

## Advanced Treatment of Spasticity 14<sup>th</sup> Jan 2017

Dr Geoffrey S Samuel  
Consultant  
Department of Rehabilitation Medicine  
Singapore General Hospital



## About the Society of Rehabilitation Medicine (Singapore)

- Represents rehab med physicians in Singapore (30 accredited specialists as of 2016).
- Focus on improving function in spite of disease
- Aims:
  - further the development of Rehab Med in Singapore
  - promote education & research in this field

• [www.rehabmed.org.sg](http://www.rehabmed.org.sg)



## Outline

- Indications to treat
- Suggested treatment plan
- Pros and cons of various advanced tx
  - Chemodenervations: Botulinum toxin injections and phenol
  - intrathecal baclofen
  - Surgical options:
    - neurosurgical- rhizotomy
    - orthopaedic- tenoplasty, transfers, osteotomy
- Summary

## Indications to Treat

1. Improve function
2. Pain relief
3. Decrease carer burden- Care and hygiene, positioning, dressing
4. Cosmesis
5. Facilitate other therapy, delay/prevent surgery

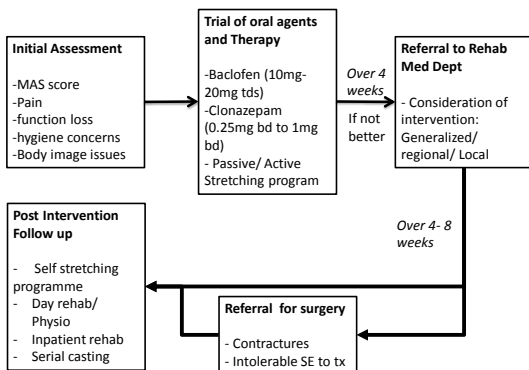


### Before Treating, remember:

**Look for factors that may worsen pre-existing spasticity :**

- Infection (e.g urinary tract infection, otitis media, pneumonia)
- Pressure sores
- Noxious stimulus (e.g., ingrown toenail, ill-fitting orthotics, gingivitis, occult fracture)
- Deep venous thrombosis
- Bladder distention
- Faecal impaction
- Fatigue

### Suggested Treatment Plan



### Further Treatment considerations

Area to treat	Treatment options
Generalised	•Combination of drugs •Intrathecal baclofen •Surgical options
Regional	•Botulinum toxin injections •Phenol chemodeneration •Focal surgery
Focal	•Botulinum toxin injections

## Further Treatment considerations

### Invasive interventions should be combined with

- regular stretching programmes
- passive stretching orthosis

to maximize effectiveness.

Rekand T. Clinical assessment and management of spasticity: a review. *Acta Neurol Scand Suppl* 2010 190:62–66  
 Kheder A, Nair KP. Spasticity: pathophysiology, evaluation and management. *Pract Neurol*. 2012 Oct;12(5):289-98. doi: 10.1136/practneurol-2011-000155.

## Advanced Spasticity Treatment

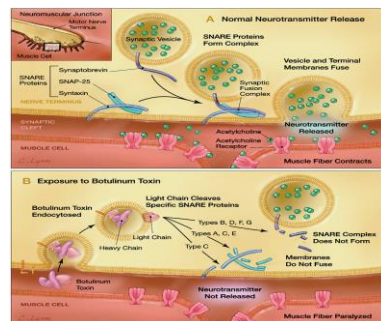
### Chemodeneration

- Botulinum Toxin A- (BoNT-A)
- Phenol neurolysis

## Botulinum toxin- How it works

- Blocks fusion of acetylcholine vesicles at the pre-synaptic membrane of the NMJ.
- Effects evident within 12 hours - 7 days
- Duration of effect up to 6 months

Mode of action of Botulinum Toxin



## Effectiveness of BoNT-A for Spasticity

- Sig. more patients had reduction of upper limb spasticity at 4-week and 8-week evaluations compared with placebo.
- insufficient data at present to establish BoNT-A efficacy on lower limb spasticity

Elia AE, Filippini G, Calandrella D, Albanese A. Botulinum neurotoxins for post-stroke spasticity in adults: a systematic review. *Mov Disord.* 2009 Apr 30;24(6):801-12. doi: 10.1002/mds.22452. (782 pts treated with botulinum toxin).

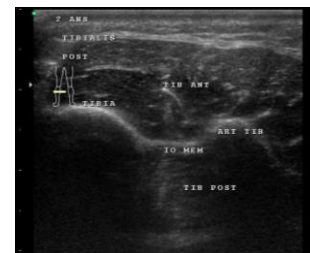
## Botulinum toxin

- established as safe and effective for the reduction of adult upper limb spasticity and improvement of passive function (multiple Class I studies for all preparations).
- Level A evidence warranted for focal spasticity involving the lower limbs.

Practice guideline update summary April 2016: Botulinum neurotoxin for the treatment of blepharospasm, cervical dystonia, adult spasticity, and headache . Report of the Guideline Development Subcommittee of the American Academy of Neurology.

