



# Acute stroke Management - Physiotherapist Perspective

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***“WALKING IS  
SOMETHING THAT  
EVERY INFANT WANTS  
TO LEARN FIRST AND  
EVERY ELDERLY  
PERSON WANTS TO  
GIVE UP LAST”***

# Contents

- ▶ Defining Hemiplegia
- ▶ Introduction
- ▶ Problems contributing to the loss of movement and function in hemiplegics
- ▶ Physiotherapy Assessment
- ▶ Acute Stroke Care
- ▶ Conclusion

# HEMIIPLEGIA

- ▶ As per WHO  
Stroke–A **vascular lesion** of the brain that results in rapidly developing clinical signs or **local or global** loss of brain function that **persists for at least 24 hours**.
- ▶ However these patients often have problem with ambulation because of insufficient movement strategies, decreased safety and the presence of pain due to abnormal limb posture.

# INTRODUCTION

- ▶ Adults who have had a CVA rely on the skill of the Physiotherapist to come back to as normal a life as possible
- ▶ In Rehabilitation centers as physios we spend at least 10percent of our working time in treating these patients.
- ▶ Hemiplegic patients present with a multitude of problems with these differing, depending upon which side of the body is affected.

# Contd.

- ▶ A left sided Hemiplegic tends to have more sensory & perceptual problems whereas a Right sided Hemiplegic can have more problems with speech.
- ▶ However they all present with varying degrees of alterations in postural reflex activity, altered muscle tone & therefore the inability to perform voluntary movements & functional tasks.

# Problems contributing to the loss of movement and function

- ▶ Loss of movement in the trunk and extremity, produce atypical or abnormal pattern of movement, or develop compensatory movement strategies to replace normal movement patterns.
- ▶ The factors can be summarized as
  - ✓ Primary impairments
  - ✓ Secondary impairments
  - ✓ Composite impairments

# ▶ Primary impairments

- Changes in the muscle strength
- Change in the muscle and postural tone
- Change in the muscle activation
- Sensory changes

## o Muscle strength

- CNS lesions result in the impairment of the muscle strength in the muscles of the affected side or affected body segments
- In the acute stroke patients, paralysis often involves all or major muscle groups of the one side.
- In less severe stroke or where the motor recovery has occurred some muscle groups contract, while the others remain paralyzed.
- Some stroke patients never experience full paralysis on their affected side but present immediately with muscle weakness. Weakness in the muscles of the trunk is present with hypertonicity on arm and leg muscles



## ▶ Muscle weakness in the trunk

- Muscle weakness in the arm or the leg prevents the use of the limb for the weight bearing and functional movement in space.
- Several studies on stroke have considered muscle strength as a reliable predictor of motor recovery and increase in muscle strength coincides with improvement in the performance of the ADLs.

## ▶ Changes in tone

ACTIVE STIFFNESS

PASSIVE STIFFNESS

## ▶ Changes in muscle activation

- Seen when the patients activates the wrong muscle during a task performance.
- They are the changes in the motor control or the ways the brain directs the organization and the sequencing of the movement.
- Several types of the movement problems relate to the changes in the activation:-
  - ❖ *Inappropriate patterns of muscle activation*
  - ❖ *Inappropriate patterns of muscle initiation*
  - ❖ *Inappropriate muscle substitution*
  - ❖ *Excessive co contraction*
  - ❖ *Excessive force production during movement*

## Secondary Impairments

- ❖ Orthopaedic changes
- ❖ Changes in muscle and soft tissue tension and length
- ❖ Pain
- ❖ Edema

## ▶ Composite movement impairment

- Sharman called them as movement dysfunction or, “imbalance or insufficient movement of the body segments” they are the combined results of the primary and secondary impairments ,motor recovery and treatment.
- They include :- movement deficits , atypical movement and compensatory movement.

