4 Treatment

4 Treatment

This section describes the relevant conditions to optimize the chances for successful treatment, ranging from the planning of treatment to the management of undesirable treatment effects. The following steps must be taken before treatment:

- Information session/consultation including evaluation of the patient's wishes (cf. section 2.3, p. 17)
- Obtaining an informed consent (cf. section 2.3, p. 17)
- Planning of treatment
- Examination with photographic documentation of the baseline findings at rest and with tensing of the muscles may also be useful (cf. section 2.1, p. 10 ff.).

The planning of treatment is guided by the wishes and needs of the patient. These are jointly established beforehand. In this context, the therapist may need to gently put into perspective any unrealistic expectations or results that cannot be achieved. To minimize miscommunication at the outset, the therapist should ask the patient to point out the region or regions that she would like to be treated and the issues that she perceives as problematic. A hand-held mirror is helpful for this. The patient can point out the details to the therapist directly using her reflection. The therapist can then also mark these details in directly with a marker (cf. section 4.4.3, p. 30), if desired. On the other hand, the therapist can also use the patient's reflection to explain the planned injection sites and treatment zones. The goals of wrinkle treatment with botulinum toxin A lie primarily in the reduction of the wrinkle depth in the region to be treated. Additionally, in good candidates, an improvement in facial shape can be achieved.

4.1 The treatment setting

The treatment setting and the atmosphere should communicate the maximum possible professionalism and care. A bright, well-ventilated treatment room set at a pleasant temperature helps achieve this. Ideally, the area being treated should be easily accessible from all sides to the therapist and any assistants.

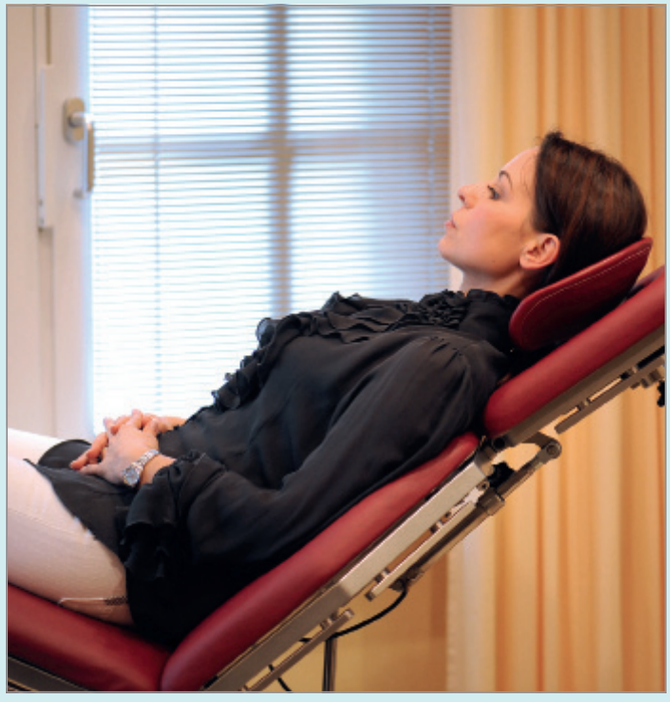
The treatment itself should not be performed under any time pressure. Even with all the optimum preparatory consultations, the patient may still ask further questions, express concern or put forward additional therapy requests immediately before the treatment. The medical professional should react to these openly, patiently and without haste. An optimum treatment result is most likely to occur with full patient compliance. In this respect, it is advisable to describe the planned treatment in detail one more time. The actual treatment follows only after the outstanding questions have been answered and uncertainties laid to rest.

4.2 Positioning the patient

The treatment is usually carried out on a special treatment chair with adjustable height and reclining position. The working height is adjusted to the size of the therapist, to ensure that the work is done ergonomically, in an upright position and without straining the back. The back of the chair should be adjustable to allow it be smoothly lowe-

Treatment position

Upright position: Since the proportions of the face change with the patient's position, the planning of treatment takes place with the patient positioned upright.



Semi-supine position: The semi-supine position makes it easier for the patient to relax and allows the therapist to work more ergonomically, as all the areas of the face are easily accessible in this position.

red right down to a supine position. When doing so, it should be kept in mind that the proportions of the face in the supine position are different relative to the upright position. The planning of treatment on the face should therefore take place with the patient semi-supine or upright. Performing the treatment on a semi-supine patient allows her to relax more easily.

4.3 Ergonomics

In this context, ergonomics involves ensuring that the therapist can work in a posture that does not strain the back. An ergonomic posture without back strain allows him or her to carry out the treatment in a relaxed way, specifically aimed at avoiding back problems. Working with the upper body upright is one of the basic principles of an ergonomic posture. Twisting movements between the pelvis and pectoral girdle should be avoided. Any turning and postural changes should involve the whole body.

The treatment surface is at the optimal level if the treatment area is at the therapist's chest height. The therapist's shoulders can hang loosely and the injection arm can be supported by resting the elbow or forearm on the treatment chair. This allows a relaxed posture to be adopted when administering the injections.

4.4 Accessories

This section describes accessories that not only help optimize the therapist's technique, but also ensure that this almost painless therapy is even better tolerated by the patient. Needles and syringes are described in the next section (cf. section 4.5, p. 30 f.).

