Manual Therapy Techniques are skilled hand movements and skilled passive movements of joints and soft tissue and are intended to improve tissue extensibility; increase range of motion; induce relaxation; mobilize or manipulate soft tissue and joints; modulate pain; and reduce soft tissue swelling, inflammation, or restriction. Techniques may include manual lymphatic drainage, manual traction, massage, mobilization/manipulation, and passive range of motion.

APTA Guide to Physical Therapy Practice

Orthopedic Manual Therapy
Common Applications

• Muscle Energy Techniques
  – Manually applied stretching/mobilization where patient actively uses his or her muscles on request while maintaining targeted preposition against a distinctly executed counterforce
• Passive mobilization with an active movement
  – Rhythmic, repetitive passive movement to pt tolerance, in voluntary &/or accessory ranges, performed concomitantly with an active movement of the pt at the same region

The Stiff Hand: Manual Therapy

Sylvia Davila, PT, CHT
San Antonio, Texas

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Indications for Joint Mobilization

- **Joint Pain**
  - Small amplitude joint play techniques
  - Stimulate mechanoreceptors in joints to reduce pain transmissions to the brain
  - Stimulate synovial fluid production & motion to bring more nutrients to articular surfaces
- **Joint hypo mobility**
  - Large amplitude joint play techniques to elongate & stretch hypo mobile articular tissues

Contraindications for Joint Mobilization

- **Severe joint swelling**
- **Unhealed fractures**
- **Severe osteoporosis**
- **Hyper mobility / ligamentous instability**
- **Conditions in which synovitis can cause permanent ligamentous or capsular damage (ie. RA)**

Joint Mobilization

- **Effects**
  - Nutritional: increases synovial fluid to improve nutrition
  - Mechanical: capsular stretch deforms collagen to improve motion
  - Neurophysiological: mechanoreceptors are stimulated → inhibit nociceptive stimulation → causes muscle relaxation

Closed Pack Position

- Joint capsule & ligaments are in maximum tension; tension is maximized between the joints

Loose Pack Position

- Joint capsule & ligaments are lax, joint play is available
  - Wrist: neutral for radio-carpal joint
  - MCPs & IPs: slight flexion
  - Thumb MCP: midway between ext & flex
  - Thumb CMC: midway between add & abd
End Feel

- Bony
- Capsular
- Muscle guarding
- Springy
- Empty

Joint Mobilization

- Grades of movement for oscillations
  - Grade I: to relieve pain, small amplitude at beginning ROM
  - Grade II: to relieve pain, large amplitude at beginning thru mid range ROM
  - Grade III: to decrease joint stiffness, large amplitude from mid range to normal limit of motion
  - Grade IV: to decrease joint stiffness, small amplitude at normal limit of motion
  - Grade V: manipulation, small amplitude beyond end range

Convex Concave Rule

- When examiner mobilizes the bone with the concave surface, move in the same direction as the restriction
- When the examiner moves the bone with the convex surface, move in the opposite direction as the restriction

Hand

- Essential for prehension and grasp
- Sensitive sensory receptor that gives cerebral cortex sensory feedback vital to its own function
MCP & IP Joints

- MCP Joints
  - Condyloid joints
  - Allow 2 planes of movement
    - Flexion / extension
    - Abduction / adduction
- IP Joints
  - Hinge joints
  - Allow 1 plane of movement: flexion / extension

MCP & IP Joints: Volar & Dorsal Glides

- Therapist’s hands
  - “Pinch” index & thumb around each bone
- Mobilizing force
  - Stabilize proximal bone & apply traction to each distal bone
  - Glide distal bone in volar direction then in dorsal direction

MCP & IP Joints: Volar & Dorsal Glides

- Articular surfaces are similar: distal ends of bones are all convex & proximal ends of the bones are concave, therefore joint mobilizations are performed in same manner
- Start position
  - Patient sitting with forearm resting on table
  - Elbow flexed 70-80 degrees
  - Pronated
  - Wrist neutral & over edge of table
  - Digits slightly flexed

Thumb

- Essential for pinch & power grasp activities
- 4 joints in column of thumb
  - Scapho-trapezial joint
    - Performed as the Intercarpal Joint Mob: stabilization of trapezium & glide the scaphoid volar & dorsally
  - Trapezio-metacarpal joint: saddle joint
CMC Joint:
Traction, Volar & Dorsal Glides

• CMC joints are plane joints that allow weak flexion & extension with ROM increasing from 2nd to 5th MC
• Allows cupping of hand
• Purpose
  – Increase mobility of hand specifically to enhance cupping & flattening of the hand

CMC Joint:
Traction, Volar & Dorsal Glides

• Therapist's hands
  – “pinch” index & thumb around each bone
  • 5th ray: 5th MC & hamate
  • 4th ray: 4th MC & hamate
  • 3rd ray: 3rd MC & capitate
  • 2nd ray: MC & trapezoid
• Mobilizing force
  – Stabilize carpal bone & apply traction to each MC then glide MC in volar direction then in dorsal direction

CMC Joint:
Traction, Volar & Dorsal Glides

• Starting point
  – Patient sitting with forearm resting on table
  – Elbow flexed 70-80 degrees
  – Pronated
  – Wrist neutral over edge of table
  – Hand resting

