

Table 1. Upper Extremity

Fracture	X-rays Needed	Immobilization	Fixation	Mobility Precautions
Scapula				
scapular body acromion process coracoid process glenoid neck glenoid fossa	AP/axillary/scapular shoulder	sling	screws reconstruction plates tubular plates mini T-plates	Stable: WBAT Unstable: protected weight-bearing 2-3 months no deltoid isometrics until 6 weeks post-stabilization sling immobilization as needed
Clavicle				
displaced nondisplaced	AP/axillary Shoulder	Sling or Figure of 8 Strap	reconstruction plates dynamic compression plate (DCP)	Stable: WBAT Unstable: PWB-NWB 6-8 weeks postinjury sling, figure 8 immobilization as fracture/patient status dictates
Humerus				
1. Proximal fractures greater tuberosity lesser tuberosity surgical neck anatomic neck	AP/axillary Shoulder AP/Lat Humerus	Coaptation Splint vs.Sling	plate wires (tension-band, K-wire) 2.5-mm Schanz pins screws external fixation hemiarthroplasty (elderly patient)	NWB 8-12 weeks sling, Neer protocol (circumduction, passive abduction & forward flexion, >4weeks then aaron)
2. Humeral shaft	AP/Lat Humerus	Coaptation Splint	DCP locked IM nail	NWB-WBAT as fracture pattern dictates
3. Distal humerus	AP/Lat Elbow AP/Lat Humerus	Posterior Elbow Splint	reconstruction plates tubular plates screws tension-band wire for olecranon osteotomy	NWB 8-12 weeks Aarom as soon as soft tissues allow
Radius & Ulna				
1. Olecranon	AP/Lat Elbow AP/Lat Forearm	Posterior Elbow Splint	tension-band wiring screw, wire fixation	Aarom as soon as soft tissues allow NWB
2. Radial head	AP/Lat Elbow AP/Lar Forearm	Posterior Elbow Splint	closed reduction mini-fragment screws mini T-plates	Aarom as soon as soft tissues allow NWB
3. Forearm isolated radius, ulna – both bones Monteggia/Glaeazzi	AP/Lat Forearm AP/Lat Forearm	Sugar Tong Splint Sugar Tong Splint	closed reduction plates screws (rare) IM nail (rare)	Aarom as soon as soft tissues allow NWB 8-12 weeks
4. Distal radius	AP/Lat Forearm	Sugar Tong Splint	closed reduction external fixation ORIF	Aarom as soon as soft tissues allow NWB 8-12 weeks
Wrist & Hand				
carpal MC phalanx	AP/Lat Hand AP/Lat Hand & Fingers	Dorsal-Volar Splint Buddy Tape	closed reduction wires mini-plates	cast, splint immobilization NWB-PWB 8-12 weeks

Terminology:

1. (NWB) Nonweight-bearing – patient may *not* use extremity for any weight-bearing activity
2. (TDWB) Touch-down weight-bearing – extremity may touch the ground just during rest, not during ambulation
3. (TTWB) Toe-touch weight bearing – toe may touch ground just for balance
4. (WOLWB) Weight-of-leg weight-bearing – approximately 20-30 lbs.
5. (PWB) Partial weight-bearing – weight limit specified by M.D.

Table 1. Upper Extremity (Continued)

