INTRATHECAL BACLOFEN THERAPY

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CME Disclosures

- Speaker's bureau and clinical investigator for Jazz Pharmaceuticals
- Speaker's bureau and clinical investigator for Medtronic, Inc
- Speaker's bureau for Piramal
- Consultant for SPR therapeutics and Clarius
- Section Editor for *Neuromodulation*
- Might discuss some off-label issue relative to intrathecal baclofen therapy

Objectives

1. Review the indications for intrathecal baclofen therapy
2. Discuss of Moss Rehab treatment protocols for intrathecal baclofen therapy.

What is Spasticity?

- Classic definition: velocity dependent increase in tone (resistance to passive range of motion) associated with UMN lesions
- 2005 SPASM consortium definition: disordered sensorimotor control, resulting from an upper motor neuron lesion, presenting as intermittent or sustained involuntary activation of muscles

Spasticity Characteristics

- Tetra : Para : Hemi : Mono extremity
- Cerebral : Spinal origin
- Congenital : Acquired etiologies
- Static : Progressive courses
- Flexor : Extensor pattern
- Global : Regional : Local involvement

Upper Spasticity Patterns

The Adducted/Internally Rotated Shoulder

The Flexed Wrist

The Pronated Forearm

The Clinched Fist

The Flexed Elbow

The Thumb-in-Palm Deformity

Lower Spasticity Patterns

Equinovarus

Stratial Toe

Stiff Knee

Flexed Knee

Adducted Thighs

Other forms of ⇧ resistance to PROM

- Rigidity
- Geigenholden
- Dystonia
- Contracture
- Heterotopic ossification
- Ankylosis

Other than dystonia, these presentations typically are not ITB sensitive

Intrathecal baclofen therapy

- Direct delivery of baclofen directly to the CSF thus affording enhanced distribution of this agent to target neurons
- Afford enhanced access to therapeutic targets within the central nervous system allowing for increased potency and decreased systemic exposure

Disease (approved indications)

- Spinal cord injury
- Multiple sclerosis
- Cerebral palsy
- Stroke
- Traumatic brain injury

Other illnesses potentially sensitive to ITB

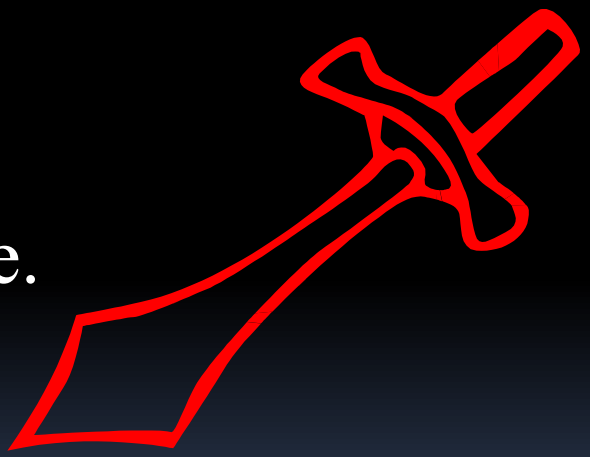
- Non-traumatic spinal diseases: hereditary spastic paraparesis, transverse myelitis, ALS
- Dystonias
- Metabolic disorders: adrenoleukodystrophy
- Primary muscle diseases: tetanus, stiff person syndrome

Spasticity and Weakness

- By definition, all spastic muscles are weak – Jacquelin Perry
- Observable strength = true voluntary strength + hypertonicity
- Interventions to reduce spasticity have the potential to “unmask” this weakness

Spasticity - two-edged sword?

- Can assist or interfere with mobility.
- Can predispose to contractures and skin breakdown.
- Can improve muscle bulk.
- Might help prevent DVT.
- Might increase muscle fatigue.
- Might reduce dexterity.

