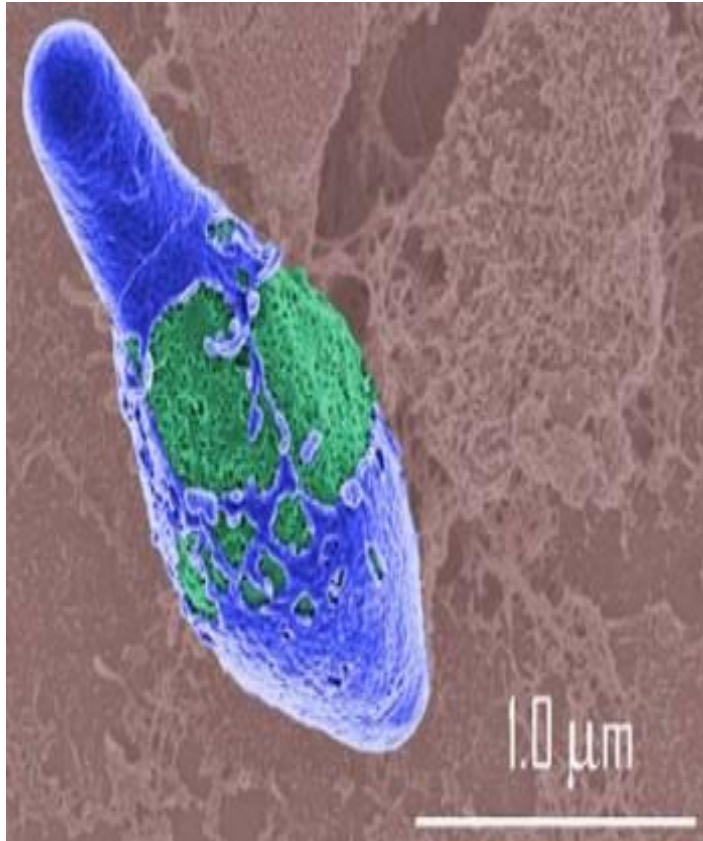


Botulinum Toxin Application

Clostridium botulinum: rod-shaped bacterium producing the neurotoxin botulin



Gram-positive anaerobic bacterium

- Seven serotypes - A, B, C, D, E, F, G

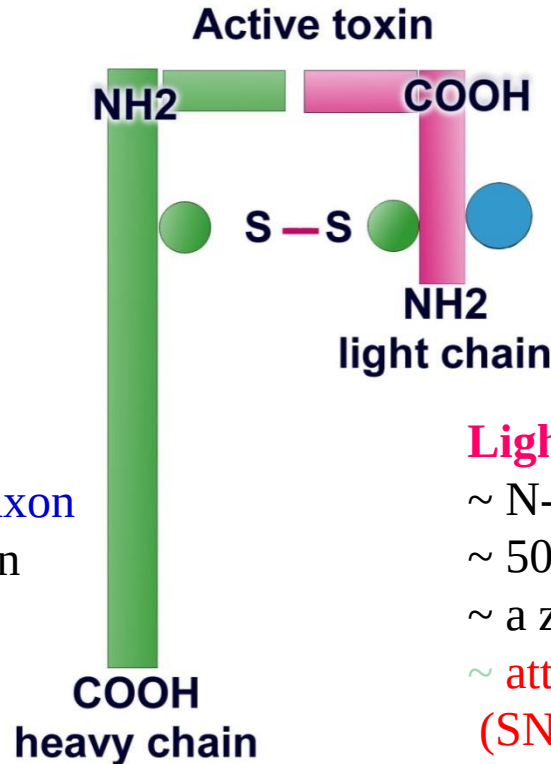
Structure of Botulinum Toxin

Heavy chain:

~ N-terminal end

~ 100 kD

~ binds to **botulinum toxin receptors** on the surface of **axon terminals**, the botulinum toxin can be taken into neurons by endocytosis.



Light Chain:

~ N-terminal end

~ 50 kD

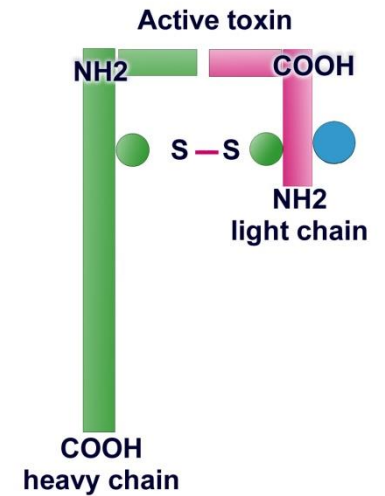
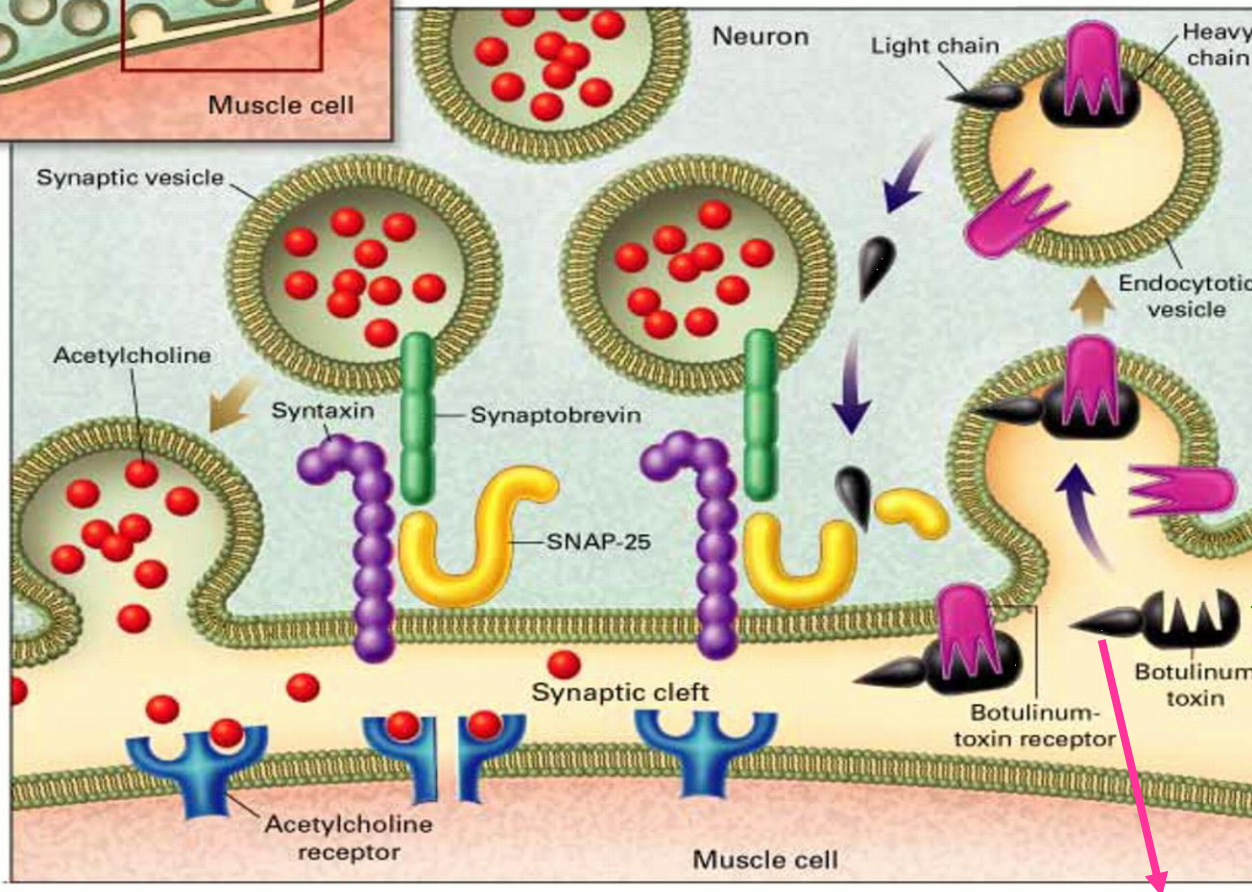
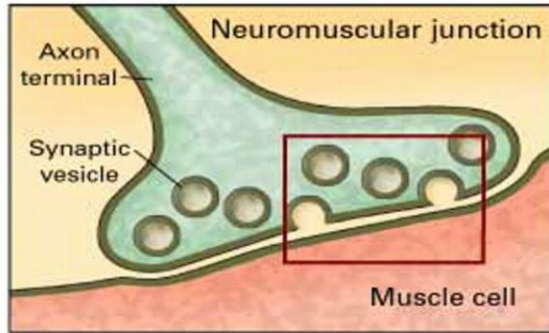
~ a zinc (Zn^{2+}) **endopeptidase**

~ attacks one of the fusion proteins (SNAP-25, syntaxin or synaptobrevin)



SNARE: SNAP (Soluble NSF Attachment Protein) REceptor") proteins

Botulinum Toxin Mechanism



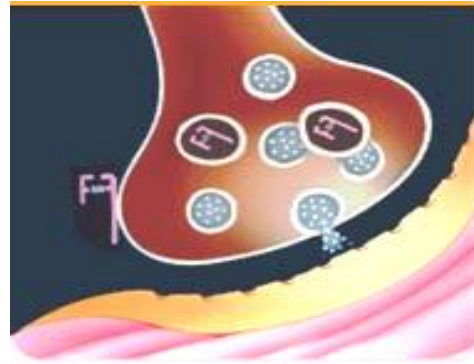
Heavy chain

Light Chain:

A specific inhibitory activity of Botulinum Toxin



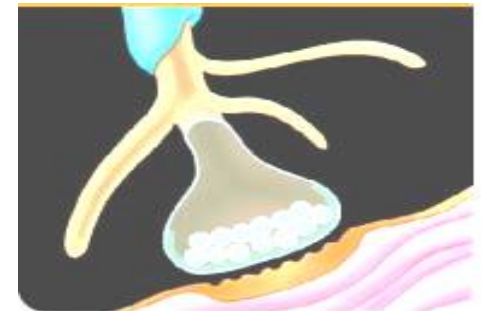
Presynaptic cell



Internalisation



Dissociation of Botulinum Toxin



Inhibition



Return of neuromuscular functions by axonal sprouting

Botulinum Toxin Products

Dysport



Botox

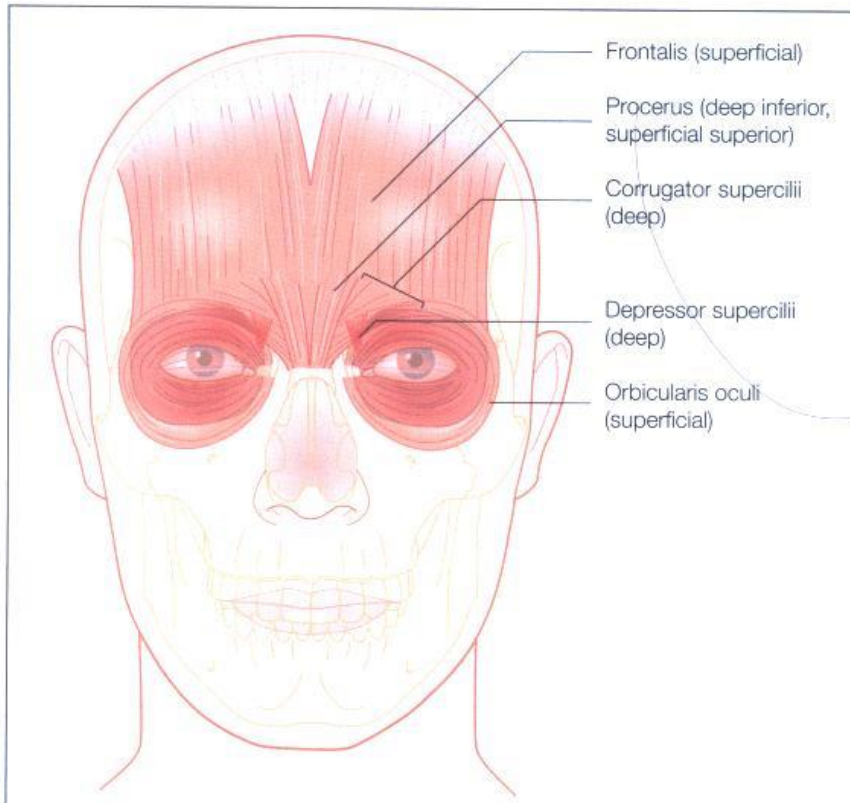


Name	AbotulinumtoxinA (ABO)	OnabotulinumtoxinA (ONA)
Strain	Hall strain of Clostridium botulinum type A	Hall strain of Clostridium botulinum type A
Purification	Column separation	Dialysis and acid precipitations