Fracture	Initial Physical Therapy Program	Advanced Physical Therapy**
Scapula		
scapular body acromion process coracoid process glenoid neck glenoid fossa	Days 1-5: shoulder pendulum exercises elbow, forearm; wrist, hand AROM; grip strengthening Weeks 2-3: gentle PROM-AAROM shoulder; deltoid, rotator cuff isometrics If stable fracture pattern- shoulder PROM-AAROM initiated 1 week postinjury, ROM, strengthening progressed to tolerance	Stable: PROM/strengthening as tolerated Unstable: strengthening at 3 months; progress to isometrics, surgical tubing, and free weights
Clavicle		
displaced nondisplaced	Stable Day 1 post-stabilization: early shoulder AROM-AAROM to tolerance; shoulder isometrics; elbow, forearm, wrist, hand AROM; grip strengthening Unstable: limit ROM as fracture pattern dictates	Stable: PROM/strengthening as tolerated Unstable: strengthening at 6-8 weeks; return to activity in 10-12 weeks
Humerus		
1. Proximal fractures greater tuberosity lesser tuberosity surgical neck anatomic neck	Day 1 post-stabilization: elbow, forearm, wrist, hand AROM; grip strengthening Days 2-5: pendulum shoulder exercises Weeks 1-3: early gentle AAROM shoulder joint within mobility limitations; deltoid, biceps, triceps, isometrics Weeks 3-6: AROM, gentle PROM shoulder	Week 12: begin strengthening; progress to isometrics, surgical tubing, free weights, isokinetics; scapular stabilization exercises are important
2. Humeral shaft	Day 1 post-stabilization: elbow, forearm, wrist, hand AROM grip strengthening Days 2-5: Pendulum shoulder exercises Weeks 1-3: Early gentle AAROM shoulder joint within mobility limitations: deltoid, biceps, triceps, isometrics Weeks 3-6: AROM, gentle PROM shoulder	Weeks 10-12: strengthening Week 12: progression the same as for the proximal humerus
3. Distal humerus	Day 1 post-stabilization: shoulder AAROM-AROM; wrist, hand active range of motion-CPM (elbow) as M.D. indicates Days 2-5: gentle elbow, forearm AROM; deltoid isometrics; grip strengthening Weeks 8-10: gentle PROM-AAROM elbow, forearm	Weeks 10-12: strengthening Week 12: isokinetics
Radius & Ulna		
3. Olecranon	Days 1-7 post-stabilization: early gentle AAROM-AROM forearm, elbow (initiated after 2-3 days); shoulder, wrist, hand AROM; grip strengthening	Weeks 10-12: PROM; strengthening
4. Radial head	Days 1-7 post-stabilization: early elbow AROM shoulder, wrist, hand AROM; grip strengthening	Weeks 10-12: PROM; strengthening
3. Forearm isolated radius, ulna – both bones Monteggia/Glaeazzi	Days 1-5 post-stabilization: immediate shoulder, hand AROM; early, gentle AAROM forearm, elbow, wrist as fracture stability allows; grip strengthening	Weeks 10-12: PROM Week 12: strengthening Weeks 8-10: PROM; light activity
4. Distal radius	Days 1-5 post-stabilization: immediate AROM shoulder, elbow, fingers; initiation of gentle wrist AROM as immobilization allows (after cast removal than splint); grip strengthening	Weeks 10-12: strengthening
Wrist & Hand		
carpal MC phalanx	Days 1-5 post stabilization: early AROM-AAROM fingers, wrist, forearm as fracture and stabilization allow; elbow, shoulder AROM; fine motor control, desensitization; techniques as indicated	Weeks 8-10: PROM; light activity Weeks 10-12: strengthening

6. (WBAT) Weight-bearing as tolerated – patient may bear weight through extremity as tolerated

7. (TKE) Terminal knee extension – short-arc quadriceps strengthening exercises

8. (SLR) Straight leg raises – isometric strengthening exercises with hip flexion

