



# BASIC REHAB INTERVENTIONS FOR STROKE

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## **DEDICATION**

**This book is dedicated to Almighty and my family.**

## **ACKNOWLEDGEMENT**

**I thank the Almighty for giving me the courage, strength and will power to embark upon and accomplish this project.**

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## **Introduction**

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Number of techniques is used for rehabilitation of stroke patients giving various results. The intervention selection depends from condition to condition and therapist to therapist. Some of the commonly used interventions are as follows.

## **Interventions**

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### **Positioning**

Ability to vary position and posture is affected in several people post stroke as a result of variable degrees of physical impairments. Therapeutic positioning aims to cut back skin injury, limb swelling, shoulder pain or laxation, and discomfort, and maximize perform and maintain soft tissue length. It additionally steered that positioning could assist in reduction of metabolism complications like those caused by aspiration and avoid compromising association and nutrition. The aim of positioning the patient is to undertake to market optimum recovery and luxury by modulating tonus, providing acceptable sensory info, increasing spatial awareness, improved ability to move with the surroundings and interference of complications like pressure sores, and muscular contraction. The most acceptable position within which to put a patient following a stroke remains unclear. there's no irregular management Trial proof to support the advice of anybody position over another however 5 main positions are recommended, a survey of physiotherapists' current positioning practices found the foremost normally counseled positions to be: sitting in AN armchair as counseled by ninety eight of respondents; facet lying on the unaffected facet then facet lying on the affected facet. Sitting in an exceedingly chair (78%, ninety fifth CI seventy four to 82%) and supine lying were less normally counseled.

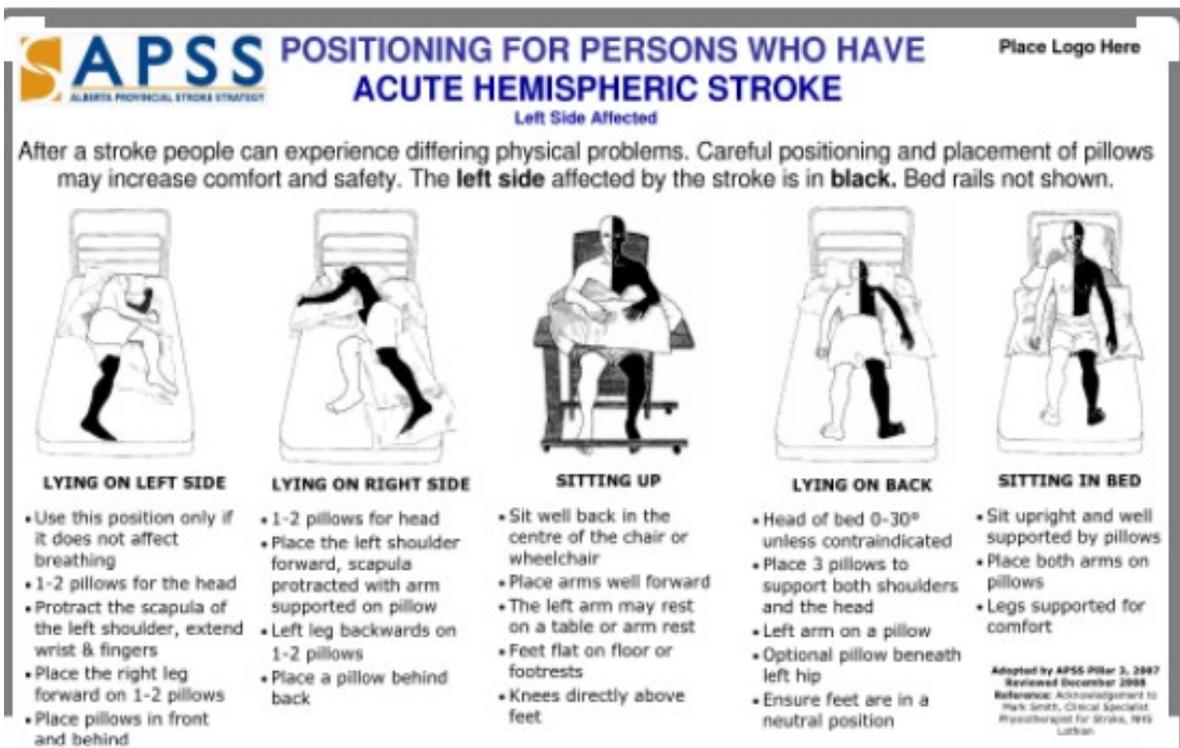


Fig 1.1 Types of Positioning. (Credits to APSS)