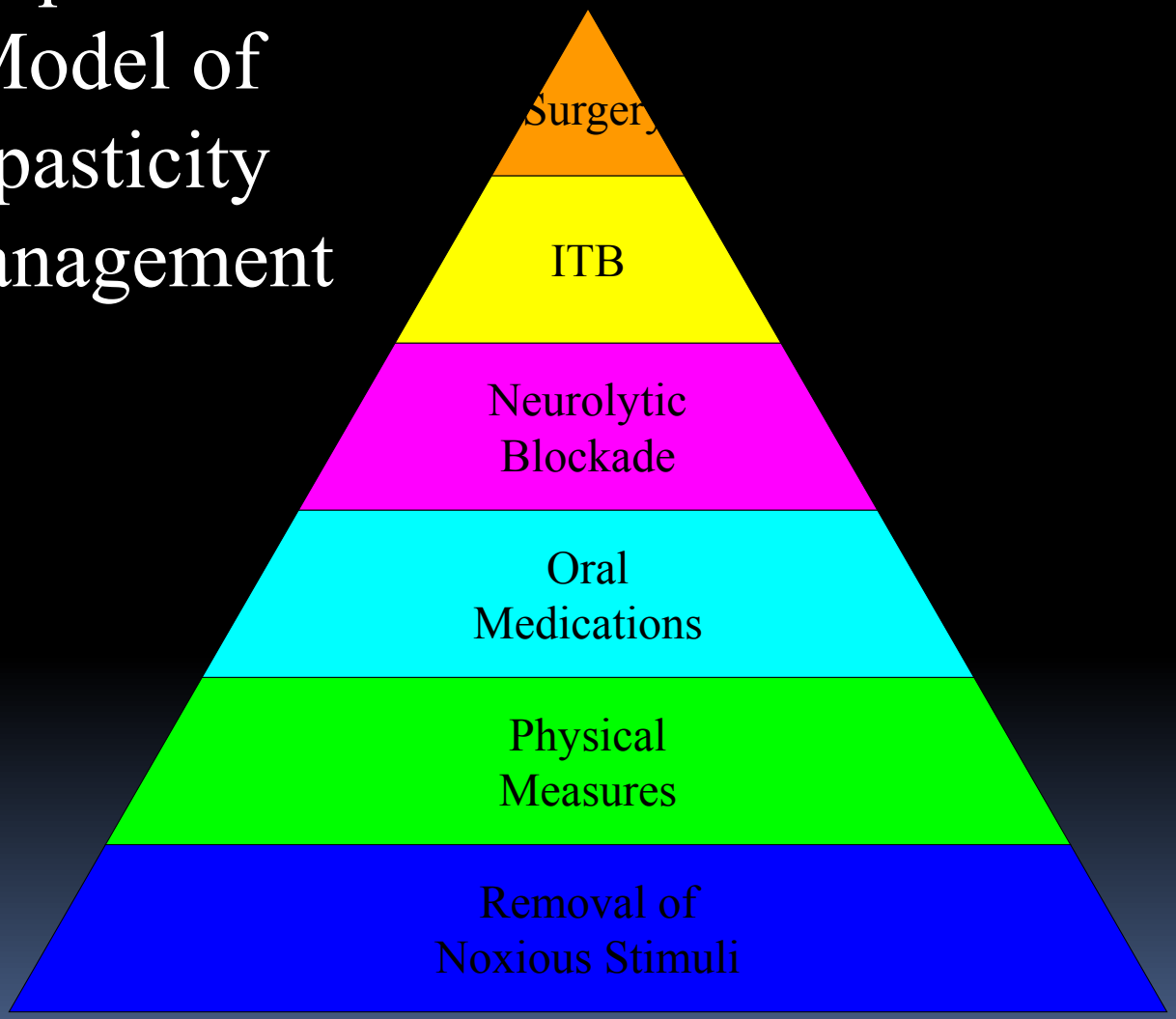


To treat or not to treat?