Ranoux et al., *J Neurol Neurosurg Psychiatry* 2002; 72: 459-462
 Odergren et al., *J Neurol Neurosurg Psychiatry* 1998; 64: 6-12
 Carr et al., *Arch Dis Child* 1998; 79: 271-273

Applications of Botulinum Toxin

Upper facial wrinkles



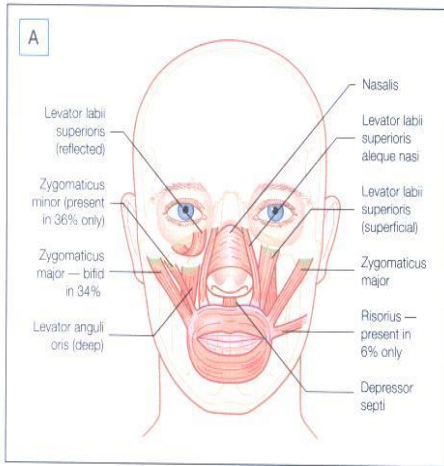
Glabellar lines/Frown Lines

Forehead wrinkles

Crow's feet

Lateral eyebrow lift/ Brow shaping

Applications of Botulinum Toxin



lower
face

Middle and lower face, neck and chest

Lower eyelid wrinkles

Bunny lines

Drooping nasal tip

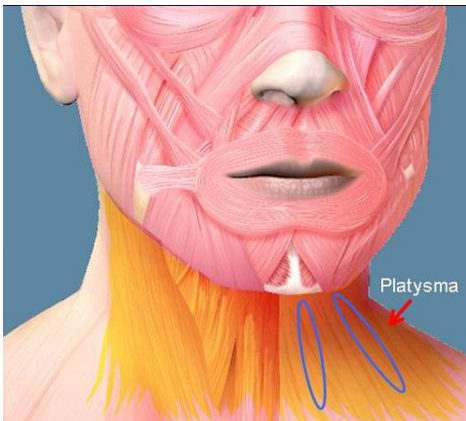
Perioral wrinkles

Masseter hypertrophy

Drooping mouth corners/ Marionette Lines

Dimpled chin

Platysmal bands/ Turkey neck



neck

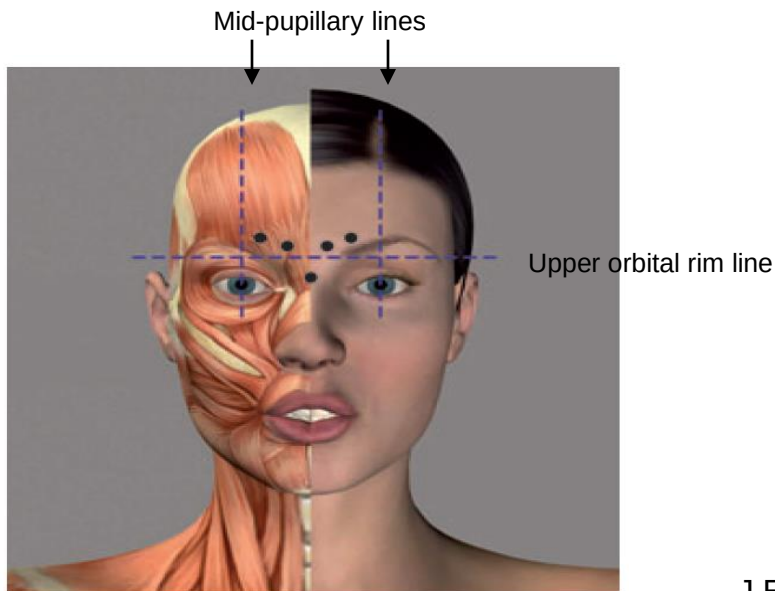
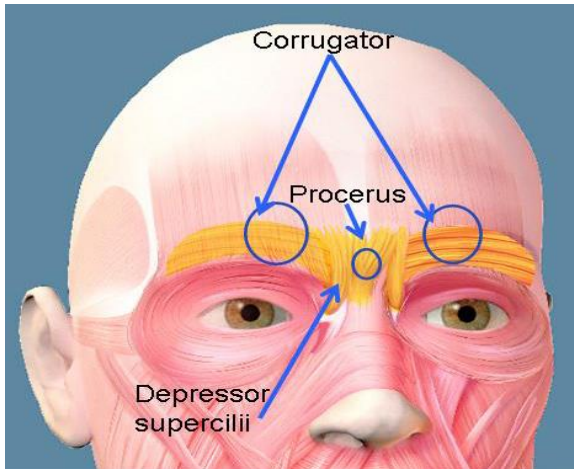
Applications of Botulinum Toxin

Calf

Hyperhidrosis

Face Lifting

Glabellar lines (Frown Lines)



Dose per injection point	10 U/point
No. injection points	5 points (1 point in the procerus and 2 points in each corrugator)
Total dose	50 U (Recommended dose range: 30-70U.)
Injection site	0.5 to 1 cm from the upper orbital rim and internal to the mid-pupillary lines ^{9-15,18}
Injection technique	Deep intramuscular and perpendicular injections to the last third of a 30G needle
Safety concerns	• Headache and injection site reactions (most frequently reported AE) • Eyelid ptosis, subsides within a few weeks.

