Physical Medicine & Rehabilitation

Background, Comprehensive Spectrum, and Therapeutic Protocols

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THE WARTIME CATALYST: WWI & WWII

Wartime Muscle Wasting Crisis

- ✓ **Prolonged Bedbound Rest:** Wounded soldiers were treated with months of total immobilization, causing severe muscle wasting and joint.
- ✓ **Early Movement Breakthrough:** Military officers introduced early movement, massage, and exercise.

SUBJECT ORIGINS & PIONEERS

Dr. Frank H. Krusen, MD

The **"Father of Physical Medicine"** who established PMR as an academic specialty after personal recovery from tuberculosis.

He founded the first clinical department of PMR at Mayo Clinic in 1935, standardizing exercise and thermal agent protocols.

THE PHILOSOPHY OF PHYSIATRY

Function Over Disease

Physiatry shifts focus from pure disease pathology to restoring maximum physical, functional, and cognitive independence.

Interdisciplinary Synergy

The Physiatrist directs multi-disciplinary units of Physiotherapist (PT), Occupational Therapists (OT), and Speech Pathologists.

Rehab Team :

- ✓ Physiatrist (PMR physician)
- ✓ Physiotherapist
- ✓ Occupational Therapist
- ✓ Speech and Language Therapist
- ✓ Rehabilitation Nurse
- ✓ Psychologist/Counselor
- ✓ Medical Social Worker
- ✓ Orthotist/Prosthetist
- ✓ Vocational Therapist/Counselor
- ✓ Dietitian/Nutritionist

Neurorehabilitation Programs

Restoring cerebral control, motor pathways, spinal coordination, and metabolic functions following acute central nervous system injuries.

Neuro Rehab

Stroke recovery

- ✓ Range of Motion (ROM) exercise
- ✓ Stretching & Strengthening exercise

Neuro Rehab

Stroke recovery

Neuroplasticity Restoration

- ✓ **CIMT Strategy**: Constraint-Induced Movement Therapy
- ✓ **Gait Pathway Pacing**: Early progressive treadmill pacing with partial weight-bearing suspension helps re-establish natural symmetrical walking cycles.

Neuro Rehab

Traumatic Brain Injury

- ✓ **Sensory Pacing Regimes:** Managing sensory re education through graded multi-sensory stimulation programs in structured clinical rooms.

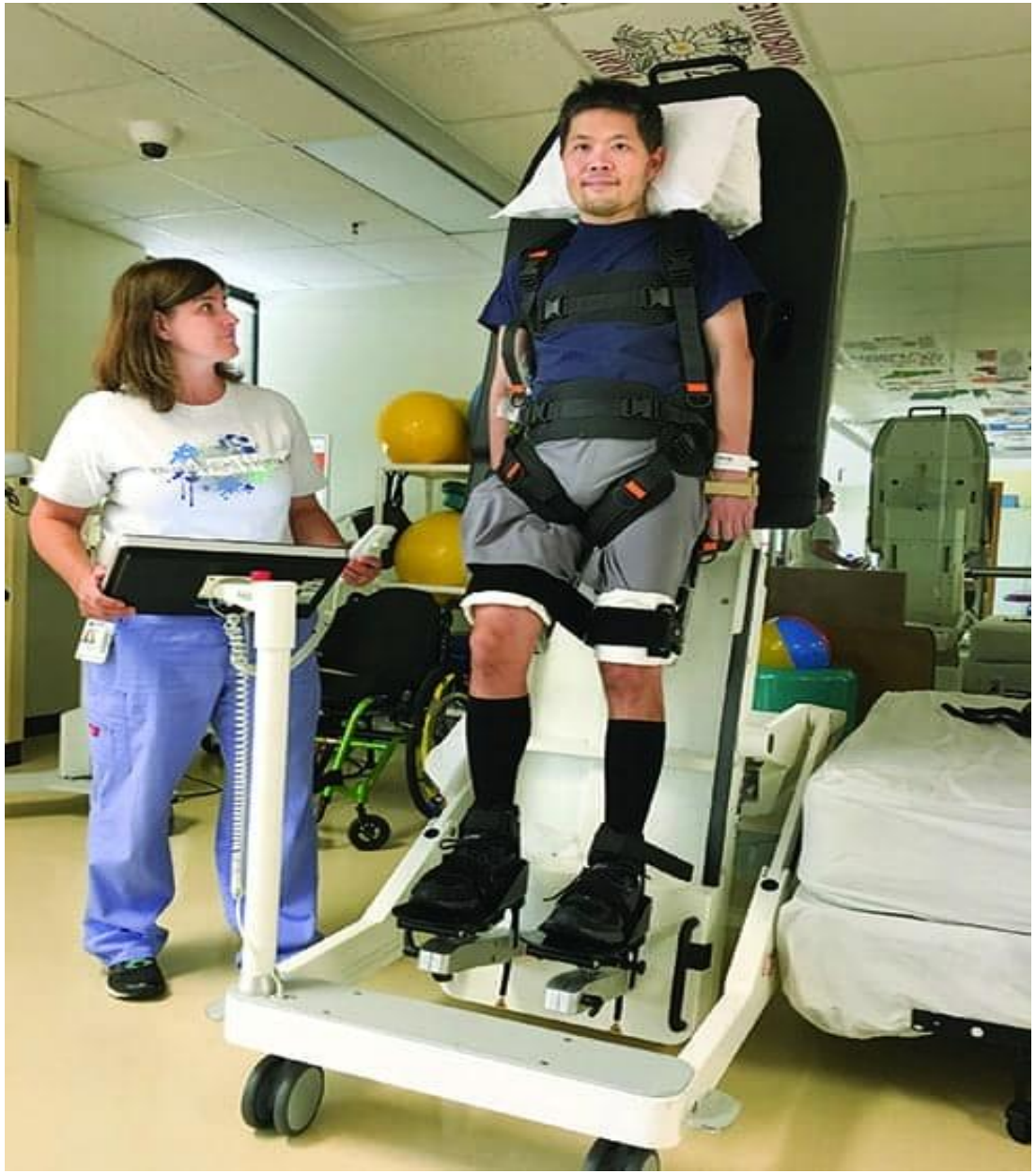
- ✓ **Coordination Re-Patterning:** Using rhythmic auditory cueing to reconstruct balance.