4.4.1 Topical local anesthetics

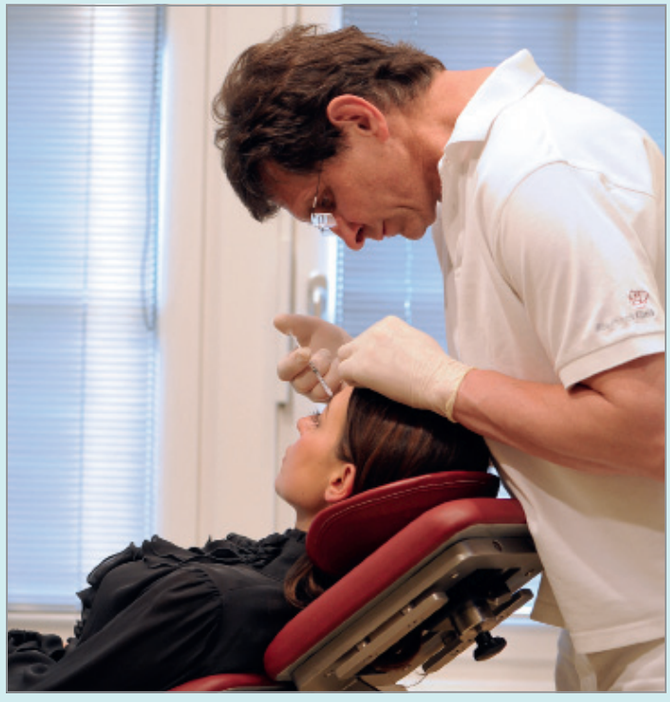
Local anesthetic creams may be applied before the treatment for particularly sensitive patients. One of the standard drugs is a combination of lidocaine and prilocaine (Emla). A mixture of lidocaine and tetracaine (Pliaglis) is also very effective. This gel acts rapidly with a very intense effect. For details of manufacturers, cf. Chapter 8, p. 167.

4.4.2 Loupe glasses

Loupe glasses enable the therapist to see stereoscopically when doing close work. Loupe glasses have a wide visual field and give a sharp, undistorted image even at the margins. Since the injections are administered with fine needles and relatively superficially, loupe glasses may be of benefit when doing this work. They allow the tiniest blood vessels to be identified and avoided, since blood vessels – particularly those around the eyes – can cause unsightly ecchymosis if traumatized during the injection.

Body posture during the treatment

Optimal posture: In this posture, the therapist's pelvis and shoulders are not twisted relative to one another, the back is straight and upright and the injection arm is supported by the treatment chair.



Incorrect posture: Here, the treatment surface is much too low: the therapist needs to bend his back, with increased strain on the cervical spine. This position does not allow the work to be done ergonomically and in a relaxed way.

4.4.3 Cosmetic pencil

An ordinary cosmetic pencil (eyebrow pencil or eyeliner) allows the injection areas to be marked before the treatment. This is also a good way of demonstrating the planned procedure to the patient.

The placement of these pencil marks is a matter for the therapist's personal preference. Many therapists do not mark in the injection sites beforehand, since the marks will need to be removed again when the skin is disinfected before the injection.

4.4.4 Coolpack

Coolpacks or ice cubes in plastic bags can be used before or after the treatment to relieve pain.

4.5 Syringes and needles

The injections should be administered as painlessly as possible. The correct choice of syringes and needles is an important factor in this respect. Insulin syringes represent the gold standard. They are used either with a very fine integrated needle or with a separate needle that can be fitted to the end. The therapist should hold the syringe in such a way as to ensure that he can read the graduations at all times, ensuring that the active substance is administered accurately and reproducibly. All the components of the syringes used should be latex-free.

4.5.1 The 0.3-ml syringe

These syringes are provided by various suppliers (cf. Chapter 8, p. 165 ff., for details of manufacturers). The needle has a diameter of 0.3 mm and is 8 mm in length. Due to the needle's special facetted

Treatment accessories

Topical local anesthetics: Lidocaine- or tetracaine-based local anesthetics can be used for anesthesia in sensitive patients.

Cosmetic pencil: An ordinary eyeliner/cosmetic pencil can be used to mark the injection sites before the treatment and to discuss these sites with the patient if necessary.

Loupe glasses: Loupe glasses like the ones shown here magnify the working area approximately four times and are an ergonomic aid to the therapist when administering the injections.

Coolpack: Coolpacks are suitable for both pre- and post-treatment. Coolpacks or ice cubes used before the treatment reduce sensitivity to pain. They also reduce swelling or pain if used after the treatment.

bevel, it causes very little pain when inserted into the skin. The needle's silicon coating also helps to minimize the pain felt by the patient. The syringe's clearly legible graduations allow precise dosing of the solutions being injected. Its design prevents a dead space, ensuring that the solution can be injected in full without any residue. A new syringe should be used after four to six injections. As these needles are very fine, they dull rather quickly with repeated skin puncture.

4.5.2 Single-use insulin syringe (1-ml volume)

The 1-ml syringe differs from the 0.3-ml version not only in volume, but particularly also in the fact that different needles can be fitted onto it. The volume of this syringe is 1 ml; its scale is divided into 0.1-ml graduations and is clearly legible. Minimal pressure on the plunger is needed for the injection, so that this type of syringe also enables the active substance to be dosed with ease.

4.5.3 Needles

Very fine needles, which are also intended for diabetics, are used to ensure that the injection is as painless and atraumatic as possible. The needles used in the injection treatment have a diameter of 0.25–0.30 mm and are 12–13 mm in length. The needles usually have a silicon coating, allowing them to penetrate readily and almost painlessly into skin and muscle. This is aided by the special facetted bevel of the needle tip. Most injectors use 30, 31, or 32 gauge needles.

4.6 Preparing the solution for injection

The active substance is initially supplied in powder form and must be reconstituted before the injection. This is best done using preservative-free, sterile normal saline (0.9% NaCl) solution. In the following section, the process for preparing a ready-to-use solution for injection is described using the product Xeomin as an example. The procedure is similar to that used for the products Botox and Dysport. The reconstituting instructions in the relevant product information texts should be referred to for further details.

Notes

- According to the package insert, the Botox 50 unit vials are diluted with 1.25 ml of preservative-free, sterile 0.9% NaCl solution.
- The Xeomin and Botox 100 unit vials are reconstituted with 2.5 ml of preservative-free, sterile 0.9% NaCl solution.
- Dysport 300 unit vials are reconstituted with 1.5 or 3.0 ml of preservative-free, sterile 0.9% NaCl solution.
- The units per milliliter ready-to-use solution of the three commercially available botulinum toxin A preparations can be read in table 4.1, p. 32.
- Many clinicians who are very experienced injectors use different reconstitution volumes than those above.
- Most clinicians also use preserved saline for reconstitution.