## Botulinum toxin- Modes of administration

Ultrasound Guided Administration



Electrical muscle stimulation



## Phenol neurolysis

- Inexpensive and effects almost immediate
- Injections may be painful!
- Good for regional treatment of spasticity- e.g. musculocutaneous nerve block, obturator nerve block
- Effects last 6 months

## Advanced Spasticity Treatment

- Intrathecal baclofen pump



## Intratechal baclofen pump

- May be used in generalised spasticity where other methods cannot sufficiently control spasticity.
- The pt must be tested before inserting the pump.
- **indicated only in a small group of patients.**
- Complications: Catheter break or dislocation and pump failure.

## Intratechal baclofen pump

### Indications for ITB therapy

- diffuse or regional patterns of chronic spasticity with or without dystonia;
- Modified Ashworth Scale (MAS) score > 2 in two or more limbs
- spasticity duration >6 months
- and failure to achieve satisfactory therapeutic response with oral baclofen, benzodiazepines or focal treatments.

Wang ZM, Law JH, King NK, Rajeswaran DK, Soh S, Rao JP, Ng WH, Chua KS. Treatment of severe, disabling spasticity with continuous intrathecal baclofen therapy following acquired brain injury: the experience of a tertiary institution in Singapore. *Singapore Med J*. 2016 Jan;57(1):8-12. doi: 10.11622/smedj.2016005.

## Advanced Spasticity Treatment

### Surgical Interventions

- Neurosurgical
- Orthopaedic

## Surgical options- Neurosurgical

- **Selective dorsal rhizotomy (SDR)** -currently the most widely used and effective CNS procedure
- Involves the cutting of selective nerve roots between L2 and S1 or S2
- Targeted at the sensory (posterior) roots
- Performed mainly on children with CP
- most children with CP experience a reduction in spasticity and an increase in ROM that occurs immediately after SDR and persists for >1yr

Cole GF, Farmer SE, Roberts A, Stewart C, Patrick JH. Selective dorsal rhizotomy for children with cerebral palsy: the Oswestry experience. Arch Dis Child. 2007 Sep. 92(9):781-5

## Surgical Options- Orthopaedic

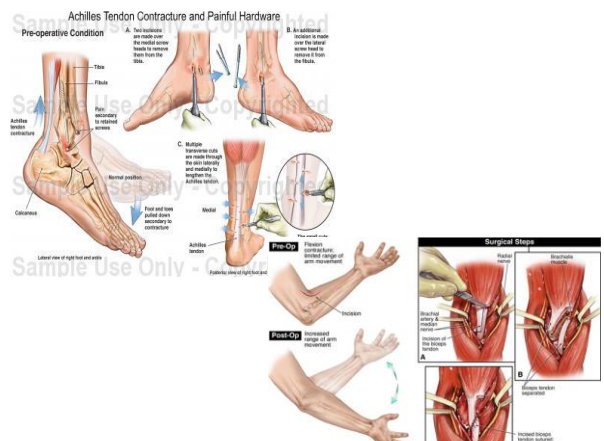
### Tendon lengthening

- Common, especially for Achilles tendon
- Other areas: knees, hips, shoulders, elbows, and wrists.
- Tendon of a contracted muscle is cut, and the joint is then positioned at a more normal angle.
- Regrowth of the tendon to this new length occurs over several weeks
- Serial casting may be used to gradually extend the joint.

### Tendon transfer

- attachment point of a spastic muscle is detached and moved.
- The muscle can no longer pull the joint into a deformed position.

Woo R. Spasticity: orthopedic perspective. J Child Neurol. 2001 Jan;16(1):47-53.



## Surgical Options- Orthopaedic

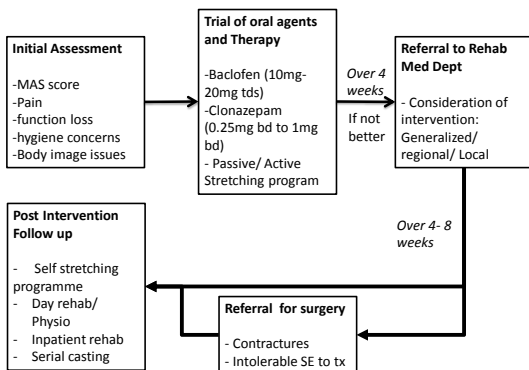
### Osteotomy

- A small wedge is removed from a bone to allow it to be repositioned or reshaped.
- A cast is applied while the bone heals in a more natural position.
- Often accompanied by contracture release surgery for fuller correction of the joint deformity.

## Summary

- Always look for aggravating factors that may worsen spasticity and treat if possible
- Have a good treatment plan with consideration of referral onwards if symptoms not better in about 4 weeks
- Combine interventions with stretching programmes and orthosis for best results

## Suggested Treatment Plan



## The End

- Questions?
- Happy Chinese New Year!
- Handouts will be uploaded [www.rehabmedicine.org.sg](http://www.rehabmedicine.org.sg)