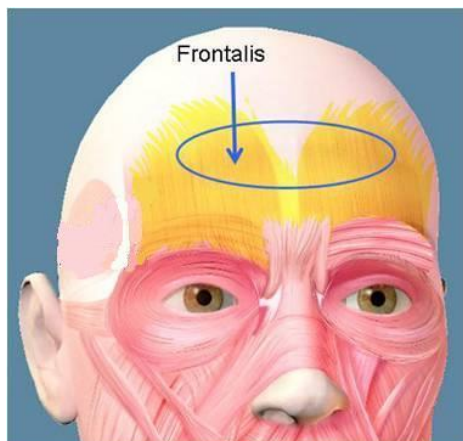
Glabellar lines (Frown Lines)

50 U Botulinum Toxin

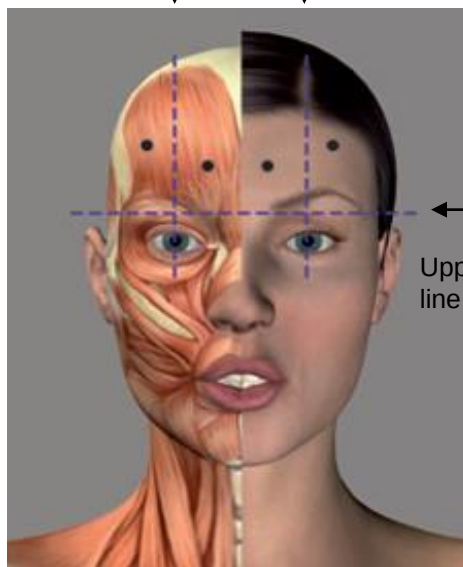
30 days



Forehead Lines



Mid-pupillary lines



Dose per injection point	5 - 10 U/point
No. injection points	4 to 6 points
Total dose	20 - 60 s.U
Injection site	-In the forehead below the hairline (4–5 cm from the orbital rim) In a slightly curved V-shape in women and straight in men if applicable Lateral points on the external orbital rim lines
Injection technique	Superficial intramuscular and perpendicular injections to the middle third of an 30G needle
Safety concerns	-To avoid brow ptosis , prefer injection points in the upper 2/3 of the forehead . - To avoid wrinkle formation above the lateral part of the eyebrows , assess carefully the position of the eyebrows before treatment, and place the lateral points on the external orbital rim lines

J Eur Acad Dermatol Venereol. 2010 Nov;24(11):1278-84.

* It is recommended to first start with a small dose to avoid a 'frozen' look, as the frontalis is a low-dose reactive muscle.

** Highly recommended especially for less experienced injectors.

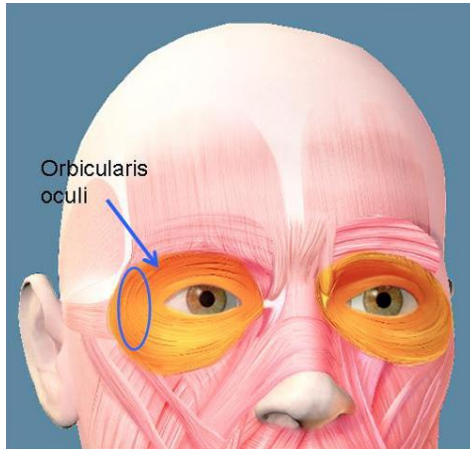
Forehead Lines

40 U Botulinum Toxin

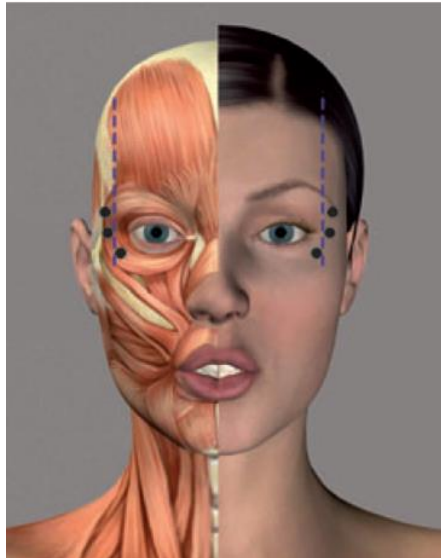
30 days



Crow's Feet



External orbital rims



Injection points

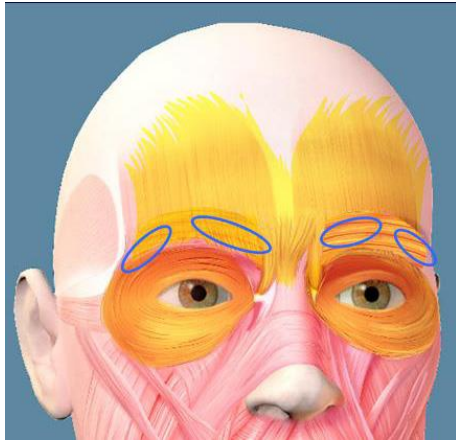
Dose per injection point	5 - 10 U/point
No. injection points	6 points in total, i.e. 3 per side
Total dose	30 - 60 U ,i.e. 15- 30 U/side *
Injection site	All points at the external part of the orbicularis oculi and about 1 - 2 cm from the external orbital rim
Injection technique	Lateral injections (20 - 30 angle to the skin, away from the patient's eyes, by be placed at the opposite to the treatment side) and superficial to the first 1/3 of the needle Use optimal lighting and stretch the skin slightly to avoid injecting into blood vessels
Safety concerns	-Should have a positive snap test and preferably good skin elasticity -Should NOT have dry eyes, prominent eye bags, scleral show or morning eyelid oedema -Mild periorbital haematoma (most frequently reported AE)