Neuro Rehab

Spinal Cord Injury

Autonomous & Postural Conditioning

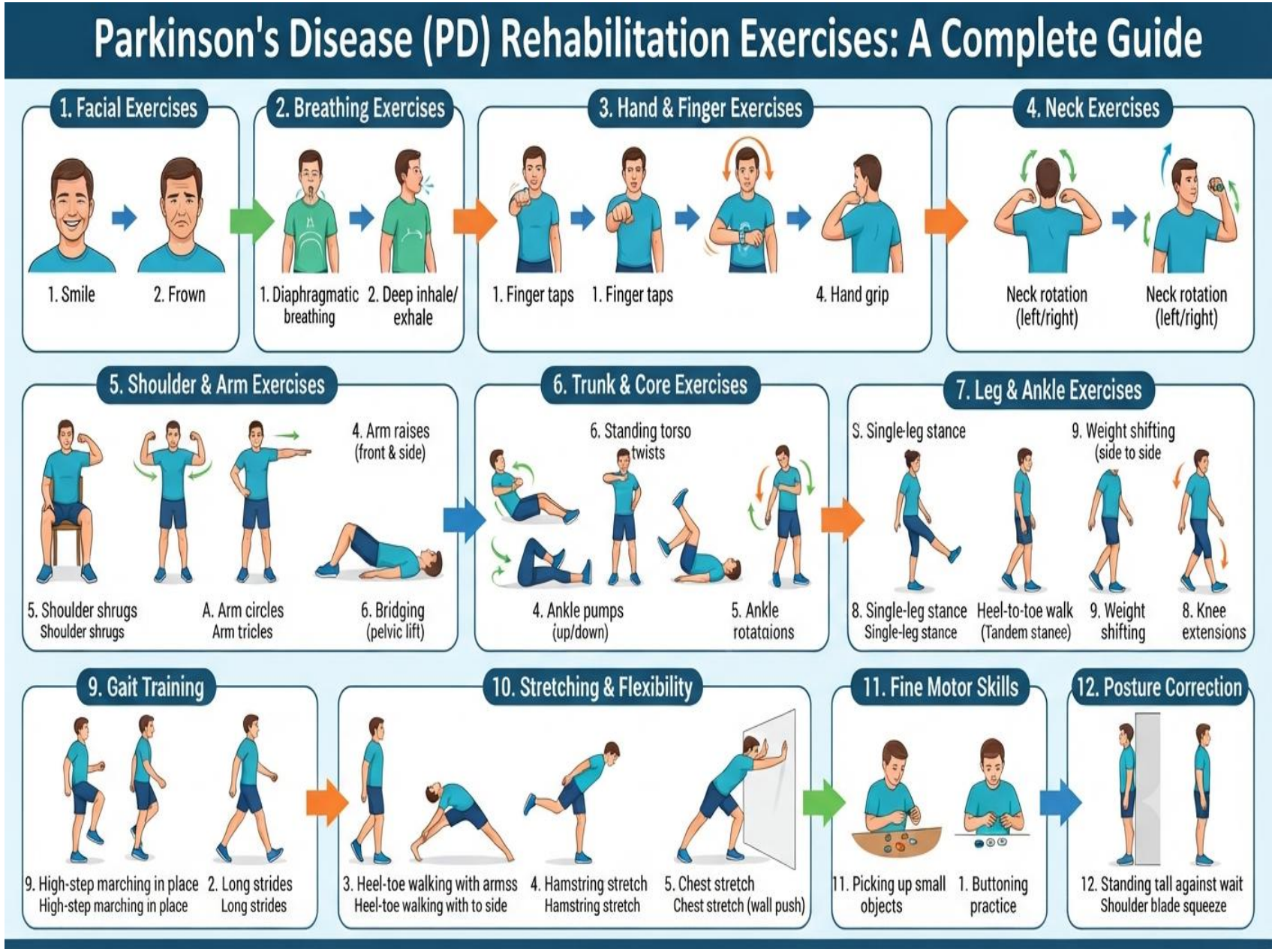
Standing Frame Therapy: Utilizing vertical standing frames to increase bone density, normalize blood pressure, and combat severe orthostatic hypotension.



Neuro Rehab

Parkinson’s disease

- ✓ Pacing & Big Movement
- ✓ Rhythmic Auditory Cueing



NEURO REHAB
SPASTICITY

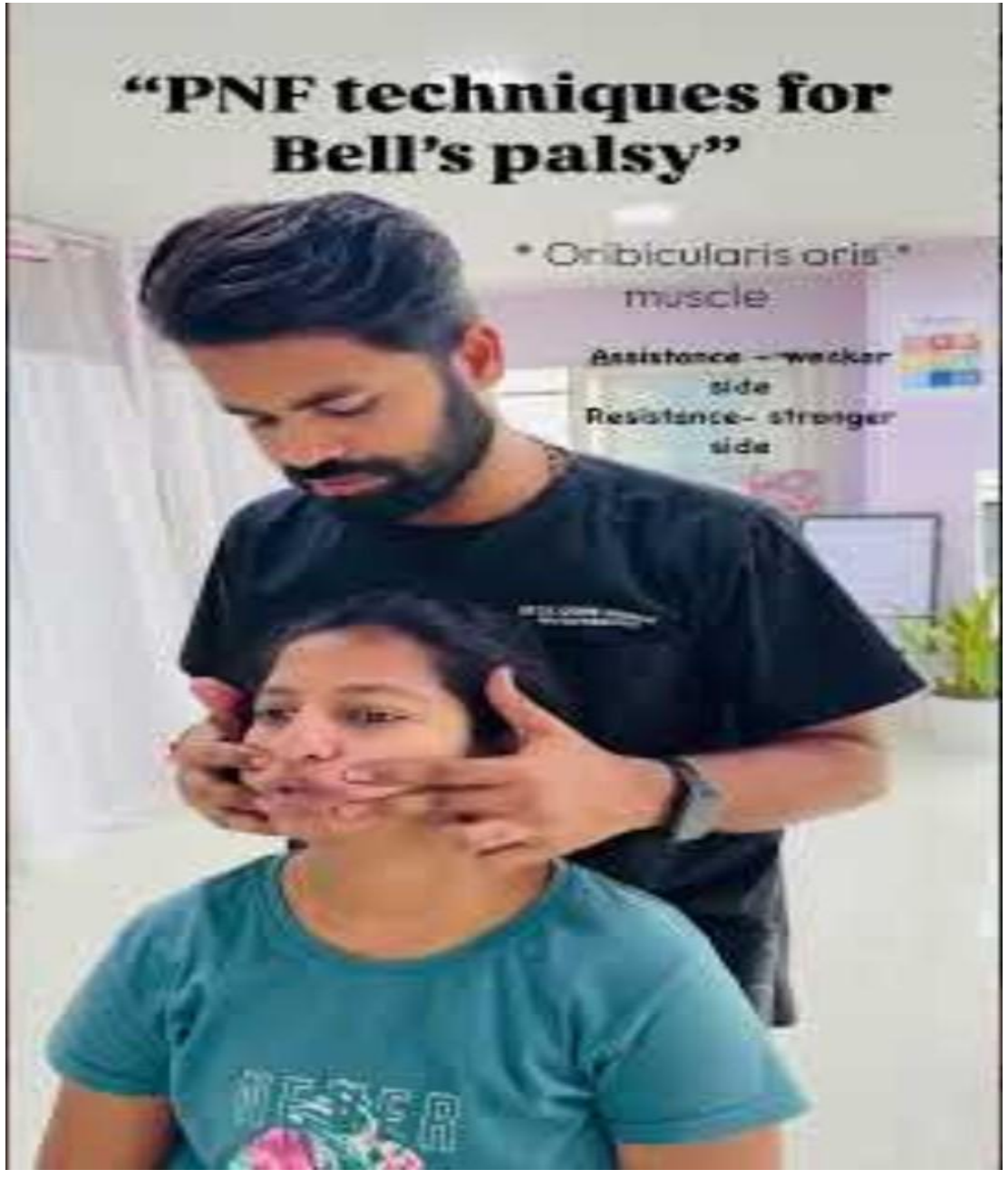
- ✓ **Spasticity & Rigidity:** Introducing Infrared Radiation (IRR) to deliver localized dry thermal energy, relaxing hyperactive muscle spindles.

