Adverse reactions to facial dermal fillers: a case report

Précis
The aim of this paper is to describe a case of an adverse reaction following the injection of facial dermal filler in the context of current legislation and research, and introduce fillers as a possibility in the differential diagnosis of a lower lip swelling.

Abstract
Aim: To describe an early-onset adverse reaction following the injection of facial fillers, and to summarise the current legislation and research regarding cosmetic dermal fillers. To emphasise that dermal fillers should be considered as part of a general dental practitioner’s differential diagnosis for lower lip swelling.

Objectives: 1. To describe the types of adverse reactions associated with dermal fillers in the literature; 2. to summarise the current European and Irish legislation and guidance regarding the use of these products; and, 3. to present a case study of an early-onset adverse reaction.

Conclusion: Dentists should question patients regarding the use of cosmetic dermal fillers as part of the differential diagnosis of any intra-oral painless swelling where other pathology cannot be identified.

Introduction
Our current social and cultural environment places great importance on our appearance. Collagen, the major structural component of the dermis, serves to strengthen and support the skin. As we get older, decreased production of collagen by fibroblasts occurs, leading to loss of tissue bulk and elasticity. As a result, deep folds, wrinkles and rhytides can develop. Injectable soft tissue fillers (ISTFs) provide an attractive option in facial rejuvenation. ISTFs can be categorised into biodegradable and non-biodegradable substances. Biodegradable fillers (such as bovine collagen and hyaluronic acid) are safer to use; however, they have a relatively short lifespan (three to 12 months). Non-biodegradable fillers (such as silicone) have a longer tissue presence but cause more adverse reactions than the biodegradable fillers. ISTFs are usually injected into the deep dermis or the dermal-subdermal junction (Figure 1). The ideal filler should be easy to use, safe, cost-effective and well tolerated by the tissue, as well as non-toxic, non-antigenic, and not carcinogenic or teratogenic. Although a variety of agents are available, the ideal filler has not yet been discovered and adverse reactions such as pain, oedema, ulceration, itching, scarring and migration of the injected filler may occur in orofacial tissues. Occasionally, more severe reactions have occurred with some materials, such as skin allergic reactions, anaphylaxis, migration, scars, necrosis, ulceration, arthralgia, myalgia, headache, nausea, retinal artery thrombosis, paralysis of the upper lip, face and forehead, persistent discolouration, and even renal failure. Complications can be attributed to the product’s properties, method of delivery, and reaction of the recipient’s immune system. Immediate complications are usually related to poor delivery technique. These include palpable filler material from overly superficial injection, uneven distribution, over or under-correction, and hypersensitivity reaction.

Elaine Kehily BDS MFDS
Senior House Officer, Oral Surgery, University College Cork

Martina Hayes BDS MFDS
Clinical Research Fellow, Restorative Dentistry, University College Cork

Christine McCreary BDentSc MB BAO FDS FFD MD
Senior Lecturer/Consultant Oral Medicine, University College Cork

Corresponding author:
Elaine Kehily
Oral Surgery
UCC Dental School and Hospital,
Wilton, Cork, Ireland
T: 021-490 5000
F: 021-454 5539
E: ekehily@ucc.ie
Early-onset complications appear within a few weeks after injection, usually presenting as non-inflammatory nodules (localised accumulations of filler). Late (up to one year) or delayed (longer than one year) complications usually present as nodules or sub-dermal masses. An immune response to filler material or chronic infection can lead to the formation of granulomas. Late hypersensitivity and granulomatous reactions have been reported with both bovine collagen and hyaluronic acid fillers.

Legislation

Dermal fillers that claim a medical purpose, as assigned by the manufacturer, and whose primary mode of action is physical, are regulated as surgically invasive medical devices for the “replacement or modification of the anatomy”, under Regulation 1 of Statutory Instrument S.I. 252 of 1994 concerning medical devices, which transposes European Directive 93/42/EEC. Examples of medical purposes would include the replacement of lipo-atrophy in HIV patients, or to augment or contour tissue in patients with cancer of the face, etc.

It is not possible for a dermal filler to be regulated as a cosmetic in the EU, on the basis that it is an injectable product. The dermal fillers we have encountered would almost invariably be regulated as medical devices, Class IIb or III.

According to the Irish Medicines Board the term ‘medical device’ covers all products, except medicines, used in healthcare for the diagnosis, prevention, monitoring or treatment of illness or disability.

The Irish Dental Council also published a Code of Practice for Dental Practitioners relating to non-surgical cosmetic procedures in March 2013. It is the view of the Dental Council that the use of botulinum toxins and dermal fillers for cosmetic treatments is not the practice of dentistry. The Dental Council acknowledges that the use of botulinum toxins or dermal fillers may be justified in exceptional circumstances, for example in the treatment of temporomandibular joint disorder/dysfunction or the management of chronic pain. It is expected that in this context the treatment will only be undertaken by dentists with the appropriate education, training and competence, and the treatment must be for an anticipated health gain. Only products authorised by the Irish Medicines Board can be used, even if the indication for which they are to be used is not authorised. The general conditions of use set out in the Summary of Product Characteristics including contraindications, warnings, precautions and monitoring requirements should be complied with in so far as they are relevant to the proposed use. The view of the Dental Council is not determinative in the context of law generally or fitness to practise.