## Early Mobilization

Immobility is related to variety of post stroke complications like deep vein occlusion etc. Early mobilization aims to cut back the time that elapses between stroke and therefore the 1st time the patient leaves the bed, increasing the number of physical activity that the patient engages in outside of bed. Early mobilization (e.g. activities like sitting out of bed, transfers, standing and walking) aims to minimize the chance of the complications of immobility and improve useful recovery. There remains some in progress discussion concerning the precise which means of terribly early mobilization however Verbeek et al (2014) outline early mobilization as 'mobilizing a patient out of bed inside twenty four hours when the stroke, and inspiring them to apply outside the bed'. Recent changes in recommendations are created as a results of the AVERT Trial RCT of over 2000 people with acute stroke, that showed that terribly early, additional frequent, higher dose mobilisation centered on out-of-bed activities additionally to usual care was worse than usual care alone and crystal rectifier to larger incapacity at 3 months with no impact on immobility-related complications or walking recovery.

## Early Mobilisation

- If condition stable – To start active mobilisation within 24-48 hours
- Physiologically sound changes in bed position & ROM exercise.
- Specific tasks ( sitting up, turning from side to side ) & Self care activities ( feeding, grooming, dressing )
- Tolerance for therapy affected by stroke severity, medical stability, mental status, cardiac instability & level of Consciousness.

**Fig 1.2 Early Mobilization**



**Fig 1.3 Walking Aid being used for mobilization**

## Balance

Balance difficulties are a unit common for several people post stroke sometimes thanks to a mixture of reduced limb and trunk control, altered sensation and generally centrally determined alteration in body illustration such the person misperceives their posture in respect to the upright. Impaired balance typically results in reduced confidence, concern of falling and will increase the chance of falls. Current proof suggests that trunk exercise coaching improve trunk performance and dynamic sitting balance, whereas task specific coaching improves equilibrium in each sitting and standing.

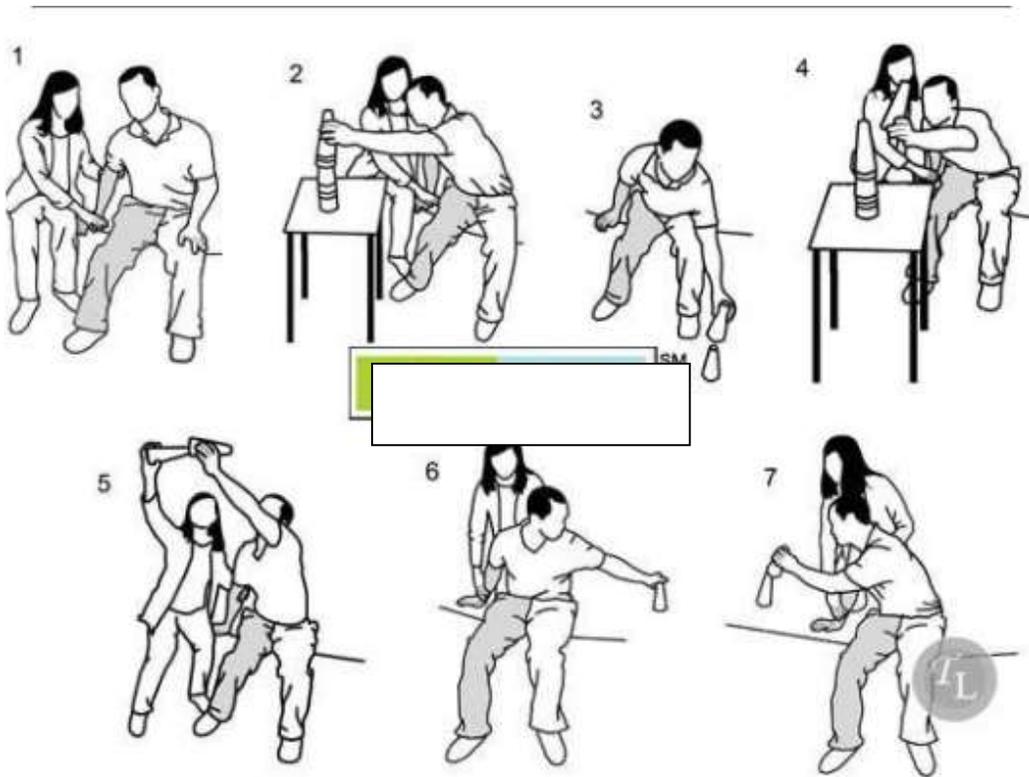


Fig 1.4 Different movements enhancing balance (Credits Therapy Library)