Syringe types

0.3-ml syringe with integrated needle: the volume of the syringe is 0.3 ml and there is no dead space. The clearly legible graduations allow optimal dosing.

1-ml syringe: this syringe is used when administering larger volumes; precise dosing is made easy by the clearly legible scale and the low plunger pressure required to inject the solution.

Needles: Very fine needles, also intended for diabetics, are used. They are 12–13 mm long and have a diameter of 0.25–0.3 mm (31 and 32 gauge). The silicon coating of the needles and the special bevel ensure that the injection causes little pain.

The reconstitution of the vial contents and the withdrawal of the solution into the syringe should take place over a surface that is easily cleaned to catch any splashes. The exposed part of the vial rubber stopper should be cleaned with 70% alcohol before inserting the needle.

First, 2.5 ml of preservative-free, sterile saline solution is injected into the 100 unit Xeomin vial using a 2-ml syringe. The NaCl solution is drawn in directly by the negative pressure in the vial.

The vial is now carefully swirled until the substance has dissolved fully in the saline. Shaking must be avoided, as this generates foam; swirling prevents foaming. The ready-to-use solution can now be drawn up into suitable syringes (cf. section 4.5, p. 30 f.).

When drawing up the solution, care is needed to ensure that the tip of the needle does not touch the glass: this can damage the tip, making the injection painful for the patient. E.g. 1 ml of the reconstituted solution Xeomin contains 40 LD_{50} units. Therefore 0.1 ml of the solution contains 4 LD_{50} units (cf. Tables 4.1 and 4.2 for further details). According to the product insert, once reconstituted, the solution should be used within hours.

Preparing the ready-to-use solution of …	
Xeomin	**Video:** "Preparation of Xeomin" http://www.kvm-tv.de/BTX/btx019.mp4
Botox	**Video:** "Preparation of Botox Cosmetic" http://www.kvm-tv.de/BTX/btx020.mp4
Dysport	**Video:** "Preparation of Dysport" http://www.kvm-tv.de/BTX/btx021.mp4

Product	Units*/ vial	Saline	Units per ml standard solution									
		ml	0.0125	0.025	0.05	0.075	0.1	0.2	0.3	0.4	0.8	1
Xeomin	**100**	2.5	0.5	1	2	3	4	8	12	16	32	40
Botox 50	**50**	1.25	0.5	1	2	3	4	8	12	16	32	40
Botox 100	**100**	2.5	0.5	1	2	3	4	8	12	16	32	40
Dysport 300	**300**	1.5	2.5	5	10	15	20	40	60	80	160	200
Dysport 300 (one-half dilution)	**300**	3	1.25	2.5	5	7.5	10	20	30	40	80	100
Dysport 500	**500**	1.5	2.5	5	10	15	20	40	60	80	160	200

Table 4.1 Units per ml ready-to-use solution after standard reconstitution. The information in this table refers to the 3 FDA-approved botulinum toxin A products in application for aesthetic indications (using 0.3-1 ml syringes). Figures do also apply to other product names containing identical substance preparations after similar reconstitution process.
***** The biological potency of one unit is specific to the preparation and cannot be equated amongst products from different manufacturers.

Product	Ml standard solution	Ml saline	Units per ml "two-third dilution"					
		ml	0.01875	0.0375	0.75	0.15	0.225	0.3
Xeomin	0.1	0.2	0.25	0.5	1	2	3	4
Botox	0.1	0.2	0.25	0.5	1	2	3	4

Table 4.2 Units per ml ready-to-use solution after preparation of a "two-third dilution." The dilution adding two volumes of saline to one volume of the standard solution is useful in low-dosed injection of Xeomin or Botox when large diffusion is desired. The given information also applies to other product names containing identical substance preparations.

Preparing a "two-third dilution"

The "two-third dilution" is used by the senior author when he applies the preparations Xeomin or Botox where small doses together with a maximal diffusion range of the active substance are indicated (e.g. in lines on the forehead or fine wrinkles on the lower eyelid). To do this, 0.1 ml of the reconstituted standard solution is diluted with 0.2 ml of preservative-free, sterile 0.9% NaCl solution. This gives 4 units per 0.3 ml instead of 4 units per 0.1 ml as in the original solution (cf. Tables 4.1 and 4.2).

Preparing the ready-to-use solution

Step 1: Dissolve the active substance, supplied in powder form, with preservative-free, sterile 0.9% NaCl solution.

Step 2: Swirl the solution carefully until the active substance has dissolved completely. Caution: do not shake, as this causes foaming.

Step 3: Draw up the ready-to-use solution into suitable syringes.

4.7 Injection techniques

There are various injection techniques that can be used to administer the active substance. Five techniques are described below:

- Direct injection
- Two-level injection
- Intradermal wheal technique
- Directed injection
- EMG-guided injection.

Which technique is recommended in individual cases is dependent on the target muscle and the individual anatomical and functional findings in the target region as well as on the practioner's practical experiences. A general distinction is made between deep injections, which administer the substance directly into the muscle belly and superficial injections applying the substance in a subcutaneous level, from which it gets to its muscular destination gently via diffusion.

4.7.1 Basic rules

The practitioner may administer the injections either sitting or standing. In either case, care must be taken to work ergonomically (cf. Chapter 4.3, p. 29). The elbow of the injection arm should ideally be supported on the treatment chair or table. The syringe is held between the index and middle fingers, with the thumb placed loosely on the plunger. The injection hand is supported on the outer edge of the little finger either directly on the patient or on the non-injecting hand. This is the basic injecting position. Two fingers of the non-injecting hand can be used to fix and lightly compress the target muscle for a more precise injecting.

