Rehabilitation Of Neurological Disorder Patients

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Physiatrist

Rehabilitation

- Rehabilitation is a dynamic process through which a person is assisted to achieve
  - Optimal physical, emotional, psychological, social, and vocational potential
  - To maintain dignity, self-respect, and a quality of life that is as self-fulfilling and satisfying as possible

Neurorehabilitation

- Neurorehabilitation is a complex medical process which aims to
  - Aid recovery from a nervous system injury, and
  - Minimize and/or compensate for any functional alterations resulting from it

Principles of rehabilitation

- Rehabilitation should begin during the initial contact with the patient
- Restoring the patient to independence or to regain his/ her pre-illness
- Maximizing independence within the limits of the disability

Principles of rehabilitation

- **Realized goals** based on individual patient assessment and to guide the rehabilitation program
- Must be an active participation
- Activities of daily living are facilitated
- Motivate the patient and helps him/her to attain social independence

Goals of rehabilitation

- Physical independence
- Mobility
- Social integration
- Occupational integration
- Psychological support

Type of rehabilitation

- Medical rehabilitation
  - Restoration of structure and function
- Vocational rehabilitation
  - Restoration of the capacity to earn a useful and decent livelihood
- Social rehabilitation
  - Restoration of family and social relationships
- Psychological rehabilitation
  - Restoration of personal dignity and confidence

Approaches of rehabilitation

- Institution based:
  - The services are delivered in an institution for the disabled

Approaches of rehabilitation

- Outreach based
  - Professional travel to the community

Approaches of rehabilitation

Community based

- Where resources for rehabilitation are available in the community and services are delivered in community area

Neurorehabilitation team

- Medical team
- Physiatrist
- Physiotherapist
- Occupational therapist
- Orthopedic surgeon
- Neurologist
- Neurosurgeon
- Plastic surgeon
- Psychiatrist
- Pediatrician
- Obstetrician
- Geneticist
- Cardiologist
- Cardiac surgeon
- General surgeon
- Oncologist
- Ophthalmologist
- Paramedical members
- Creative movement therapist
- Recreation therapist
- Prosthetist
- Rehabilitation nurse
- Speech pathologist
- Psychologist
- Play and drama therapist
- Music therapist
- Social worker
- Vocational counsellor
- Non governmental organization
- Community
- Family members

Neurorehabilitation team

Medical team

Physiatrist

Physiotherapist

Occupational therapist

Orthopedic surgeon

Neurologist

Neurosurgeon

Plastic surgeon

Psychiatrist

Pediatrician

Obstetrician

Geneticist

Cardiologist

Cardiac surgeon

General surgeon

Ophthalmologist

Paramedical members

Creative movement therapist

Recreation therapist

Prosthetist

Rehabilitation nurse

Speech pathologist

Psychologist

Play and drama therapist

Music therapist

Social worker

Vocational counsellor

Non-governmental organization

Community

Family members

Factors affecting quality of life and coping

- Nature of disease
- Severity of disease
- Freedom to live and work
- Economical stability
- Access to education

Patterns of muscle recovery in hemiplegia

- Flaccidity
  - Occurs from the time of injury to 2 to 3 days after(decreased or no tendon reflexes or resistance to passive movement)
- Spasticity
  - onset 2 days to 5 weeks (Hyperactive tendon reflexes and exaggerated response to minimal stimuli)
- Synergy
  - Onset 2–3 weeks (Simultaneous flexion of muscle groups in response to flexion of a single muscle (e.g., an attempt to flex the elbow results in contraction of the fingers, elbow, and shoulder)
- Near normal, slight incoordination may be present

Positioning (Importance of Positioning)

- Prevent development of musculoskeletal deformities
  - Contracture
  - Ankylosis(stiffness and rigidity of joints)
- ↓ Pressure ulcers
- ↑vascular supply
- ↓Thrombosis
- ↓Edema

Principles for positioning of patient in bed

- Unconscious patient should be repositioned every few (e.g., 2 hours) hours
- If spasticity is present, frequent repositioning is necessary
- Splinting and casting
  - To inhibit tone may be ordered and applied by a physical therapist

Principles for positioning of patient in bed

- Any restrictions of position are posted in patient file (paper or electronic site)
- A sufficient number of pillows should be available to maintain body alignment.
- Trochanter rolls and other positioning devices are useful

Principles for positioning of patient in bed

- Weak or paralyzed arm,
  - It is positioned to approximate the joint space in the glenoid cavity
  - The affected arm is not pulled
  - A pillow or small wedge in the axillary region
    - To prevent adduction of the shoulder

Principles for positioning of patient in bed

- Special resting hand splints to prevent contracture
  - Remove periodically to assess the skin for pressure ulcers
- Reduce edema
  - Elevating the hand higher than the elbow or
  - By using elastic glove

Principles for positioning of patient in bed

- Foot drop
  - high-top sneakers or special splints, may be ordered
- Heels are kept off the bed to prevent pressure ulcers from developing
- Pillow placed crosswise to elevate the lower legs or heel guards may be applied

Left Side Affected

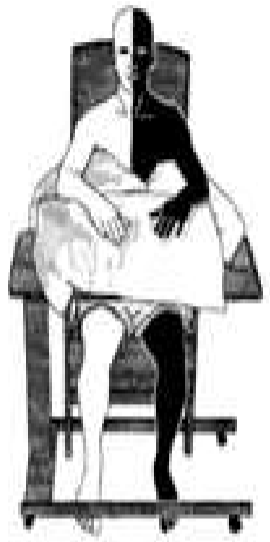
After a stroke people can experience differing physical problems. Careful positioning and placement of pillows may increase comfort and safety. The **left side** affected by the stroke is in **black.** Bed rails not shown.