*Post-stabilization to healing

**After fracture healing

Table 2. Lower Extremity: Acetabulum to Femur

Fracture	X-Rays Needed	Immobilization	Fixation	Mobility Precautions
Acetabulum				
Posterior wall; posterior columns; anterior wall; anterior column; transverse; T-shaped; posterior column/posterior wall; transverse/posterior wall; both column; anterior column with posterior hemitransverse (Letournel classification)	AP Pelvis Judet Views CT San (3mm Cuts)	Distal Femoral Traction	Lag screws reconstruction plates	Kocher-Langenbeck approach: (posterior), avoid active hip extension rotation Iliinguinal approach: (anterior), avoid active hip flexion, vigorous trunk and abdominal flexion Extended iliofemoral approach: (posterolateral), no active hip abduction 6-8 weeks; weight-bearing; NWB 8-12 weeks; positioning ROM; posterior wall involvement – no hip flexion greater than 70 degrees for 6 weeks
Pelvis				
1. Anterior ring public symphysis rami	AP, inlet & outlet Pelvis, CT scan	See pelvic fracture disruption protocol	plating external fixation lag screws	TDWB-WBAT 10-12 weeks postinjury (depends on associated, posterior ring involvement)
2. Posterior Ring Sacrum SI fracture/dislocation iliac wing			screws plating	TDWB-WOLWB 10-12 weeks
Femur				
1. Femoral head	AP Pelvis AP/Lat hip	Distal Femoral Traction	Screw fixation hemiarthroplasty THA (in elderly patient as fracture dictates)	Toe-touch weight-bearing 8-12 weeks no straight leg raises (SLR) TTWB, WBAT dependent on prosthesis fixation (see femoral neck fracture)
2. Femoral neck	AP Pelvis AP/Lat both hips (uninjured side with templates)	Buck's Traction	screws dynamic hip screw endoprosthesis (elderly)	WB as necessary for balance for ambulation WB as necessary for balance for ambulation WBAT ROM precautions: avoid simultaneous/combo movements of the operative hip. Allow flexion, extension, abduction, adduction or rotation in cardinal planes of motion with no restriction; no SLR 6 weeks Posterior surgical approach: no hip flexion greater than 60 degrees, avoid hip adduction, internal rotation past neutral; no SLR 6-8 weeks WB as necessary for balance for ambulation
3. Interochanteric femur	AP Pelvis AP/Lat hip	Buck's Traction	DHS IM nail	TTWB; no SLR; no active hip abduction with blade-plate fixation
4. Subtrochanteric femur	AP Pelvis AP/Lat Femur	Distal Femoral Traction	DHS Blade plate IM nail	Interlocked nail/plate TTWB 6-8 weeks
5. Femoral shaft	AP/Lat Femur AP/Lat Knee AP Pelvis If severely comminuted get scanogram opposite femur	Distal Femoral or proximal tibial Traction	IM nail DCP, LC, DCP	Note: Knee immobilizer, external support may be needed To allow early crutch training if quad control slowly achieved; DCP fixation same as IM nail protocol TDWB 10-12 weeks
6. Supracondylar, intracondylar femur	AP/Lat Femur AP/Lat Knee AP Pelvis	Knee Immobilizer	condylar blade plate; condylar buttress plate; screws	

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3. (TTWB) Toe-touch weight bearing – toe may touch ground just for balance
4. (WOLWB) Weight-of-leg weight-bearing – approximately 20-30 lbs
5. (PWB) Partial weight-bearing – weight limit specified by M.D.

Table 2. Lower Extremity: Acetabulum to Femur (Continued)

Fracture	Initial Physical Therapy Program	Advanced Physical Therapy**
Acetabulum	Days 1-discharge: bilateral UE strengthening; AAROM knee, ankle; quad, hamstring isometrics, TKE; early mobilization initiated (exercise instruction, bed mobility, transfer, ambulation training); hip AAROM, flex<60 if post wall fx; lying prone is encouraged to prevent hip flexion contracture (2-3x/day, 20 min intervals); Weeks 6-8: AROM –AAROM hip, no limits; hip abductor isometrics; hip extensor strengthening	Weeks 12-14: WBAT, wean from crutches, gait retraining; strengthen quads, hamstrings, abductors, flexors, extensors, and lower trunk muscles; initiate balance/proprioceptive awareness training; aerobic/fitness training; rehabilitation is tailored to the surgical approach (i.e., extended iliofemoral approach requires more extensive hip abductor strengthening)
Pelvis	Day 1-discharge: bilateral UE strengthening; AAROM hip joint as fracture stability/pattern allows; quad/hamstring sets, terminal knee extension; AROM knee, ankle	Weeks 12-14: WBAT, wean from crutches, gait retraining; strengthen quads, hamstrings, abductors, flexors, extensors, and lower trunk muscles; initiate balance/proprioceptive awareness training; aerobic/fitness training
3. Anterior ring pubic symphysis rami		
4. Posterior Ring Sacrum SI fracture/dislocation iliac wing	Day 1-discharge: bilateral UE strengthening; PROM hip joint as fracture stability/pattern allows; quad/hamstring sets, terminal knee extension; AROM knee, ankle	Weeks 12-14: WBAT, wean from crutches, gait retraining; strengthen quads, hamstrings, abductors, flexors, extensors, and lower trunk muscles; initiate balance/proprioceptive awareness training; aerobic/fitness training
Femur	Day 1-discharge: bilateral UE & contralateral LE strengthening; AAROM, isometrics, AP involved LE; bed mobilization/transfer and ambulation training	Weeks 3-6: A/AAROM operative hip; hip abductor & extensor strengthening; balance/proprioception training Week 6-12: WBAT, wean from crutches; hip abductor & extensor strengthening, balance/proprioceptive training; closed kinetic chain activities, functional training
3. Femoral head		
4. Femoral neck	Day 1-discharge: bilateral UE & contralateral LE strengthening; quad/hamstring, AAROM, isometrics, AP involved AAROM; bed mobilization/transfer and ambulation training	Weeks 3-6: A/AAROM operative hip; hip abductor & extensor strengthening; balance/proprioception training Week 6-12: WBAT, wean from crutches; hip abductor & extensor strengthening, balance/proprioceptive training; closed kinetic chain activities, functional training
3. Interchanteric femur	Day 1-discharge: bilateral UE & contralateral LE strengthening; AAROM, isometrics, AP involved LE, TKE/assisted SLR; bed mobilization/transfer and ambulation training	Weeks 3-6: A/AAROM operative LE; TKE, SLR; hip girdle, quad & hamstring strengthening; balance/proprioception training Week 6-12: WBAT, wean from crutches; hip abductor & extensor strengthening, balance/proprioceptive training; closed kinetic chain activities, functional training
4. Subtrochanteric femur	Day 1-discharge: bilateral UE & contralateral LE strengthening; AAROM, isometrics, AP involved LE, TKE/assisted SLR; bed mobilization/transfer and ambulation training	Weeks 3-6: A/AAROM operative LE; TKE, SLR; hip girdle, quad & hamstring strengthening; balance/proprioception training Week 6-12: WBAT, wean from crutches; hip abductor & extensor strengthening, balance/proprioceptive training; closed kinetic chain activities, functional training
5. Femoral shaft		
6. Supracondylar, intracondylar femur	Day 1-discharge: bilateral UE & contralateral LE strengthening; AAROM, isometrics, AP involved LE, TKE/assisted SLR; bed mobilization/transfer and ambulation training	Weeks 3-6: A/AAROM operative LE; TKE, SLR; hip girdle, quad & hamstring strengthening; balance/proprioception training Week 6-12: WBAT, wean from crutches; hip abductor & extensor strengthening, balance/proprioceptive training; closed kinetic chain activities, functional training

