises to the elbow and shoulder
- At week 2, MD may repeat x-ray or choose a bone scan in the event of continued pain and tenderness over the snuffbox with negative x-rays

Sub Acute Stage / Moderate Condition: Week 3-6

Goals: Protection
Continue to control pain and edema as needed
Increase range of motion (ROM)
Incorporate activities of daily living (ADLs)

- Continue exercises as above
- Limit supination and pronation ROM exercises based on pain

Settled Stage / Mild Condition: Week 7-12

Goals: Full range of motion (ROM)
Begin strengthening program
Return to all activities (exception to contact sports and heavy labor)

- Remove short-arm cast at 6-8 weeks if fracture appears radiographically and clinically healed.
- May use wrist splint for protection
- Gentle AROM of the wrist and thumb
- Advance as tolerated to progressive resistive exercises (PREs) for all joints

Intervention for High Performance / High Demand Functioning in Workers or Athletes

Goal: As above
Return to optimum level of patient function

- Approaches / Strategies listed above
- External Devices
  Protective equipment
  Splint / Tape

Postoperative Rehabilitation for ORIF

Acute Stage / Severe Condition: Immediately following surgery to Week 3

Goals: Protection with cast or splint
Control pain and edema
Maintain range in uninvolved joints (fingers, elbow, shoulder)
Incorporate basic activities of daily living (ADLs)

- Elevation and application of compressive dressing of the arm to assist in edema control
- AROM and PROM of digits consisting of blocking and composite exercises, except the thumb
- AROM and AAROM exercises to the elbow and shoulder

Sub Acute Stage / Moderate Condition: Week 4-7

Goals: Protection with cast or splint
Continue to control pain and edema as needed
Increase range of motion (ROM)
Incorporate activities of daily living (ADLs)

- Continue fingers, elbow, and shoulder exercises as above
- At 6 weeks if fracture appears radiographically healed, cast or splint is removed for gentle AROM exercises of the wrist and thumb

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Settled Stage / Mild Condition: Week 8-12

Goals: Full range of motion (ROM)
Begin strengthening program
Return to all activities (exception to contact sports and heavy labor)

- Advance therapeutic exercises with gentle AROM of the wrist and thumb exercises
- Begin grip strengthening with use of silicone putty at 10 weeks
- Advance as tolerated to progressive resistive exercises (PREs) for all joints
- May use wrist splint for protection for all activities

Intervention for High Performance / High Demand Functioning in Workers or Athletes

Goal: As above
Return to optimum level of patient function

- Approaches / Strategies listed above
- External Devices
  Protective equipment
  Splint / Tape

Selected References:

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