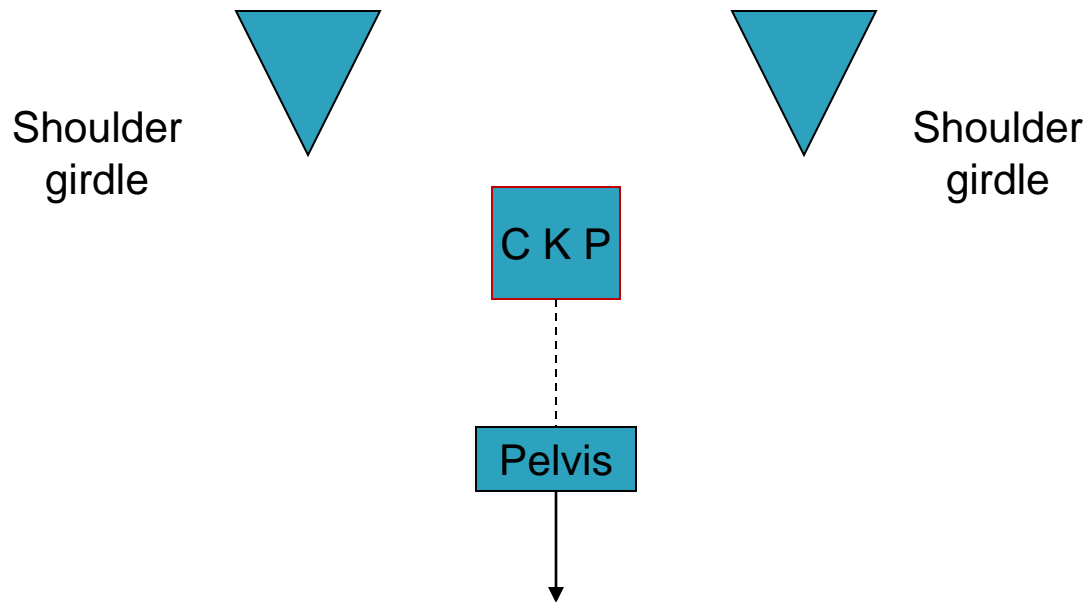
- Movement deficits– they are the missing pieces of the movement. Present when ever the recovery is incomplete .They may even be the muscles whose function is blocked by secondary impairments. These deficits can be seen in the movement component of the trunk and the extremities.
- Atypical movements– they use the muscle activation and sequences of joint movement that do not follow normal muscle synergies or biomechanical rules.
- Compensatory movement– they are the movement substitution that replace the normal movements to accomplish a functional goal or task. Acquired when the normal movements are absent.

- Undesirable compensation–leads to neglect of the involved side, asymmetric posture and movements. Once established difficult to undo.

# MID LINE

## What is it?

Correct alignment of the key points



For balance one needs to have a midline and be able to move away from it and return to it without falling there by initiating RRs & ERs.

# POSSIBLE FACTORS

(leading to deviation from mid line)

- ▶ Flaccidity on one or both sides.
- ▶ Inability to recruit sufficient extensor activity.
- ▶ Lack of RR & ER.
- ▶ Overuse / compensation of unaffected sides.
- ▶ Sensory & Perceptual problems.

# A Pure Flaccid Patient

- ▶ When a patient is flaccid he/she is guaranteed to deviate from the midline as they cannot maintain any position against gravity, thus would fall in any direction to take up the BOS.
- ▶ This happens because he/she is unable to recruit postural tone which is important for all antigravity activities. There is no initiation of ERs & RRs & patient is unable to balance.

# Patients With Compensations Of Flexion

- ▶ These patients presents with side flexion to the unaffected side again being deviated from the midline.
- ▶ They adopt this position as they lack postural tone on the affected side & are unable to stabilize against gravity.
- ▶ They hold on into flexion & overcomes his unaffected side to increase stability resulting in no interplay between the two sides of the body.

# Patients With Compensations Of Extension : “The Pusher”

- ▶ These patients have their trunk side flexed towards the unaffected side. The arm & leg on the unaffected side tend to thrust away from it pushing themselves over to the affected side & thus off balance.
- ▶ They also strongly resist any correction of this posture.
- ▶ Left Hemiplegics are more likely to present with this type of compensation because of sensory & perceptual problems.



# Patients With Sensory Problems

- ▶ There is a category of patient who do not particularly develop a compensation of flexion or extension but due to massive sensory loss they are unable to maintain a midline position.
- ▶ These patients can totally neglect the affected side of the body i.e. they do not acknowledge half of their body.

# Physiotherapy Assessment

- ▶ Motor function
- ▶ Muscle tone (high/low)
- ▶ Sensation/Proprioception/Co-ordination
- ▶ Alignment/Stability in various positions
- ▶ Neuromuscular anatomy
- ▶ Compensation Strategies
- ▶ Balance
- ▶ Mobility

# ▶ OBSERVE

## I. How??

- Does the patient move
- Relation to normal tone
- Does he balance(dynamic)
- Does he change his position
- Does he compensate – unaffected side
  - Affected side
- How does he react to being – handled
  - being moved.

