

CASE REPORT CRANIOMAXILLOFACIAL

Gingival and alveolar bone necrosis following chin augmentation with hyaluronic acid filler: a case report

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Introduction

Soft tissue enhancement of the face using hyaluronic acid (HA) filler is one of the most commonly performed cosmetic treatments and it is gaining in popularity. According to the 2021 international survey on aesthetic/cosmetic procedures, over 5.2 million HA filler procedures were performed by plastic surgeons alone, a 60.1 per cent increase since 2017.¹

Although rare, cosmetic injectors must know how to recognise and promptly manage severe complications of HA fillers. Due to the limited complications reported in the literature, the chin is generally considered a relatively safe region to inject HA filler.^{2,3} We present the first reported case of avascular necrosis of the gingiva and mandibular alveolar bone, following chin augmentation with HA filler.

Case

A 25-year-old woman with no significant medical or dental history underwent chin augmentation with 2 mL of Belotero Volume Lidocaine (Merz Aesthetics, Geneva, Switzerland) during a cosmetic injectables teaching course. The procedure was performed by four trainee nurse injectors under the supervision of a senior medical trainer. The filler contained high molecular weight sodium hyaluronate crosslinked with 1,4-butanediol diglycidyl ether.

The patient experienced increasing pain and chin mottling, and the following day was advised by the senior medical trainer to present to the emergency department (ED). The patient was discharged with instructions to follow up in a public plastic surgery clinic the next morning. At both the ED and the plastic surgery clinic, the patient

received no treatment for vascular compromise, such as hyaluronidase or any other intervention.

Two days after chin augmentation with HA filler, the patient developed gingival bleeding and severe, intractable pain that interfered with speaking and swallowing. Only then did the senior medical trainer administer hyaluronidase and direct the patient to return to the ED.

On examination there was a 3 × 4 cm area of mottled skin over the chin suggestive of ischaemia, with buccal and lingual gingival necrosis around teeth 41, 31 and 32 (see **Figure 1a** and **1b**). The facial and trigeminal nerves were intact. Except for an elevated C-reactive protein of 157 mg/L, blood tests were normal. The orthopantomogram identified no periapical lucency or destructive osseous focus within the maxilla or mandible (see **Figure 2**).

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Fig 1. (a) On presentation, day 2 post-injection, mottling of the skin suggesting ischaemia predominantly on the left side of the mentum with surrounding erythema. (b) On presentation, day 2 post-injection, crusting and necrosis of the gingiva in-between teeth 41 and 31, 31 and 32, and to a lesser extent 32 and 33. (c) Day 3 post-injection, after hyaluronidase treatments, improved mottling but ongoing erythema, oedema and bruising. (d) Day 3 post-injection, after hyaluronidase treatments, improved perfusion of gingiva between teeth 32 and 33 but white necrosed gingiva still present between 31 and 32, and to a lesser extent 41 and 31. (e) Day 5 post-injection, after further hyaluronidase treatments and light-emitting diode (LED) therapy, improved perfusion of soft tissue of the mentum and resolved bruising. (f) Day 5 post-injection, after further hyaluronidase treatments and LED therapy, healthy bleeding gingiva between teeth 41 and 31, and 32 and 33, with remnant white necrotic tissue between 31 and 32.



Fig 2. The orthopantomogram of the patient taken on the second presentation to the emergency department to rule out any destructive osseous focus within the maxilla or mandible.

The patient received morphine, prednisone, cefazolin and aspirin loading with symptomatic improvement, and was admitted under the plastic surgery team. The patient was discharged the next day with oxycodone, amoxicillin-clavulanate and aspirin, with a follow-up appointment that afternoon with a cosmetic plastic and reconstructive surgeon for further hyaluronidase treatment. There was no active bleeding or sign of infection on discharge. In the week post-discharge, the patient received four treatments of hyaluronidase and LED therapy. Circulation returned to the chin, leaving some swelling and minor ulceration (see **Figure 1c-f**).

The patient was reviewed by a periodontist seven days post-discharge. There was gingival recession around teeth 31 and 32. A radiograph demonstrated 60 per cent bone loss interproximally between teeth 31 and 41. The periodontist concluded that the patient had experienced avascular necrosis of the soft tissues and alveolar bone in the mandibular anterior segment. Promisingly, follow-up a week later showed granulation tissue on previously exposed bone and reduced tenderness.