## Standing

1. Practicing useful task-specific coaching whereas standing
2. Walking coaching that features challenge to standing balance (e.g. over ground walking, obstacle courses)
3. Providing visual or modality feedback
4. Receive progressive balance coaching
5. Receive lower limb strengthening exercises
6. think about for AN ankle-foot orthosis

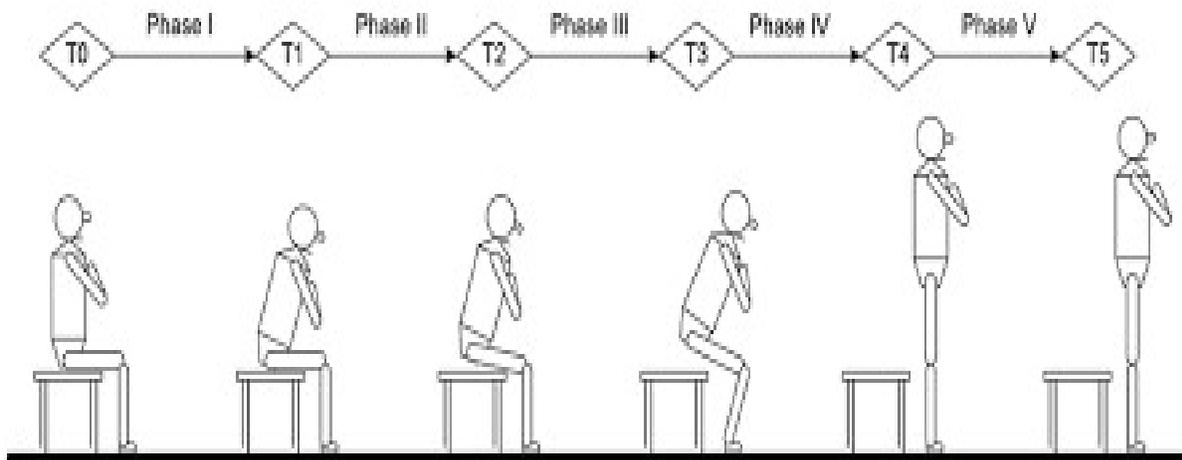


Fig 1.5 Standing strategies in stroke patients (Credits: Frontiers of Neurology Yu Rong Mou et al)

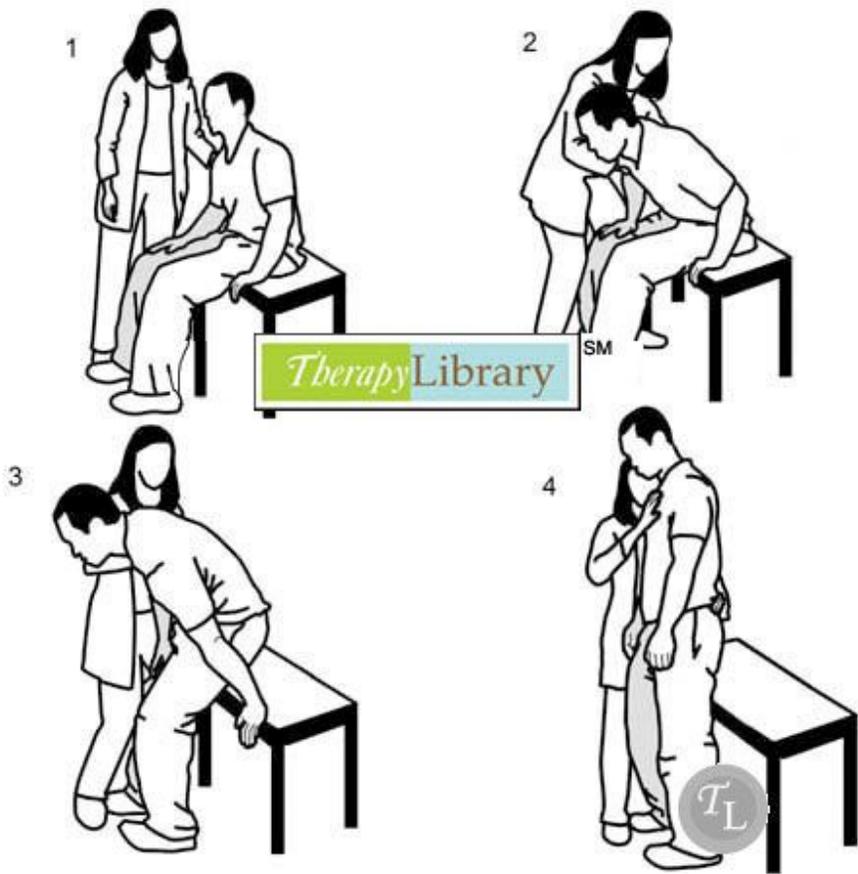


Fig 1.6 Sit to stand techniques in stroke (Credit: Therapy Library)