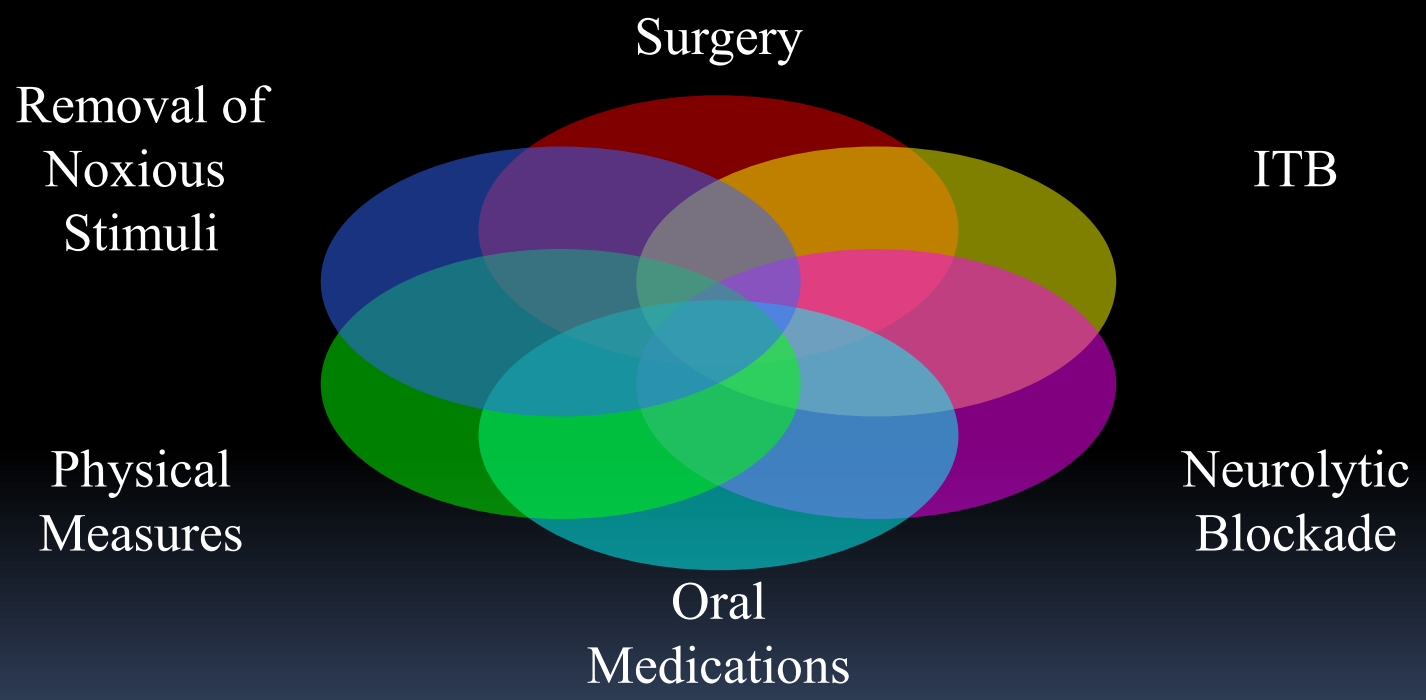
When determining of degree of hypertonicity reduction, the practitioner must examine both the positive and negative aspects of spasticity.

Optimized outcomes occur when the patient and treatment team have congruent treatment goals.

Sequential Model of Spasticity Management



Synergistic Model of Spasticity Management



Intrathecal baclofen therapy

Indicated when patients

- Are poorly controlled with other treatments
- Are poorly tolerant of other treatments
- Require the precise control that the intrathecal delivery system affords

Intrathecal baclofen therapy

Patients must

- be clinically stable (> one year post injury, not in an exacerbation, etc.)
- understand the risks and benefits of therapy (test dose, implant, long-term maintenance)
- have resources available to return to clinic for refills.
- positive test dose

Intrathecal baclofen therapy

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Current status of programmable intrathecal delivery systems