- ✓ **Gait Synergy:** Relaxing localized calf spasticity under IRR prior to passive ankle dorsiflexion and gait rehabilitation.

Facial Rehab

Proprioceptive Neuromuscular Facilitation Exercise

- ✓ **PNF Facial Exercises:** Applying proprioceptive neuromuscular facilitation vectors to weak muscles, stimulating cranial nerve VII motor units.



MSK & Spine Rehabilitation

Targeting painful cervical, thoracic, and lumbar spine pathologies through targeted biomechanical offloading and progressive exercises.

NECK PAIN & CERVICAL CARE

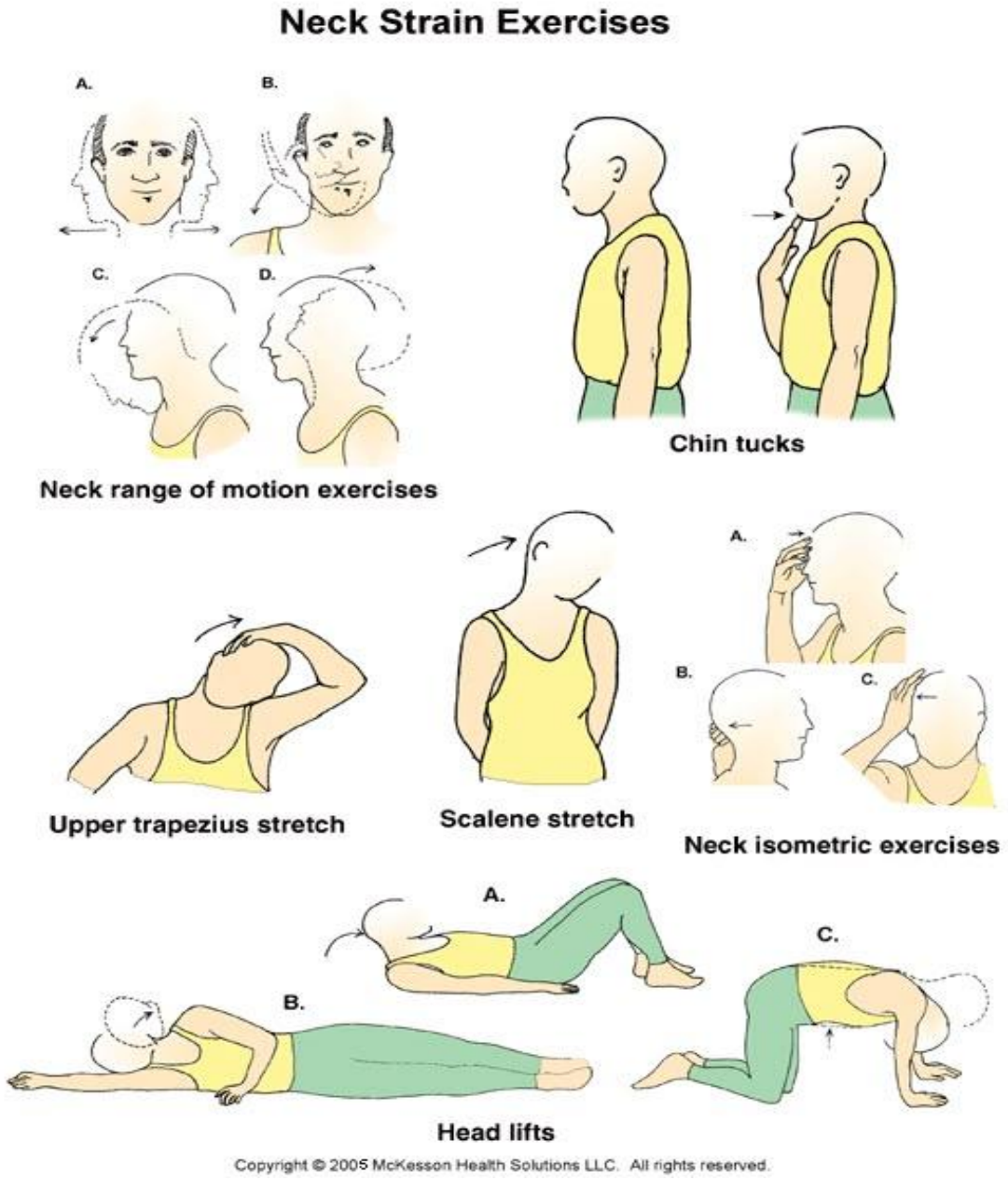
Somatic & Postural Correction

Deep Neck Flexor Strengths:

Recruiting weak muscles through graded exercises .