## 2. Why??

- Does the patient move as he does
  - Tone
  - Associated Reactions
- Increased / decreased levels of balance mechanisms
- Increased / Decreased sensory input.

# III. What??

- Can I do about it
- Where / what level do I start i.e. Trunk – central postural tone, balance mechanisms or the most mobile part
- Proximal key points – shoulder girdle or pelvis.

# IV. Treatment

- What can I alter now
- Short term goals
- Long term goals

# Acute Stroke Care

- ▶ When Should Stroke Rehabilitation Start?
- ▶ Priorities are :
  - Manage stroke sequel to optimize recovery
  - Prevent post-stroke complications that may interfere with recovery process

# Contd.

- ▶ The best time to start therapy is determined by the observation of the status “medically stable” or more or less, 2 to 7 days after onset.
- ▶ As a member of the medical team, the physical therapist should be informed as soon as a new stroke patient is admitted, to request physician referral and begin to see the patient within 36 to 48 hours after admission.
- ▶ It also depends on the physician decision for referral. Clinical lab test results and/or vital signs



# Contd.

- ▶ Consider that rehabilitation is a process.
- ▶ Rehabilitation and discharge planning begins at the time of admission to acute care

# Contd.

- ▶ The rehabilitation of patient & its success is not wholly dependent upon the Physiotherapy sessions but also on what happens to the patient throughout the rest of the day.
- ▶ Rehab should be regarded as a 24hour management of way of life.
- ▶ Ensure that outside the therapy sessions the patient does not use excess effort to carry out activities because this leads to abnormal patterns of movement.

# Contd.

- ▶ Rehabilitation is not a passive activity & in order to improve the patient has to participate & repeat activities & movements to relearn them.
- ▶ Every effort should be made to get the patient actively involved in the rehabilitation process so that he learns how to carry out purposeful & segmental management patterns.

# Contd.

## What are the benefits of early assessment and rehabilitation?

- ▶ Assessment should start as early as possible in the ER and continue through the inpatient and community reintegration phases
- ▶ Early consultation with rehab professionals:
  - Contributes to reductions in complications from immobility such as joint contracture, falls, aspiration pneumonia and deep vein thrombosis
  - Contributes to early discharge planning for transition from acute care to specialized rehabilitation units or to the community
  - Should reduce the overall cost of care through improved outcomes and reduced time to discharge.

# Physiotherapy Aims

- ▶ To help patient be able to get out of bed as and be mobile as soon and as much as possible
- ▶ To normalise muscle tone
- ▶ To restore muscle function
- ▶ To control compensation strategies
- ▶ To maintain muscle length
- ▶ To re-educate balance
- ▶ To retrain walking and restore mobility
- ▶ To maximise functional ability while allowing on-going neuromuscular recovery
- ▶ These goals should be agreed by the physical therapist, the patient and the care givers.

# Components of Acute stage Care

- ▶ Patient and Family Education
- ▶ Positioning
- ▶ Skin Care
- ▶ Chest Care
- ▶ Maintenance of General mobility, Muscle length, Strength and Joint ROM.
- ▶ Enhancement of Optimal recovery through functional training.
- ▶ Prevention of stress, trauma and pain of the affected shoulder,
- ▶ Prevent loss of muscle and soft tissue length

# Patient and Family Education

- ▶ Content should be specific to;
  - The phase of care
  - Patient/caregiver readiness
  - Patient/caregiver needs
  - Education should be timely, interactive, up to date and provided in a variety of formats, languages including aphasia friendly
- ▶ Processes should be established by clinical teams for education including designating team members for provision and documentation of education

# Contd.

- ▶ Education content should include:
  - The nature of the stroke and its manifestations
  - Signs and symptoms of stroke
  - Impairments and their impact on the person
  - Caregiver training to manage
  - Risk factors
  - Post-stroke depression
  - Cognitive impairment
  - Discharge planning and decision making
  - Community resources
  - Home adaptations



# Patient and care givers education goals

- ▶ Care giver will be able to participate to the overall physical therapy management.
- ▶ Patient will be able to demonstrate an active learner attitude
- ▶ Care giver and patient will be able to participate actively to the prevention of muscle shortening and shoulder complications.