## Gait & Mobility

The highest priority for several individuals with restricted quality when stroke is to run severely. This section focuses on treatments and instrumentality geared toward rising walking and includes exercise. people post stroke get pleasure from time spent in task-specific, walking-orientated leg exercises that have an internal organ focus each early and late when stroke. Interventions ought to be of a spare intensity with attention on progression, task-specificity and challenge to enhance outcomes and may embody strengthening exercises for the leg, over-ground walking, circuit categories and treadmill coaching with and while not weight support. If walking performance is poor when stroke, community activity is also restricted and other people could become confined and isolated from society

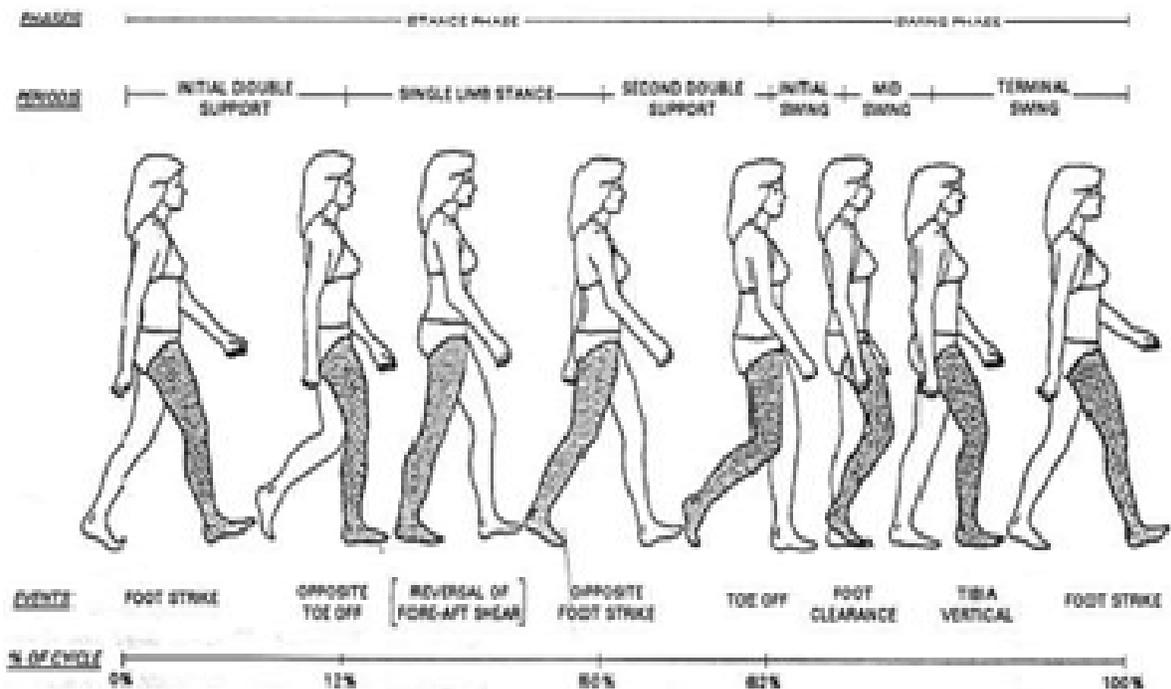


Fig 1.7 Gait pattern in stroke

## Treadmill Training

Treadmill coaching are often utilized for each Gait Re-education / coaching however additionally to assist enhancements in aerobic perform. Treadmill coaching are often completed with the patient's body-weight partly supported by a harness so as to grade the number of weight supported, that is employed for people with vital useful limitations. Speed dependent treadmill coaching while not a harness might also be utilized. Therapists facilitate alternating stepping and weight-bearing, and as several as 3 therapists is also needed to help with the whole gait cycle. Shepherd and Carr argued

that there are a unit 3 reasons why treadmill coaching will support gait re-education: 1. It permits an entire apply of the gait cycle 2. It provides chance for gaining enhancements in speed and endurance 3. It optimizes aerobic fitness Task-specific coaching on a treadmill has additionally been shown to induce growth of neural structure and plant tissue locomotion areas in people following stroke and may end in a rise in cadence and a shortening of step length as compared to over ground walking. Treadmill coaching could improve walking speed and endurance but it doesn't seem to be more practical than alternative walking-orientated interventions of matched intensity for rising walking ability.