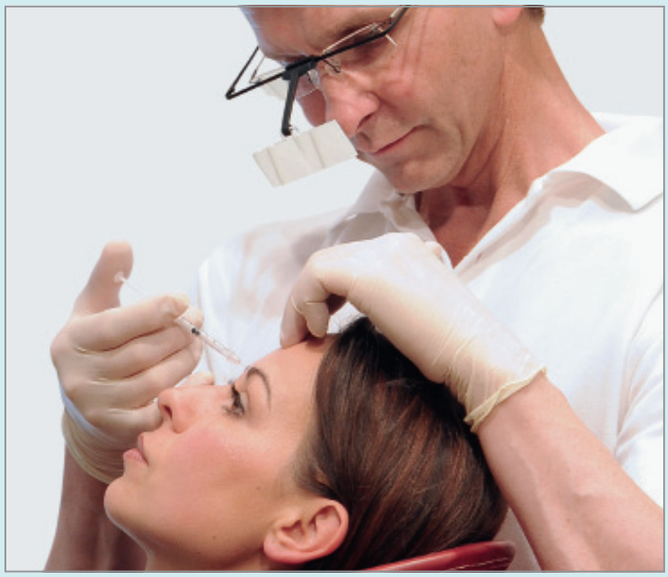
Video: "Basic hand position"
http://www.kvm-tv.de/BTX/btx003.mp4

The injection is carried out after provoked muscular activation. One of the basic rules is that the injections have to be as painless as possible for the patient. The use of syringes with extra fine cannula, as well as a careful insertion technique, are elementary in that context. Pain can be caused when the needle is inserted too deeply so that it pushes against the muscle-underlying periost and gets bent. To prevent this, needles always should be inserted slowly and diagonally to the skin surface.

Video: "Basic rules of injection"
http://www.kvm-tv.de/BTX/btx004.mp4

Tip
The senior author further recommends the so-called "knocking technique" to reduce pain during injection. By patting the patient's forehead with firm and rhythmical slaps, s/he creates mechanical deflection. In doing so immediately before the injection is done, the practitioner is able to decrease the injection pain by up to 80% as clinical experience has shown.

General hand position



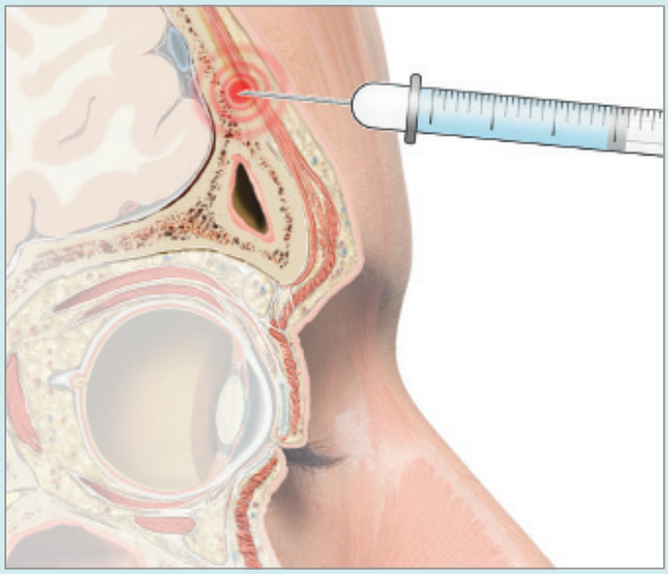
The syringe is held between the index and middle fingers, the thumb is placed loosely on the plunger and the injection hand is supported with the little finger. The needle should be inserted gently and in a diagonal direction to the skin surface.

Knocking technique

Rhythmical slapping on the patient's forehead before the injection is done will significantly reduce the pain during injection.

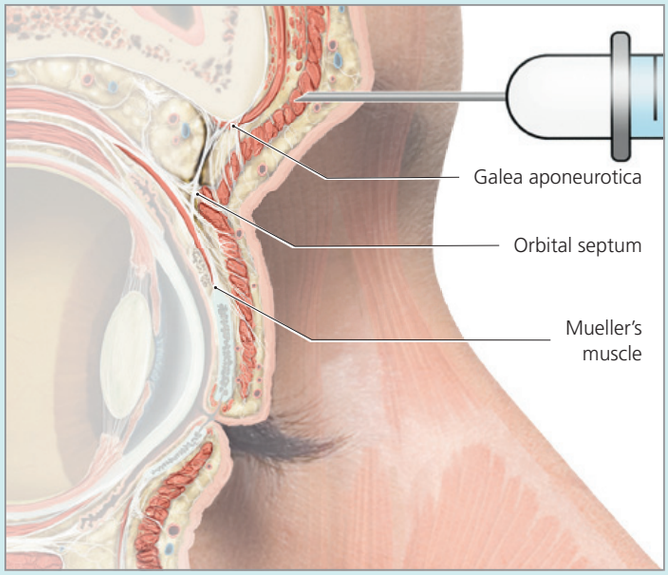
Besides prevention of pain, there are further basic rules important to follow during the injecting in order to avoid possible unwanted side effects of the therapy with botulinum toxin A. As an example, superficial subcutaneous injections or the use of dilutions (e.g. the "two-third dilution," p. 32) do allow an extra carefully substance dosing in areas with a given risk of overcorrection like the forehead. Concerning botulinum toxin injections around the eyebrows, a possible paralysis of the superior tarsal muscle (Mueller's muscle), leading to ptosis, has to be averted. Ptosis can occur after unwanted distribution of the substance behind the orbital septum, normally inhibited by the epicranial aponeurosis (Galea aponeurotica), which functions as a natural diffusion barrier. Along with careless injections, it is possible that the epicranial aponeurosis gets damaged by the needle allowing diffusion of the substance in the area of the superior tarsal muscle. For that reason, it is important to inject with a maximal distance to the orbital boundary. By using the thumb or forefinger of his contralateral hand, the practitioner is able to segregate the target muscle from its bony basis at a maximal level, ensuring safe injections along the eyebrow without the given risk of ptosis.