# Positioning and Seating

- ▶ **Importance of positioning**
  - Positioning is a 24 hour approach:
  - ‘The way the patient is handled, transferred and enabled to move within their environment optimises success at all stages of recovery’ (Raine 2009).

# Why is positioning important?

- ▶ Comfort
- ▶ Efficient breathing
- ▶ Improved digestion
- ▶ Pressure relief
- ▶ Social / environmental interaction
- ▶ Improve Function
- ▶ Improve Communication
- ▶ Improved swallow

# Physical effects of positioning

- ▶ Maintain muscle length and joint range
- ▶ To improve muscle activity/ tone
- ▶ To prevent abnormal tone developing
- ▶ Protect the hemiplegic arm
- ▶ To encourage the return of normal movement

# Vulnerable joints after stroke

- ▶ Need to be aware of joints which are more at risk of injury post stroke due to reduced muscle tone supporting these joints
- ▶ Special attention needs to be paid to these joints to prevent them being damaged and becoming painful
- ▶ Other joints are at risk of losing range of movement as due to the loss of muscle activity, they tend to fall into a position
- ▶ Shoulder complex, Wrist & Ankle are the most vulnerable joint.

# Positioning in bed

- ▶ Side lying on affected side
- ▶ Side lying on unaffected side
- ▶ Supine Lying
- ▶ Sitting

# Side lying on affected side

- ▶ Side lying on the affected side stimulates the affected side through weight bearing and tactile input and facilitate postural activity in both central and proximal segments
- ▶ Another advantage is that the patient has their unaffected side free for function

# Side lying on affected side (Right Hemiplegia)





# Side lying on unaffected side

- ▶ Side lying on the non-affected side provides stability for more movement of the affected limb in space

# Side lying on unaffected side

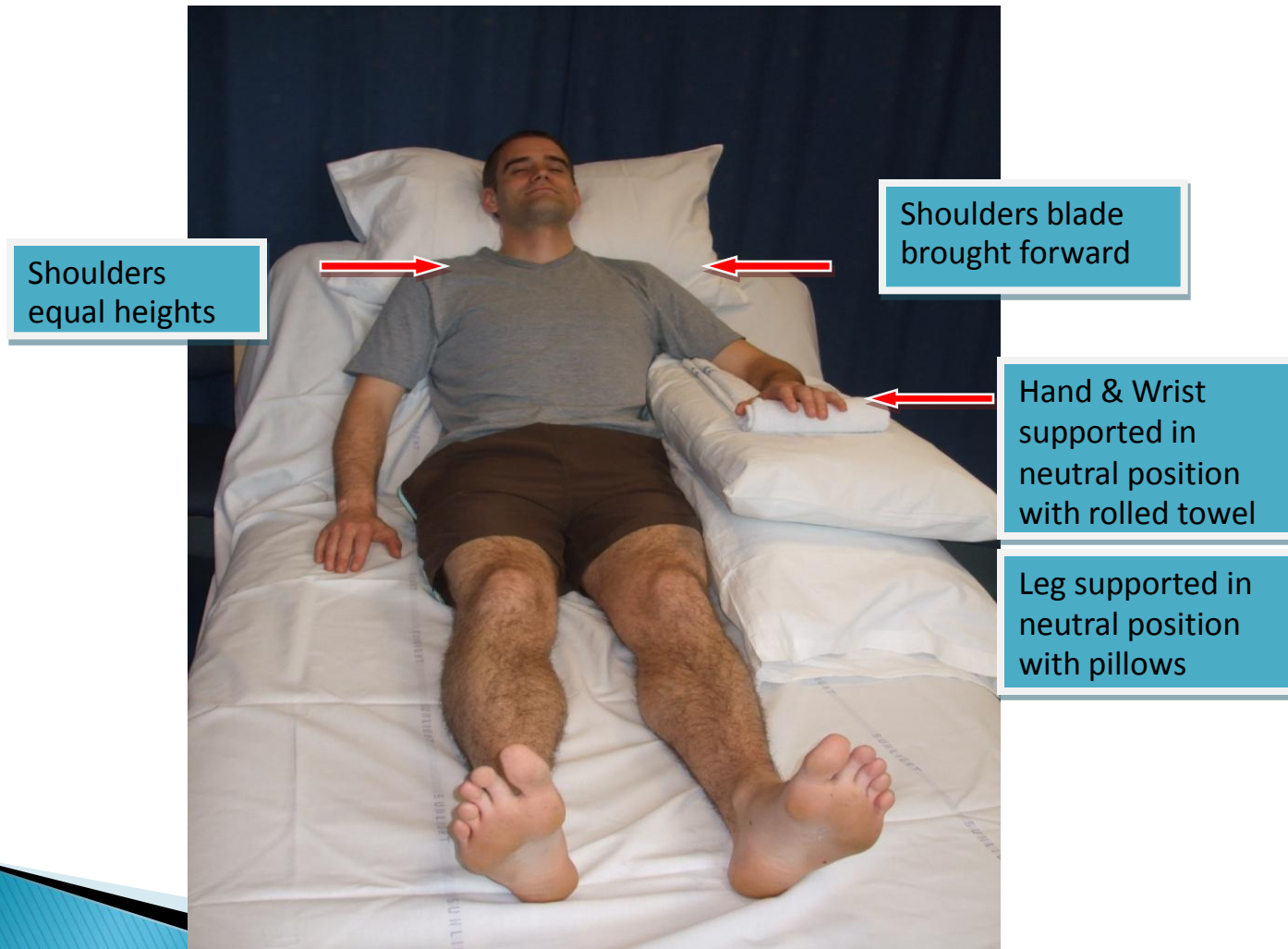
(Left sided hemiplegia)

