



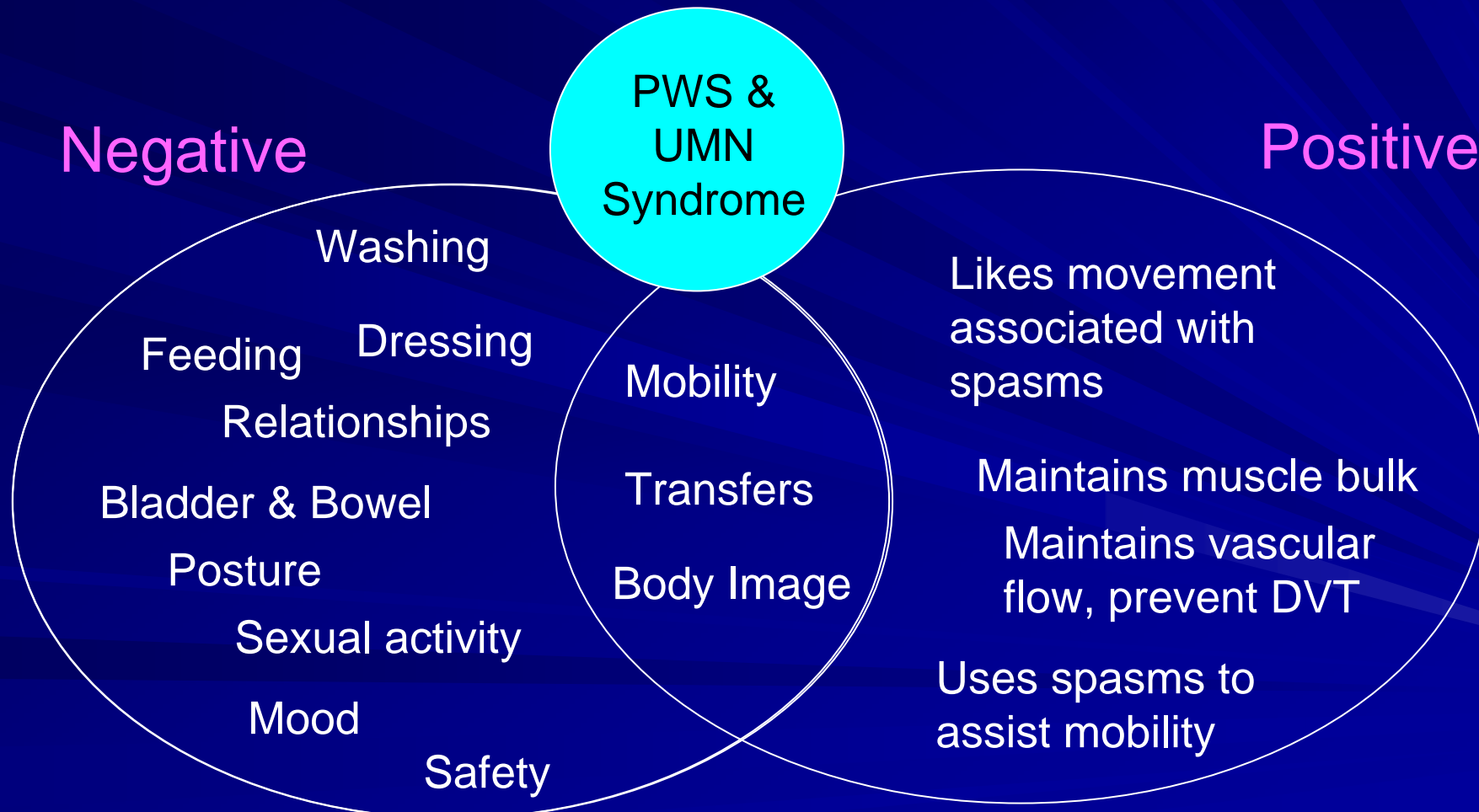
# Spasticity Management: Pharmacological treatment

**Val Stevenson**

# Plan

- **Devising a treatment plan**
  - Impact of spasticity on the person
  - Assessment
- **Interventions and team management**
  - Overview of treatments
  - Oral drugs
  - (Botulinum toxin and Intrathecal baclofen)
  - Intrathecal phenol
  - Surgery
- **Long term follow up**

# Impact of Spasticity and Spasms



Remember spasticity can also be useful..