A follow-up three months later found the patient to have a loose tooth 31 and an uneven chin contour.

Discussion

A review of the literature discovered cases of chin augmentation with HA filler complicated by tongue necrosis.^{2,4} There have also been cases of gingival necrosis following HA filler injection of

the nasolabial lines and nose.^{5,6} This is the first reported case of gingival and mandibular alveolar bone necrosis following chin augmentation with HA filler.

The teeth and gingiva of the anterior segment of the mandible receive an arterial supply from the incisive artery, a branch of the inferior alveolar artery (IAa), which is illustrated in **Figure 3**. The IAa arises from the first portion of the maxillary artery and descends between the sphenomandibular ligament and ramus of the mandible. The IAa enters the mandibular canal and gives off branches supplying the mandible, gingiva, molar and premolar teeth. Near the premolars, the IAa gives off the mental artery, before continuing as the incisive artery. The mental artery exits the mandibular canal via the mental foramen and supplies the soft tissue of the mentum. The incisive artery continues within the mandibular canal, supplying the incisor teeth, gingiva and corresponding mandibular bone. The incisive artery anastomoses with the opposite side.⁷

By understanding the vascular anatomy of the mandible and lower teeth, we can hypothesise how the patient's complications arose. The cosmetic injector has likely infiltrated the left mental artery and administered a bolus of filler under high pressure. This has likely flown retrogradely into the left IAa and then embolised along the left incisive artery into the distal right incisive artery via the anastomosis, while also occluding the distal segment of the left incisive artery. Occlusion of the left mental artery and distal segments of the

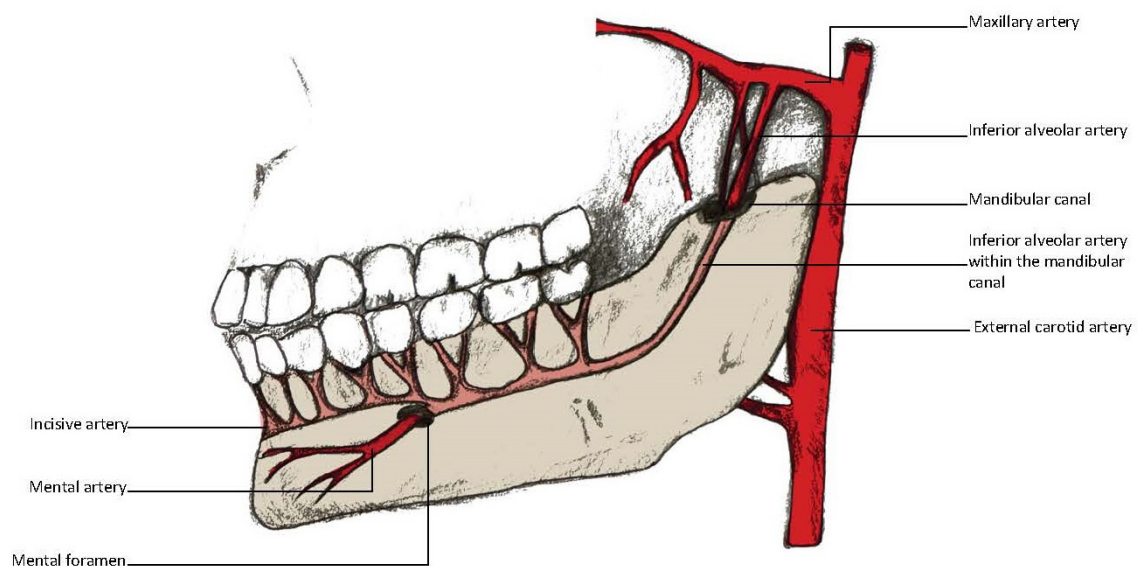


Fig 3. Diagram of the mandible, illustrating the inferior alveolar artery branching off the maxillary artery and entering the mandibular canal. Within the mandibular canal the inferior alveolar artery gives off branches supplying the teeth and soft tissue before giving off the mental artery, and then continuing on as the incisive artery.

incisive arteries bilaterally resulted in avascular necrosis of the chin and teeth 41, 31 and 32 corresponding alveolar bone and gingiva.⁸ This hypothesis is consistent with the distribution of necrosis seen in **Figure 1b**.