Basic rules for safe injecting



The fine needles used for botulinum toxin injections can bend if they reach the periost, which will cause pain while performing injections. For that reason, injections to the bone have to be avoided in any case.

By carefully inserting the needle in a diagonal direction to the skin surface, injections are as painless as possible.



When injecting near the eyebrow, possible windowing of the epicranial aponeurosis by the needle can lead to an undesired diffusion of the active substance behind the orbital septum causing paralysis of the Mueller's muscle and ptosis.

Two fingers of the non-injecting hand are used to create a maximal distance between the muscular target parts and the orbital margin, allowing safe injecting.

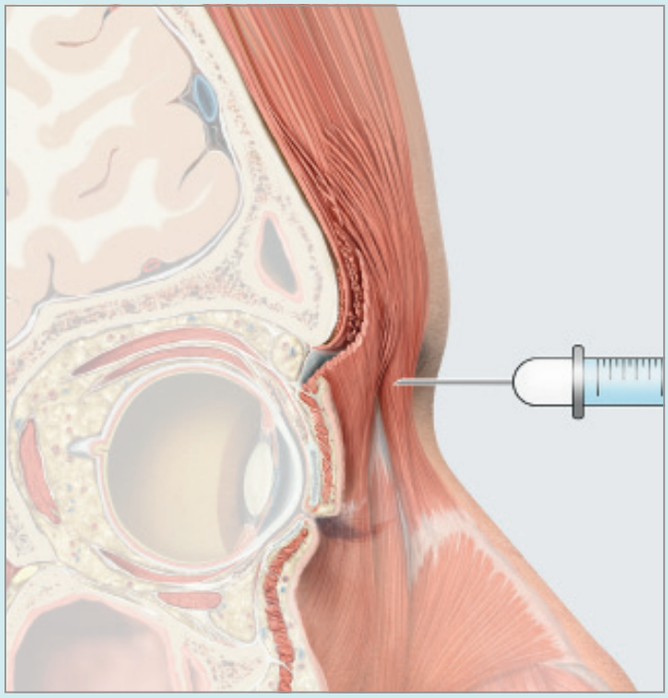
Video: "Rules for safe injecting"
http://www.kvm-tv.de/BTX/btx005.mp4

4.7.2 Direct injection

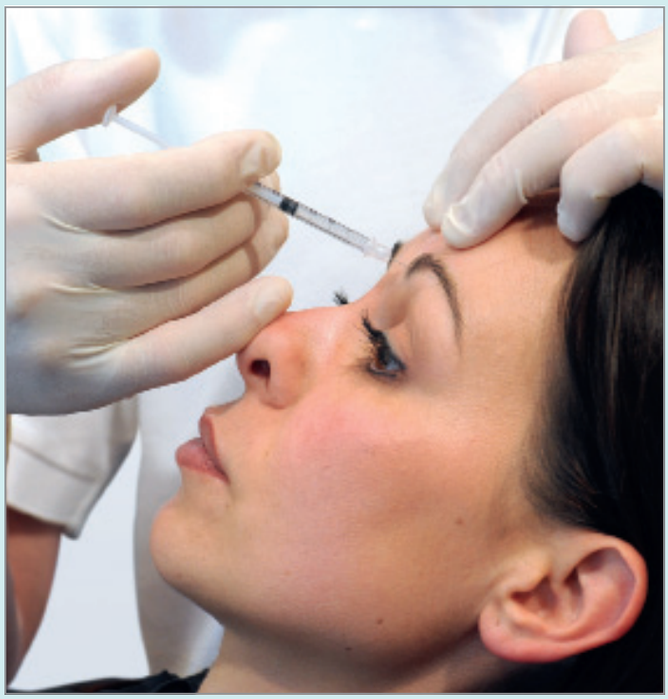
For the direct injection, the needle is inserted perpendicularly to the skin. The botulinum toxin is injected into the belly of the target muscle, located beforehand by palpation. To ensure more accurate placement of the drug, the muscle can also be held in place between the thumb and index finger of the free hand and compressed lightly.

Video: "Direct Injection technique"
http://www.kvm-tv.de/BTX/btx006.mp4

Direct injection: Procerus muscle



Cross-sectional anatomy, schematically demonstrating direct injection into the muscle belly of the procerus muscle.



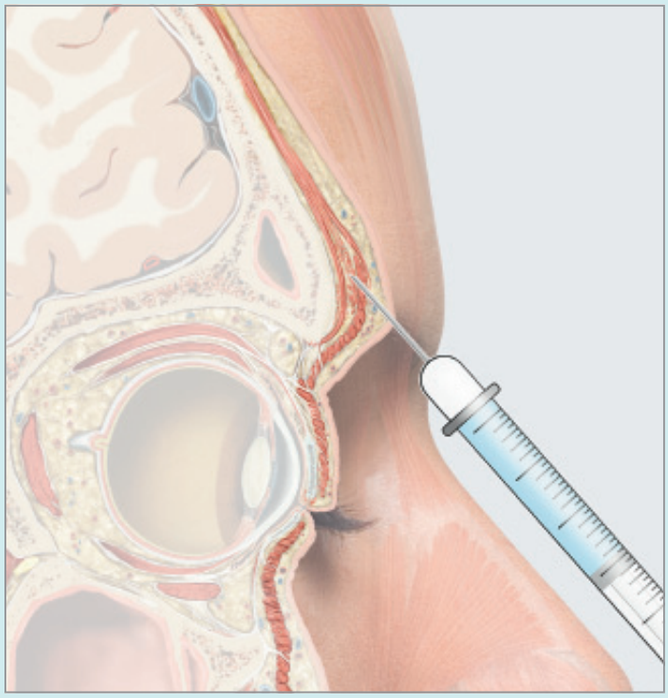
In practice, the direct injection is performed in perpendicular direction to the skin after provoked contraction of the target muscle.