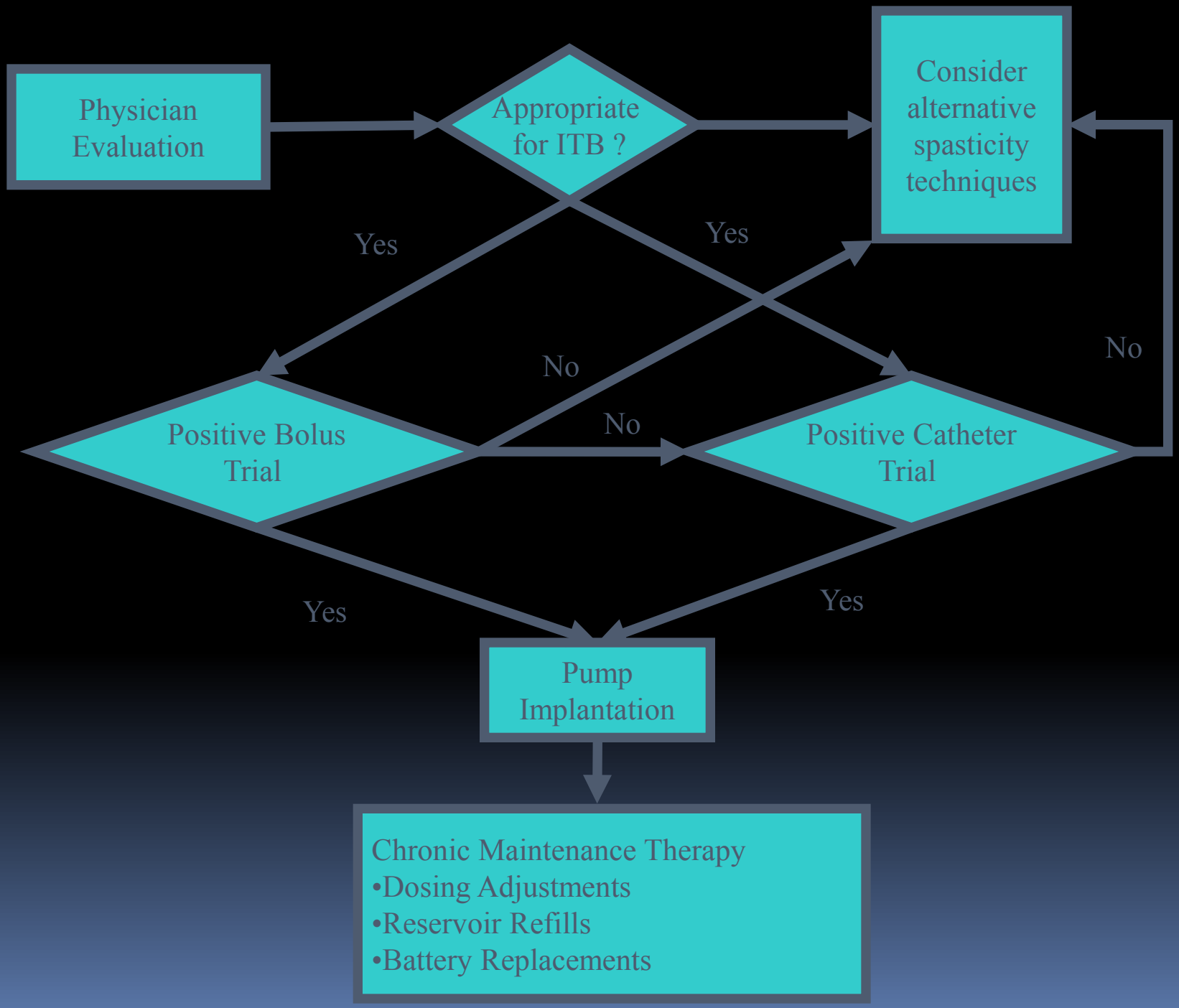
3 systems had US FDA approval

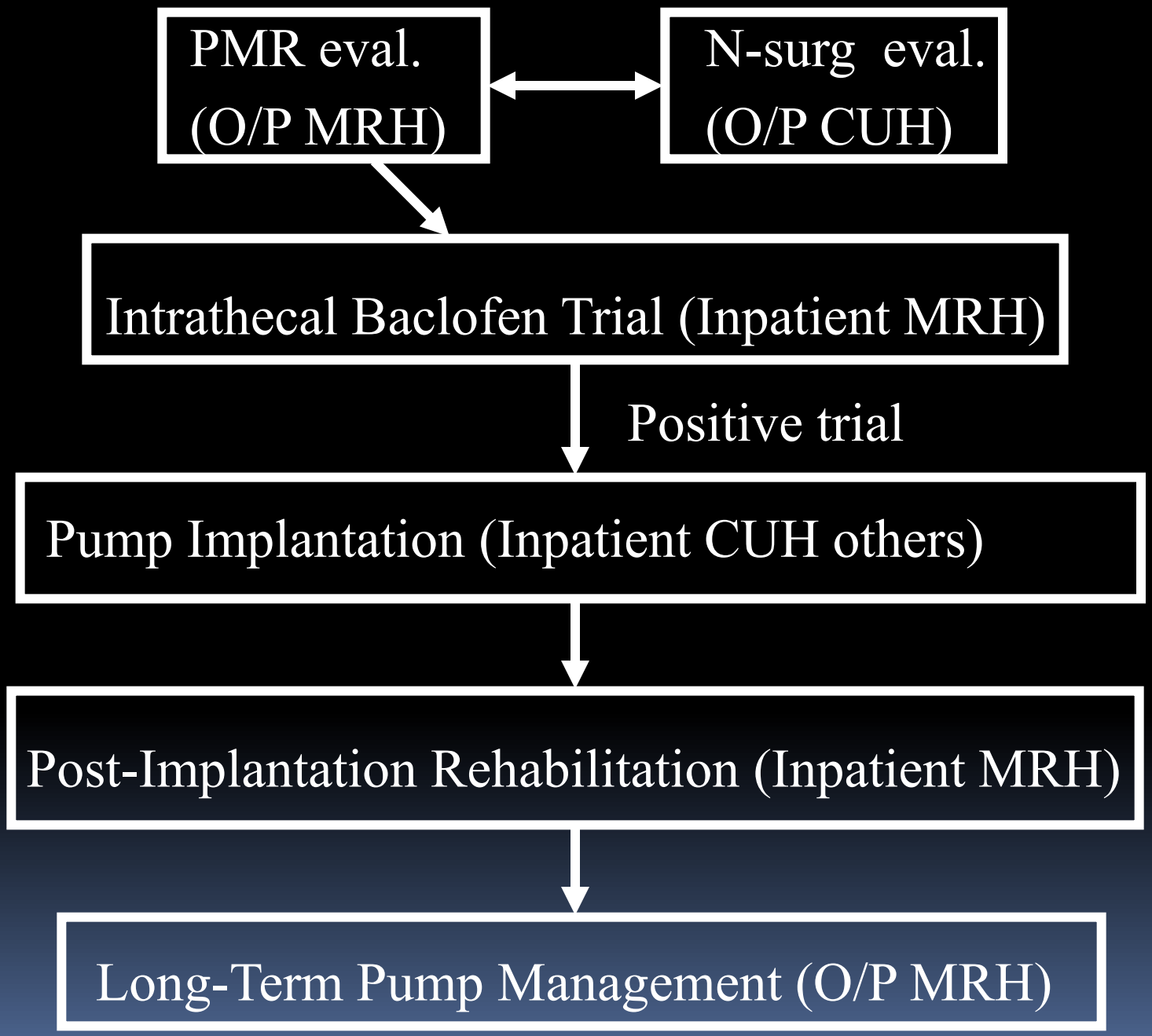
Medstream now out of commercial use

Alfred Mann foundation completed trials

	Baclofen	Morphine	Ziconotide
Synchromed 2	Adults + peds	Adults	Adults
Medstream	Adults		
Prometra		Adults	
AMF		Adults	

Presentation will focus on the SynchroMed system


Physician Evaluation
Appropriate for ITB ?
Consider alternative spasticity techniques
Yes
Yes
No
No
No
Positive Bolus Trial
Positive Catheter Trial
Yes
Yes
Pump Implantation
Chronic Maintenance Therapy
•Dosing Adjustments
