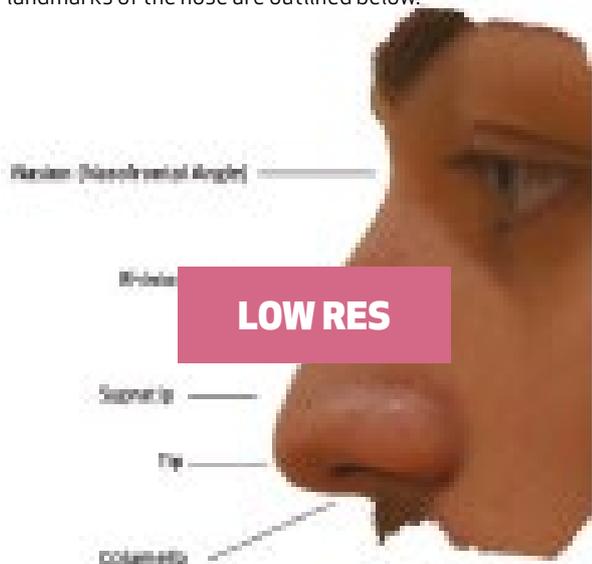


Anatomy on the nose

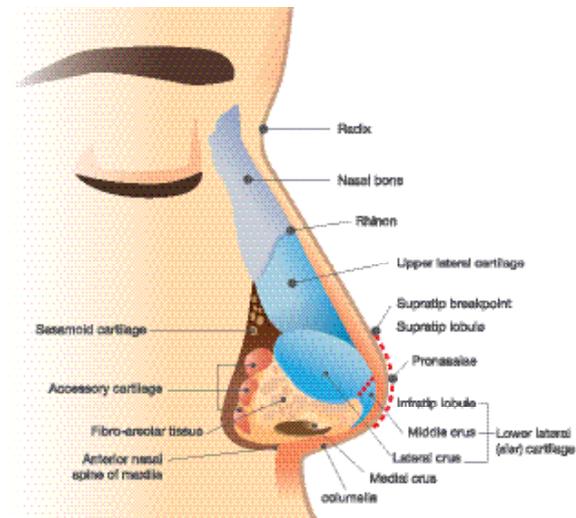


Dr Tim Eldridge on the anatomy of the nose and complications

When injecting hyaluronic acid HA fillers in the face, special attention must be paid to the anatomy of the face. Certain areas of the face must be avoided. The nose is not one of those areas, but a thorough knowledge of the anatomy of the nose is required to perform medical rhinoplasty safely. The nose is highly innervated, and intravascular injection can cause problems in surrounding areas, ranging from skin necrosis to blindness. The main landmarks of the nose are outlined below.



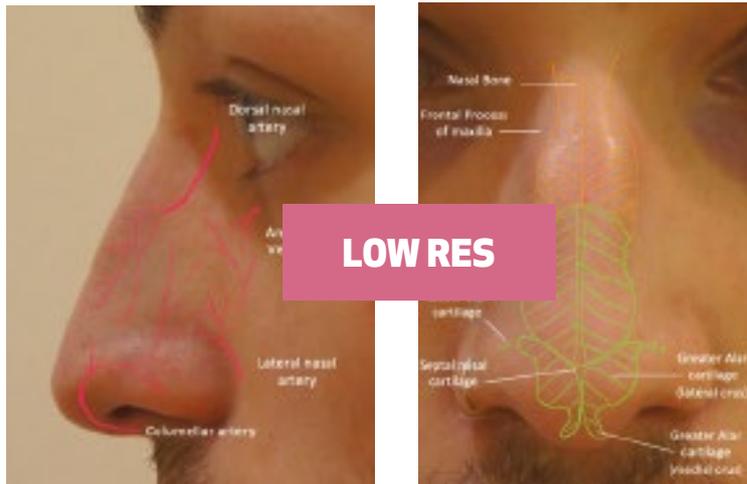
A framework of skin, cartilage and bone form the nose. These are supported by connective tissue and held together by ligaments (Sheen and Sheen 1998).



The skeletal part of the nose is made up of bone and cartilage. The bony part runs from the rhinion upwards, and cartilage is found from the rhinion down to the tip. The tip of the nose is formed of skin, ligaments, and cartilage.