4.7.3 Directed injection

The method known as directed injection is aimed at the site of maximum muscular tension that the patient can produce in the target muscle. This injection technique is often used for the corrugator muscle. The needle is inserted parallel to the direction of the fibers.

Video: "Directed injection technique"
http://www.kvm-tv.de/BTX/btx007.mp4

Directed injection: Corrugator muscle



Cross-sectional anatomy, schematically showing the directed injection following the muscle fibers of the deeper-lying corrugator muscle.

In practice, the directed injection is aimed at the side of maximal muscular tension that the patient is able to produce.

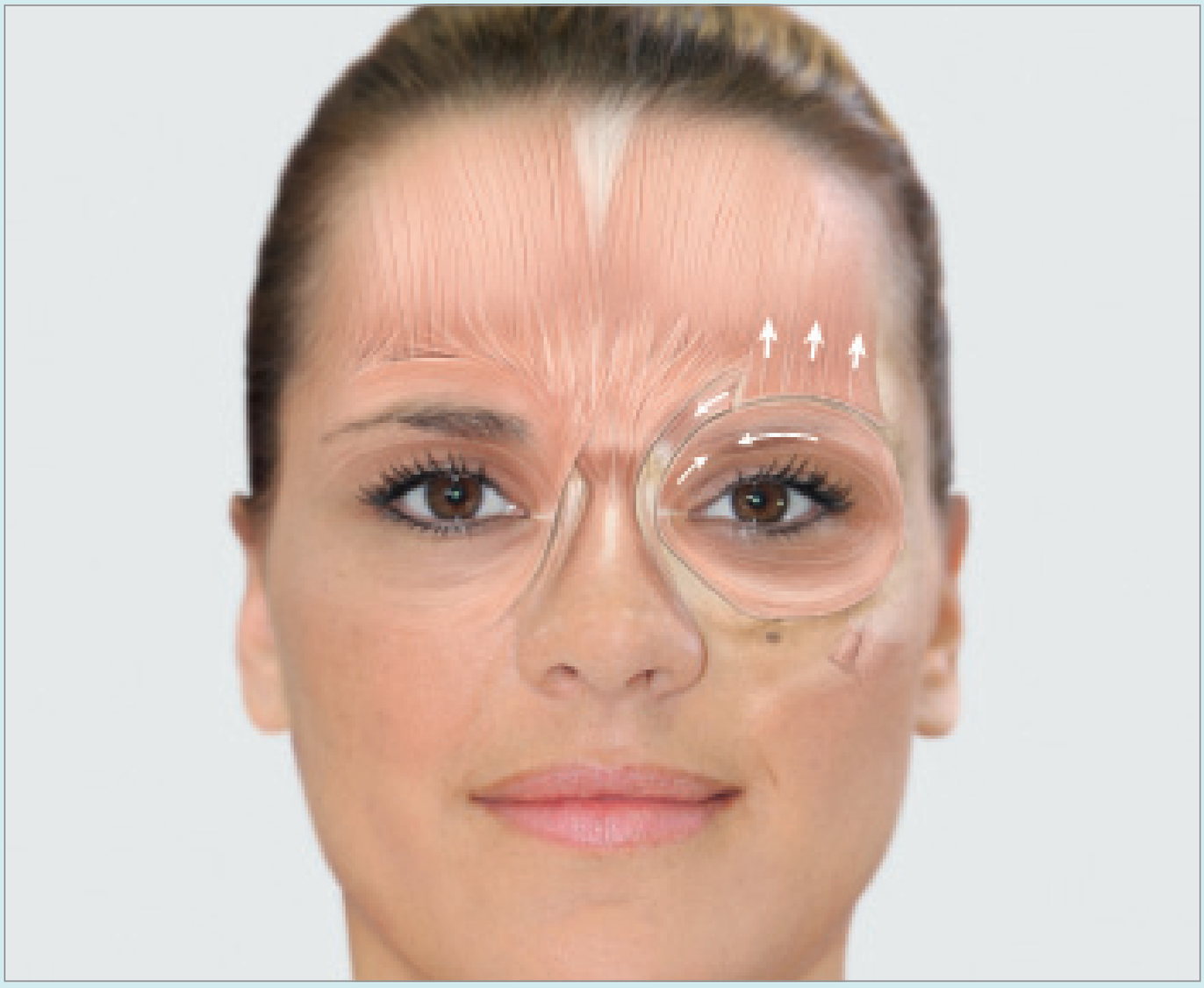
4.7.4 Two-level injection

The two-level injection is used preferentially when treating the eyebrow region. In other words the complex muscular bulk above the orbital margin consisting of the orbicularis oculi, corrugator and epicranius (frontal belly, caudal part, also referred to as Frontalis) muscles. The technique pursues the treatment goal of a natural eyebrow lift.

In the two-level injection, the active substance is injected at two levels, a deep and superficial one. The deep injection is aimed at the caudal part of the frontalis muscle. Weakening it triggers forced activity in the predominant, inferior part of the muscle acting as the only elevator of the brows. The needle is then withdrawn to a superficial level in the region of the orbicularis oculi muscle, followed by targeted intramuscular inactivation of that muscle depressing the brows in activity. Both injections will probably have further weakening effects on the contiguous corrugator muscle. Thus, use of the two-level injection achieves simultaneous stimulation of the levator (frontalis muscle) and reduction in the tone of the depressors (orbicularis oculi muscle, orbital part and corrugator muscle) leading to a maximal lifting effect.