**Fig 1.8 Partial Body weight treadmill training (Credits Biodex)**

## Electromechanical motor-assisted

Electromechanical-assisted gait coaching, with and while not partial weight support yet like or while not FES, area unit used as adjuncts to over ground gait coaching for the rehabilitation of patients when stroke and may be accustomed provide non-ambulatory patients intensive apply (in terms of high repetitions) of complicated gait cycles. Machine-controlled mechanical device gait machines consist either of a robot-driven body covering orthosis or a mechanical device answer with 2 driven foot-plates simulating the phases of gait and provide reduced effort for therapists, as they not ought to set the paralytic limbs or assist trunk movements. The most distinction between mechanical device-assisted and treadmill coaching is that the method of gait coaching is machine-controlled and supported by an electromechanical answer. Current analysis indicates that repetitive gait coaching together with physical therapy could improve walking ability in patients when stroke.

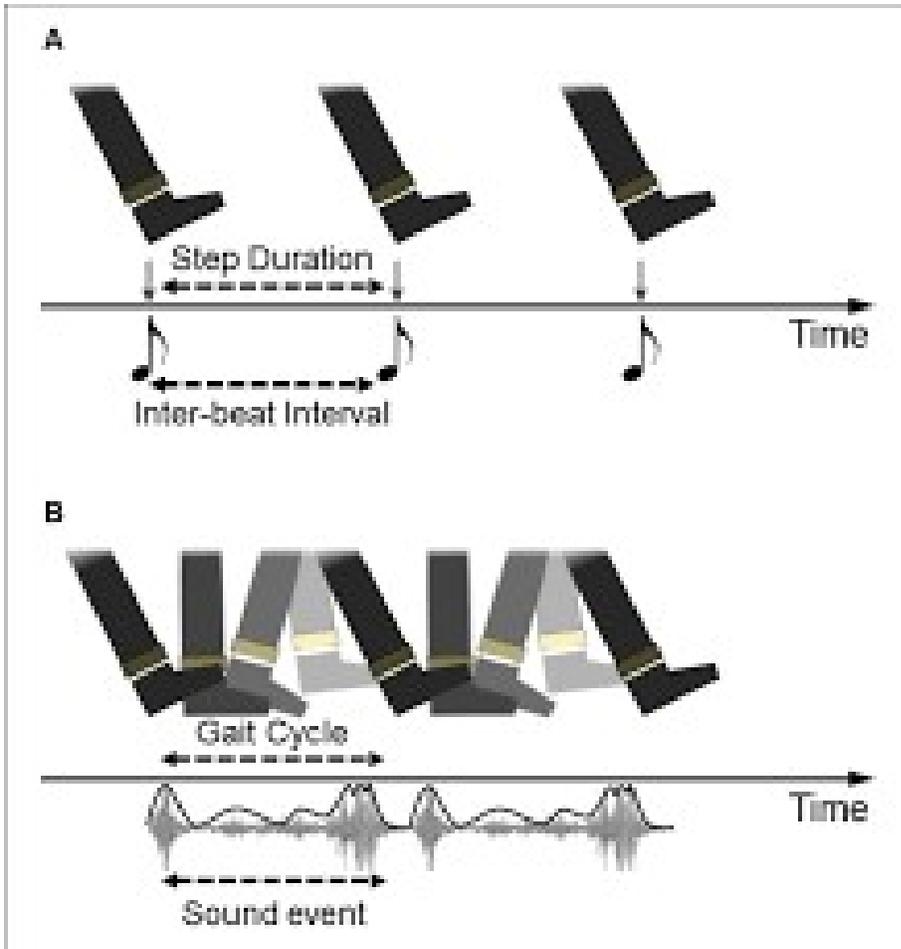


**Fig 1.9 Electric gait trainer**

## Rhythmic Cueing

Motor Control analysis provides extended proof that modality rhythm will improve temporal arrangement and variability of motor responses, specifically, in motor tasks with complicated temporal arrangement needs or in disorders touching temporal arrangement of movement, external rhythm will give extra stability to timekeeper mechanisms within the brain. For singsong Cueing the patient's steps area unit matched to the beat of the pendulum or especially ready music so as to synchronies motor responses into stable time relationships. The patient is asked to require steps in

step with the beat; therefore the singsong beat acts as a cue. If the beats are a unit of a standardized frequency, this cueing can promote the temporal symmetry of walking. If the frequency of those consistent beats is inflated, cadence and, therefore, speed will increase. The goal is to influence gait parameters like pace frequency, stride length and therefore walking speed and symmetry. Systematic review provides proof that gait coaching with cueing of cadence is more practical than gait coaching alone in rising walking when stroke. Gait coaching with cueing of cadence made quicker walking and longer stride length, and should have positive effects on cadence and symmetry.