LYING ON LEFT SIDE

- Use this position only if it does not affect breathing
- 1-2 pillows for the head
- Protract the scapula of the left shoulder, extend wrist & fingers
- Place the right leg forward on 1-2 pillows
- Place pillows in front and behind

LYING ON RIGHT SIDE

- 1-2 pillows for head
- Place the left shoulder forward, scapula protracted with arm supported on pillow
- Left leg backwards on 1-2 pillows
- Place a pillow behind back



SITTING UP

- Sit well back in the centre of the chair or wheelchair
- Place arms well forward
- The left arm may rest on a table or arm rest
- Feet flat on floor or footrests
- Knees directly above feet

LYING ON BACK

- Head of bed 0-30° unless contraindicated
- Place 3 pillows to support both shoulders and the head
- Left arm on a pillow
- Optional pillow beneath left hip
- Ensure feet are in a neutral position

SITTING IN BED

- Sit upright and well supported by pillows
- Place both arms on pillows
- Legs supported for comfort

Adopted by APSS Pillar 3, 2007
Reviewed December 2008
Reference: Acknowledgement to Mark Smith, Clinical Specialist Physiotherapist for Stroke, NHS Lothian

Wrist support splint

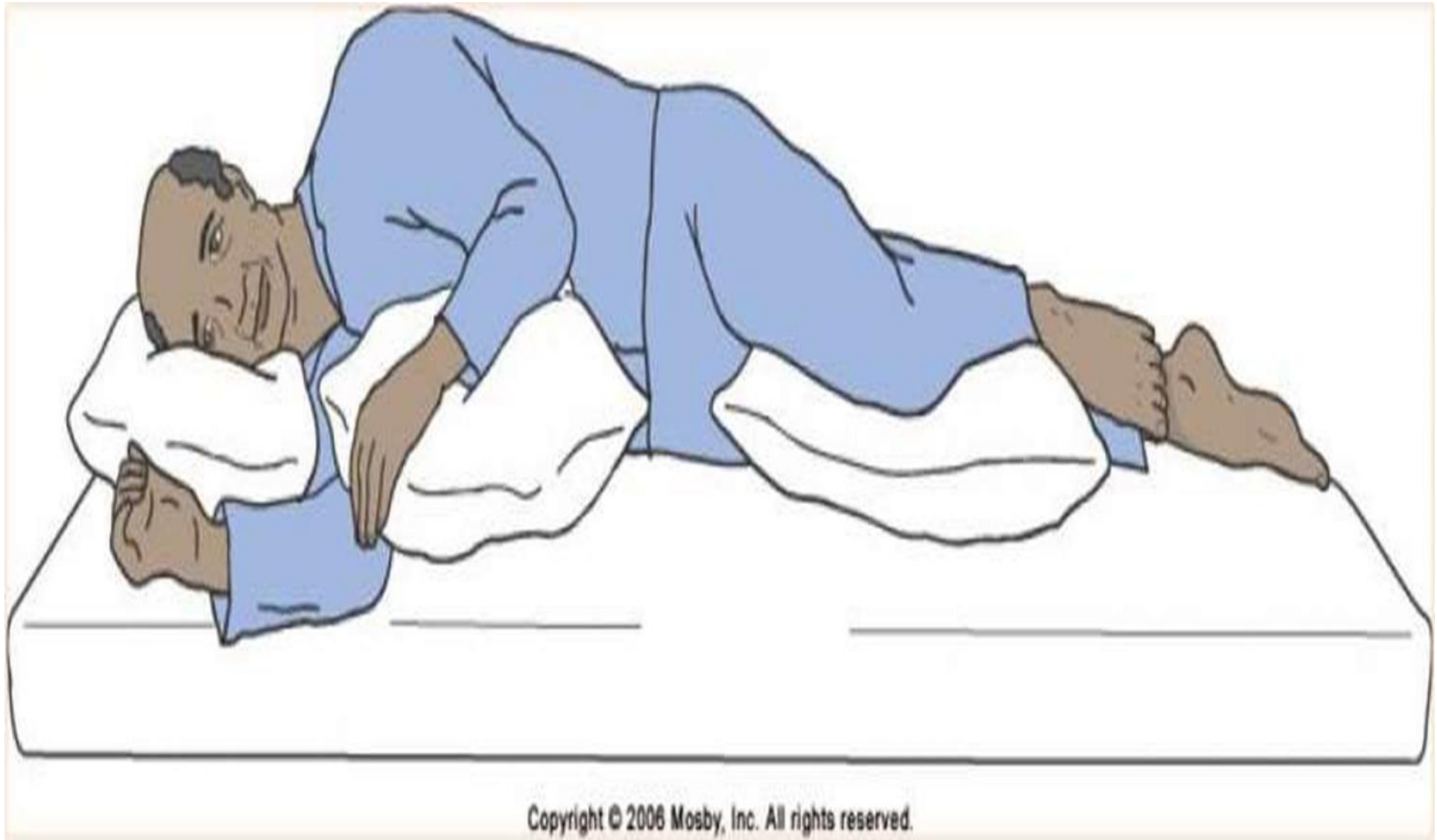
Foot drop boot

How To Position A Stroke Patier

Trochanter

Side-Lying Position

- Favorable for unconscious patient
- head of the bed elevated 10 to 30 degrees
- head should be placed in a neutral position
- Soft collar or towel roll is useful to maintain the neutral position
- Head turned slightly to facilitate drainage of oral secretions and to maintain a patent airway



Sitting

- Conscious patient may sit on the side of the bed, using the over bed table and pillows for support.

- For the weak, debilitated patient who cannot hold up the head or neck, a high-back chair that extends to the top of the head is most effective