# Spasticity Assessment

- Information gathering
- MDT Outpatient clinic- ICP
  - Who? Dr, PT, Nurse.....
- Effect of spasticity, spasms on daily activities incl sleep, mood, participation
- Assess patient expectations
- Look for trigger factors

# Triggers and noxious stimuli



**Skin**



**Bladder**



**Splints**



**Orthotics**



**Bowels**



**Pain, skin**



**Seating & positioning**

# Measures



- Tone - Ashworth (1964)
- Range of movement - Goniometry
- Spasm scale - (Penn et al 1989)
- Visual analogues of pain, comfort, leg stiffness
- Description of position in W/C- photos
- MAIN PROBLEM



**GOAL**

Wessex ACPIN Spasticity Presentation 2009. © Dr Val Stevenson



# Goal

OUR GOAL FOR  
THE WEEK



# Options for Spasticity Management

MILD  
SPASTICITY

SEVERE  
SPASTICITY

→ Ongoing Medical, Therapy & Nursing →

Oral  
Medication

Inpatient  
Rehabilitation

Focal  
Treatments

Intrathecal  
Baclofen

Intrathecal  
Phenol

Surgical  
Options

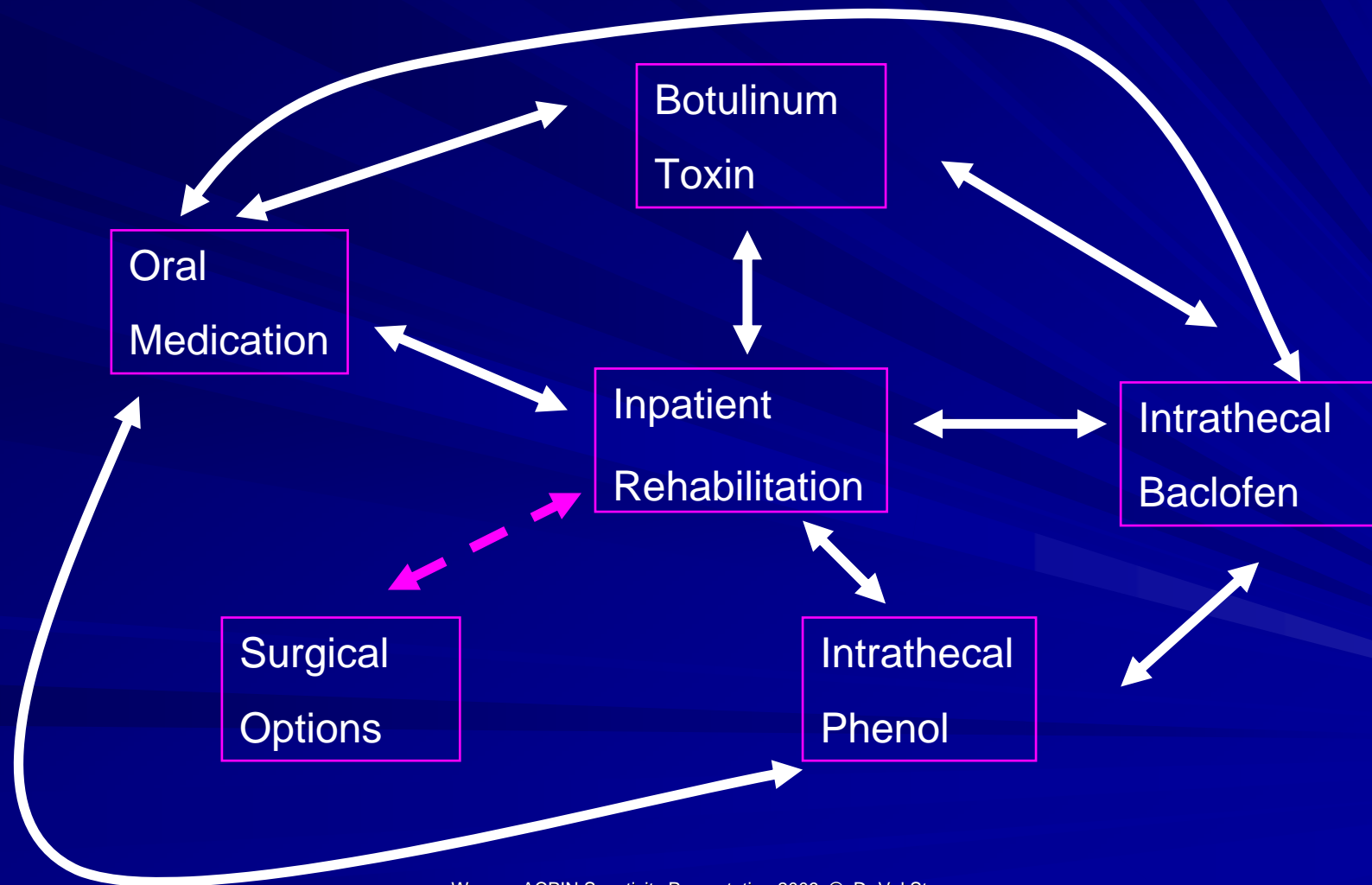
Primary

Teamwork

Secondary

Intermediate

# Spasticity Management



# Individualised Treatment Plan

## ■ Education

- What is spasticity?
- Contribution of spasticity to current problems/function

## ■ Management of trigger factors

## ■ Physical management programme

- Positioning, Seating, Standing, Stretches, Strengthening

## ■ Pharmacological treatment

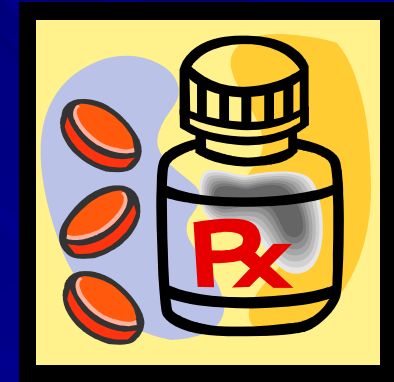
# Physical Intervention- Aims

- Remove physical trigger factors
- Determine spasticity needed for function and what is not
- If needed → prevent contracture and overuse of spasticity
- If not needed → re-educate movement patterns
- Maximise use of weakened muscles
- Maintain/improve soft tissue length