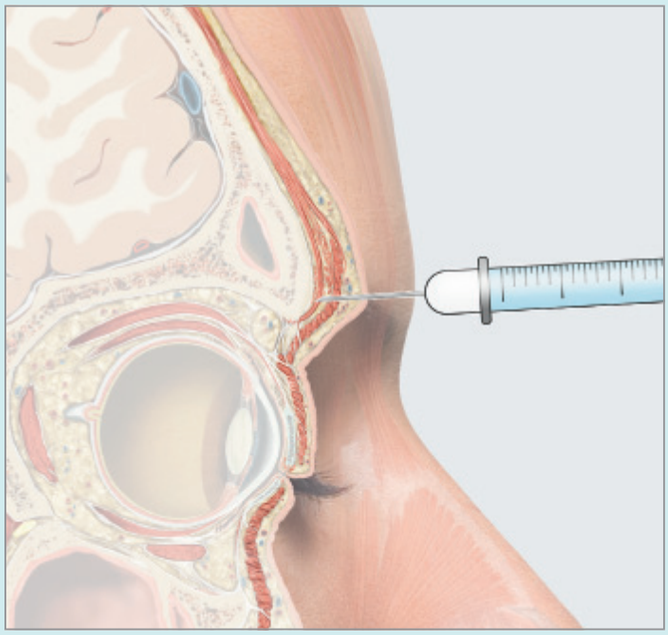
Video: "Two-level injection technique"
http://www.kvm-tv.de/BTX/btx008.mp4

Two-level injection: Intended effect



The two-level injection technique can be used along the eyebrow to achieve a natural lifting effect at two levels. By administering the toxin successively in a deeper and in a more superficial muscular layer, triggering of the elevator muscle (Frontalis) and weakening of the depressor muscles (orbicularis oculi muscle, orbital part; corrugator supercilii muscle) can be realized in one action.

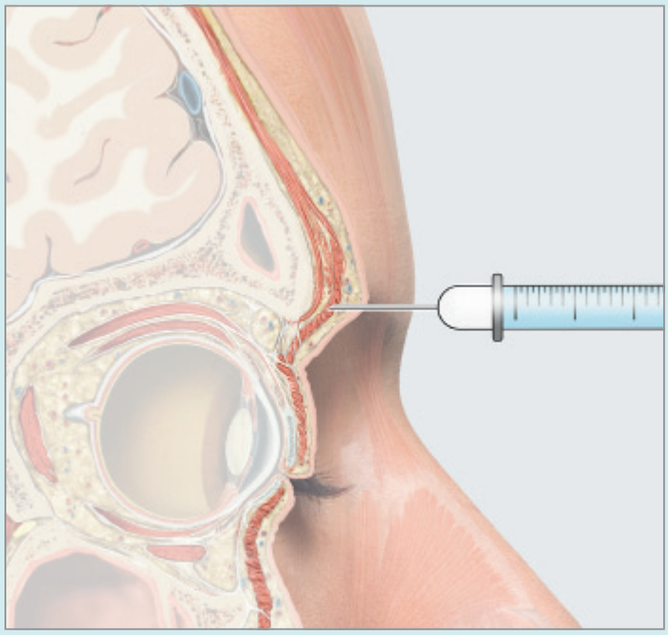
Two-level injection: Performance



Level 1, cross-sectional anatomy: In the deep injection level, the toxin is meant to weaken central fibers of the caudal frontalis muscle. This will force the predominant, inferior part of the levator to enhanced compensatory activity.

Level 1, practice: For that purpose, the practitioner gives a deep injection first. Possible complications are prevented by isolating the muscular parts from the orbital margin with the aid of his non-injection hand.

Two-level injection: 2. Superficial layer



Level 2, cross-sectional anatomy: In the superficial injection level, the toxin is supposed to reach subcutaneous muscular parts. This is namely the orbital part of the orbicularis oculi muscle leading to dampened depressor activity.

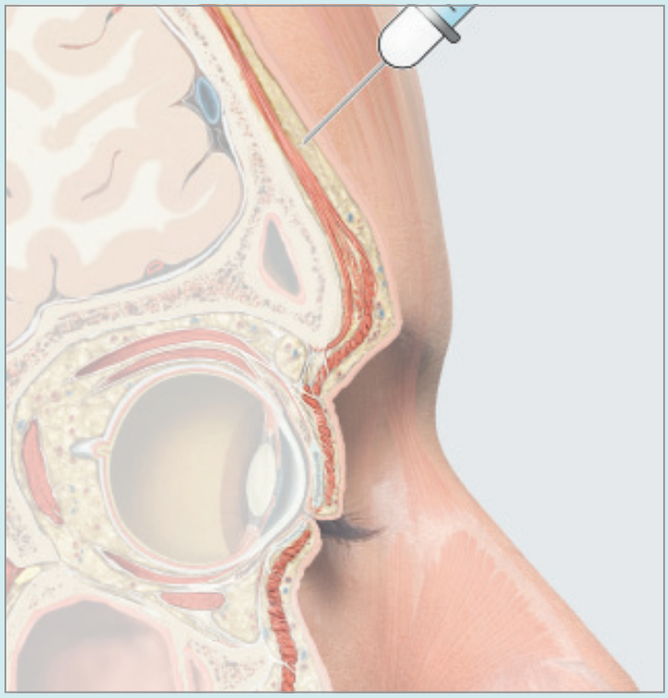
Level 2, practice: The practitioner therefore withdraws the needle to a superficial level within the muscular bulk and injects another dosis targeted at the orbicularis oculi muscle.