Sitting

- Some patients have a neck brace; apply it for sitting
- Pillows or rolls support the arms in the desired position
- Feet are positioned flat on the floor
  - Pressure on the bottom of the feet assists in stretching the heel cord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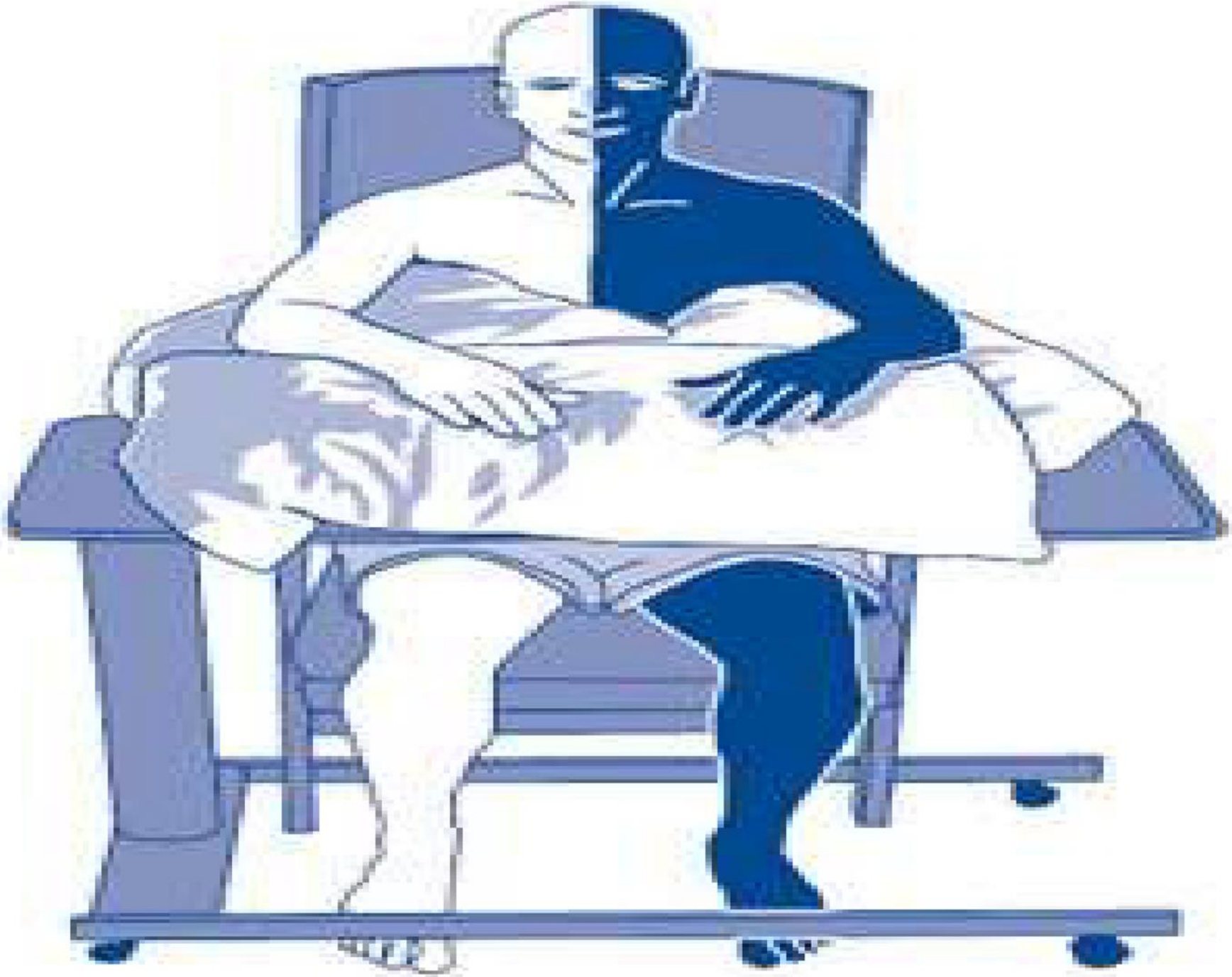

Mobility, transfer and ambulation

- Transfer Types
  - Two-person lift
    - Physical transfer by at least two staff members; no active patient participation
  - Mechanical lift
    - Transfer using a lifting device that is operated by staff members; no active patient participation

Two-person lift

Mechanical lifts

Principles of transfer

- Contact guard
  - Provision of verbal cues and minimal physical support during the activity, such as holding the arm or waist during ambulation

- Supervision
  - Provision of verbal cues only, as necessary

Principles of transfer

- Transfer toward the unaffected side
- Patients should wear properly fitted, flat shoes.
- Never tug on the paretic arm by pulling on the upper arm or shoulder.
- If balance is unsteady, stand on the affected side, ready to grasp the belt around the patient’s waist

Standing

- If the patient's knees buckle and additional assistance is required, stand in front of the patient and push with your knee against the patient's unaffected knee to lock the knee in position and prevent buckling
- A walker or four-point cane may be used for support

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2

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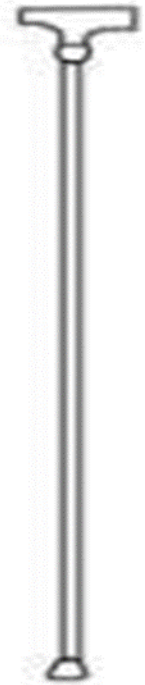

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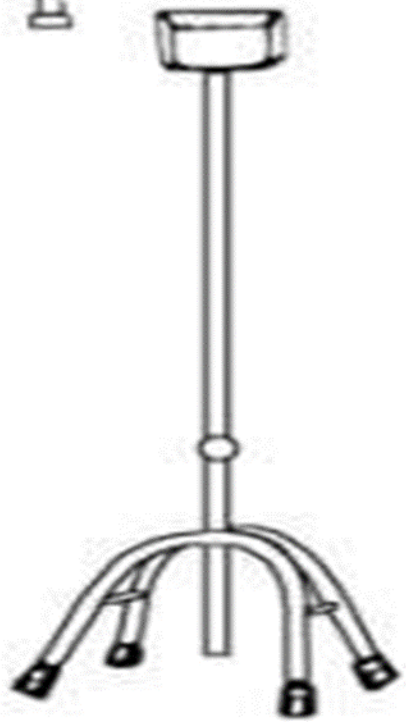

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Transfer Activity (From Lying in Bed to a Sitting Position in Hemiplegic Patients)

- Move toward or roll onto the side of the bed on which you intend to sit
- Slip the unaffected leg under the affected leg at an angle so that the unaffected leg becomes a transfer cradle for the affected limb
- Place the affected arm on the abdomen or lap

Transfer Activity (From Lying in Bed to a Sitting Position in Hemiplegic Patients)

- Push off the mattress with the unaffected elbow, raising your upper body, while turning your hips toward the side of the bed on which you intend to sit.

- Swing the unaffected leg over the side of the bed, and use the unaffected hand to push up.

- Once in the sitting position, lean on the unaffected hand to maintain an erect position.