Crow's Feet

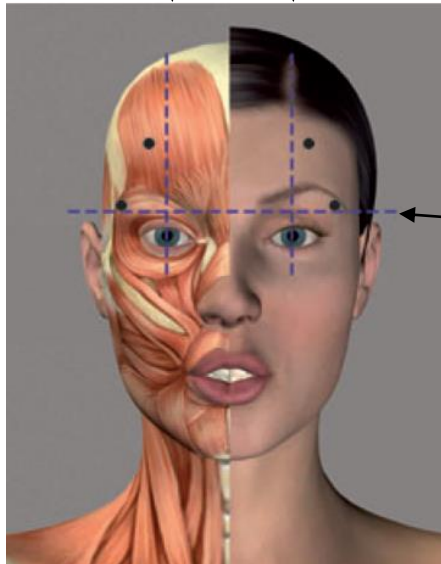
**30 U Botulinum Toxin
30 days**



Lateral eyebrow lift (Brow shaping)



Mid-pupillary lines



Upper
orbital
rim line

Dose per injection point	5 – 10 U/point
No. injection points	2 per side, 4 points in total.
Total dose	20 - 40 U in total, i.e. 10 - 20 U/side
Injection site	- 1 injection point should be placed at each eyebrow tail into the pars orbicularis, 2 additional injection points placed at the external part of the frontalis , slightly more internal than the orbicularis points
Injection technique	Superficial intramuscular injections and perpendicular to the skin, to the middle third of the needle
Safety concerns	• Rare eyelid and brow ptosis (when the injection volume is too large or when the injection sites are too close to the orbital rim).

Lateral eyebrow lift (Brow shaping)

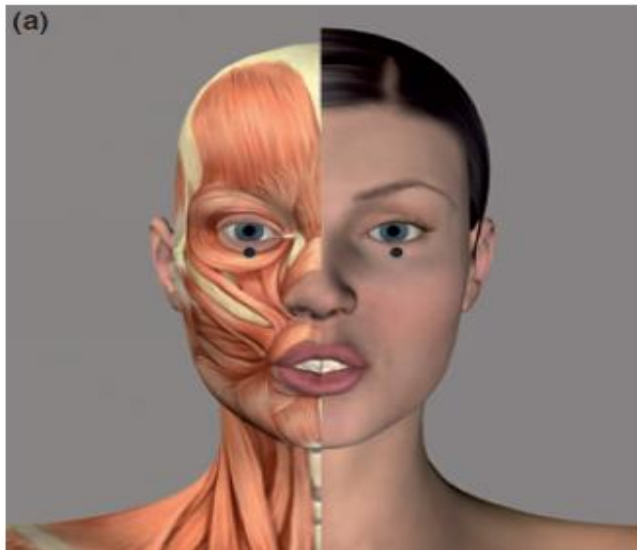
**20 U Botulinum Toxin
7 days**



Lower eyelid wrinkle



Dose per injection point	1-2.5 U/point
No. injection points	1-2 point/side, 2-4 points in total
Total dose	5 U in total, i.e. 2.5 U/side
Injection site	1-2 injections at the mid-pupillary line, about 2 mm below the border of the lower eyelids
Injection technique	Injection should be very superficial
Safety concerns	Patient selection is crucial for this indication. Injectors should avoid patients having dry eyes , prominent eye bags, scleral scleral show or morning eyelid oedema. In addition, patients need to have a positive snap test and preferably good skin elasticity .



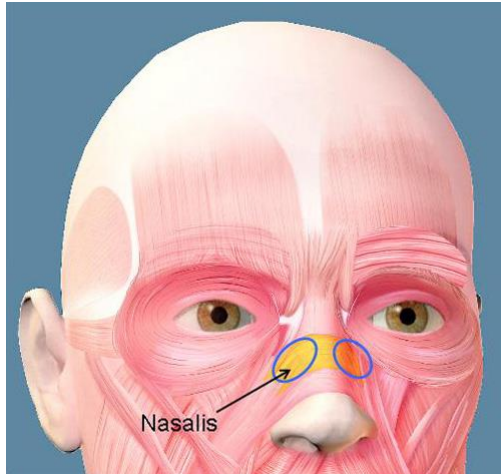
J Eur Acad Dermatol Venereol. 2010 Nov;24(11):1285-95.

Lower eyelid wrinkle

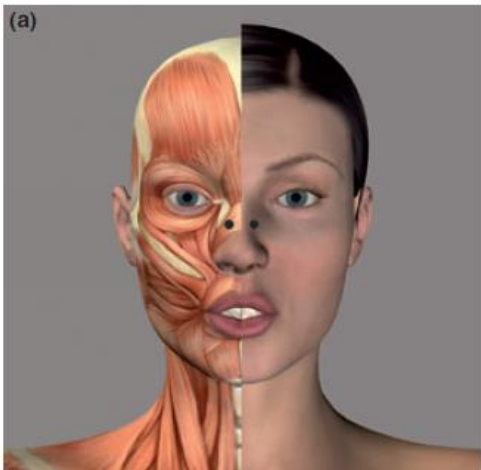
**6 U Botulinum Toxin
15 days**



Bunny lines



Dose per injection point	5-10U/point
No. injection points	1 point/per side, 2 points in total
Total dose	10-20U in total
Injection site	1 cm above the upper lateral part of the nostril
Injection technique	The injection should be very superficial to, avoiding contact with blood vessels or periosteum. The orientation of the injection should be perpendicular, with an angle of about 45° to the nasal bone.