•Reservoir Refills
•Battery Replacements


PMR eval.
(O/P MRH)
N-surg eval.
(O/P CUH)
Intrathecal Baclofen Trial (Inpatient MRH)
Positive trial
Pump Implantation (Inpatient CUH others)
Post-Implantation Rehabilitation (Inpatient MRH)
Long-Term Pump Management (O/P MRH)

Patient preparation for screening test

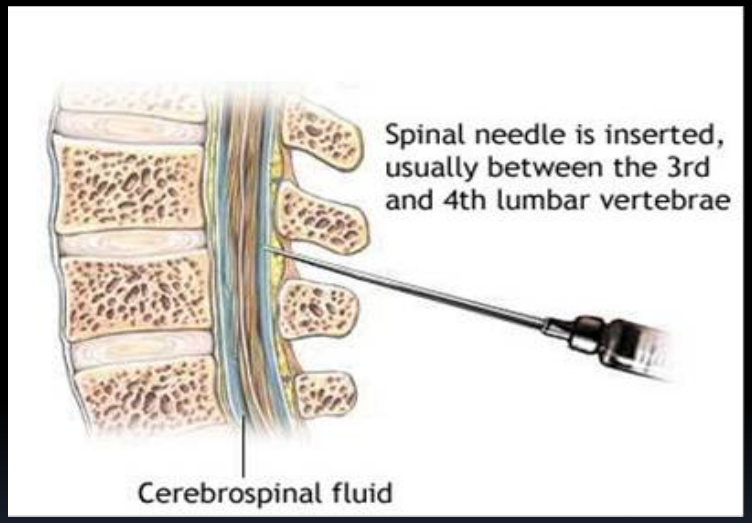
- Discuss realistic goals and expectations for the screening test. The goals for the screening test may not be the same as the long-term goals for ITB Therapy
- Review potential adverse events (and management strategies) that might occur during trial

