



The Use of Botox in Paediatrics

By Megan Bloore, Amy Bury
and Catrin Lawson

What are Botox Injections?

- Botox also known as Botulinum toxin type A is naturally produced by the bacterium *Clostridium botulinum*
- It is then purified before use in controlled doses
- It is used in the treatment of spasticity by being injected into the affected muscles
- Spasticity is caused by a neuromuscular condition where the disease affects the ability of the nervous system to deliver nerve impulses to the muscles



What conditions can Botox be used in?

- Cerebral palsy
- Spinal muscular atrophy
- Muscular dystrophy
- Motor Neurone Disease
- Inflammatory myopathy



When is Botox Suitable?

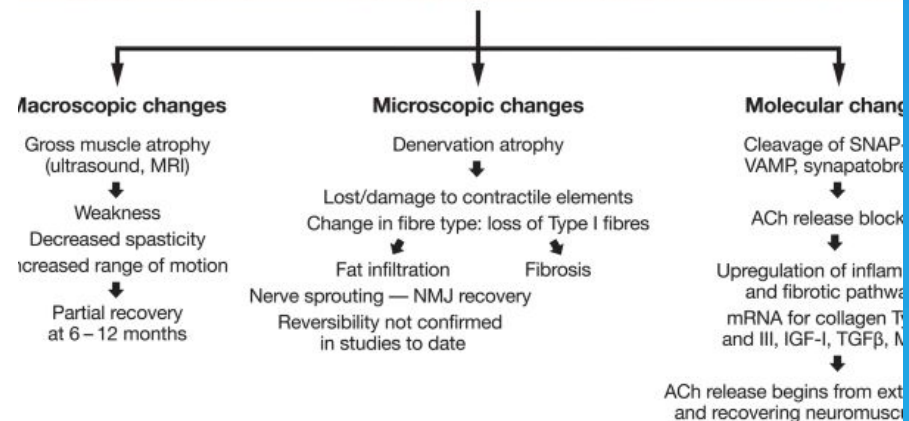
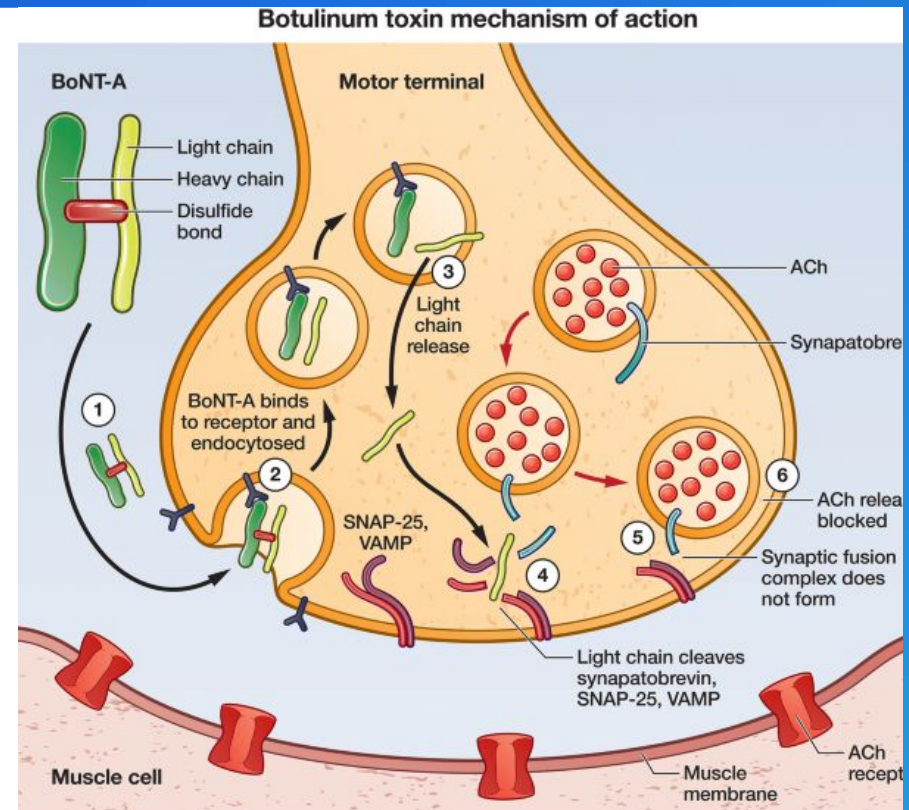
- According to NICE guidelines, Botox is appropriate
 - Impeding motor function
 - Compromising care and hygiene
 - Causing pain
 - Impeding tolerance of other treatments
 - Causing cosmetic concerns to the child
- The earlier the spasticity is reduced the better the outcome.
- Once muscle is shortened, the effect of spasticity effect will be as apparent due to the contracture

Why do we inject Botox to treat spasticity?

- Spasticity causes a reduction in ROM which makes it difficult for the child to perform ADLs
- If spasticity isn't treated the muscles can shorten to a point where they are stuck in a deformed position
- Botox combined with intensive physiotherapy can reduce the risk of a permanent deformity developing

How does Botox work?