6. WBAT) Weight-bearing as tolerated – patient may bear weight through extremity as tolerated

7. (TKE) Terminal knee extension – short-arc quadriceps strengthening exercises

8. (SLR) Straight leg raises – isometric strengthening exercises with hip flexion

*Post-stabilization to healing

**After fracture healing

Table 3. Lower Extremity: Patella to Foot

Fracture	X-rays Needed	Immobilization	Fixation	Mobility Precautions
Patella				
Nondisplaced; displaced	AP/Lat Knee	knee immobilizer	cylinder cast, lag screw (s) tension-band wiring	Stable: WBAT Unstable: TTWB 4-8 weeks
Tibia				
1. Tibial plateau	AP/Lat Knee CT Scan	knee immobilizer	buttress T-plate DCP screws	TDWB 8-12 weeks NO TKE exercise (avoid excessive end- range anterior tibial glide)
2. Tibial Shaft	AP/Lat tibia	Cadillac Splint	IM nail reamed and unreamed; plates and screws; external fixator	PWB 6-8 weeks TDWB 8-12 weeks PWB 6-8 weeks
Ankle				
1. Pilon	AP/Lat Ankle Mortise View AP/Lat Tibia	Cadillac Splint Calacneal Traction	screws and plates	NWB 12 weeks
2. Medial malleolus, posterior malleolus, lateral malleolus (Weber A, B, C)	AP/Lat Ankle Mortise View	Cadillac Splint	screws, plates, and tension-band wiring	PWB 8-12 weeks
Foot				
1. Calcaneus extraarticular intraarticular	Lat Foot Oblique Foot Harris Heel View CT Scan (3mm Cuts)	Cadillac Splint Use a lot of padding to protect from Inevitable swelling.	Reconstruction plate H-plate; lag screw K-wires	NWB 12 weeks
2. Talus	Lat Foot Oblique Foot	Cadillac Splint With toe plate	lag screws K-wires (rare)	NWB 12 weeks
3. Metatarsals and phalanx	AP/Lat & oblique Foot	Cadillac Splint With toe plate	screws, wires, and pins	closed reduction immobilization

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5. (PWB) Partial weight-bearing – weight limit specified by M.D.
6. (WBAT) Weight-bearing as tolerated – patient may bear weight through extremity as tolerated
7. (TKE) Terminal knee extension – short-arc quadriceps strengthening exercise