This case highlights the importance for cosmetic injectors to understand the vascular anatomy of the face. By correlating the clinical signs of the patient with the vascular anatomy, prompt recognition of vascular occlusion to the mental and incisive arteries can be made, which should then lead to more definitive management. This also highlights the need for other doctors to be familiar with the complications of HA fillers and their management. This patient's diagnosis was missed by several doctors, significantly delaying definitive management. The patient spoke with the senior cosmetic physician associated with the company running the course, presented to an ED and attended an appointment with a public hospital plastic surgery clinic before finally presenting to our ED and receiving definitive management. Patients with vascular compromise secondary to HA filler should be immediately treated with large doses (450–1500 units) of hyaluronidase, injected into the affected area and along the course of the affected vessel.⁹ Treatment within 48 hours has been shown to prevent, if not reduce in severity, tissue necrosis.⁹ There are a number of resources on the acute management of vascular occlusion, including the Aesthetic Complications Guidelines, which are freely available through the *Journal of Clinical and Aesthetic Dermatology*.^{9–12}

Cosmetic injectors should be vigilant in preventing complications from HA fillers. This can be achieved by understanding the facial vascular anatomy and also being aware that it can be highly variable.^{13,14} Injecting into a presumed 'safe' area of the face should not lead to complacency regarding proper injection techniques, such as constant needle movement, low injection pressure, small boluses and using blunt large bore cannulas.^{9–11} Models for cosmetic training courses should be specifically made aware that there is a higher risk of infection and vascular occlusion when being injected by multiple, inexperienced injectors.^{15–17}

Conclusion

This case study is the first to report avascular necrosis of the gingiva and mandibular alveolar bone following chin augmentation with HA filler. The delay in definitive patient management due to poor recognition of vascular occlusion from HA filler has led to disfigurement of the patient's chin and permanent periodontic complications. This case highlights the need for not only cosmetic injectors, but all doctors involved in the care of these patients, to have a good understanding of the vascular anatomy of the face and how to recognise and promptly manage HA filler complications.

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Patient consent

The patient has given informed consent to the publication of their images and the information pertaining to their experience within this manuscript.

Conflict of interest

The authors have no conflicts of interest to disclose.

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References

- 1 International Society of Aesthetic Plastic Surgery. *ISAPS international survey on aesthetic/cosmetic procedures performed in 2021*. [PDF on Internet]. [Cited 29 May 2023]. Available from: https://www.isaps.org/media/vdpdanke/isaps-global-survey_2021.pdf.
- 2 Wang Q, Zhao Y, Li H, Li P, Wang J. Vascular complications after chin augmentation using hyaluronic acid. *Aesthet Plast Surg*. 2018;42(2):553–559. <https://doi.org/10.1007/s00266-017-1036-3> PMID:29260270
- 3 Fang M, Rahman E, Kapoor KM. Managing complications of submental artery involvement after hyaluronic acid filler injection in chin region. *Plast Reconstr Surg Glob Open*. 2018;6(5):e1789. <https://doi.org/10.1097/GOX.0000000000001789> PMID:29922566 PMCid:PMC5999422