**Fig 1.10** Rhythmic Cueing ie stepping with the rhythmic beat

## Virtual Reality

Advances in video game technology mean that devices victimization laptop and vice technology, like the Nintendo Wii ®, area unit currently found in several people’s homes. The potential of those kinds of adjuncts to maximise task-orientated apply and increase energy expenditure area unit setting out to be explored. Video game quality coaching involves the utilization of technology that permits

the patient to maneuver concerning in an exceedingly virtual surroundings and receive feedback on their performance and is recommended that the utilization of a virtual surroundings produces plant tissue reorganization. What is more, virtual environments area unit variable and may afford patients the chance to apply beneath a spread of simulated circumstances. The difficulty level of the coaching situations are often adjusted by variable the speed and slope of the treadmill, the complexity of tasks, and therefore the quantity of weight support and may enable immediate patient feedback on performance, that is a vital element of learning. Whereas practiced medical care can invariably be a neighborhood of rehabilitation, the utilization of VR-enhanced treadmill coaching is also a cheap thanks to increase patient motivation to apply walking beneath totally different simulated conditions. It remains unclear whether or not video game quality coaching is more practical than alternative interventions for patients with a stroke in terms of snug and most walking speed, spatiotemporal gait parameters and walking ability.



**Fig 1.11 Patient performing actions looking at the virtual screen(Credits Saebo)**

## Over ground Walking

Over ground walking involves walking and walking-related activities on a solid surface, wherever the therapist observes the patient's gait, sometimes on level surface, and has the patient do a variety of different activities and exercises to influence their gait. The profit is that over-ground gait coaching is often utilized in nearly any setting or location while not requiring an excellent deal of advanced instrumentality.

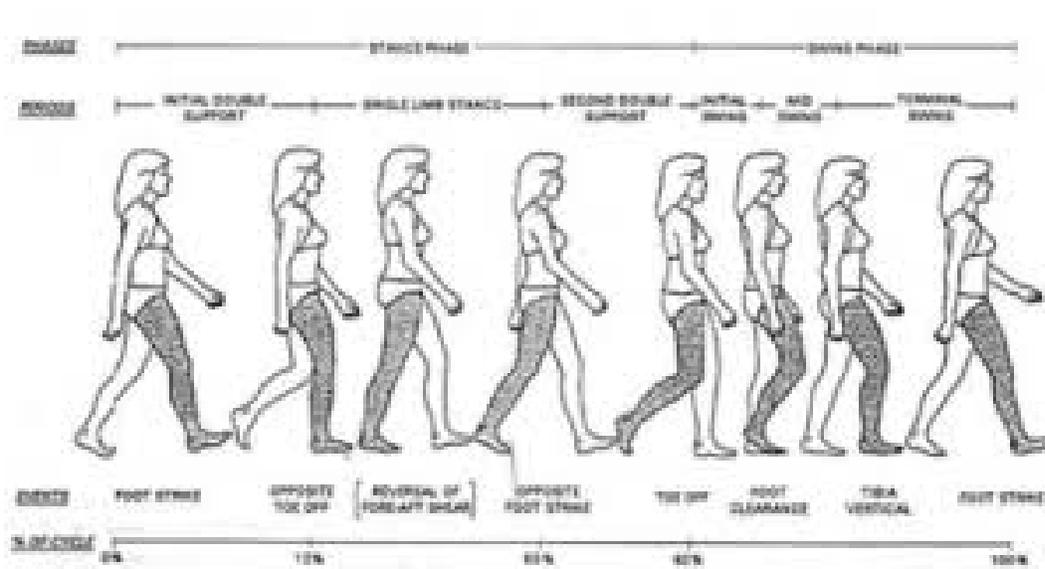


Fig 1.12 Walking cycle in Stroke Patients

## Orthotics

Orthotics, like every tool utilized in the treatment of a posh and chronic condition, will target all levels of health promptly. it should be AN intervention designed to vary body structures, or AN intervention to support And stabilize unresponsive muscles thus an activity are often performed, or AN adjunct to alter participation in an exceedingly life role like work. in step with Elmore John Leonard et al (1989) AN orthosis may be a device that, once applied properly to AN acceptable external surface of the body can come through one among additional of the following: • Relief of Pain • Immobilisation of contractile organ Segments • Reduced Axial Loading • Prevention or Correction of Deformity • Improved perform Orthoses area unit made of varied kinds of materials together with thermoplastics, carbon fiber, metals, elastic, EVA, cloth or a mixture of comparable materials. Some styles are also purchased at retailer; others are additional specific and need a prescription from a doc, World Health Organization can match the orthosis in step with the patient's needs. Over-the-counter braces area unit basic and offered in multiple sizes. they're usually fell on or strapped on with Velcro, and area unit control tightly in situ. KNGF Clinical tips recommends trial of mortise joint Foot Orthotic for patients whose safe and/or economical walking ability is obstructed by drop foot throughout the swing section of walking following Multidisciplinary consultation.