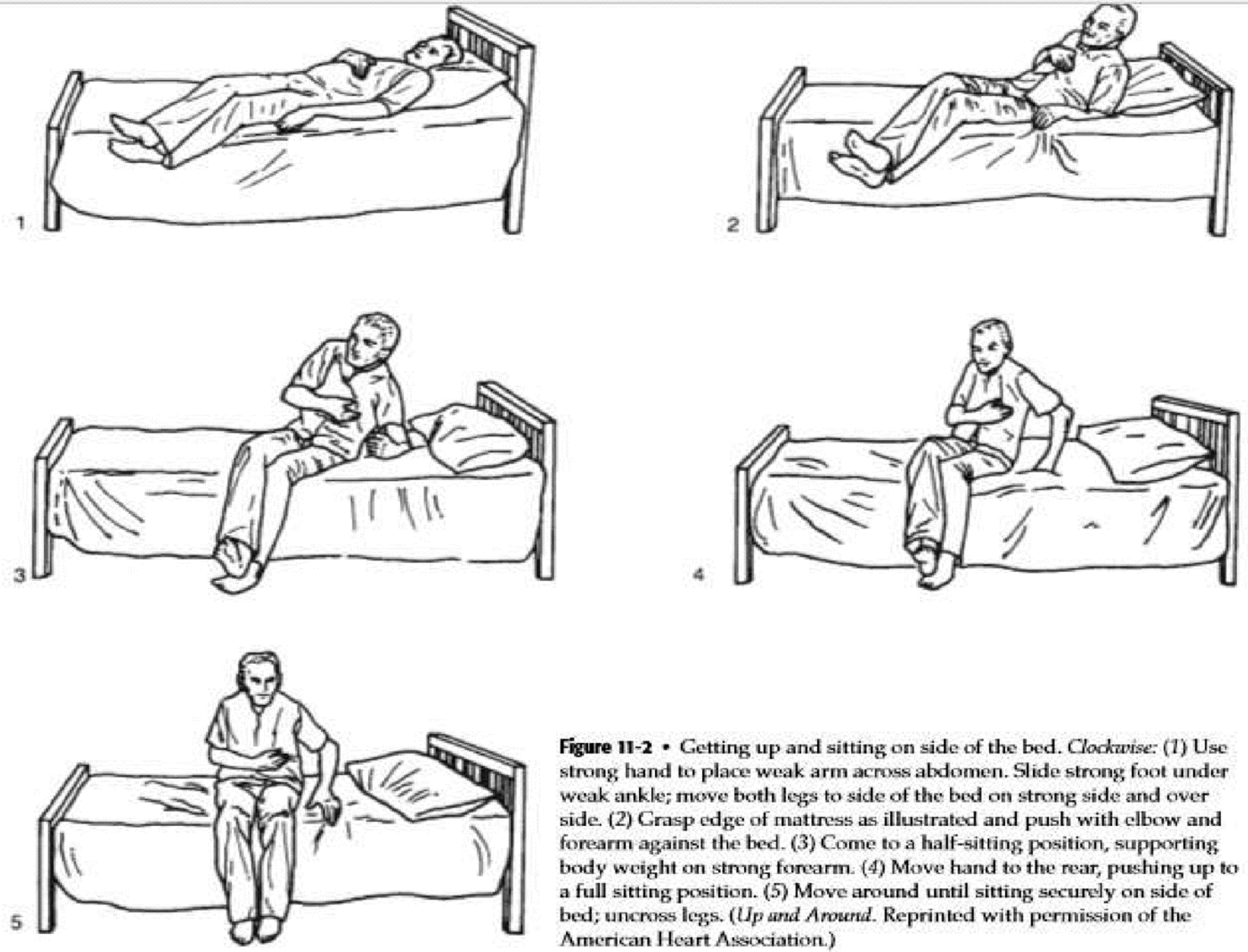


Figure 11-2 • Getting up and sitting on side of the bed. *Clockwise:* (*1*) Use strong hand to place weak arm across abdomen. Slide strong foot under weak ankle; move both legs to side of the bed on strong side and over side. (*2*) Grasp edge of mattress as illustrated and push with elbow and forearm against the bed. (*3*) Come to a half-sitting position, supporting body weight on strong forearm. (*4*) Move hand to the rear, pushing up to a full sitting position. (*5*) Move around until sitting securely on side of bed; uncross legs. (*Up and Around*. Reprinted with permission of the American Heart Association.)

Transfer Activity (From Lying in Bed to a Sitting Position in Hemiplegic Patients)

- Paraplegic or Incomplete Quadriplegic Patients
  - Most transfer activities for quadriplegic and some incomplete quadriplegic patients require direct assistance from facility personnel

Transfer Activity: From a Sitting Position on the Bed to a Chair

- Place the chair at a slight angle as close as possible to the bed on the unaffected side
- With feet close together, lean forward slightly, put the unaffected hand on the mattress edge, and push off to a standing position, bearing weight on the unaffected side

Transfer Activity: From a Sitting Position on the Bed to a Chair

- Once balance has been maintained and is steady enough for momentary release of support, move the strong hand to the farthest arm rest of the chair.
- Keep the body weight well forward; pivot on the unaffected foot, and slowly lower to a sitting position