# Pharmacological Therapies

## ■ Generalised

- Baclofen, Tizanidine, Dantrolene, Benzodiazepines, Gabapentin



## ■ Focal

- Botulinum toxin
- Regional nerve blocks



## ■ Intrathecal

- Baclofen
- Phenol

# Issues with Oral Drugs

- **Optimisation of effects**

- Timing, drug choice

- **Side effects**

- **Blood monitoring**

- **Exposing weakness**

- Trunk and lower limbs

- **Mechanism for monitoring effect and adjusting dose**



Remember- the aim is to improve function and minimise complications, not simply to reduce spasticity

# Optimisation

## Getting the most out of the drugs

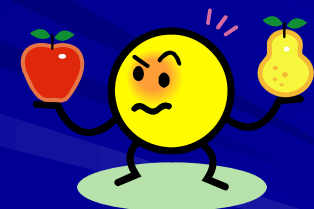
### ■ Timing

- Tablets on waking.. Not with breakfast
- Adjust to activities eg. Car travel, work patterns, therapy, sexual activity



### ■ Drug choice

- Take advantage of other drug actions
  - Clonazepam and sedation- for nocturnal spasms
  - Gabapentin- for neuropathic pain



### ■ Mechanism for monitoring effect and adjusting dose

- Patient and carer education, treating therapists, GP

# Combining drugs

Start low and go slow

## ■ Start first choice drug

- Increase according to effect or tolerance
- Stop titration when desired effect achieved or side effects occur
- If no effect at full tolerated dose, withdraw

## ■ Add in 2<sup>nd</sup> drug

- Repeat process

# Baclofen

- GABA derivative (inhibitory neurotransmitter)
- Plasma  $\frac{1}{2}$  life 3-4 hours
- Dose 5mg od- 40mg tds
- Side effects common; drowsiness, confusion, dizziness, weakness
- Avoid abrupt withdrawal

# Tizanidine

- Equivalent to baclofen and diazepam in comparison studies but less side effects
- $\alpha$  adrenergic antagonist; reduces excitatory spinal cord transmission
- Side effects- drowsiness, dry mouth
- LFT's necessary- transient hepatotoxicity may occur

# Dantrolene

- Acts peripherally on skeletal muscle by inhibiting release of calcium ions from the sarcoplasmic reticulum
- Reduces reflex > voluntary contractions
- Plasma  $\frac{1}{2}$  life 9 hours (25mg- 100mg qds)
- Side effects- drowsiness, weakness, GI symptoms
- LFT's necessary- hepatotoxicity may occur

# Benzodiazepines

- Potentiation of GABA action post-synaptically
- Inhibition of descending excitatory pathways
- Role limited by side effects; drowsiness and dependence
- Clonazepam useful for nocturnal spasms

# Gabapentin

- Short term reduction in spasticity demonstrated in placebo controlled trials
  - Patients reported improved ADL's, sleep, mood and appetite
- Potentiation of GABA action
- Side effects; fatigue, reduced concentration, drowsiness and unsteadiness

# What if the drugs don't work?

Review trigger factors and physical management programme before escalating therapy

Other treatment options:

- **Focal treatments**

- Chemical neurolysis or botulinum toxin

- **Intrathecal baclofen**

- **Intrathecal phenol**

- **Surgery**

# Intrathecal Phenol

- Protein coagulation & necrosis
- Axonal degeneration
- Indiscriminate destruction of motor and sensory fibres

# Selection Criteria

- Severe lower limb spasticity
- Oral Medication, physiotherapy, nursing no longer effective
- ITB not appropriate
- Bladder & bowel dysfunction with effective management programme in place
- Aware of potential sexual dysfunction
- Sensory impairment of lower limbs