Wrist Mobilization Techniques
Radiocarpal Joint: Traction, Volar & Dorsal Glides

• Purpose
  – Traction: to increase joint play in radiocarpal & ulnocarpal joints & decrease pain
  – Volar glide: to increase wrist extension
  – Dorsal glide: to increase wrist flexion

• Start position
  – Patient sitting with forearm resting on table
  – Elbow flexed 70-80 degrees
  – Pronated
  – Wrist neutral over edge of table
  – Hand resting

Radiocarpal Joint: Radial & Ulnar Glides

• Purpose
  – Radial glide to increase wrist UD
  – Ulnar glide to increase wrist RD

Radiocarpal Joint: Traction, Volar & Dorsal Glides

• Therapist hands:
  – Stabilize distal radius & ulna at styloid processes grasping dorsally with one hand, around distal carpal row with other hand
• Mobilizing force
  – Pull carpals distally for traction
  – Volar glide: apply simultaneous force in volar direction (Add physiological wrist extension during volar glide)
  – Dorsal glide: apply simultaneous force in dorsal direction
Radiocarpal Joint: Radial & Ulnar Glides

- Starting position
  - Patient sitting with forearm resting on table
  - Elbow flexed to 70-80 degrees
  - Forearm neutral rotation
  - Wrist neutral over edge of table
  - Hand resting

Radiocarpal Joint: Scaphoid-Radius & Lunate-Radius Mobilizations

- Starting position
  - Patient sitting with forearm resting on table
  - Elbow flexed 70-80 degrees
  - Pronated
  - Wrist neutral over edge of table
  - Hand resting

- Therapist’s hands
  - Pinch index & thumb around distal radius with one hand & scaphoid or lunate with other hand

Radiocarpal Joint: Radial & Ulnar Glides

- Therapist’s hands
  - Stabilize distal radius & ulna at styloid processes grasping dorsally with one hand, grasp distal carpal row with other hand

- Mobilizing force
  - Pull carpal distally for traction
  - Radial glide: apply simultaneous force in radial direction
  - Ulnar glide: apply simultaneous force in ulnar direction (add physiological UD during radial glide or RD during ulnar glide)

Radiocarpal Joint: Scaphoid-Radius & Lunate-Radius Mobilizations

- Mobilizing force
  - To increase flexion
    - Stabilize scaphoid or lunate & glide radius in volar direction
  - To increase extension
    - Stabilize radius & glide scaphoid or lunate in volar direction
    - Add physiological extension during volar glide of scaphoid or lunate
Intercarpal Joint Mobilizations

- Purpose: general wrist mobility
- Start position:
  - Patient sitting with forearm resting on table
  - Elbow flexed 70-80 degrees
  - Pronated
  - Wrist neutral and over edge of table
  - Hand resting

Intercarpal Joint Mobilizations

- To increase flexion
  - Glide concave radius volarly on stabilized scaphoid
  - Glide concave radius volarly on the stabilized lunate
  - Glide concave trapezium-trapezoid unit volarly on stabilized scaphoid
  - Glide concave lunate volarly on the stabilized capitate
  - Glide concave triquetrum volarly on the stabilized lunate

Intercarpal Joint Mobilizations

- Grasp patient’s hand so elbow hangs unsupported
- Weight of arm provides slight distraction to joint so therapist only needs to apply glides
- Therapist’s hands
  - Pinch index & thumb around capitate with one hand and pinch one carpal bone (lunate, scaphoid, triquetrum) with other hand
- Mobilizing force
  - Stabilize capitate & glide each carpal bone in volar direction then dorsal direction

Intercarpal Joint Mobilizations

- To increase extension
  - Glide convex scaphoid volarly on stabilized radius
  - Glide convex lunate volarly on the stabilized radius
  - Glide convex scaphoid volarly on stabilized trapezium-trapezoid unit
  - Glide convex capitate volarly on the stabilized lunate
  - Glide convex hamate volarly on the stabilized triquetrum
Distal Radial Ulnar Joint: Volar & Dorsal Glides

- DRUJ – concave ulnar notch of the radius articulates with the convex head of the ulna
- Purpose
  - Volar glide to increase pronation
  - Dorsal glide t increase supination

Identify Joint Dysfunction & Determine Treatment

- Intra-articular adhesions or pericapsular stiffness
  - ROM unaffected by proximal or distal joint position; capsular end feel
  - Treatment:
    - Mobilize

- Shorted extra-articular muscles:
  - ROM affected by proximal or distal joint position
  - Treatment:
    - Stretch
Identify Joint Dysfunction & Determine Treatment

- **Muscle weakness:**
  - ROM affected by gravity

- Treatment:
  - Strengthen

Identify Joint Dysfunction & Determine Treatment

- Nerve root adhesion or entrapment
  - Neural tension tests

- Treatment:
  - Neural Mobilization

Identify Joint Dysfunction & Determine Treatment

- **Pain:**
  - Empty end feel

- Treatment
  - Modalities or Grade II – II mobs

Identify Joint Dysfunction & Determine Treatment

- Soft tissue restrictions:
  - Palpation

- Treatment:
  - Soft Tissue Mobilization
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Sylvia Dávila, PT, CHT
San Antonio, Texas