- It acts on the neuromuscular junction and inhibits the release of acetylcholine which means signals can't be passed across the synapse
- By limiting the nerve signals, it stops the muscle contracting
- This allows the muscle to relax and then be stretched either manually or by a splint
- By stretching the muscle, we can lengthen it and increase the range of movement



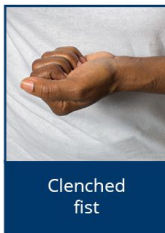
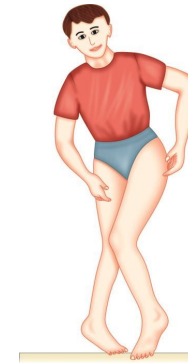
Areas targeted using Botox

Botox is effective on muscle tone in various parts of the body such as:

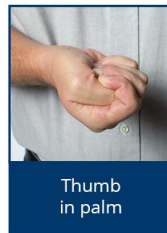


In the **lower limbs** to aid standing and walking

- Hamstrings
- Adductors
- Gastros



Clenched fist



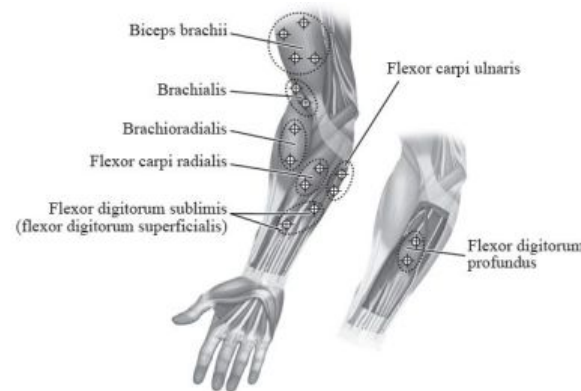
Thumb in palm



Bent wrist



Pronated forearm



In the **upper limbs** to help with grip and UL function

- Wrist flexors
- Biceps

How do we use Botox alongside Physiotherapy?

- Botox is not appropriate for all spasticity cases and each child requires assessment from both a physio and the person performing the injection
 - Botox needs to be provided alongside intensive physiotherapy
 - This Physiotherapy may involve:
 - Measurement of Range of Movement before and after the injections
 - Manual stretches
 - Fitting of orthotics and braces
 - Serial casting
 - Carer education
 - Provision of splinting regime and home exercise program
 - Muscle strengthening exercises
 - Practice of functional tasks and mobility
- Use of a goniometer to assess Range of Movement



How long does Botox take to work?

- Injections usually take effect within a few days, with peak relaxation four to six weeks later,
- although this can vary from child to child.
- The chemical effects last for approximately three months.
- However, the functional benefits may last for longer, in some cases, up to one year after the injection.



What are the benefits of Botox?

The reduction in tone after Botox results in:

Increased ROM

Increase independence in functional activities and ADL's

Consistent stimulation and repetitive practice can promote neuroplastic changes

Improved positioning of joints and limbs

Reduced pain

Improved gait

Serial Casting and Bracing after Botox

- Particularly after lower limb Botox injections, children will often be fitted with serial casts during or within a week of the procedure.
- This is to put the joint in a prolonged stretch to enhance the benefits of the Botox injection. (Park et al., 2010)
- The joint will remain in cast for 4 weeks and will be refitted and adjusted every 1 or 2 weeks
- Once the cast is removed, the patient will more than likely be given a brace, AFO or removable cast that can be put on and removed during the day by the patient or the patient's family. They may also be given splints to wear during the night.
- 16- 23 hours is recommended
- It is important to check the condition of skin inside the brace often to be aware of any irritation or changes in the limb that may require adjustments
- Also, the part about serial casting and bracing will vary place to place dependent on Consultants. Often here they have Botox and serial cast whilst under GA. AFO's will then be worn in day and they may or may not have night splints. Overall though it looks great.



Resources

- <https://www.gosh.nhs.uk/conditions-and-treatments/procedures-and-treatments/botulinim-toxin-injections/>
- <https://nhsforthvalley.com/wp-content/uploads/2020/10/Serial-cast-leaflet.pdf>
- <https://www.physio.co.uk/treatments/paediatric-physiotherapy/botox-for-children.php>
- <https://www.scope.org.uk/advice-and-support/botox/>
- <https://www.cerebralpalsyguidance.com/cerebral-palsy/treatment/botox/>
- <https://www.nice.org.uk/guidance/cg145/chapter/1-guidance#botulinum-toxin-type-a-2>
- <https://www.medicines.org.uk/emc/product/859/smpc>
- <https://nhsforthvalley.com/wp-content/uploads/2020/10/Serial-cast-leaflet.pdf>
- Park, E., Rha, D., Yoo, J., Kim, S., Chang, W. and Song, S., 2010. Short-Term Effects of Combined Serial Casting and Botulinum Toxin Injection for Spastic Equinus in Ambulatory Children with Cerebral Palsy. *Yonsei Medical Journal*, 51(4), p.579.