Patient preparation for screening test

- Consider tapering oral antispasmodics and avoiding neurolytic procedures prior to trial
- Define plan for temporary discontinuance of anticoagulation / antiplatelet
- Antibiotic prophylaxis (catheter trials only)
- Review assessment measures

Intrathecal administration – technical details

- Traditional lumbar puncture technique
  - Localization: Fluoroscopic, Sonographic



- Anesthesia
  - Typically local (EMLA)
  - Consider MAC for selected patients

Pharmacology of ITB bolus injection

- Onset: ½-1 hour after bolus
- Peak: 4 hours after bolus
- Duration: 4-8 hours after bolus
- Individual patient variability can be observed
- Rarely, prolonged effects have been reported

Adverse effects

ITB	LP / catheter placement
Hypotonia	Spinal Headache
Somnolence	Meningitis
Nausea / Vomiting	Seizures
Headache	Herniation
Dizziness	Death

Implantation

- Performed by neurosurgery
- Performed under general anesthesia
- Implanted in a subcutaneous or subfascial pouch in the abdomen
- Catheter is placed intrathecally (usually L3 or L4) and tunneled subcutaneously to the pump.

Implantation

- Catheter tip placement is typically at the T10-T11 level although more cephalad placement is possible to address upper extremity hypertonicity
- Acute hospital length of stay is 2-3 days

Post Implantation Care

Intrathecal baclofen adjustments
Weaning from oral medications
Incisional care
Monitoring for secondary effects
Transfer training

Ambulatory

Ambulation training
Ambulatory self care
Ambulatory home management

Nonambulatory

Wheelchair and
seating adjustments
Caregiver training
Bracing needs

Post-Implantation Rehabilitation

- Timing can controversial for some centers
- Abdominal binder – comfort / spinal headache
- Careful attention to pump site – padding
- No undue twisting / bending

Spinal Headache Management

- Bedrest - actually controversial
- Hydration
- Ketorolac
- Caffeine
- SPG block
- Blood patch – usually bedrest afterwards

Chronic ITB Therapy Management

- No such thing as too much education

→ How we educate patients in the future is likely to change

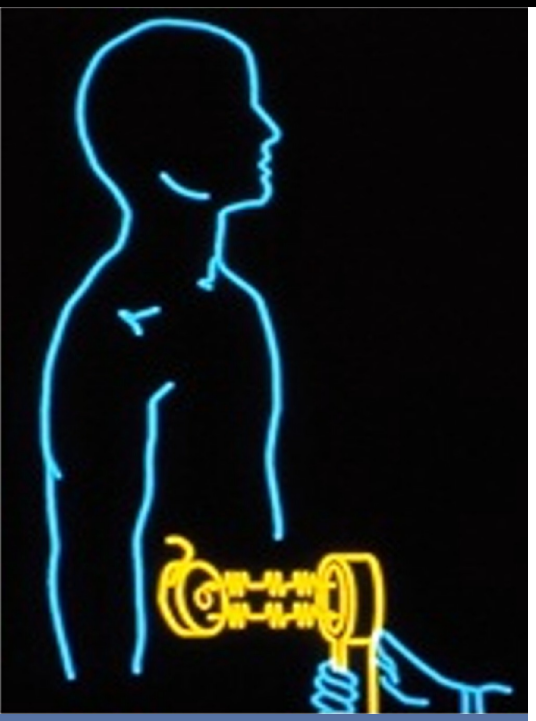
- Need to be active partner in the therapy from the very beginning
- Management of patient expectations may be key to therapy optimization
- Evaluation of physical or functional changes

Chronic ITB Therapy Management

- Check logs at every appointment
- Refilling the pump reservoir
- Troubleshooting any pump malfunction
- Replacing the pump for battery replenishment (every 5-8 years)
- Avoidance of physical trauma to pump
- Electronic check of pump after MRI studies