Upper-Limb Orthoses		Lower-Limb Orthoses	
WO	Wrist Orthosis	FO	Foot Orthosis
WHO	Wrist-Hand Orthosis	AFO	Ankle-Foot Orthosis
EO	Elbow Orthosis	KO	Knee Orthosis
EWHO	Elbow-Wrist-Hand Orthosis	KAFO	Knee-Ankle-Foot Orthosis
SEWHO	Shoulder-Elbow-Wrist-Hand Orthosis	HKAFO	Hip-Knee-Ankle-Foot Orthosis

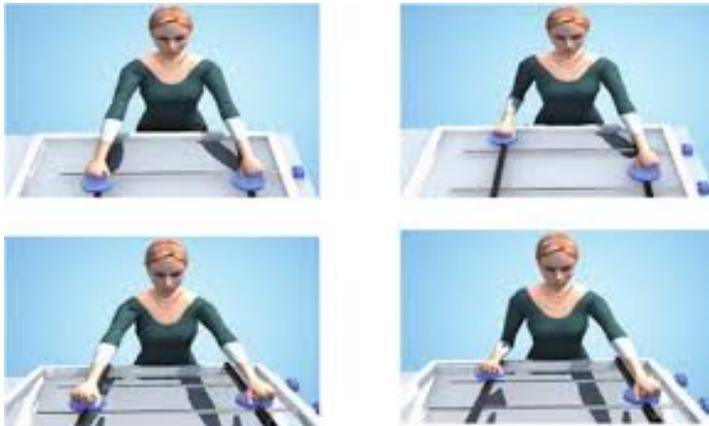
Fig 1.13 Different orthotics used in Stroke

## Upper Limb

Up to eighty fifth of individuals post stroke expertise altered arm perform, with just about four-hundredth of people being laid low with higher limb perform long run. Loss of arm perform adversely affects quality of life, and useful motor recovery in affected higher extremities in patients with unilateral paralysis is that the primary goal of physical therapists. "Currently there's no prime quality proof for any interventions that area unit routine apply, and proof is depleted to alter comparison of the relative effectiveness of interventions." In alternative words, the proof is depleted to point out that of the interventions area unit the foremost effective for rising higher limb function"

## Bilateral Arm Training

Bilateral Arm coaching provides intensive coaching of bilateral coordination to alter apply of two-handed skills. Throughout bilateral arm coaching, movement patterns or activities area unit performed with each hand at the same time however freelance from one another and may even be cyclic. This approach was developed in response to known limitations of Constraint elicited Movement medical care (CIMT) that precludes the chance to apply bilateral skills notably useful activities that area unit inherently two-handed. Unilateral and bilateral coaching area unit equally effective. However, intervention success could rely upon severity of higher limb paralysis and time of intervention post-stroke.



**Fig 1.14 Using both arm to perform activities**

## **CONSTRAINT INDUCED MOVEMENT THERAPY**

Constraint-induced movement medical care (CIMT) involves intensive targeted observe with the affected limb whereas restraining the non-affected limb, which suggests that in task-specific observe, people with handicapped person stroke area unit forced to use their affected limb. Following a medicine incident, typically the affected arm and hand don't seem to be used sufficiently notwithstanding there's some purposeful activity gift. To handle this 'Learned non-use', the approach of CIMT was developed whereby the non-affected limb was affected herewith forcing the affected limb to figure. This forced-use medical care combined with shaping and purposeful coaching is currently ordinarily called CIMT. Different classes of CIMT will be distinguished to be used in Stroke counting on the length of the immobilization of the paralytic arm and therefore the intensity of task-specific practice: Original CIMT Applied for two to three weeks consisting of immobilization of the non-paretic arm with a cushiony mitt for ninetieth of waking hours utilising task-oriented coaching with a high variety of repetitions for six hours a day; and behavioral ways to enhance each compliance and transfer of the activities practiced from the clinical setting to the patient's home setting.