Radiculopathy Offloading:

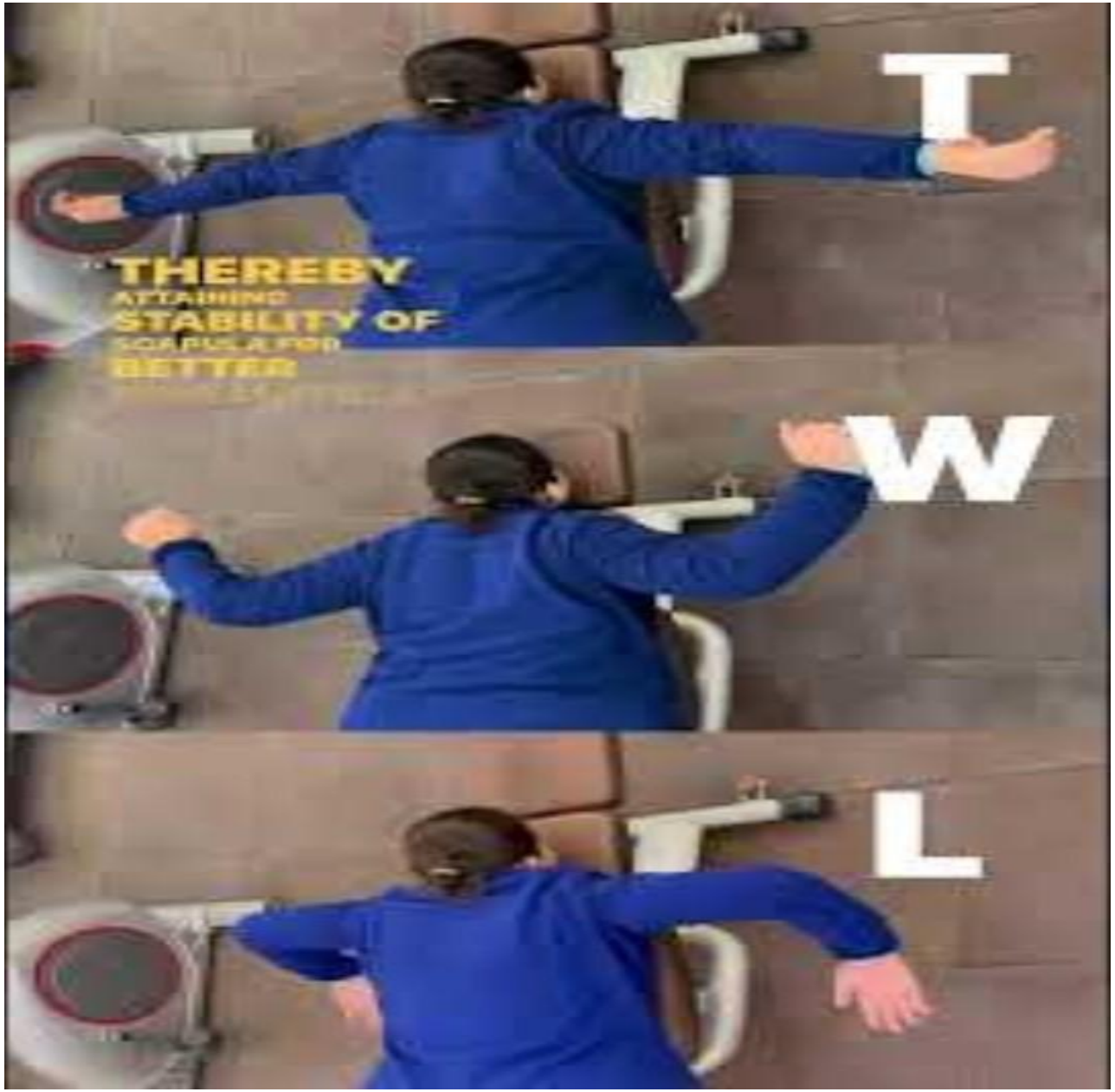
Applying manual or mechanical traction vectors to widen intervertebral foramina and relieve nerve root compression.



UPPER BACK PAIN

Thoracic Extension & Stability

- ✓ **Scapular Stabilization:** Training the middle and lower trapezius, rhomboids, and serratus anterior using targeted resistive bands.
- ✓ **Myofascial** trigger point release



LOW BACK PAIN & PLID

Disc Herniation Offloading

- ✓ McKenzie Extension Regime
- ✓ Lumbar Facet Mobilization exercise
- ✓ Sciatic nerve gliding exercise
- ✓ Piriformis muscle stretching exercise.
- ✓ Mechanical Lumbar Traction
- ✓ ADL modifications