Pump adjustments

- Titration of dosing during the first 6-9 months post implant
- Adjustments done via radiotelemetry



Modes of intrathecal delivery

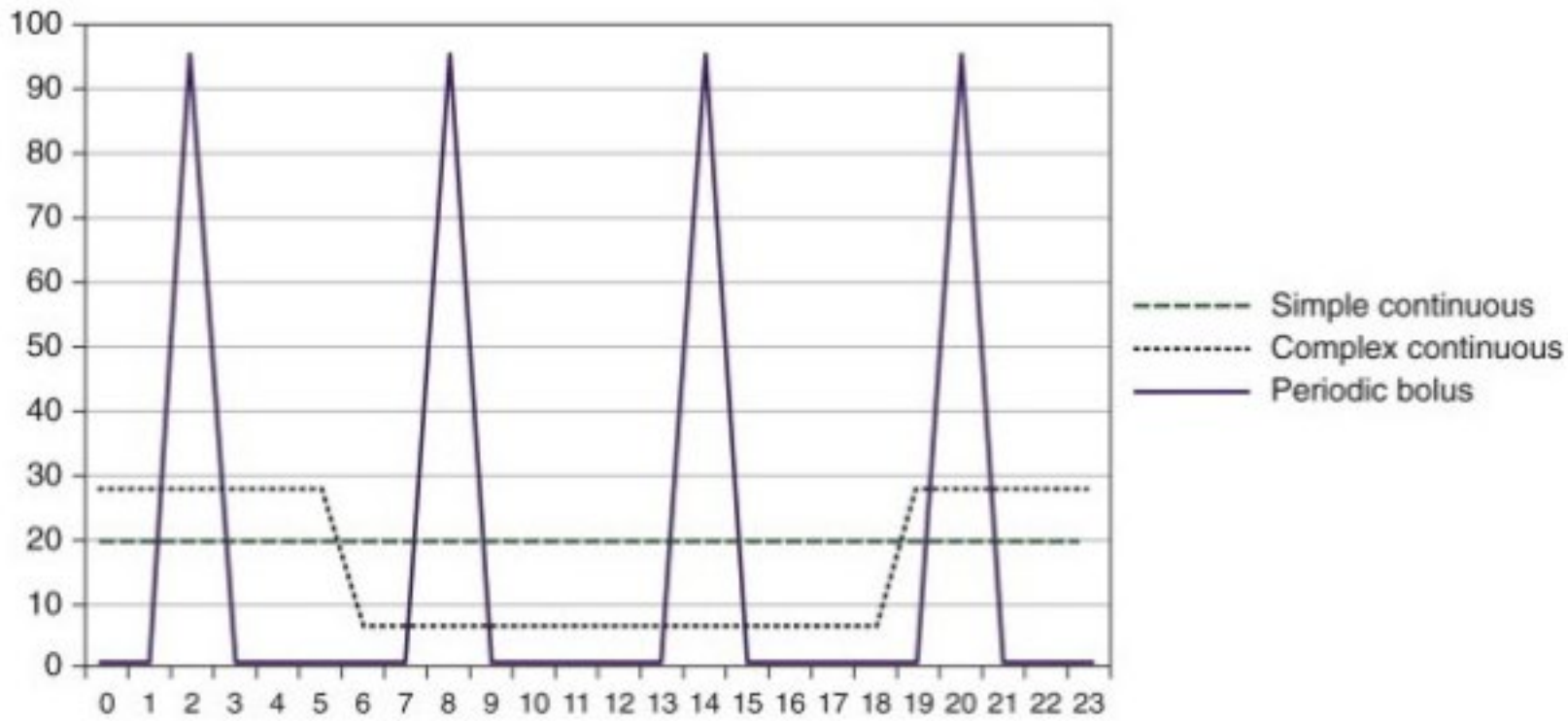


Fig. 21-1 Various modes of intrathecal delivery.

