

# Management of Edema

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### Definition

Edema is the accumulation of an excessive amount of serous fluid in or around the cells, tissues, or serous compartments of the body. Edema can be localized to a particular region or more widespread and can be caused by various triggers, such as trauma, medication, or systemic illness. Lymphedema occurs as a result of obstruction of lymphatic vessels or lymph nodes and the subsequent build-up of lymph in the affected region. Angioedema is the rapid swelling of the dermis, subcutaneous tissue, and mucosa. It can be severe and life threatening and should be treated as a medical emergency (see ACE Group Guideline on Anaphylaxis). Less severe cases can cause swelling, which can last several weeks; this may be just present at the treatment site or may be more generalized.

Seriousness of complication		Frequency of complication	
Minor complication	X	Common	X
Worrying complication		Occasional	
Moderate complication		Infrequent	
Serious, but not major		Rare	
Major complication		Very rare	

### Introduction

Edema is a very common side effect when performing dermal filler injections and is usually relatively mild and self-limiting. Patients should be counselled about the risk of edema and swelling prior to treatment. The development of edema is dependent on many factors, including:

- ¥ Patient factors (age, lifestyle factors, medical conditions, pre-existing lymphatic compromise<sup>1</sup>)
- ¥ Medication (nonsteroidal anti-inflammatory drugs [NSAIDs], hormonal treatments, calcium channel blockers, certain vitamins<sup>2</sup>)

¥ Product factors (For dermal fillers, type of product, area treated, volume injected<sup>3</sup>)

¥ Treatment factors (the amount of trauma caused by the treatment process, for example, when injecting dermal fillers, injection technique and speed of injection can result in greater swelling).

### Incidence

In general, the greater the insult to the skin caused by an aesthetic treatment, the larger amount of edema that will develop. Swelling following dermal filler treatment is likely to be in the order of 10 to 50 percent, although in reality all patients are likely to develop a degree of edema by the nature of

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the treatment. The incidence of swelling following the injection of Restylane using patient diaries was 87 percent in a randomized, double-blind, multicenter study<sup>4</sup>.

### Signs and Symptoms of Edema

Edema is characterized by the presence of swelling within or beneath the skin; it may be pitting (holds an indentation after digital pressure) or non-pitting (springs back into place after applying pressure). Edema may be tense due to the position and anatomical structures restricting the swelling, but often it is soft and easily compressible to palpation. It has a different consistency and is distinguishable from the presence of a foreign body (such as dermal filler), which tends to be more defined and firm. If the area is red and warm, infection needs to be considered (see ACE Group Guideline on Acute Skin Infection).<sup>5</sup>

### Areas of Caution

Edema can occur anywhere treatment is performed; however, the areas of the face that specifically appear to be prone to swelling are the lips, periorbital region, and malar region.<sup>1,3,5</sup>

Tissue edema may be unilateral and quite pronounced especially with some hydrophilic hyaluronic acid dermal fillers, and practitioners must be cautious to ensure that they do not mistake edema for dermal filler resulting in asymmetry<sup>6</sup>.

### Minimizing the Risk

To minimize the risk of edema, practitioners should follow these recommendations:

1. Ensure a full medical history is taken to include any pre-existing conditions, medications taken including contraception or hormone replacement therapy (estrogen increases the risk of edema), aspirin, NSAIDs, and supplements (vitamin E, ginger, ginseng, ginkgo biloba, garlic, kava kava, celery root, and fish oils).<sup>2</sup>
2. Consent should include a full explanation on the risks of side effects and complications, and the patient must be informed of any injection site reactions.<sup>2</sup>
3. Select appropriate dermal filler for the correct indication. Some dermal fillers have additional components, such as mannitol, to help reduce the risk of developing edema.
4. The less trauma during the procedure, the less risk of

swelling. Although edema is, in part, technique-dependent,<sup>1,3</sup> it is, at varying degrees, so common it should often not even be considered an actual complication.<sup>7</sup> Edema is likely to be more significant when tissue planes are traumatized by fanning techniques, when a large volume of filler is injected into one location, and when a product is injected too quickly.<sup>1</sup>

5. Apply gentle massage after treatment, but avoid vigorous massage, which may increase tissue trauma and contribute to swelling.<sup>8</sup>

6. The most common inflammatory reactions, such as swelling, tenderness, or redness, are easily managed with the application of ice.<sup>9</sup> Although application of ice or cool packs is often recommended as a measure to reduce swelling, there is no evidence that it makes a difference even though patient satisfaction is increased.