4.7.5 Subdermal wheal technique

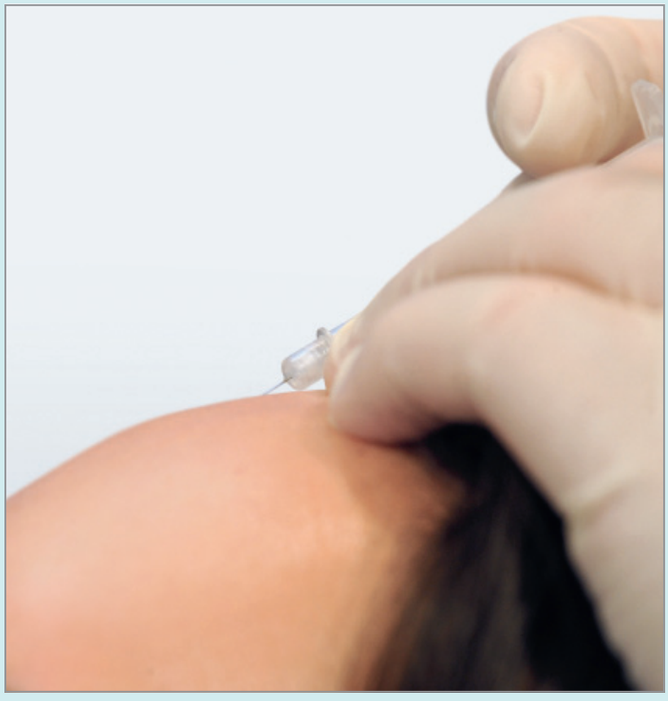
The so-called subdermal wheal technique provides a further option for particularly careful toxin placement. In this technique, the needle is held almost tangentially to the skin, inserting it into its uppermost layer and injecting the solution to form a subdermal wheal. This technique is used preferentially for the lower eyelid region, as the fibers of the orbicularis oculi muscle insert directly into the surface of the skin in this area. Another area where the technique is often used is the forehead. By being injected in this way, the toxin reaches the muscular target structures by diffusion.

Video: "Subdermal wheal technique"
http://www.kvm-tv.de/BTX/btx009.mp4

Subdermal wheal technique: Frontalis muscle



Cross-sectional anatomy, schematically demonstrating the superficial injection technique administering the substance in a subcutaneous level.



In practice, the needle is inserted nearly tangentially to the skin surface, creating a subdermal wheal by carefully injecting.

4.7.6 EMG-guided injection

EMG-guided injection has its advantages and disadvantages. Advantages include the more accurate localization through the acoustic signaling of the muscle activity. It may advantageous for use in very small muscles, which are difficult to distinguish such as the Levator labii superioris alaeque nasi, for relatively inexperienced injectors.

This must be weighed against disadvantages including equipment costs, the increased time input and the much thicker standard needles. The wider the needle, the more painful, unpleasant and traumatic the injection. In general terms, EMG-guided injection is rarely used in aesthetics.

4.8 Pre- and post-treatment of the face

On the day of treatment, ideally, the patient should not put on any make-up; if she does, it will need to be removed before the treatment. In very sensitive patients, an analgesic cream can be applied before giving the injections (cf. section 4.4.1, p. 29). The area being treated is disinfected before the injection with alcohol or a suitable alcohol-free antiseptic (e.g. Octenisept), which is less burning.

The injections generally cause little pain. However, minor superficial blood vessels may occasionally be punctured, causing small hematomas. The treatment areas can be cooled with cold compresses if desired.

4.9 Marking

Some therapists like to mark the treatment area or the planned injection sites before administering the injection. An ordinary cosmetic pencil is suitable for this. The advantage of marking is that the treatment can be agreed on with the patient and the proposed procedure also be explained to her. Other therapists, however, administer the injections without prior marking. In any case, marking is a useful descriptive tool that can be used to explain the planned treatment to the patient. Before the injection, the marks should be removed for hygienic reasons, although this also means that these useful mapping guides are removed.

Video: "Planning and marking of injections"
http://www.kvm-tv.de/BTX/btx010.mp4

Pre- and post-treatment

Before the treatment starts, make-up should be removed and the skin disinfected with a suitable antiseptic.

Marking

An ordinary eyebrow pencil can be used to mark the target areas.

4.10 Management of adverse treatment effects

The active substance botulinum toxin is very safe at the low doses used for dermatological indications. Side effects tend to be rare, provided that the contraindications are observed. Details of unwanted complications may be found in the description of the regional treatments (cf. Chapter 5, p. 43 ff.). The patient needs to be informed of the peculiarities of botulinum toxin treatment – such as the slow onset of action over the course of several days – during the obligatory information session. The treatment's possibilities and limitations also need to be explained beforehand. In this context, the patient should be told that botulinum toxin produces particularly good therapeutic results when used for facial expression lines. Only limited success is to be expected with age-related skin changes (actinic elastosis). Additional methods, such as augmentation with fillers and endogenous fat, or laser resurfacing, or surgery are used in these cases.

4.10.1 Unrealistic expectations

A careful evaluation of what the patient expects to gain is conducted before the treatment. By doing this, the therapist can counsel the patient regarding any unrealistic expectations.

4.10.2 Insufficient immobilization of the target muscles

Weak immobilization may be an entirely desirable result at the first treatment. The dose can be up-titrated (as it were) in one or more follow-up injections, until satisfactory immobilization is achieved.

4.10.3 Excessive immobilization of the target muscles

Excessive immobilization of the target muscles can lead to a rigid, mask-like facial expression. Thus, too much sedation of the frontal belly of the frontalis muscle makes the patient incapable of wrinkling the forehead – thus reducing the capacity for facial expression, which is desirable in a social context. Around the mouth, excessive immobilization of the orbicularis oris muscle may impair closure of the mouth, which can have a negative impact when chewing or whistling. The effect of excessive sedation can be countered by carefully feeling one's way towards the optimum dose over the course of several sessions.

4.10.4 Inadvertent immobilization of neighboring muscles

Diffusion of the toxin into neighboring muscles is one of the most unpleasant complications of botulinum toxin treatment. The periorbital area and the larynx are at risk of this. In the periorbital region, this may result in ptosis or the onset of double vision. Diffusion into the area around the larynx can lead to problems with swallowing and speech. These adverse effects can be minimized by using correct injection technique and the minimal effective dose for the treatment area.

4.10.5 Effects due to a failure to observe contraindications

The need to be aware of contraindications is an essential prerequisite of treatment with any drug, including botulinum toxin (cf. section 1.6, p. 7).

4.10.6 Local effects

Hematomas, inflammation or tenderness can develop at the injection site. According to the manufacturers' product information, there have also been isolated reports of erythema multiforme, urticaria, psoriasis-like rash, pruritus and allergic reactions.