Table 3. Lower Extremity: Patella to Foot (Continued)

Fracture	Initial Physical Therapy Program	Advanced Physical Therapy**
Patella Nondisplaced; displaced	Days 1: bilateral UE strengthening; ankle AROM; knee CPM post-op if indicated Days 2 to discharge: quad hamstring isometrics***; knee/AROM as fracture pattern allows***; SLR***	Weeks 4-8: strengthening; progress knee A/AROM; begin quad Isometrics and SLR if there was quad mechanism involvement Week 8: WBAT, wean from crutches; concentrate on short arc/end range; quadriceps strengthening; closed kinetic chain activities (i.e., cycling, partial squats, leg press); balance proprioceptive training
Tibia 1. Tibial plateau	Day 1-discharge: bilateral UE & contralateral LE strengthening; AAROM, isometrics, AP involved LE; bed mobilization/transfer and ambulation training Weeks 6-8: TKE initiated; A/AROM operative LE; hip girdle, quad & hamstring strengthening; balance/proprioception training	Weeks 12-14: WBAT, wean from crutches, gait retraining; strengthen quads, hamstrings, abductors, flexors, extensors, and lower trunk muscles; initiate balance/proprioceptive awareness training; aerobic/fitness & functional training
2. Tibial Shaft	Day 1-discharge: bilateral UE & contralateral LE strengthening; AAROM, isometrics, AP involved LE; bed mobilization/transfer and ambulation training Weeks 6-8: TKE initiated; A/AROM operative LE; hip girdle, quad & hamstring strengthening; balance/proprioception training	Weeks 12-14: WBAT, wean from crutches, gait retraining; strengthen quads, hamstrings, abductors, flexors, extensors, and lower trunk muscles; initiate balance/proprioceptive awareness training; aerobic/fitness & functional training
Ankle 1. Pilon	Immediate post-stabilization: bilateral UE strengthening; gluteal, quad, hamstring isometrics Day 2 to discharge: hip, knee toe AROM; SLR, TKE Week 2: ankle subtalar AROM; progressive hip and knee strengthening	Week 12: PROM initiated; strengthening; balance/proprioceptive awareness training; WBAT, wean from crutches; closed kinetic chain program
2. Medial malleolus, posterior malleolus, lateral malleolus (Weber A, B, C)	same as pilon fracture	Weeks 8-10: gait progression after fracture healing; AROM/PROM ankle and subtalar joints; balance/proprioceptive awareness training
Foot 1. Calcaneus extraarticular intraarticular	Preoperative: UE strengthening; uninjured extremity strengthening Involved extremity hip, knee isometrics; crutch training for short distance (primary elevation of extremity) Day 1: UE strengthening; uninjured extremity AROM strengthening involved extremity hip- knee isometrics; AROM, Toe AROM to tolerance Days 2-3: crutch training, NWB involved extremity (limited time in dependent position) Days 4-7: early ankle, subtalar AROM when surgical incision is sealed Week 1 to month 3: continue early AROM ankle, subtalar, toes; gentle PROM toe dorsiflexion and plantarflexion; progress involved extremity; hip-knee conditioning Same as calcaneus	Month 3: gradually increase weight-bearing starting at 20lbs to FWB over 1 mo; gradually wean from assistive device as patient tolerates; pool therapy if available; gait training, re-education; desensitization techniques as needed; ankle subtalar AROM isometrics; low impact endurance training Months 4-6: gait progression, advanced balance and proprioceptive activities; ankle, subtalar isometric, isotonic strengthening with tubing/theraband; no free weights; soft-tissue immobilization Month 6: ankle, subtalar PROM; joint mobilization; isokinetic assessment, strength-endurance training; advanced balance, gait training as indicated
2. Talus	Day 1 post-stabilization: bilateral UE strengthening; hip, knee AROM, isometrics; ankle, subtalar, toe AROM as fracture Pattern allows	Same as calcaneus
3. Metatarsals and phalanx		Same as calcaneus
8. (SLR) Straight leg raises – isometric strengthening exercises with hip flexion		Weeks 8-12: WBAT; wean from crutches; proprioceptive/balance training; closed kinetic chain activities
9. (UE) Upper extremity		
10. (LE) Lower extremity		

*Post-stabilization to healing

**After fracture healing

***Note: No active quads if quadriceps mechanisms involved or disrupted