The soft tissues of the nose comprise of skin, the superficial fatty layer, the fibromuscular layer, the deep fatty layer and the periosteum. The skin covering the nose varies in thickness. The skin is thinnest over the rhinion and thickens towards the tip of the nose. Where the skin is thin it is mobile, and where it is thicker it is more adherent (at the tip).

The muscles sit below the superficial layer of the skin and subcutaneous tissues. The muscles are innervated by the facial nerve and joined by the superficial musculoaponeurotic system (SMAS).



VASCULATURE

The nose is highly vascularised, with the majority of blood vessels being small. To avoid inversion of the blood vessels (which can lead to arterial embolism) when placing fillers, the injection needs to be placed below the SMAS in the avascular deep plane. Due to the number of blood vessels and the type of multi-directional movement, necrosis is rare. Injecting fillers after surgical rhinoplasty has been performed increases the risk of necrosis, especially in the top of the nose. Often blood circulation is compromised post-surgery and vessels may not be where they should be. Extra care needs to be taken and a more in-depth pre-treatment assessment made.

The facial artery provides blood supply to the nose. It divides into the superior labial and the angular artery, which form the columellar branch and lateral nasal branch, and supply the tip of the nose. The ophthalmic artery supplies the upper part of the nose. It branches to form the angular vessels and the dorsal nasal artery.

COMPLICATIONS

No matter where they are injected, all HA fillers are associated with complications. Most reactions are only mild and of short duration but in more recent years it has become apparent that longer duration or even permanent effects, such as blindness, can occur. For the purpose of the article, only a selection of the more common problems will be discussed.

Bruising

More common after filler is injected into the dermal and subdermal planes after using the fanning and threading technique, when fillers are injected deeper. The risk of bruising can be reduced by identifying any contraindicated medications or any medication which results in blood thinning, using narrower gauge needles or cannulas to avoid multiple entry points. Fillers containing anaesthetic (lidocaine and epinephrine) will reduce the risk of bruising. Bruising can be treated with a cold compress applied to the

affected area. Vitamin K cream can also help to treat the affected area.

Oedema

Post treatment swelling normally occurs after injecting HA fillers. It is usually associated with the volume of product injected and the technique. It is generally short acting and can be reduced by identifying any contraindicated medication, using narrower needles or cannulas. Remedial treatment is cold compress.

Angioedema

HA fillers are foreign objects and when injected may trigger a type I hypersensitivity reaction. This usually occurs within hours of the treatment and can be severe, lasting

for several weeks. It presents locally at the injection site or more generalised throughout the face. Treatment ranges from administering antihistamines +/- steroids through to dissolving the filler with hyaluronidase.

Infection

HA fillers are associated with a risk of infection as they need to be injected, breaking the surface of the skin. An aseptic technique will help prevent the risk of infection.

Nodules

Often visible after HA filler procedures, especially in thinner skin. They may either be inflammatory or non-inflammatory.

Non-inflammatory nodules

One of the most common adverse effects following HA filler treatments. Occurrence is due to poor technique and down to the injector (incorrect placement or poor choice of product). These nodules must be differentiated from foreign body granulomas, or biofilms which result from an inflammatory reaction around the filler. Treatment ranges from removing the filler with hyaluronidase or excision. However, depending on product, if identified early on these nodules often respond to massaging.

Inflammatory nodules

Present as biofilm nodules or foreign body granulomas.

Biofilm nodules

Occur when the HA filler is coated with bacteria forming a biofilm after being injected. Usually present two to four weeks after treatment. Diagnosis of biofilm nodules is difficult, but fortunately quite rare with HA fillers. If a red indurated area presents after HA filler treatment (either immediate post treatment or delayed) suspect a biofilm nodule. Precautions to reduce the risk is to use an aseptic technique. Treatment once diagnosed usually includes excision and antibiotics. >

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Foreign body granulomas

Appear as red papules, nodules or plaques +/- ulceration. They can become firmer with time due to fibrosis. These nodules are very rare and can present after a period of several months. Diagnosis is normally through biopsy and treatment consists of steroids.