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- 4 Thanasarnaksorn W, Thanyavuthi A, Prasertvit P, Rattanakuntee S, Jitaree B, Suwanchinda A. Case series of tongue necrosis from vascular complications after chin augmentation with hyaluronic acid: potential pathophysiology and management. *J Cosmet Dermatol*. 2023;22(3):784–791. <https://doi.org/10.1111/jocd.15475> PMID:36700378
- 5 Livada R, Shiloah J. A rare case of gingival necrosis following an extraoral injection of dermal filler. *Clin Adv Periodontics*. 2023;14(1):26. <https://doi.org/10.1002/cap.10243> PMID:36827000
- 6 Rauso R, Bove P, Rugge L, Chirico F. Unusual intraoral necrosis after hyaluronic acid injections. *Dermatol Surg*. 2021;47(8):1158–1160. <https://doi.org/10.1097/DSS.0000000000003099> PMID:34115680
- 7 Meuten JEK, Powers K, Frost DE, Kendell BD. Applied surgical anatomy of the head and neck. In: Fonseca RJ, Walker RV, Barber HD, Powers MP, Frost DE (eds). *Oral and maxillofacial trauma*. 4th ed. London: Saunders, 2013:177–219. <https://doi.org/10.1016/B978-1-4557-0554-2.00010-1>
- 8 Ashton MW, Taylor GI, Corlett RJ. The role of anastomotic vessels in controlling tissue viability and defining tissue necrosis with special reference to complications following injection of hyaluronic acid fillers. *Plast Reconstr Surg*. 2018;141(6):818e–830e. <https://doi.org/10.1097/PRS.0000000000004287> PMID:29750757
- 9 King M, Walker L, Convery C, Davies E. Management of a vascular occlusion associated with cosmetic injections. *J Clin Aesthet Dermatol*. 2020;13(1):e53–e58.
- 10 Goodman GJ, Magnusson MR, Callan P, Roberts S, Hart S, McDonald CB, Liew S, Porter C, Corduff N, Clague M. Neither positive nor negative aspiration before filler injection should be relied upon as a safety maneuver. *Aesthet Surg J*. 2021;41(4):np134–np136. <https://doi.org/10.1093/asj/sjaa215> PMID:33236760 PMCID:PMC7954536
- 11 Goodman GJ, Magnusson MR, Callan P, Roberts S, Hart S, Lin F, Rahman E, McDonald CB, Liew S, Porter C, Corduff N, Clague M. Aspiration before tissue filler—an exercise in futility and unsafe practice. *Aesthet Surg J*. 2022;42(1):89–101. <https://doi.org/10.1093/asj/sjab036> PMID:33512439 PMCID:PMC8670299
- 12 Goodman GJ, Magnusson MR, Callan P, Roberts S, Hart S, McDonald CB, Clague M, Rudd A, Bekhor PS, Liew S, Molton M, Wallace K, Corduff N, Arendse S, Manoharan S, Shamban A, Heydenrych I, Bhatia AC, Peng P, Pavicic T, Kapoor KM, Kosenko DE. A consensus on minimizing the risk of hyaluronic acid embolic visual loss and suggestions for immediate bedside management. *Aesthet Surg J*. 2020;40(9):1009–1021. <https://doi.org/10.1093/asj/sjz312> PMID:31693068 PMCID:PMC7427155
- 13 Nguyen JD, Duong H. Anatomy, head and neck: inferior alveolar arteries. [Internet]. Treasure Island: StatPearls Publishing. [Updated 14 August 2023; cited 9 February 2024]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK547736>.
- 14 Cotofana S, Lachman N. Arteries of the face and their relevance for minimally invasive facial procedures: an anatomical review. *Plast Reconstr Surg*. 2019;143(4):1282–1283. <https://doi.org/10.1097/PRS.0000000000005201> PMID:30688884
- 15 Saththianathan M, Johani K, Taylor A, Hu H, Vickery K, Callan P, Deva AK. The role of bacterial biofilm in adverse soft-tissue filler reactions: a combined laboratory and clinical study. *Plast Reconstr Surg*. 2017;139(3):613–621. <https://doi.org/10.1097/PRS.0000000000003067> PMID:28234833
- 16 Goodman GJ, McDonald CB, Lim A, Porter CE, Deva AK, Magnusson M, Patel A, Hart S, Callan P, Rudd A, Roberts S, Wallace K, Bekhor P, Clague M, Williams L, Corduff N, Wines N, Al-Niaimi F, Fabi SG, Studniberg HM, Smith S, Tsirbas A, Arendse S, Ciconte A, Poon T. Making sense of late tissue nodules associated with hyaluronic acid injections. *Aesthet Surg J*. 2023;43(6):np438–np448. <https://doi.org/10.1093/asj/sjad028> PMID:36759325 PMCID:PMC10184938
- 17 Alam M, Kakar R, Dover JS, Harikumar V, Kang BY, Wan HT, Poon E, Jones, DH. Rates of vascular occlusion associated with using needles vs cannulas for filler injection. *JAMA Dermatol*. 2021;157(2):174–180. <https://doi.org/10.1001/jamadermatol.2020.5102> PMID:33377939 PMCID:PMC7774041