**Fig 1.15 CIMT- constraining the normal hand (Credits : thelancet)**

## **ELECTRICAL STIMULATION**

Functional Electrical Stimulation seems to moderately improve higher limb activity compared with each no intervention and coaching alone. Current proof counsel that electrical stimulation ought to be utilized in stroke rehabilitation to enhance the power to perform purposeful higher limb activities. ROBOT motor-assisted ARM coaching Robot-mediated treatment utilizes machine-controlled devices to supply passive, active or resistive limb movement that might give extended periods of treatment and coverings that area unit conscious of the actual desires of the individual by exploitation the person's movement as feedback, as ability changes over time. There's presently conflicting proof as there's still restricted proof to counsel once or however typically mechanism motor-assisted arm movement ought to be used. Individuals with reduced arm perform once a stroke ought to solely be offered robot-assisted movement medical care or contractile organ electrical stimulation as Associate in nursing adjunct to standard medical care within the context of a test.



**Fig 1.16 Using electrical stimulation to perform tasks**

## **CARDIORESPIRATORY TRAINING**

There is Associate in Nursing increasing vary of aerobics choices being accessed by individuals with following Stroke. These vary from aerobics programmers (e.g. over ground walking or treadmill coaching programmers) Associate in Nursing an array of sporting and exercise categories to the employment of technology (e.g. computer game training). These choices, supported by the growing body of proof, gift the healer and patient with the power to pick out a programme for a private, that is timely and might be dole out in Associate in nursing acceptable setting.

## **STRENGTH TRAINING**

Progressive resistance coaching ought to be offered to those with reduced strength in their arms or legs.

## **HYDROTHERAPY**

Immersion in water will enhance the treatment of neurologically impaired people with each therapeutic, psychological and social edge. hydrotherapy is that the term used for exercise in heat water and could be a widespread treatment for patients with medical specialty and contractor conditions and is outlined by the hydrotherapy Association of chartered Physiotherapists steering on smart observe in hydrotherapy as a medical care programmed exploitation the properties of water, designed by a fitly qualified healer, to enhance perform, ideally in a very purposeful and fitly heated hydrotherapy pool



**Fig 1.17 Stroke patient being treated using Hydrotherapy**

## **ELECTROTHERAPY**

Electrical stimulation could also be used for those with reduced strength in their arms or legs (particularly for those with but antigravity strength). Electrical stimulation could also be wont to stop or cut back shoulder laxation.

## **SPASTICITY MANAGEMENT**

There is wide dialogue on the definition, physiological nature and importance of fitfulness. fitfulness will cause discomfort or pain for the and might be related to activity limitation. fitfulness is common, particularly in a very non-functional arm with shut association between fitfulness and alternative impairments of arm perform and quality.

## **STRETCH**

Stretch could also be applied in a very variety of how throughout medicine rehabilitation to attain totally different effects. the categories of stretching used include; quick / fast, Prolonged and Maintained. presently the proof for stretching in stroke rehabilitation is weak in relevance its use in fitfulness managment.

## **BOTULINUM**

Medication injected into active spastic muscles to domestically block fitfulness. BoNT-A injections contribute to improved walking perform together with physiatrics. Similarly, the employment of BoNT-A for rising hand perform is effective together with physical therapy. Injections within the submandibular glands area unit effective to scale back drooling. BoNT-Aadministration improves fitfulness, vary of movement and simple care (i.e. passive perform) and clinical goal attainment however not activity-level function (i.e. active function).

## **CONTRACTURE MANAGEMENT**

A muscle muscular contraction could be a permanent shortening of a muscle or joint. it's sometimes in response to prolonged hypertonic fitfulness in a very focused muscle space. Contractures don't seem to be uncommon in limbs plagued by fitfulness. Contractures will impede activities like laundry or putt on garments, and should even be uncomfortable or painful and limit the power to sit down in a very chair or mobilise.A Systematic Review to work out whether or not stretch will increase joint quality in individuals with existing contractures or those in danger of developing contractures provides moderate to top quality proof that stretch, whether or not passive or through

the means that of splint or serial casting, doesn't have a clinically vital result on joint quality in individuals with medicine conditions.

## **FATIGUE MANAGEMENT**

Fatigue is common grievance post-stroke, Associate in Nursingd is clear even in those people UN agency have created an otherwise complete recovery. Over four-hundredth of semipermanent stroke survivors report in progress problems with fatigue that impact on their daily living activities with lack of energy Associate in Nursingd/or an hyperbolic ought to rest a day, because the main characteristics which might be brought on by each mental and physical activity. Fatigue has additionally been related to depression, and should be a predictor of shorter survival. Management ways embrace the identification of triggers and re-energisers, environmental modifications and way changes, programing and pacing, psychological feature ways to scale back mental effort, and psychological support to handle mood, stress and adjustment.



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