Arm supported in neutral position with pillows

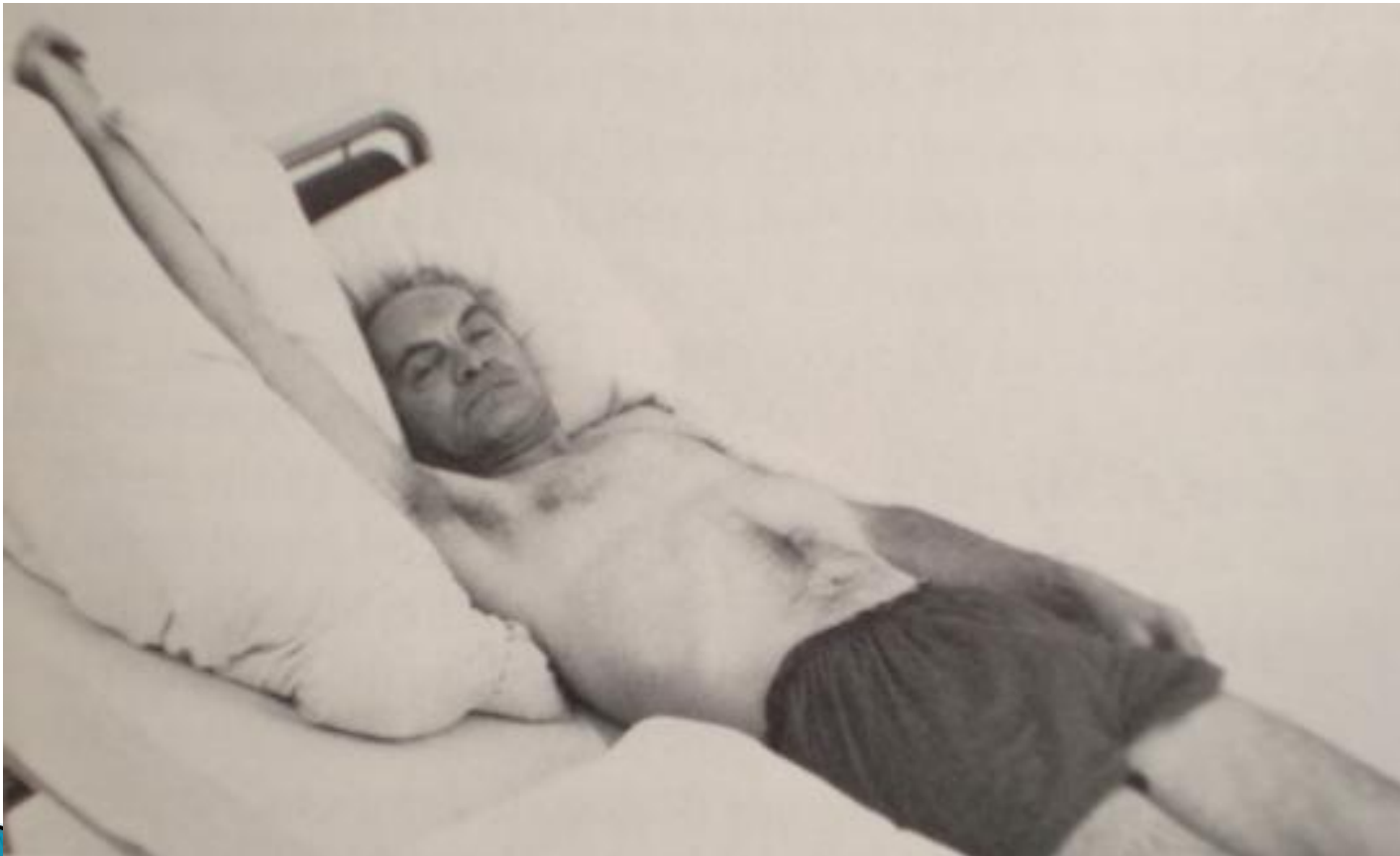
Leg bent at hip and knee and supported in neutral position with pillows