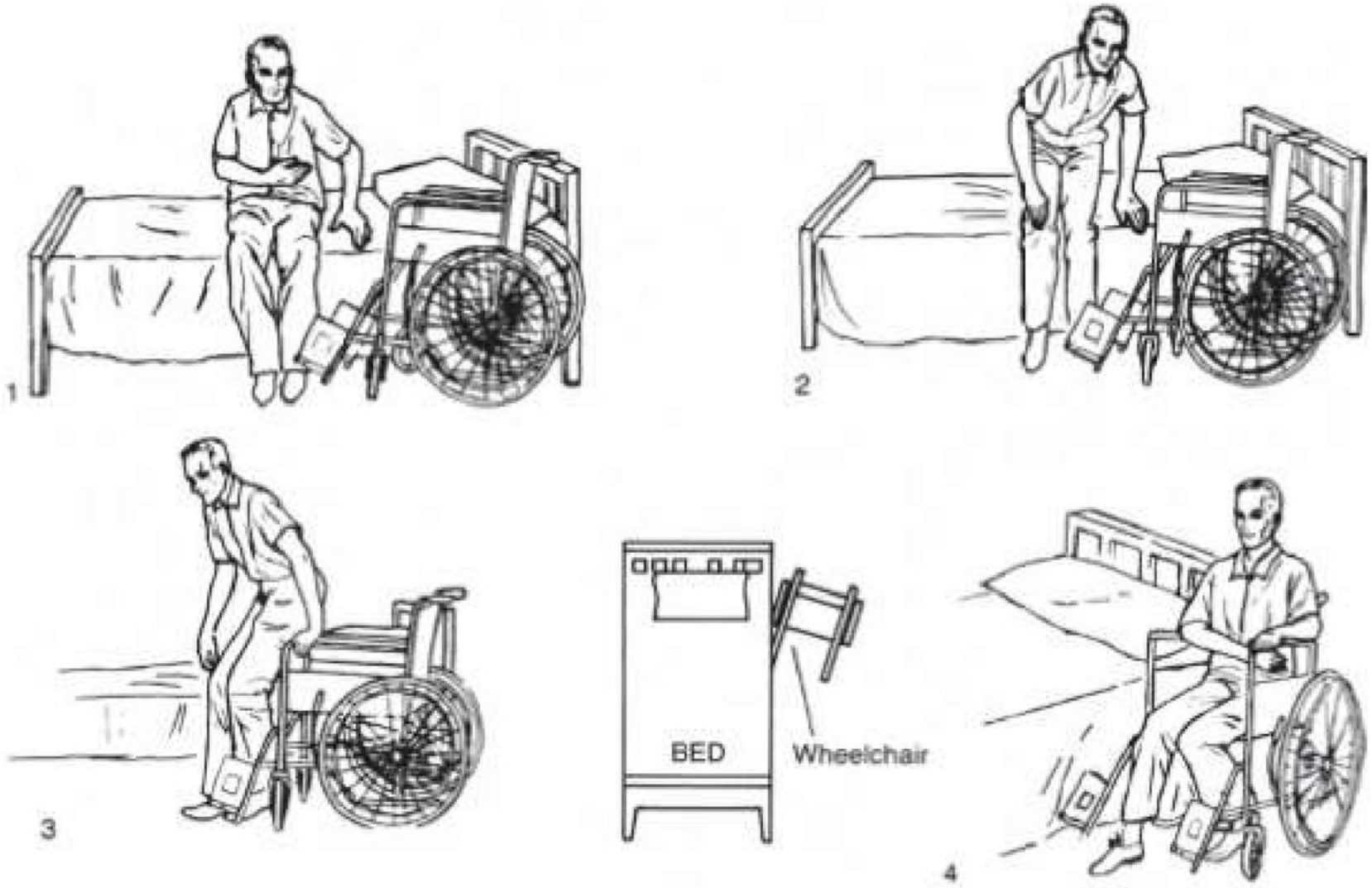


Figure 11-4 • Transfer from bed to wheelchair. *Clockwise:* (*1*) Place wheelchair at 45-degree angle to bed on patient's stronger side; lock brakes and raise footrest; move to the edge of bed. (*2*) Push down on bed with stronger arm; push off bed and stand, keeping weight on the stronger leg. (*3*) Move stronger arm and leg to opposite side of wheelchair. (*4*) Lean forward and sit down while holding on to wheelchair arm. (*Up and Around*. Reprinted with permission of the American Heart Association.)