Case report

A 33-year-old man presented to Cork University Dental School and Hospital complaining of a painless swelling on the inside of his lower lip. The swelling had been present for approximately one week and the patient did not believe that it had increased in size since presentation. The patient was fit and well, did not take any medications and did not have any known allergies. Extra-orally there was no evidence of swelling or asymmetry, and there were no enlarged lymph nodes on palpation. His temperature was taken and was normal. Intra-orally there was a swelling evident in the lower labial sulcus in the region of his 43, 42 and 41. It measured approximately 7mm x 7mm, and was non-fluctuant and painless to palpation. His temperature was taken and was normal. Extra-orally there was a swelling evident in the lower labial sulcus in the region of his 43, 42 and 41. It measured approximately 7mm x 7mm, and was non-fluctuant and painless to palpation. It was not evenly raised across its surface and had a ‘lumpy’ appearance. The swelling appeared quite superficial and had a yellow colour. On closer examination, a smaller discrete swelling of similar appearance was noted in the labial sulcus adjacent to the 33.
The patient had undergone an extensive course of dental treatment two years previously during which all of his upper and lower incisors, canines and first premolars had full coverage all-ceramic crowns placed. The patient reported that this had been done for cosmetic reasons, as he had been unhappy with the colour of his teeth. All of the lower teeth gave a positive response when vitality was tested and none were tender to percussion. There was no tenderness when the swellings were palpated. A periapical radiograph of the lower teeth did not show any pathology, nor did a radiograph of the soft tissues (Figure 4).

On further questioning, the patient informed us that he had attended a beauty salon 12 days previously and was injected with dermal fillers to improve the appearance of ‘marionette lines’ (lines that run downward from the commissure of the mouth). He was unsure what type of filler had been injected but he reported that he had had fillers injected previously without any side effects. The appearance of both lesions was consistent with that of displaced filler material as described in the literature. Due to the risk of numbness of the lower lip it was not deemed necessary at that time to biopsy and the patient was asked to attend for review in three months. The patient was satisfied with this and was given instructions to contact the Dental Hospital if he noticed any changes before his review appointment. The authors noted no change in presentation at three-month review.

Discussion
Cosmetic dermal fillers are known to cause foreign body granulomatous responses. A granuloma is defined as a mass of granulation tissue, typically produced in response to infection, inflammation, or the presence of a foreign substance. The foreign body granuloma that results consists of many macrophages acting to phagocytose the filler.23 Acute inflammation can occur between two to three days and a few weeks after injection. Early non-inflammatory nodules are localised accumulations of filler material, in particular, collagen or hyaluronic acid derivatives.23 These complications can often be managed by gentle massage. Late (several weeks to one year) or delayed (longer than one year) complications usually present as nodules or subdermal masses. A variety of therapeutic drugs are available to suppress the acute inflammation that can occur with fillers in the presence of a pre-existing granuloma. Local intra-lesional or systemic steroids have been used successfully. Minocycline is advocated as a modulator of the immune response. Cyclosporine and tacrolimus both inhibit calcineurin and thus modulate the T-cell response. Surgery is only successful if the inflamed nodule is localised and circumscribed. Injection of the enzyme hyaluronidase may be of some value in diffusing the inflammatory response. Spontaneous resolution is always a possibility. Regardless, recurrences should be expected.

In this case, the appearance of the lesion is most likely consistent with a calcium hydroxyapatite filler as reported in the literature. The swollen region may be an accumulation of the filler itself, or may be a granulomatous reaction to the filler as described above. Due to the surge in the use of dermal fillers, general dental practitioners should be aware of the possible risks and complications associated with these products. They may also experience pressure to provide their patients with predictable and effective results. This case has shown, however, that there is room for error and the effects can be difficult to correct and distressing for patients when things go wrong. It is imperative that those performing non-surgical cosmetic procedures are appropriately trained and competent.

Conclusion
It is the view of the Dental Council that the use of botulinum toxins and dermal fillers for cosmetic treatments is not the practice of dentistry. Injectable soft tissue fillers, when used in the right way and in expert hands, can achieve predictable and effective results. This case has shown, however, that there is room for error and the effects can be difficult to correct and distressing for patients when things go wrong. It is imperative that those performing non-surgical cosmetic procedures are appropriately trained and competent. This case also demonstrates that dermal fillers should be considered as part of a general dental practitioner’s differential diagnosis for a lower lip swelling.

Acknowledgements
The authors wish to express their gratitude to Dr Donal O’Keeffe for his assistance with this case report.
References