RHEUMATOLOGICAL REHAB: RA & SPA

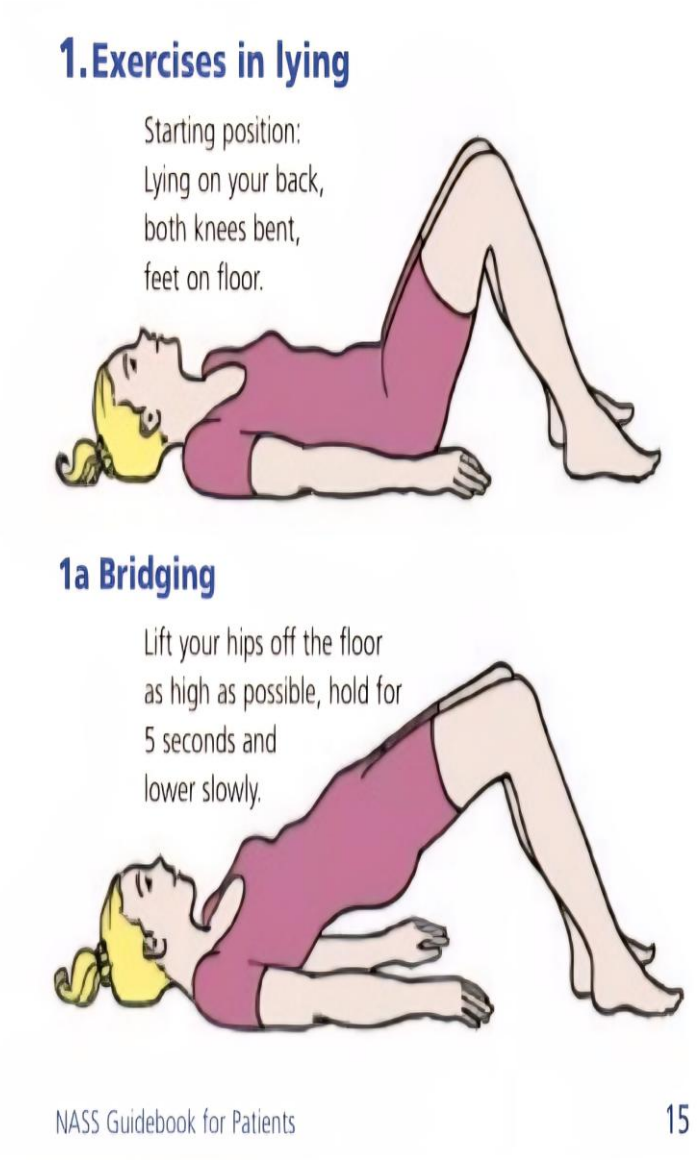
Micro-Circulatory Conditioning

- ✓ **Thermal Wax Absorption:** Immersing stiff hands in warm Paraffin Wax Bath to soften collagen and increase elasticity.
- ✓ **Flexor Excursion:** Utilizing safe, uniform heat conduction to prepare digits for active flexion, tendon gliding, and grasp retraining.

Spondyloarthropathies (SpA)

NASS Protocol

- ✓ Correcting spinal sagittal alignment and chest expansion through posture training & exercises.



1b Spinal Rotation

Lift your arms up in front towards the ceiling, with fingers linked.

Take your arms to the right as far as possible while taking your knees to the left as far as possible. Turn your head to the same side as your arms. Repeat to the opposite side.

2. Exercises in 4 point kneeling

Starting position:
Kneel on all fours. Keep your hands shoulder width apart and directly under your shoulders. Keep your knees hip width apart and directly under your hips.

2a Cat Stretch (spinal flexion & extension)

Keeping your elbows straight throughout, tuck your head between your arms and arch your back as high as possible.

Lift your head and hollow your back as much as possible.

2b Superman Stretch (spinal extension)

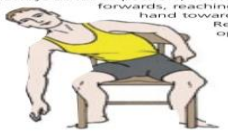
Keeping your head up, raise your right arm forwards as you raise your left leg backwards as high as possible. Hold for 5 seconds. Return to all fours and change to raising your left arm and right leg.

3. Chair Exercises in sitting

Starting position:
Sit on a stable kitchen/dining room chair with your feet on the floor, hooked around the legs of the chair:

3a Spinal side flexion

Place your hands by your sides. Hold the back of the chair with your left hand. Bend sideways as far as possible, without bending forwards, reaching your right hand towards the floor. Repeat to the opposite side



3b Spinal Rotation

With your hands clasped on your forearms at shoulder level, turn your upper body to the right as far as possible. Repeat to the opposite side.

3c Neck Rotation

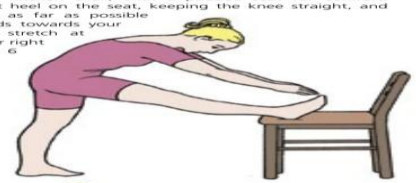
Hold the sides of the chair seat. Turn your head to the right as far as possible without letting your shoulders turn.

Repeat to the opposite side.

4. Leg Stretches

4a Hamstring stretch

Stand facing a kitchen chair, with a padded seat for comfort. Place your right heel on the seat, keeping the knee straight, and reach forwards as far as possible with both hands towards your foot. Feel the stretch at the back of your right thigh. Hold for 6 seconds. Relax.



Repeat twice, stretching a little further each time. Relax.

Repeat with the opposite leg.

4b Hip flexor stretch

Face the side of the chair and hold the chair back with your right hand.

Bend your right knee and place your right shin on the seat.

Place your left foot forward as far as possible.

Now place both hands behind your back. Bend your left knee as much as possible, keeping your head up and your back straight. Feel the stretch at the front of your right hip. Hold for 6 seconds. Relax. Repeat twice, stretching a little further each time. Relax.

Turn round to face the other side of the chair. Repeat with the opposite leg.