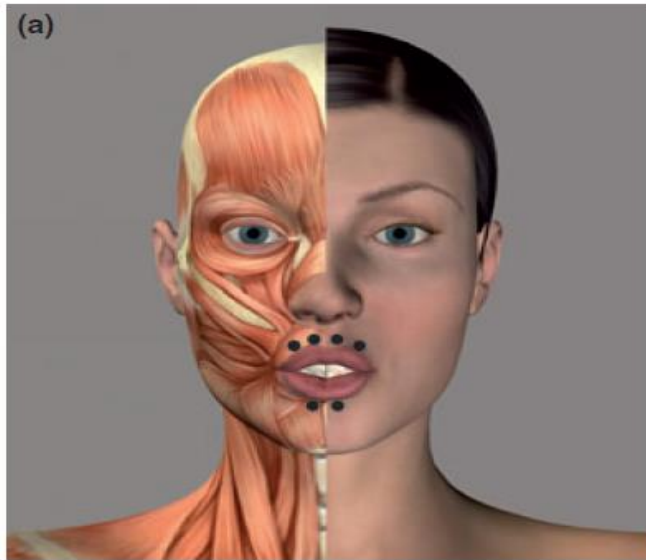
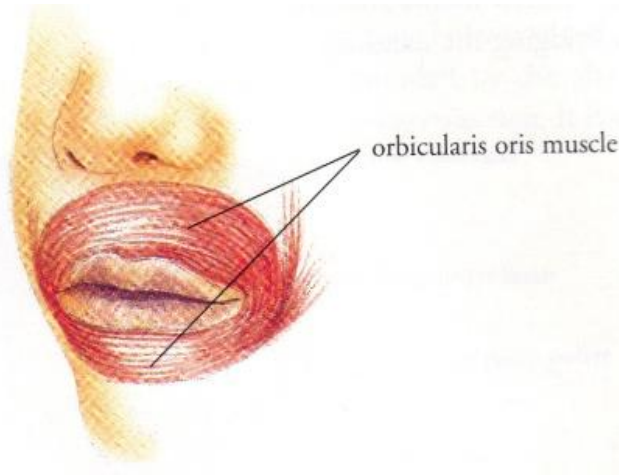


Bunny lines

**30 U Botulinum Toxin
21 days**



Perioral wrinkles



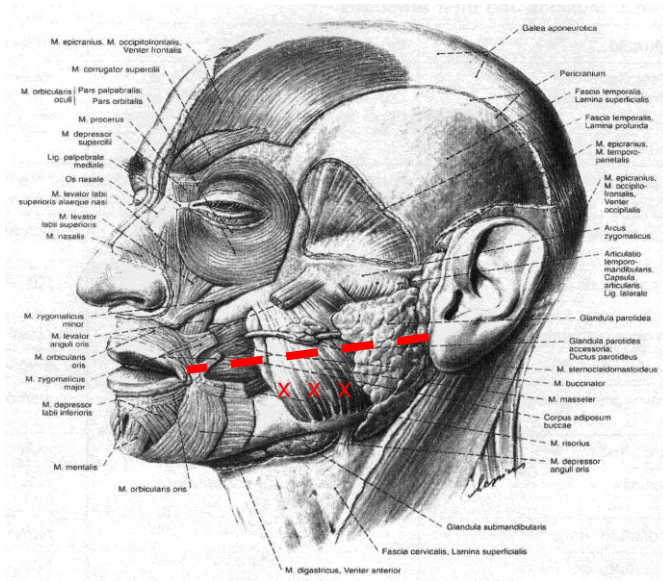
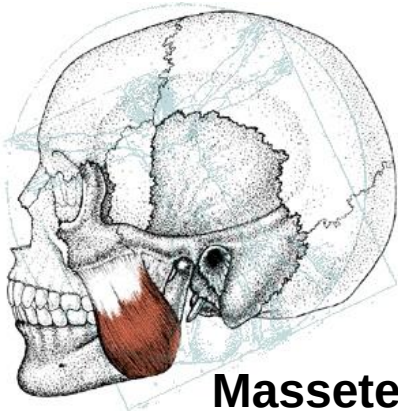
Dose per injection point	1-2U/point
No. injection points	the upper lip: 4-6 points , symmetrical the lower lip : 2 points
Total dose	4-12U in total
Injection site	The lateral points should be at least 1.5 cm away from the mouth corners , at the cross points of the lip vermilion border and vertical lines extended from the external ala . The medial points : 1 mm away from the philtrum .
Injection technique	Injection should be perpendicular to the skin and superficially intramuscular, to the first third of the needle.
Safety concerns	The lateral points should be sufficiently far away from the mouth corners , to avoid possible adverse events such as mouth asymmetry , drooping mouth corners and drooling

Perioral wrinkles

**12 U Botulinum Toxin
21 days**

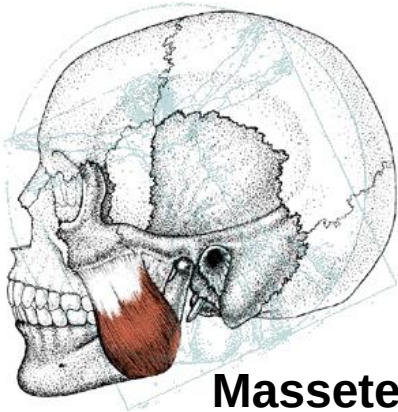


Masseter hypertrophy

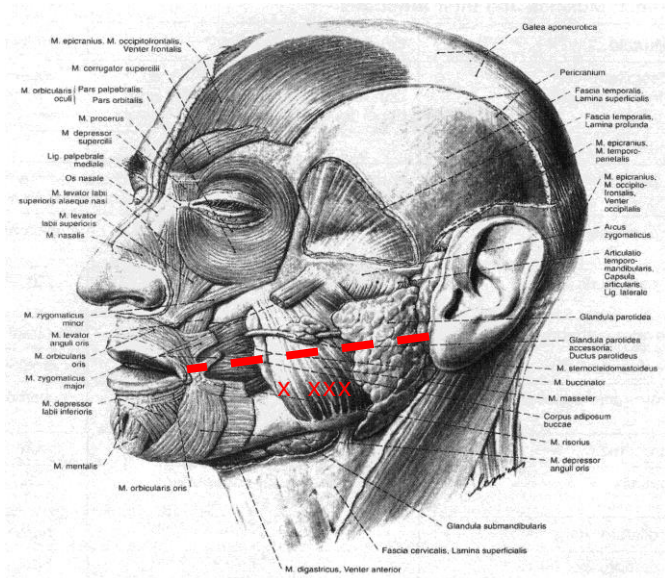


Dose per injection point	10-20U/point
No. injection points	3 points /side, total 6 points
Total dose	120U for Asians, 60 for Caucasians
Injection site	The injection points should be below the ear lobe–mouth corner line and about 1.5 cm above the mandibular angle border .
Injection technique	Injection should be perpendicular to the skin and intramuscular, to the middle third of the needle.
Safety concerns	In some cases, the masticating capability might also be reduced (start with a smaller dose). Injection just beneath the zygomatic bone should be avoided as it may impair the function of zygomatic muscles, resulting in awkward facial expression especially when smiling.