Paraesthesia

This is a rare complication which occurs due to damage to the nerve from the needle, injection of the HA filler directly into the nerve or tissue compression from the filler. There is also a potential to cause paraesthesia by too much massaging of the product after placement, forcing it into a foramina. Damage may be short lived and reversible, or permanent if there is complete nerve transection. Treatment ranges from dissolving the product with hyaluronidase to administering triamcinilone. The risk can be reduced by thorough knowledge of anatomy and correct injection technique.

Vascular compromise

This is a major adverse effect as a result of injecting the filler into a blood vessel, occluding it, or compression of the vessel from the filler. Vascular occlusion and compression can result in skin necrosis which does not necessarily occur where the filler was injected, it can occur in tissue where no filler was placed. A bolus of filler may enter a blood vessel and travel a distance before it occludes it.

To reduce the risk, the injector must have a thorough knowledge of anatomy, know what to look for, and treat immediately. The use of cannulas will reduce the risk, but if needles are used aspiration is mandatory. The use of biphasic fillers, such as Perfectha Deep, which has a large particle size compared to monophasic fillers, reduces the risk of intravascular injection of filler mass. Immediate observations are tissue blanching. Should this occur, stop injecting and massage the area until the blanching disappears. If the patient reports pain following the treatment, or significant skin discolouration then occlusion must be suspected. Treatment includes application of nitroglycerin paste to the area, hot compress, and hyaluronidase to remove the filler. If not identified early enough scarring may result.

Retinal artery occlusion

This catastrophic adverse effect, although rare, has increased reports over the past few years. It is essential to have this as a possible adverse effect on your consent form. It occurs after injection of HA filler into one of the distal branches of the ophthalmic artery. These branches include the angular artery and zygomatico temporal, zygomatico facial, and dorsal nasal arteries. The supratrochlear and supraorbital arteries are also terminal branches of the ophthalmic artery.

Occlusion of the retinal artery blocks blood supply to the retina, causing visual impairment or even blindness. If there is any evidence of a visual problem, such as immediate blurring or loss of vision, injection should be stopped. Hyaluronidase should be injected into where the filler was placed, and nitroglycerin paste massaged into the affected area. A warm compress should also be applied to the area to increase vasodilation. Aspirin (unless contraindicated for the patient) should be administered to prevent further clot formation due to vascular compromise. Nitroglycerin paste massages should be continued until improvement is seen. Sildenafil may also be used to dilate the compromised vasculature. In severe cases, the patient should be placed in a hyperbaric chamber to receive hyperbaric oxygen as soon as possible. Risk can be reduced by thorough knowledge of anatomy, correct injection technique and using the correct product.

When injecting into the nose it is safer to stay on the midline of the nose. If not using a cannula always inject deep and aspirate, especially at the tip of the nose and the dorsum. It is essential that the correct technique is adopted and the speed of the injection is very slow, injecting only small amounts of filler. On the tip of the nose stop immediately if blanching is observed.

In summary, when performing any HA filler treatment, the four P's must be followed:

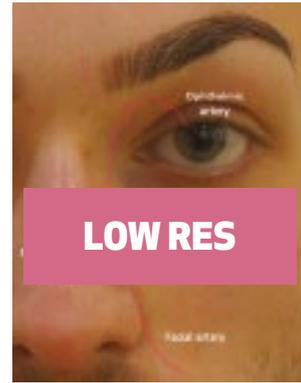
Patient: Is the patient suitable for treatment (including medical history etc.)

Product: Selecting the correct product for the job

Placement: Correct technique for placing the filler

Practitioner: Is the right person performing the treatment and do they have the knowledge and experience to perform the treatment?

Injection points and techniques, and how to stay safe with both cannula and needle, will be covered in the next article. **AM**



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Dr Timothy Eldridge BDS founded myFACE dentistry and facial aesthetics in Cheltenham in 2009 and is the principal dentist. Today he spends half of his time in practice combining non-surgical treatments with cosmetic and restorative dentistry, and the other half as a clinical supervisor at Birmingham Dental Hospital. He is a full member of the British Academy of Cosmetic Dentistry and is currently chairman of CODE. Dr Eldridge has trained hundreds of dentists, doctors, therapists, hygienists and registered medical nurses both nationally and internationally. He is the trainer and course leader for Dr Paul Tipton's facial aesthetic training courses, and is a committee member of the British Academy of Restorative Dentistry.