CHRONIC PAIN: PSCP & CRPS

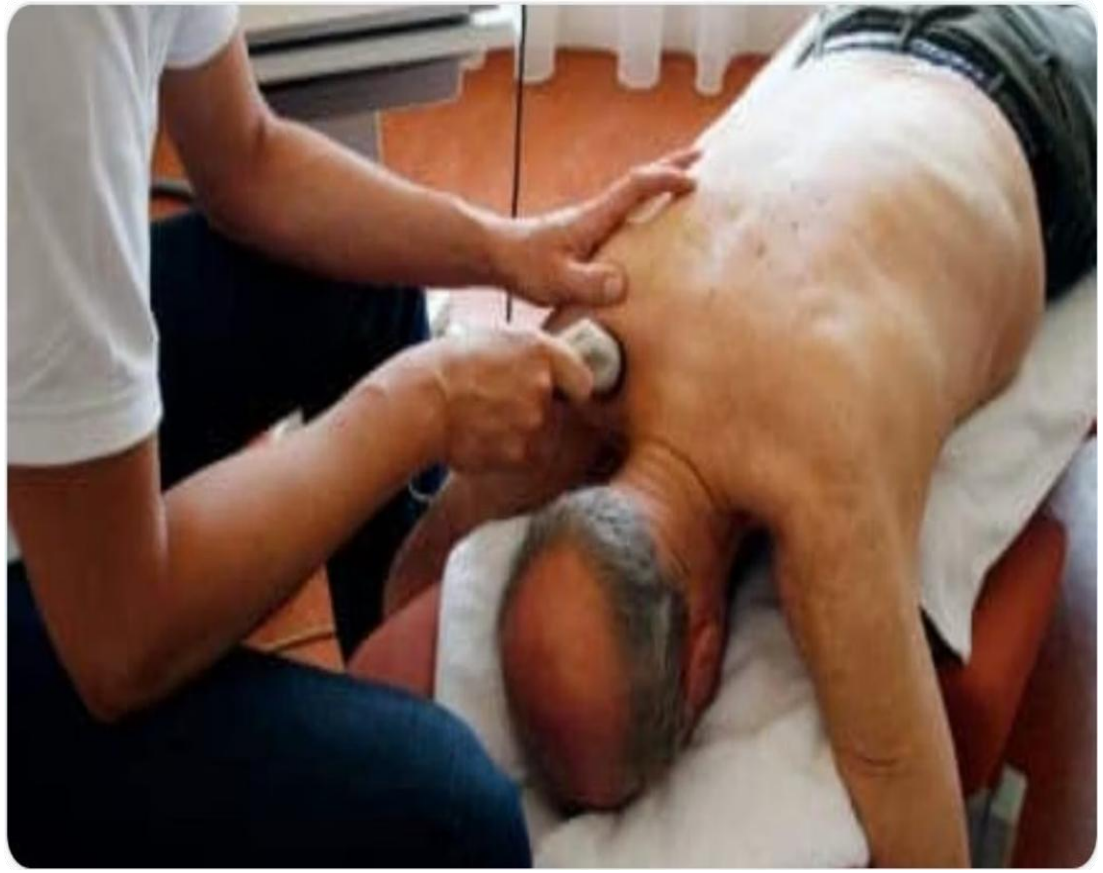
Neuropathic Pain Restructuring

- ✓ **Post-Stroke Central Pain (PSCP):** Managing intractable brain-derived pain with low-intensity somatic exercises and tactile desensitization.
- ✓ **Complex Regional Pain Syndrome (CRPS):** Dampening sympathetic hypersensitivity through Mirror Therapy to rewire central somatosensory pathways.

ORTHOPEDIC REHAB: SHOULDER CLINIC

Shoulder Restructuring

- ✓ **Adhesive Capsulitis:** Breaking down joint capsule adhesions through hydrodilatation, deep heating, and passive end-range manipulation.
- ✓ **Rotator Cuff Tendinitis:** Offloading subacromial loading, reducing localized tendinitis, and correcting scapulohumeral rhythm.



CARDIOPULMONARY REHABILITATION

Phase-Based Lung Expansion

- ✓ **Controlled Pacing:** Progressive aerobic training on treadmills while carefully monitoring vitals.
- ✓ **Diaphragmatic Training:** Teaching pursed lip breathing and incentive spirometry to reduce shortness of breath and improve lung compliance.

Orthotics & Shoe Modifications

Plantar Force Readjustments

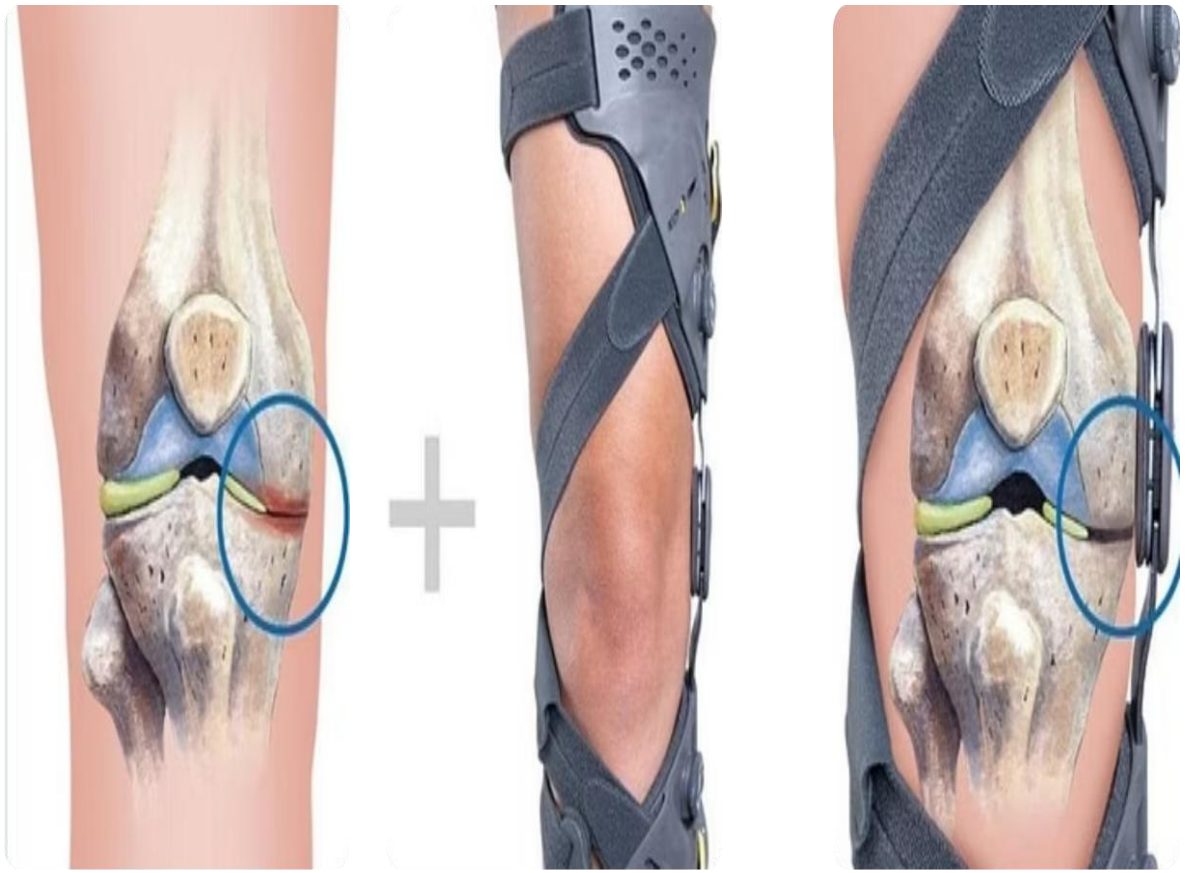
Biomechanical Wedges: Prescribing lateral heel wedges (3 to 5 degrees) to reduce pain in medial compartment knee osteoarthritis.

Rocker Bottom Modifications: Utilizing rocker bottom soles to accelerate heel-to-toe progression and offload calcaneal spurs and metatarsalgia.

Knee OA Orthotics & Bracing

Compartment Offloading

- ✓ **Unloader Knee Brace:** Applies a corrective three-point bending force to open joint space in unicompartmental osteoarthritis.



PERIPHERAL NERVE

Ankle Foot Orthosis (AFO) Splinting

- ✓ **Peroneal Neuropathy:** Sustaining clear dorsiflexion angles during the swing phase of gait using a rigid posterior leaf spring orthotic.