PHYSICAL THERAPY

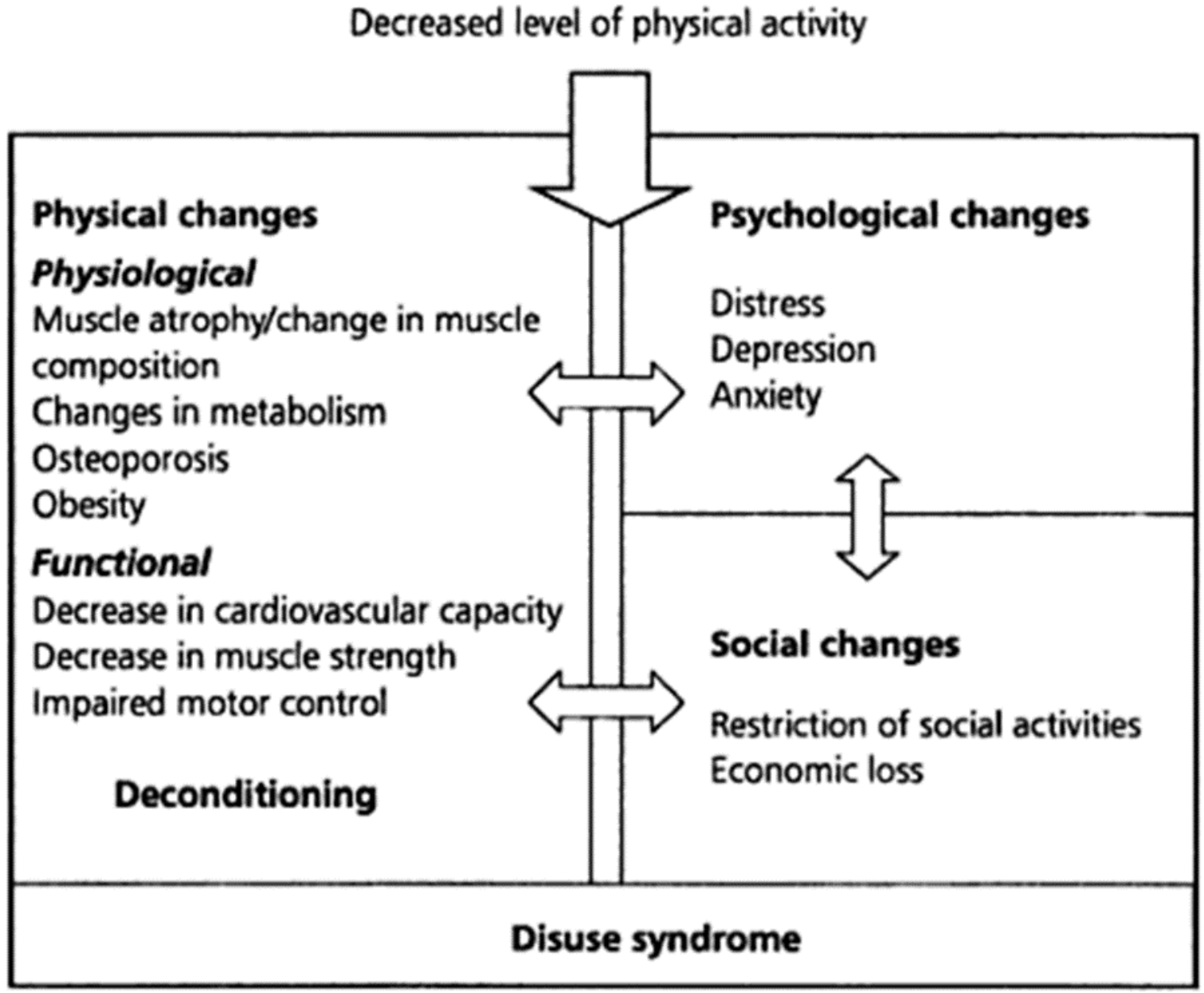


Fig. 7.1 Disuse syndrome: Consequences of long-term inactivity.

Therapeutic exercise

- Diagnosis
  - Impairments and disability of musculoskeletal, neuromuscular systems and CNS
- The aim of therapeutic exercise
  - Reconditioning, improved muscle strength and length, and attainment of optimal joint range of motion
  - Indirectly provide pain relief, increase functional activities, and help to achieve a better quality of life

Physical Therapy

- Therapeutic exercises
- Modalities such as electric stimulation, ultrasound, hot packs, and
  - ***Issues***
    - Musculoskeletal concerns (chronic pain, athletic injuries, repetitive stress injuries, DJD, MPS, fibromyalgia)
    - The effects of neurological illnesses such as stroke, MS
    - Cardiac and pulmonary rehabilitation

Values of ability

- Almost everyone, regardless of age, values the ability to function as independently as possible during activities of everyday life

Interrelated components of physical function

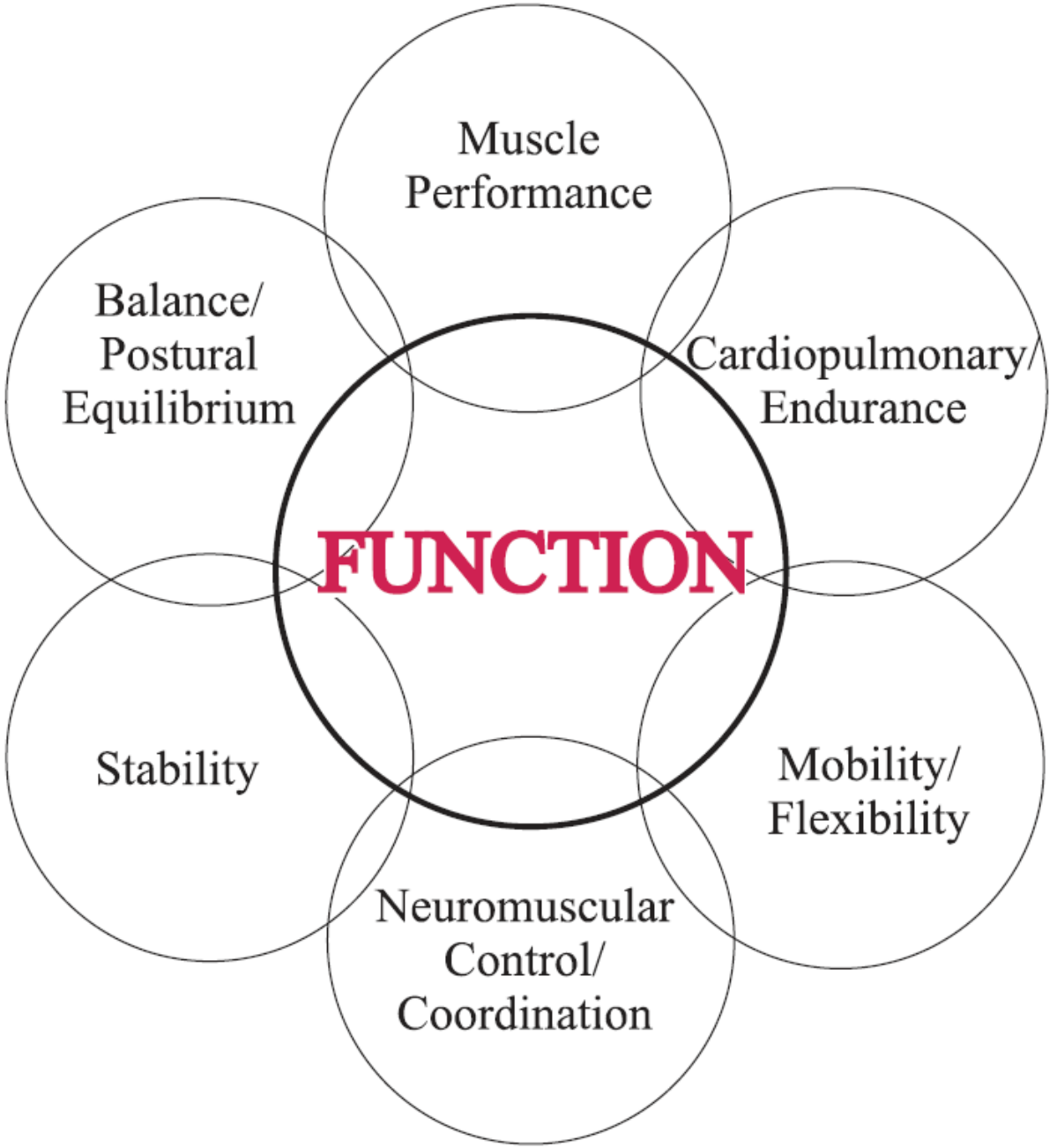


FIGURE 1.1 Interrelated components of physical function.