# Supine Lying



# Alternate position of arm in supine lying



# Positioning when seated

- ▶ Patients need to be sat out of bed as soon as medically stable if suitable seating is available
- ▶ Therapists will initially carry out the assessment and seat in the appropriate chair with appropriate pressure cushions
- ▶ Advice will be given on length of time it is advisable for patient to sit out .

# Seating – Things to check

- ▶ Hips need to be level in the chair and at the back of the chair
- ▶ Pelvis needs to be level ,not rotated
- ▶ Trunk central ,supported with lateral supports if needed
- ▶ Legs in neutral ,thighs supported on seat
- ▶ Feet supported on foot plates which are at equal heights
- ▶ Upper Limb supported on pillow

# In Chair

Trunk central  
between  
lateral  
supports



Shoulders  
equal heights  
and  
supported

Support leg to  
prevent it  
rolling in or  
out

Feet/ankles  
at equal  
heights

Feet flat on  
a firm  
surface

# General mobility goals

- ▶ Patient is able to do effective bridging in bed
- ▶ Patient is able to roll in bed and transfer from supine lying to sit on edge of bed
- ▶ Patient is able to hold sitting and standing
- ▶ Patient is able to reach in all directions and to the floor while in sitting and in standing
- ▶ Patient is able to transfer from bed to chair and back
- ▶ Patient is able to walk with or without assistive device and/or outside help



# Prevention of stress, trauma and pain of the affected shoulder

- ▶ Use proper positioning of the upper limb while patient is in any given position.
- ▶ Avoid dangerous handling methods, especially while passive mobilization is performed and while helping patient to move in and out of position.
- ▶ Always support the arm when patient is sitting either in front or sideways on a high table.

# The Perceptions of Stroke

## Myth

- ▶ Stroke is not preventable
- ▶ Stroke cannot be treated
- ▶ Stroke only strikes the elderly
- ▶ Stroke happens in the heart
- ▶ Stroke recovery ends after 6 months

## Reality

- ▶ Up to 80% percent of strokes are preventable
- ▶ Stroke requires emergency treatment
- ▶ Anyone can have a stroke
- ▶ Stroke is a “Brain Attack”
- ▶ Stroke recovery can last a lifetime

# Stroke Recovery

- 10% of stroke survivors recover almost completely
- 25% recover with minor impairments
- 40% experience moderate to severe impairments requiring special care
- 10% require care within either a skilled-care or other long-term care facility
- 15% die shortly after the stroke

# Types of Recovery Services

- Rehabilitation unit in the hospital
- In-patient rehabilitation facility
- Home-bound therapy
- Home with outpatient therapy
- Long-term care facility
- Community-based programs

# Recent Advances

- ▶ Body weight supported gait training
- ▶ Balance Trainer

# Body weight supported gait training



# Balance Trainer



# Conclusion :

- ▶ In order to regain maximum recovery for patients with Hemiplegia it is essential to commence treatment & rehabilitation as soon as possible.
- ▶ This ensures that compensations on the unaffected side & abnormal reactions on the affected side are dealt with & inhibited at an early stage.



# Contd.

- ▶ Regaining patients midline is very important as this forms the basis on which bilateral, symmetrical activities with interplay between the two sides of the body can take place.
- ▶ If the unaffected side totally dominates than every activity on the affected side will never be able to experience normal movements & activities as spasticity & abnormal movements will predominate.

*THANK YOU*