# Efficacy

25 patients

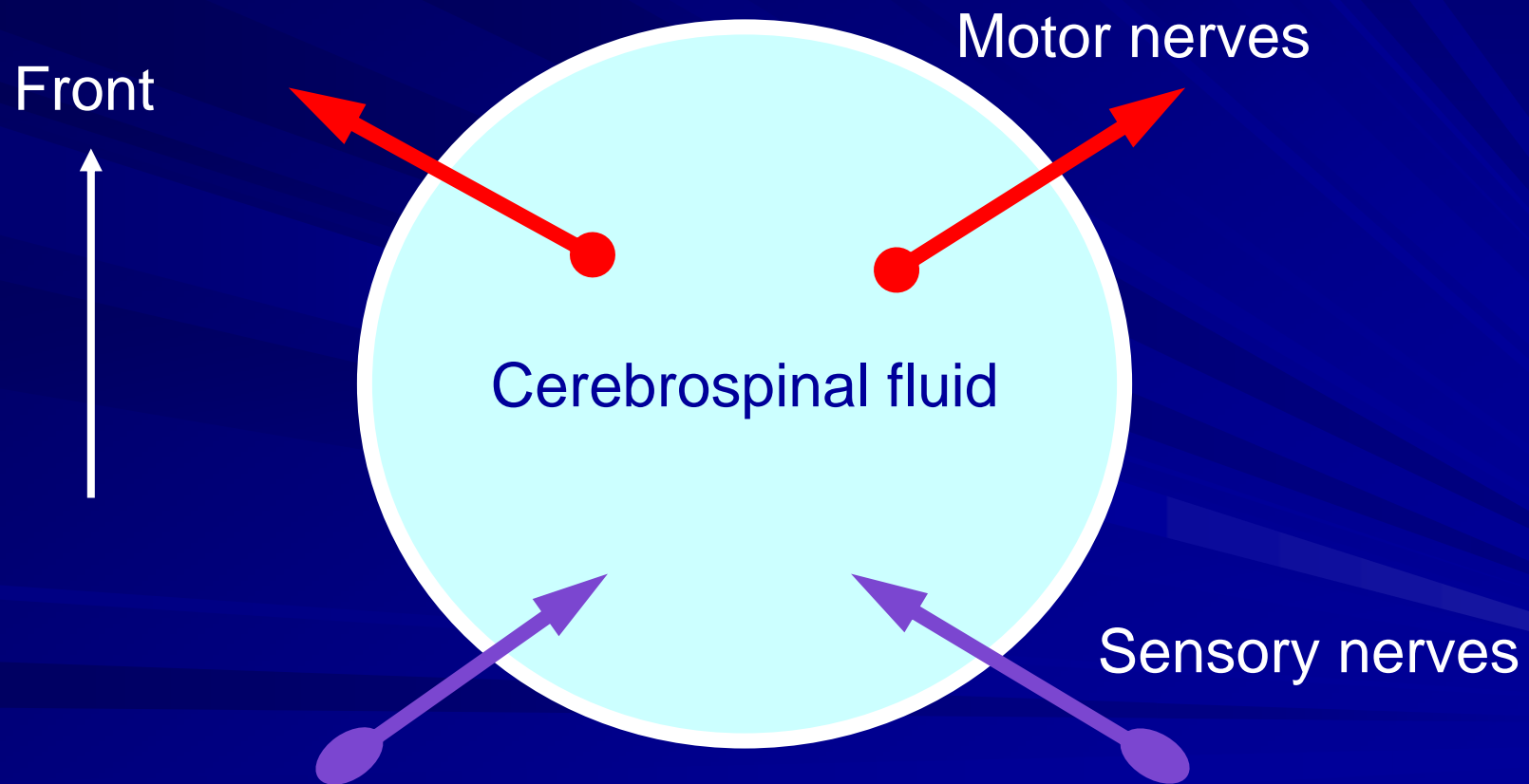
- Goals of treatment;
  - Increase ease of care
  - Comfort
  - Positioning in bed or wheelchair
- Marked reduction in tone, pain, spasm intensity and frequency. Increased ease in positioning, hoisting, hygiene and dressing

Managing Severe Lower Limb Spasticity - Can Intrathecal Phenol still have a role? Jarrett L et al. (2002) J Neurol, Neurosurg & Psychiatry. 73(6):705-9.