Pump Refills

- Short O/P procedure
- Occurs every few weeks to months
- Sterile conditions
- Localization techniques for difficult patientsts
- Concern over pocket fills

Complications of IT therapy

- Over or under dosing
- Battery failure – should be preventable
- Empty reservoir – should be preventable –
- Catheter disruption

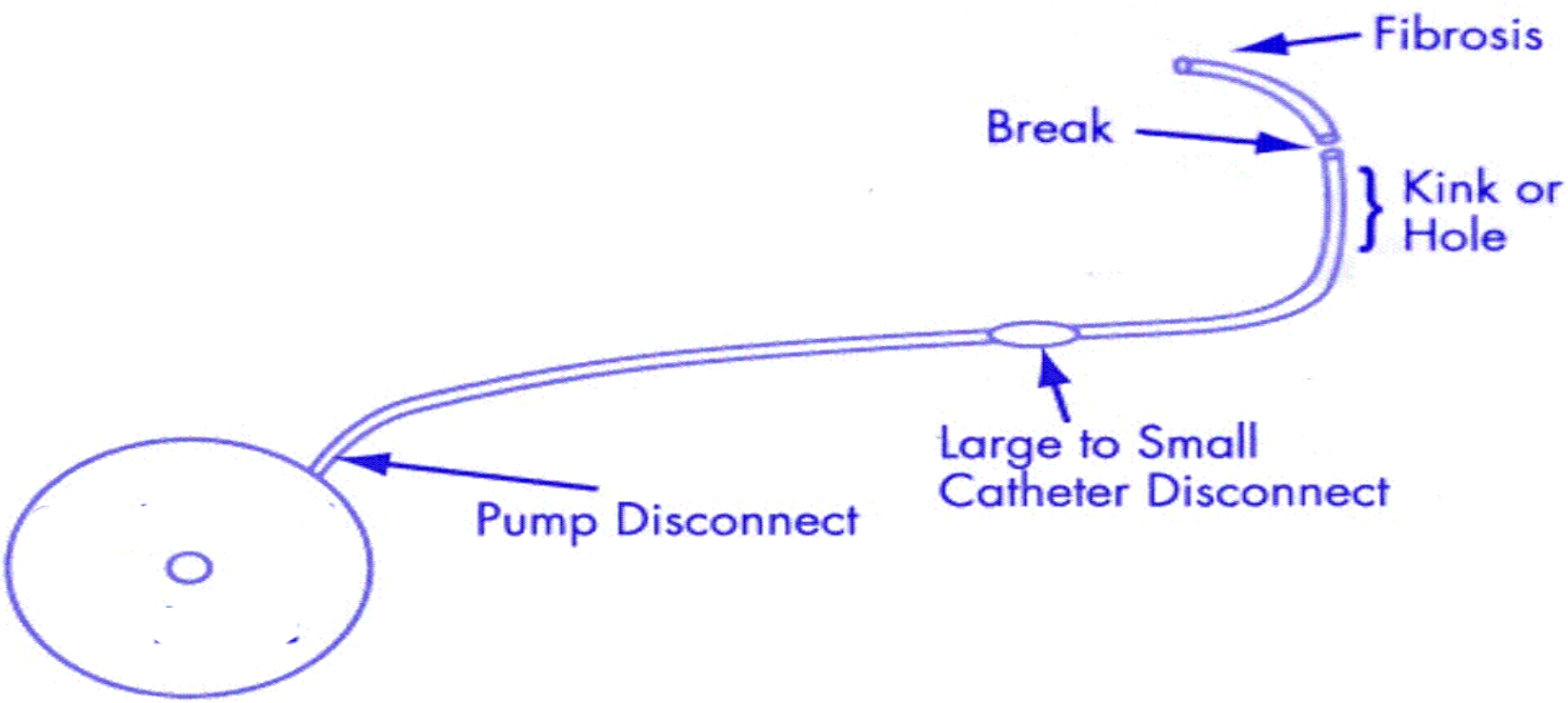
Dosing issues - Withdrawal

- Caused by rapid reduction in intrathecal delivery
  - programming error, drug formulation error, empty reservoir, catheter disruption or battery failure
- Treatment:
  - Treatment of underlying cause if possible
  - Restore intrathecal delivery promptly
  - Addressed with oral baclofen, oral periactin, parenteral BZDs

Dosing issues - Overdose

- Caused by rapid increase in intrathecal delivery
  - programming error or drug formulation error
- Treatment:
  - Reprogram pump
  - Correct drug formulation
  - Reversal agents – physiostigmine or flunazenil

Potential catheter disruptions



Summary

- Significant piece of spasticity management, but not the only tool
- Serious side effects of this therapy are possible but can be minimized with a dedicated team approach

Thanks for your attention !!!