- ✓ **CTS wrist splint:** Hold the wrist in neutral position

PEDIATRIC REHAB: CEREBRAL PALSY

Developmental Milestones

Motor Coordination: Retraining core developmental milestones (head control, rolling, crawling, sitting) with targeted physical therapies.

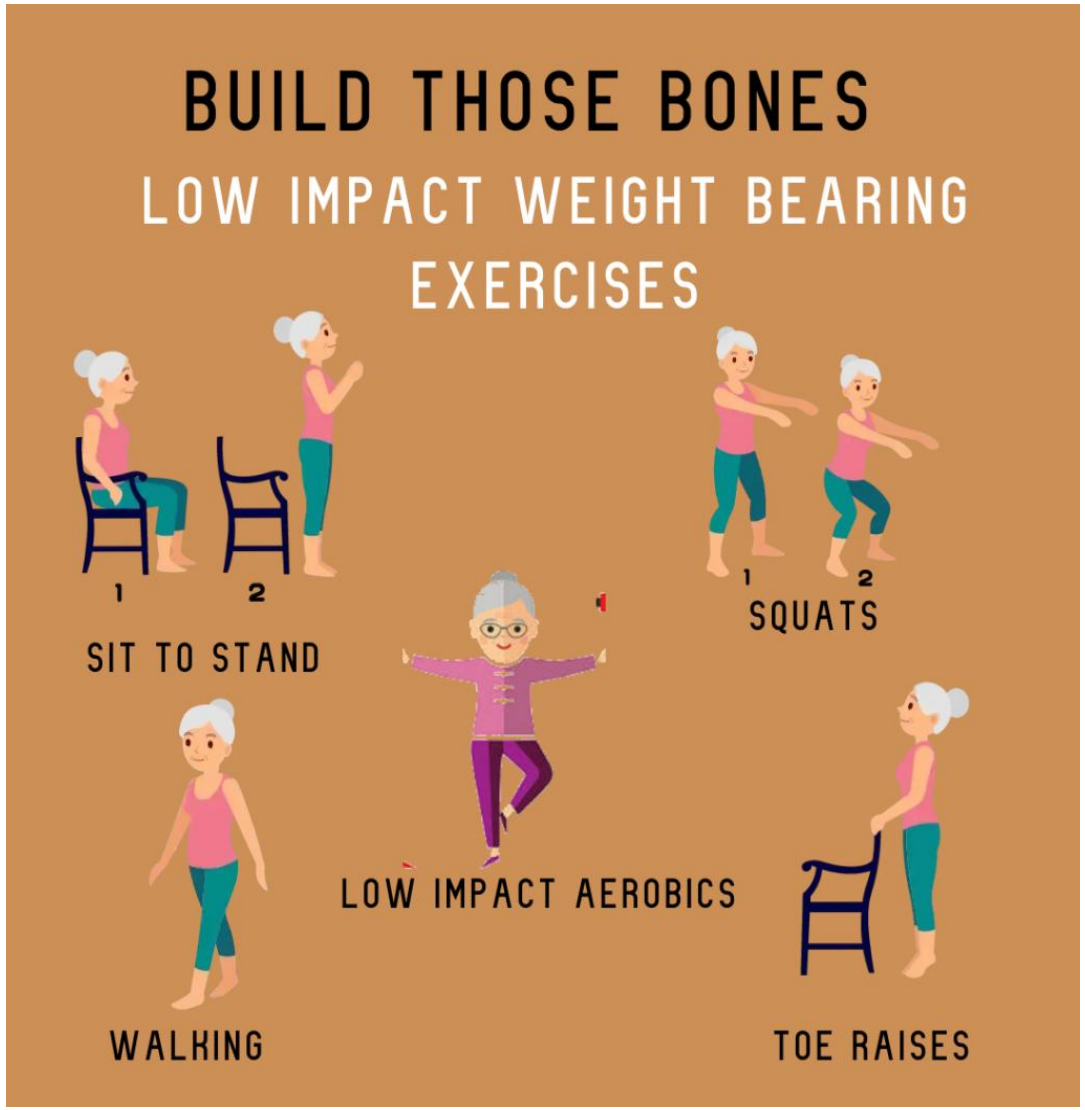
Spasticity Orthoses: Utilizing dynamic bracing (AFOs) to maintain structural joint length and prevent Achilles tendon shortening.

GERIATRIC REHAB

Fall Prevention Strategies

- ✓ **Vestibular & Balance Training:**
- ✓ **Strengthening exercise :** Prevent Sarcopenia
- ✓ **Bone Preserving Exercises:**

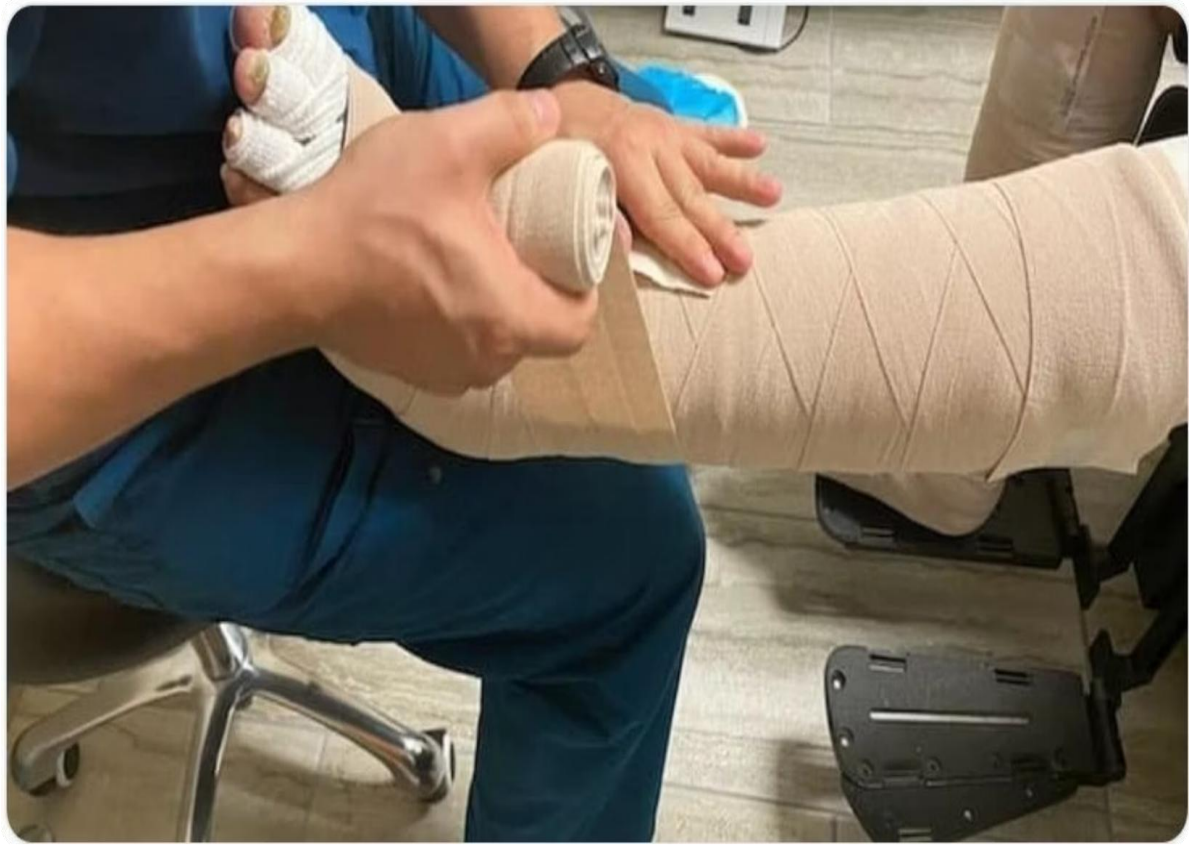
  Progressive weight bearing exercises to combat osteoporosis-induced fragility fractures.