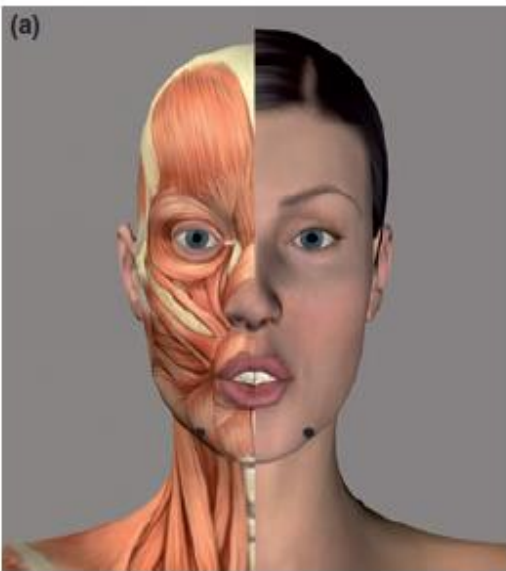
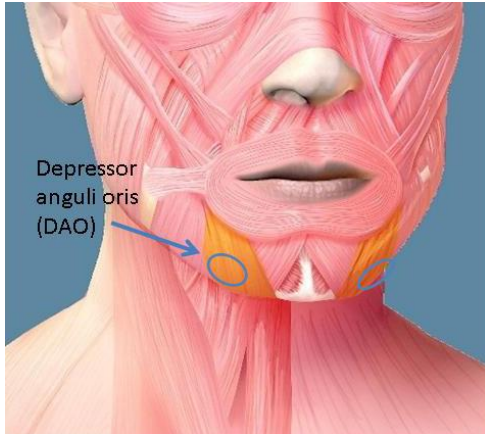
Square Face



Dose per injection point	25U/point
No. injection points	4-5 points/side
Total dose	100-125U/side
Injection site	The injection points should be below the ear lobe–mouth corner line and about 1.5 cm above the mandibular angle border.



Marionette Lines (Drooping mouth corner)



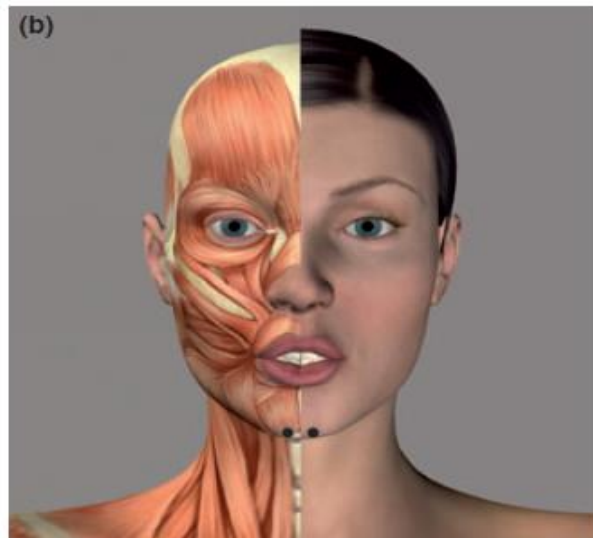
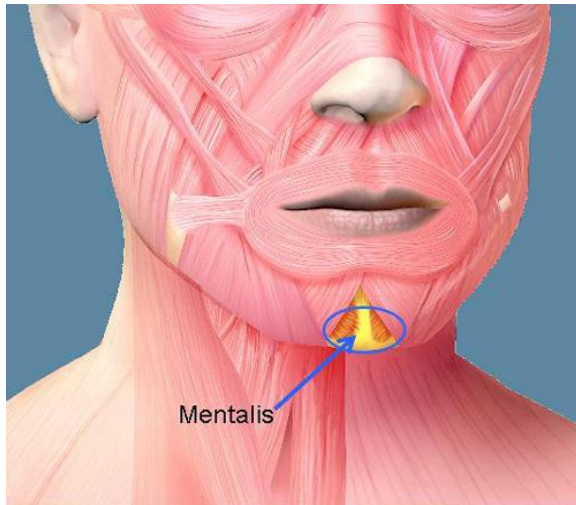
Dose per injection point	5-10U/point
No. injection points	1 point/per side, total 2 points
Total dose	10-20U in total
Injection site	-The injection points should be slightly internal to the cross points of the extension of the nasolabial fold and the jaw line. -The muscle location can be verified by asking the patients to grind their teeth or to grimace.
Injection technique	The injector should pinch the muscle slightly to prevent its movement and inject intramuscularly and perpendicularly, to the middle third of the needle.
Safety concerns	When the injection dose is too high or when injection points are too close to the mouth corners , resulting in adverse events such as drooling, speech impairment and mouth asymmetry (start with a minimal dose / volume and far away from the mouth corners).

Marionette Lines (Drooping mouth corner)

**20 U Botulinum Toxin
21 days**



Dimpled Chin



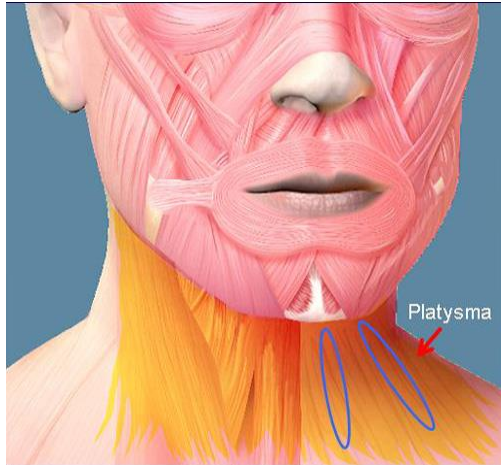
Dose per injection point	5-10U/point
No. injection points	2 points
Total dose	10-20U in total
Injection site	A two-point injection at the bony jaw line close to the centre. The injector can identify the points by asking the patient to try to reach his / her nose with the lower lip.
Injection technique	The needle should be perpendicular to the skin, and injection should be superficial, intramuscular to the middle third of the needle.
Safety concerns	Injecting a higher than recommended dose or injecting close to the lower lip may affect the depressor labii inferioris and the orbicularis oris, causing drooling, speech impairment, mouth asymmetry and lower lip ptosis.