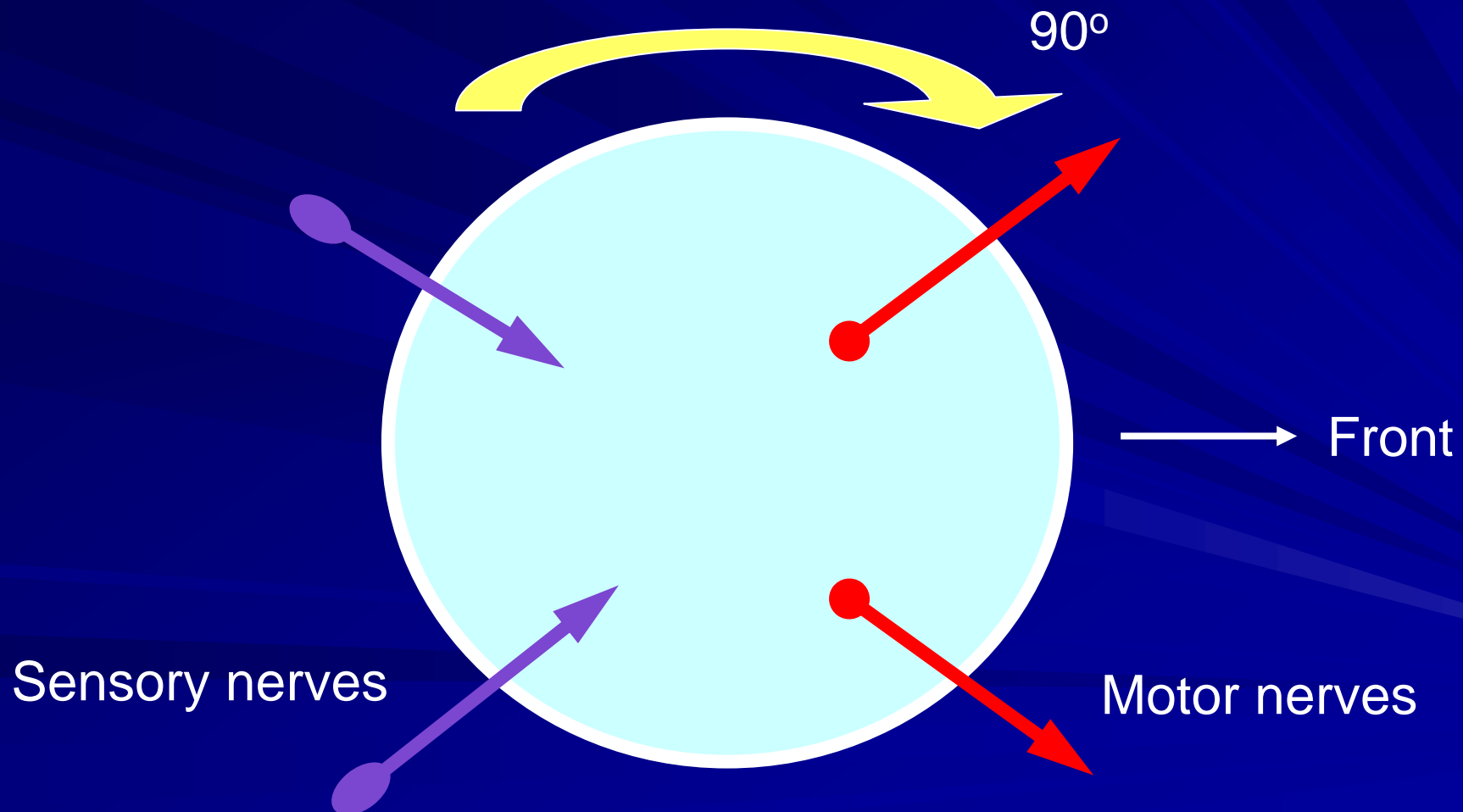
# Aspects of IP Service

- Spasticity assessment & measures
- Expert injector
- Local anaesthetic trial as inpatient
- Nursing, physio and Wh/C service follow up
- Repeat injections may be necessary