Types Of Therapeutic Exercises

- Flexibility Exercises
  - ROM exercises
  - Stretching
- Resistance Exercise
  - Strength
  - Endurance
- Aerobic Exercise
- Balance exercise
- Neuromuscular re-education
- Breathing exercises
- Aquatic exercises

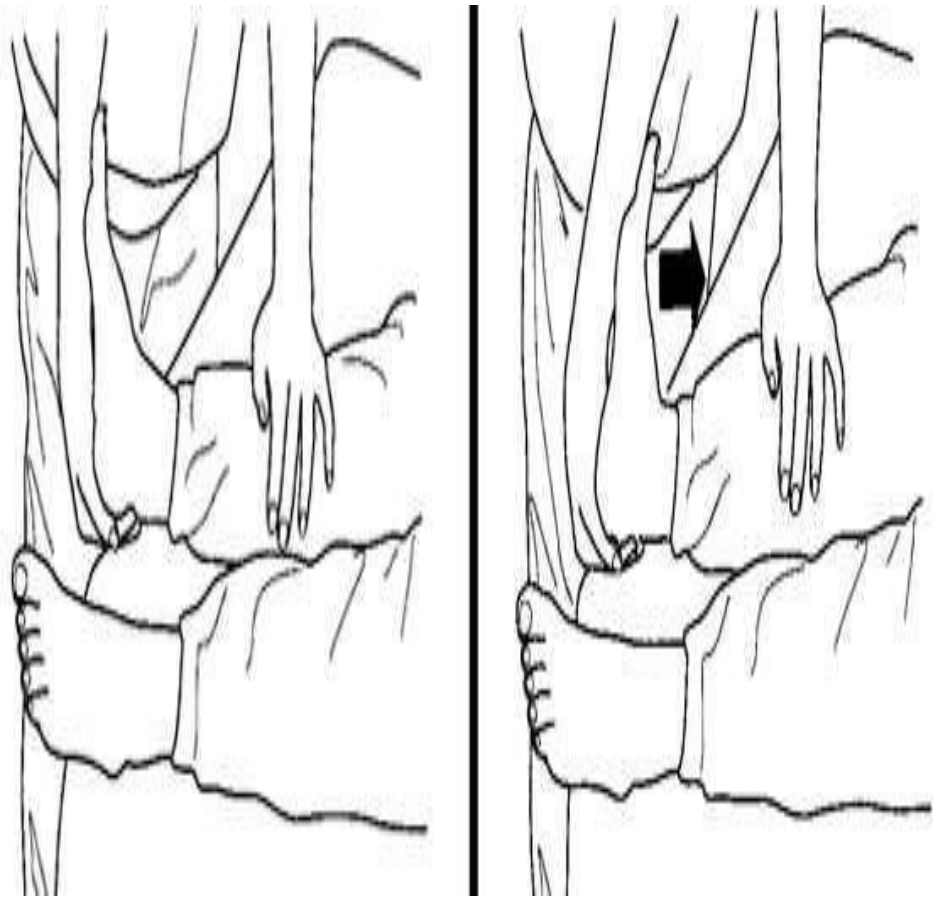
And Many More!

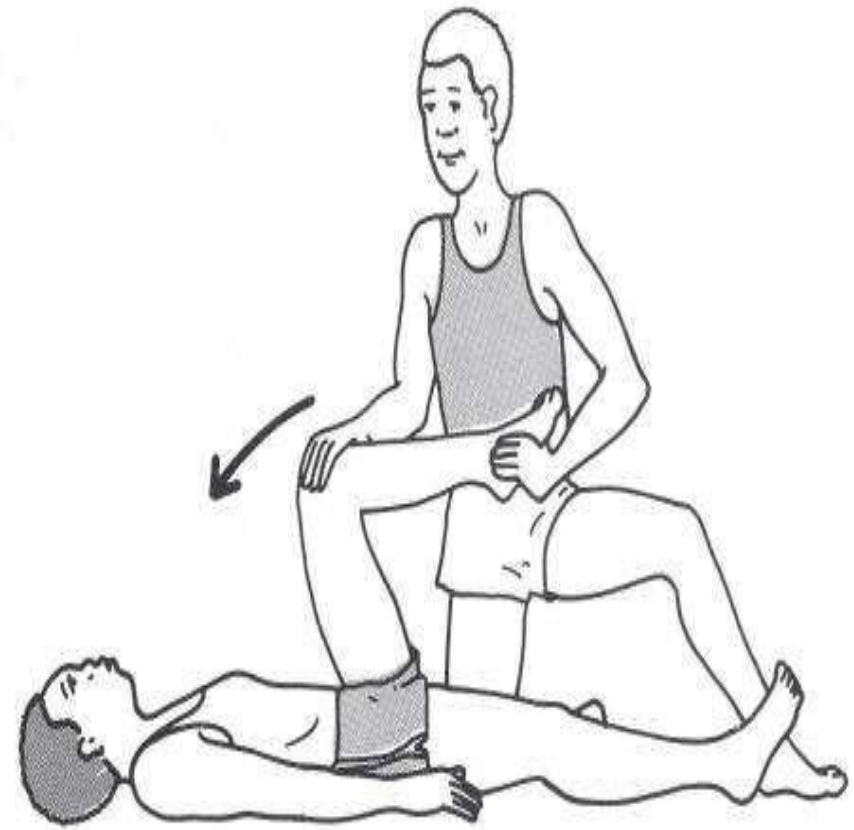
ROM exercises

- Goal
  - To maintain mobility within available range
- Type
  - Active ROM
  - Active-assisted ROM
  - Passive ROM
- Technique
  - Full ROM repeated 3-5 times and performed 1 to 2 times daily for at least three times per week

ROM exercises Cont.