7. Injecting a local anesthetic into the treatment area will lead to secondary edema, which can alter contour and affect treatment.<sup>10</sup>

8. Avoid extremes of temperature (hot or cold) or altitude within the first 48 hours to limit the persistence of edema.

### Malar Edema<sup>1,11</sup>

Malar edema is the collection of fluid in the infraorbital region and is a common complication following the injection of dermal filler into the tear trough. One retrospective study showed that almost 25 percent of patients developed a prolonged malar edema lasting an average of 5.4 months following the injection of hyaluronic acid in this region.<sup>12</sup> It can also occur following other periorbital treatments, such as skin peels, laser treatments, and carboxytherapy, and with certain skin care products.

### Treatment of Tyndall Effect

**Edema < 2 weeks duration.** Edema occurring within the first two weeks should be managed expectantly. Even quite significant edema will settle down within a relatively short time. Ice or cool packs have not been proven to reduce swelling; however, many leading practitioners would advocate the use of ice packs<sup>9,13</sup> or warm compresses to minimize erythema, edema, and tenderness<sup>14</sup>. Consider gentle massage over the area, which may improve lymphatic drainage and the patient can do this at home. Watchful waiting,<sup>14</sup> reassurance, and appropriate follow-up are usually all that is required, and the majority of cases of

post-injection, trauma-related edema dissipate within one week<sup>1</sup>. There is little evidence to support the use of oral steroids in the management of swelling in the acute phase unless the edema is severe or if angioedema develops. A single intravenous bolus of 1g methylprednisolone given intraoperatively during facial surgery resulted in less edema and a shorter duration of swelling as well as less requirements for analgesia and no adverse events.<sup>15</sup> One author states that edema secondary to cryotherapy can be partly inhibited by a potent topical steroid immediately following treatment<sup>5</sup>.

Edema may arise due to an antibody-mediated type I hypersensitivity reaction. This usually presents rapidly after treatment and is often due to exposure of the tissue to a foreign material, such as dermal filler. Swelling may be localized or generalized, mild to severe. Immunoglobulin E sets off an inflammatory cascade and mast cell degranulation leading to the release of histamine, cytokines, prostaglandins, leukotrienes, heparin, and proteases resulting in edema, erythema, pain, and itching.<sup>1</sup> The swelling and inflammation will usually settle in a matter of hours to days, but can sometimes last for several weeks if there is an ongoing reaction to the dermal filler. Initial treatment involves antihistamines (e.g., loratadine 10mg once a day or cetirizine 10mg once a day) although oral steroids may be required if there is significant swelling and discomfort (e.g., prednisolone 40mg once a day for 1 week).

**Edema > 2 weeks duration.** In some circumstances, swelling can be prolonged and last for several months. In these situations it is prudent to identify the cause of the swelling rather than just to try and treat the swelling in isolation. Superficial product placement is often misdiagnosed as edema and when a hyaluronic acid is injected too superficially, it will attract a large amount of water giving the impression of swelling. The treatment should be directed at dealing with the incorrectly placed product to improve the edema (see ACE Group Guideline on The Use of Hyaluronidase in Aesthetic Practice).<sup>3,16</sup> Eyelid edema secondary to hyaluronic acid filler treatment is safely and effectively treated with hyaluronidase.<sup>16</sup> Similarly, an underlying inflammatory nodule is also likely to cause some local edema and should be dealt with appropriately (see ACE Group Guideline on Delayed Onset Nodules). Infection is another cause and should be treated.

A delayed onset facial edema may develop several days to weeks after treatment, typically one day after injection of dermal filler, which may be caused by a type IV hypersensitivity reaction.<sup>1</sup> These are characterized by T lymphocytes rather than antibodies and present with induration, erythema, and edema. These reactions do not respond to antihistamines, but can be

treated with oral steroids, as the hypersensitivity is usually long-lasting, the patient is usually prescribed a loading dose of steroids with a tapering off regimen to the lowest dose that will control symptoms (e.g., prednisolone 40mg a day for 1 week, then reduce by 5mg every few days until symptoms are controlled at the lowest possible dose, usually around prednisolone 5mg). As there are risks and other considerations associated with longer term steroids (including gastric ulceration and osteoporosis), often the best course of action would be to remove the underlying problem and dissolve hyaluronic acid filler with hyaluronidase and for non-hyaluronic acid fillers, attempt to remove by extrusion or dispersion, or breakdown with laser therapy.<sup>1</sup> In these situations, management should be performed by an aesthetic practitioner experienced in these complications.

If there are no other treatment options, a short course of diuretics may be prescribed (e.g., furosemide 20–40mg a day for 7 days<sup>17</sup>). Other therapies that appear safe, but have very limited evidence for their use, include radiofrequency and ultrasound therapy applied to the swelling.

### Follow-up

All patients presenting with significant edema should be carefully followed-up and photographs should be taken to objectively assess the swelling over time. If the edema persists for more than six weeks and simple measures have not been successful, it would be sensible to consider referral to a practitioner who has more experience in this area.

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