CANCER REHAB & LYMPHEDEMA

Lymphatic drainage

- ✓ **Decongestive Therapy (CDT):** Combining Manual lymphatic drainage (MLD) with multi-layered compression bandaging to relieve post-mastectomy lymphedema.

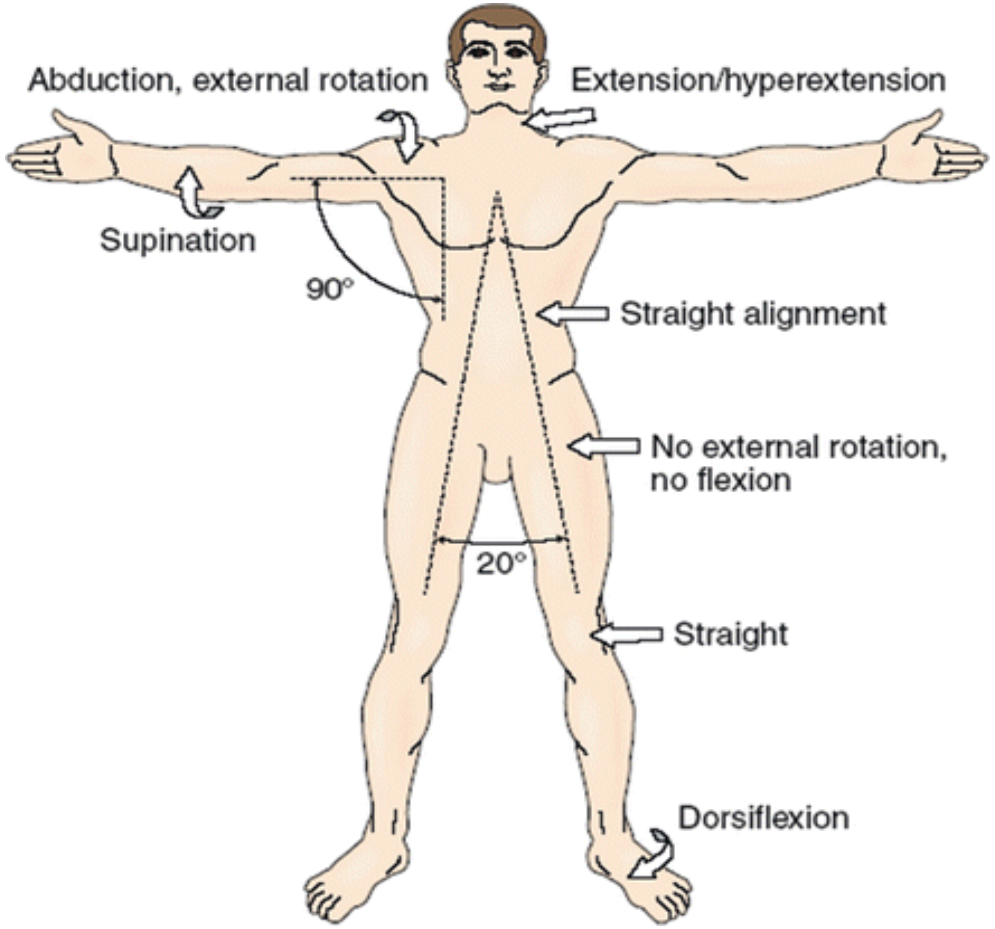


BURN REHAB & JOINT SPLINTING

Preventing Structural Contractures

- ✓ **Active Scar Manipulation:** Delivering deep transverse friction massage and continuous slow stretching matrices to avoid hypertrophic scar tightness.

- ✓ **Antideformity Splinting**



Prosthetic Gait & Limb Care

Stump Conditioning & Gait

- ✓ **Pre Prosthetic Sparing:** Utilizing cohesive compression to shape the residual limb and desensitize nerve endings.

- ✓ **Gait Biomechanics:** Conducting targeted gait training with prostheses, correcting vaulting, circumduction, and hip hiking patterns.

GAIT RETRAINING & BALANCE

Dynamic Sensorimotor Training

- ✓ Proprioceptive stimulation
- ✓ Kinematic Realignment
- ✓ Aids and appliances

EVIDENCE BASED CLINICAL EFFICACY

85%

Functional Recovery Rate

Why Rehabilitation is Essential

Combining medical modalities with targeted progressive exercises achieves superior outcomes over passive pharmacological care alone.

Beginning multidisciplinary rehabilitation within the first 30 days post injury correlates with an **85% success rate** in achieving functional independent living.

THE CORE PHILOSOPHY OF PMR

Adding Life to Years

"Medicine adds years to life.
Physical Medicine & Rehabilitation adds life to years."

— Dr. Frank H. Krusen, Father of Physical Medicine