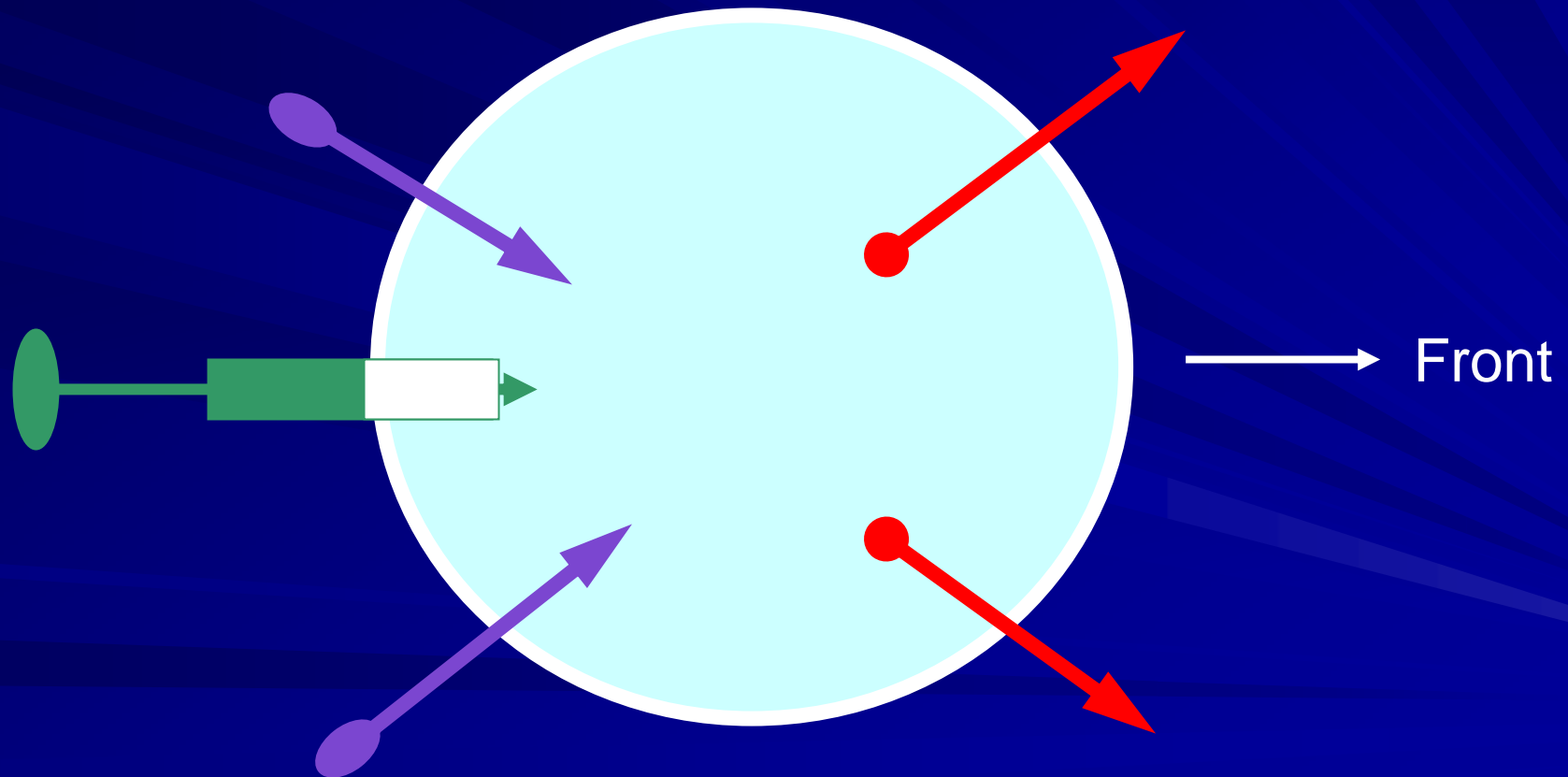
# Lumbar spinal anatomy



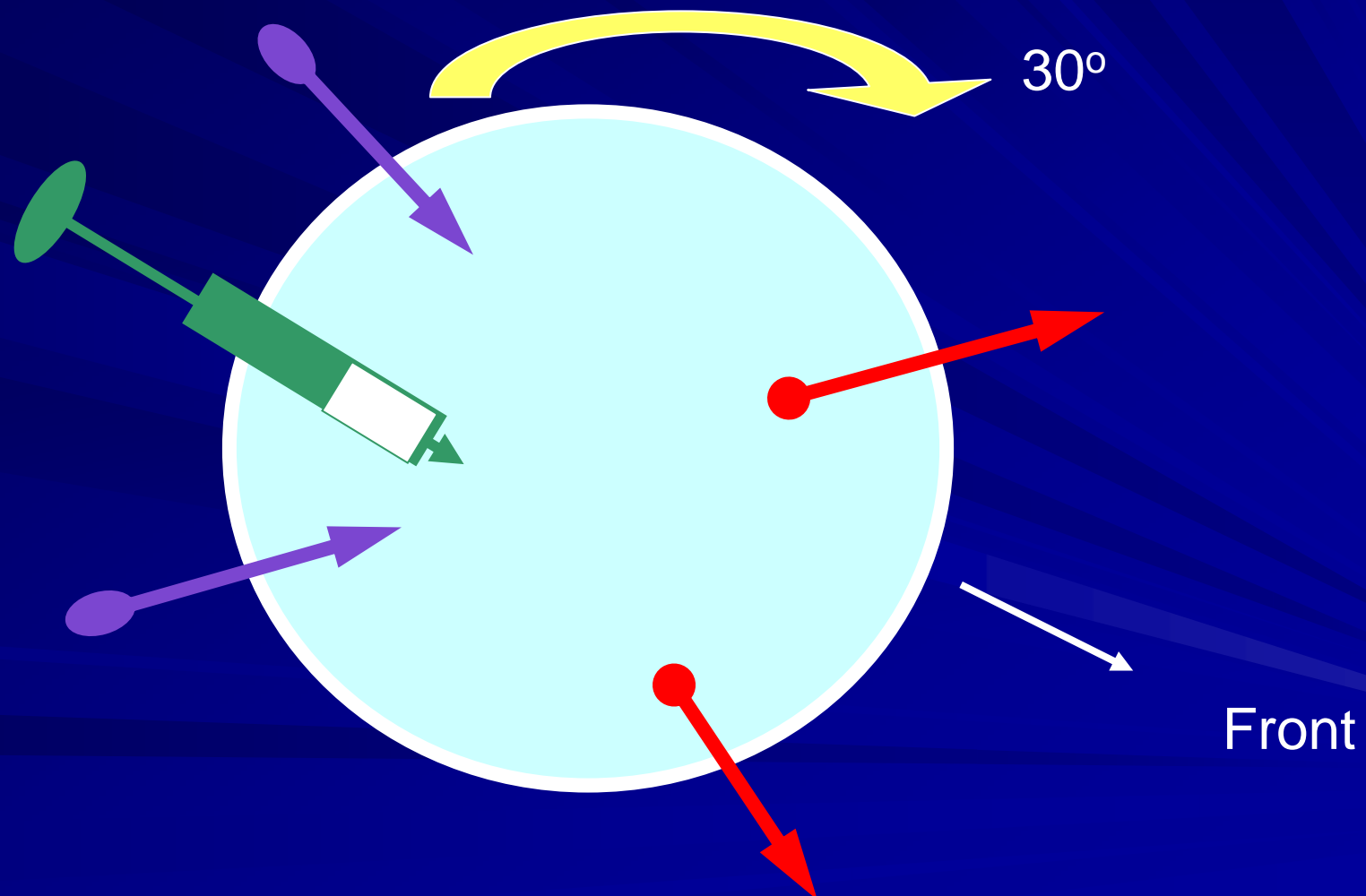
# Right lateral position



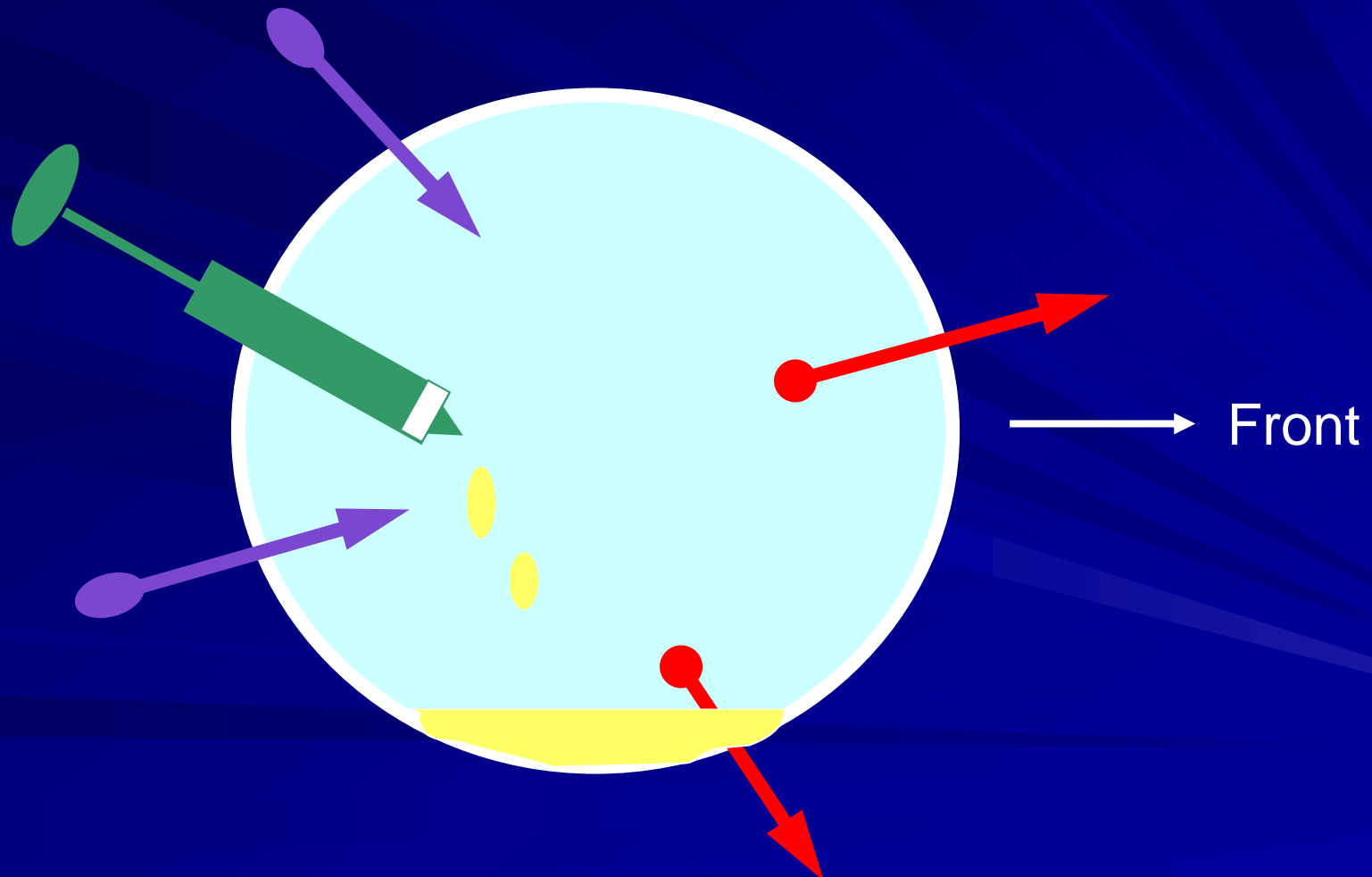
# Lumbar puncture



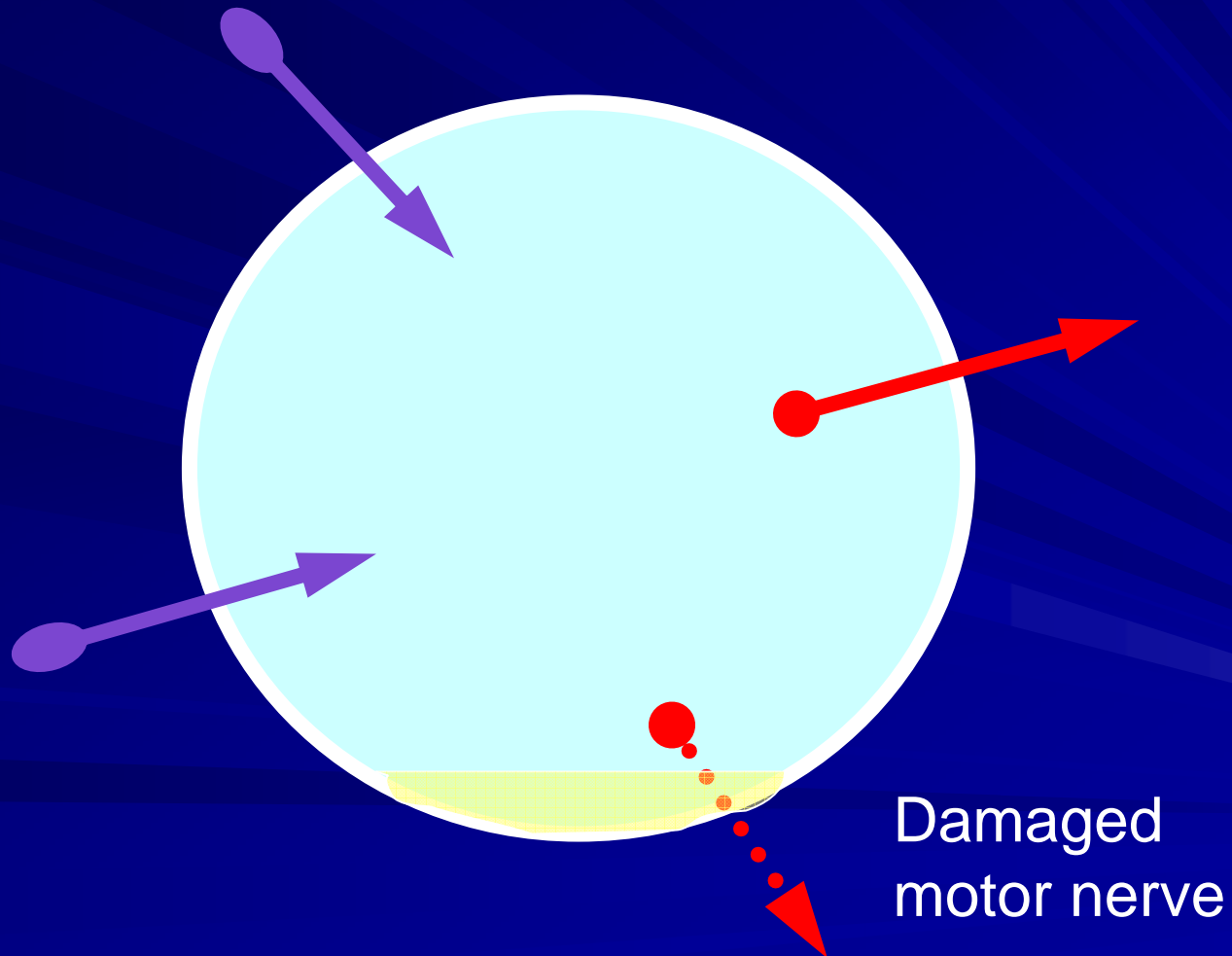
# Modified right lateral position



# Insertion of Phenol



# End Result



# Neurosurgery

Reserved for severe cases



## ■ Peripheral Neurotomies

- Microsurgical technique; preservation of ~1/4 fibres prevents excessive weakness and wasting

## ■ Selective Dorsal Rhizotomy

- Predominantly children with cerebral palsy
- Selection of rootlets divided

## ■ MicroDREZotomy (DREZ- dorsal root entry zone)

- Microsurgical incisions, 2-3mm in depth, 35-45 degree angle
- Useful for pain

# Orthopaedic Procedures

Consider only after spasticity treated and goal orientated

## ■ Tendon lengthening

- Aim; to achieve a more functional position of limb

## ■ Tendon transfer

- Used to normalise articular orientation
- E.g. distal tendon of peroneus brevis onto the tibialis anterior for equinavarus foot

## ■ Osteotomies

- Correct bony deformity from abnormal childhood growth

## ■ Articular surgery (arthrodesis)

- Last resort and never in growing children



# MDT Management

## Nurses

Skin, Bladder, Bowel

Drug education

Positioning

## PT

Standing, Positioning,  
Stretching, Exercise  
programme, Splinting, FES,  
Monitoring treatment

## PWS / Carer

Monitor aggravating factors

Exercise / stretching

Monitor drug effectiveness

## OT

Adaptations

Wheelchair

Positioning

Splinting

Role/  
function

## DR

Timing of  
assessments  
& treatments

Drug prescribing &  
evaluating

# Acknowledgements

- To all of the patients who consented to their photos being used to help with education and training of health professionals
- To you all for listening....

Any questions?