Dimpled Chin

**14 U Botulinum Toxin
21 days**



Platysma folds (Turkey neck)



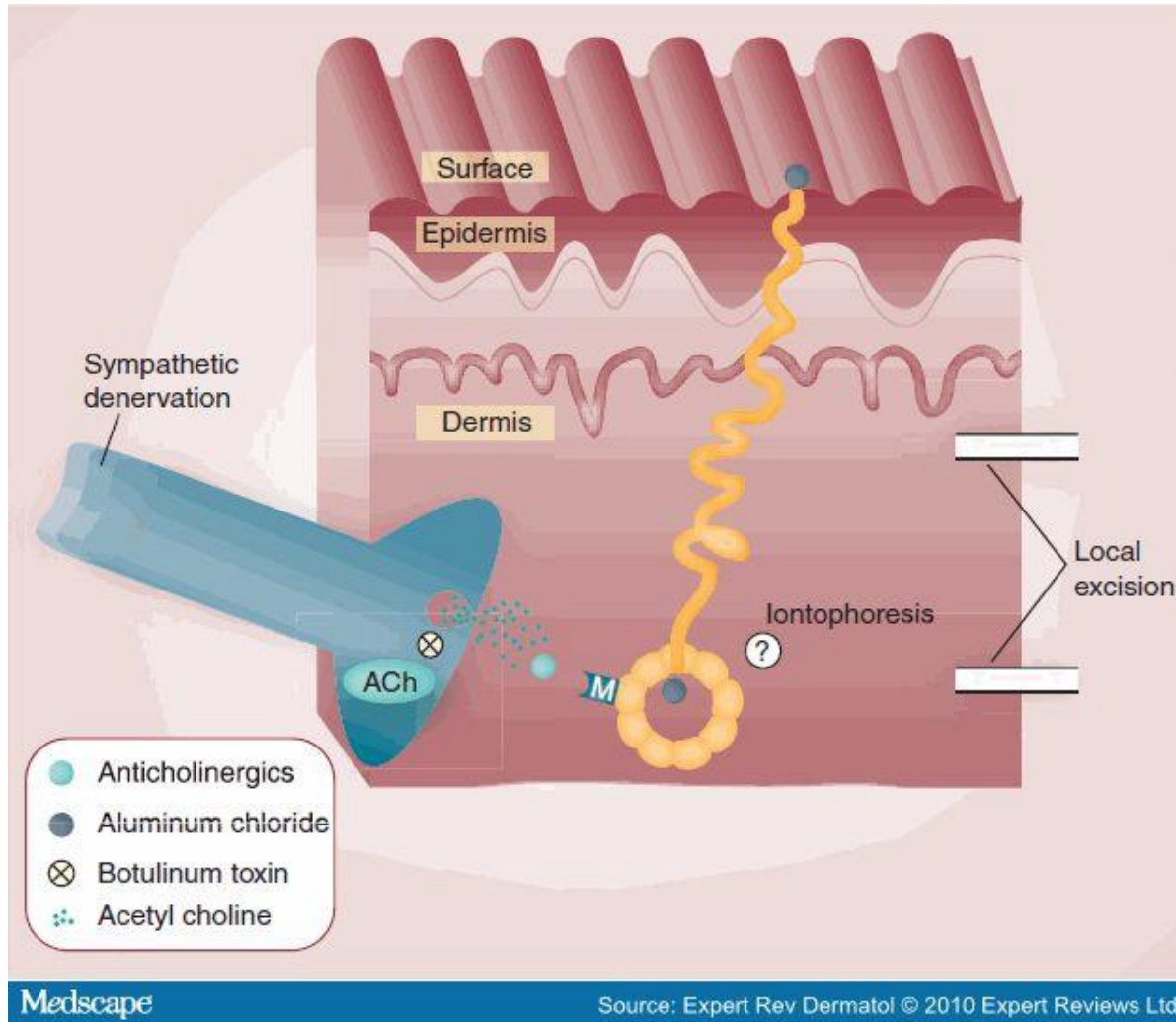
Dose per injection point	5-10U/point
No. injection points	Depends on the number and length of platysma bands.
Total dose	Max dose: 50U/side
Injection site	It is recommended that injectors start the first point at the jaw line, and go down every 2 cm to at least the middle of the bands
Injection technique	The injector can examine the prominence of platysmal bands by asking the patients to pronounce the letter 'E'. Once the platysmal bands become apparent, the injector should slightly pinch it, pull it away and inject horizontally on the band with a superficially intramuscular injection.
Safety concerns	Although dysphagia, dysphonia and neck weakness were listed as potential serious adverse events, they were results of extremely high dose or very deep injection of botulinum toxin.

Platysma folds (Turkey neck)

120 U Botulinum Toxin
13 days



Hyperhidrosis



Axillary hyperhidrosis



Iodine-Starch test.

- ✦ Injection points :
 - about **15 sites/each side**
- ✦ Injection dosage :
 - 10U/point** Botulinum Toxin
(0.05cc/point)
 - Nerve block**

Iodine-Starch test.



Use a surgical pen and standard ruler to mark injection points 1.5 to 2 cm apart and staggered.



Count injection points and allocate recommended dosage of Botulinum Toxin solution per injection.



Inject to a depth of approximately 2 mm and at a 45° angle to skin surface with bevel side up. Be sure not to inject directly on ink mark to avoid a permanent tattoo effect. After injection, clean treated area with alcohol.

Palmar hyperhidrosis



💡 Injection points :

-16 ~ 30 sites for the palm

-14 ~ 16 sites for fingers

Nerve block

💡 Injection dosage :

-5 ~ 8 U/point Botulinum Toxin (0.025 cc/point)

Contraindication

- Known hypersensitivity to any component of Botulinum Toxin
- generalized disorders of muscle activities
- usage of aminoglycoside antibiotics.
- pregnancy

Thanks for your attention