- Pattern
  - Anatomic planes of motions
  - Combined patterns of motion
    - Diagonal patterns similar to proprioceptive neuromuscular facilitation (PNF)
    - Functional pattern
      - Pattern used in teaching activities of daily living
      - Pattern used in instruction the blind in functional activities





A passive static exercise

Active assited exercise

Strengthening exercises

- Isometric Exercise
- Dynamic/isotonic (resistive) Exercise
  - Weight machine exercise, free-weight exercise, plyometric exercise
- Isokinetic Exercise
  - Provides maximum resistance throughout entire ROM

Isometric/muscle strengthening exercises

- Accomplished by alternately tightening and relaxing the muscle without joint movement
- Provides strength base for dynamic exercise

Dynamic/isotonic (resistive) Exercise

- Manual resisted exercises
  - Resistance can be applied by the patient himself or by any other person.
- Mechanical resisted exercises
  - Mechanical devices are used to oppose the active movement of a person e.g weights, pulleys

Manual resisted exercises

Mechanical resisted exercises

Goals of muscle strengthening exercises

- Strengthen muscles enough to perform a given function
- As muscle strength increases, resistance is gradually increased (progressive resistive exercise, PRE)

Tilt table(for orthostatic hypotension)

Mat exercise

Gait training
Mirror feedback therapy with parallel bars

Co-ordination exercise

Task oriented exercise

- Involves repeating meaningful movement that works more than on joint and muscles

Electrotherapy

Electrotherapy

- Electrical Stimulation
  - Muscle/nerve stimulation
    - Muscles with intact nerve
    - Denervated muscles
  - Pain modulation
- Heat applications
  - Superficial (e.g., IR…..)
  - Deep heat(e.g., US…..)
- Cold applications
- Repetitive Transcranial Magnetic Stimulation (rTMS)

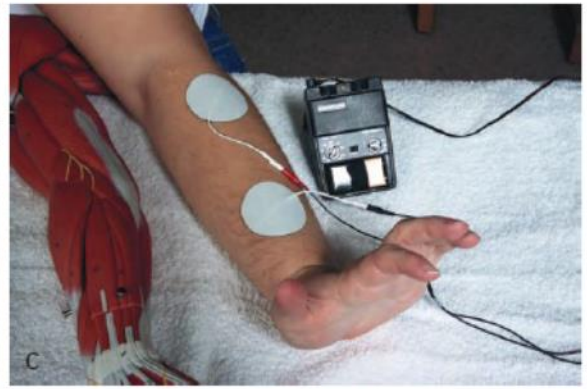


FIGURE 12-3 Each of the photographs depicts identical electrode placement sites with identical electrical stimulation parameters. The goal for the stimulation was wrist extension. However, in A, the distal electrode is larger than the proximal electrode, causing ulnar deviation. In B, the proximal electrode is larger than the distal electrode, causing radial deviation. In C, wrist flexion is accomplished this time with equally sized electrodes.

FIGURE 12-4 Contraction of the rectus femoris with the use of electrical stimulation delivered through two 3-inch-round electrodes placed on the muscle.

WHY DO I NEED TO KNOW ABOUT...

ELECTRODE SIZE

Remember that Ohm's law states that the delivered energy is directly related to the amount of resistance encountered. If you use small electrodes, the resistance will be higher and the sensation potentially more uncomfortable, which may make it very difficult to accomplish a treatment goal.

Pliability of the electrode to conform to the body part is necessary. Rigid metal electrodes do not conform well to contoured anatomical regions. Poor conformity can also result in hot-spot delivery of the electrical energy. In this case a high concentration of electrical energy over a small area, for example, the "hot spot," is a factor of not having the entire conductive surface of the electrode in contact

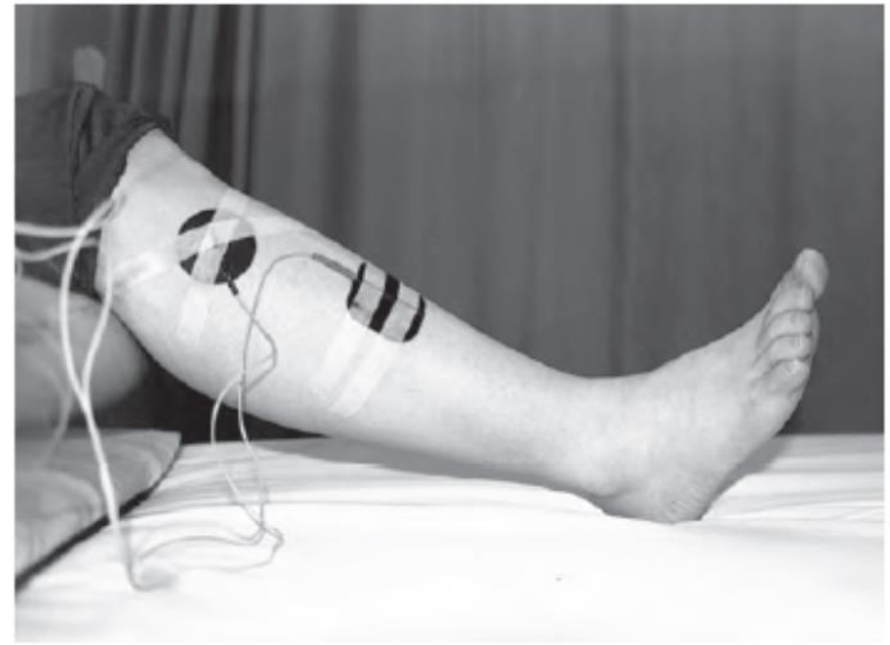
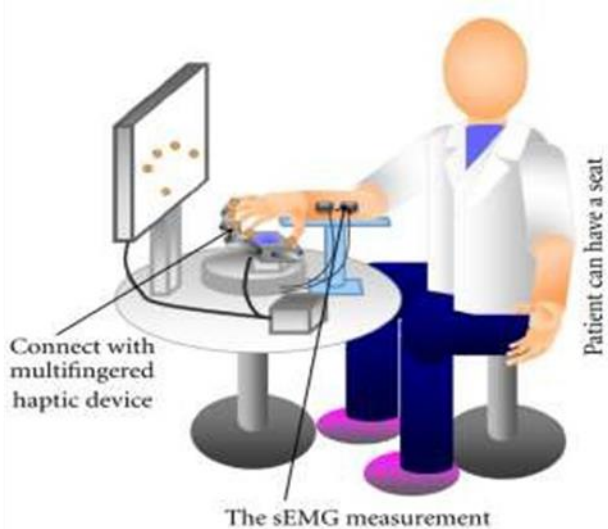


FIGURE 13-4 A balanced dorsiflexion response to NMES. Note electrode placement and extremity positioning.

- **Biofeedback**
- Electromyogram



Others aspect of rehabilitation

- Chest physiotherapy
- Pain relief
- Speech therapy
- Bowel and bladder care
- Orthoses (spinal corsets, crutches)

THANK YOU