

Dear Editor,

I read with great interest "Hemorrhage secondary to implant surgery" by Drs Sakka and Krenkel.<sup>1</sup> Some important considerations were not discussed in the article, and there seems to be some confusion about anatomic spaces.

The floor of the mouth anatomy has basically 3 spaces of concern to implant dentists: submandibular, submental, and sublingual. The submandibular space contains the submental artery, as discussed in the article, and a hemorrhage from this artery is indeed life threatening.<sup>2</sup> A patient with a violated submental artery would need early airway maintenance to prevent a later forced entry or tracheotomy. A complex dissection done to locate a hemorrhaging submental artery for ligation may be inappropriate. Ligation at the origin of the submental artery near the angle of the mandible as it leaves the facial artery, relatively remote from the bleeding site, may be the best course of action. However, because of the multiple anastomoses that generally occur here, the bleeding may not substantially subside, so the patient would require immediate hospitalization.

The authors list several considerations. The third consideration cautions against lingual cortical perforations. Although this is appropriate, apparently the authors missed information in their reference 23, in which Isaacson reported a case where arterial bleeding was encountered during implant surgery in the anterior mandible.<sup>3,4</sup> After a lingual aspect dissection, the osteotomy was found to be completely intraosseous. The sublingual artery was sectioned intraosseously by the drill. It then recoiled into the floor of the mouth and formed a hematoma. The authors of the case report apparently did not dissect the lingual aspect of the mandible to determine if the osteotomy was indeed extracortical. Their osteotomy may have been completely intraosseous, so the true cause of the hemorrhage will never be known. If the osteotomies perforated the lingual cortex then they would need to be redirected so as not to have the implants perforate the cortex when placed. The authors

apparently do not know if their implants are inappropriately positioned. It is understandable that the authors did not desire to remove the periosteum of the distracted bone, thus compromising the vascular supply that may induce resorption. However, ascertaining the position of the implants may be an important consideration. Perhaps a cone beam computerized tomogram would have been appropriate or a discussion about probing the lingual aspect to detect a perforating osteotomy.

In their fifth consideration, the authors may have confused the submandibular space with the sublingual space. The sublingual artery generally courses and enters the symphysis superior to the mylohyoid and genioglossus muscles that form a substantial separation from the submandibular and submental spaces.<sup>5</sup> Thus, a hemorrhage of the sublingual artery at the anterior mandible would not compromise the airway and would not be life threatening, although not to be minimized because the patient would need to be monitored. However, referral to specialized care or hospitalization would not be indicated. Nevertheless, if the surgeon is uncertain as to the source of the hemorrhage then an immediate referral or hospitalization would be necessary. A hemorrhage in the sublingual space would not require hospitalization. The sublingual space communicates with the submandibular space at the posterior free borders of the mylohyoid muscle but a sublingual hematoma would need to be massive and long-standing to create an airway compromise. The sublingual artery may not be capable of creating such a massive hematoma. The submental and submandibular spaces communicate directly, and a hematoma in the submental space would directly involve the submandibular space, potentially compromising the airway.

In severely atrophic mandibles, the sublingual artery generally deteriorates and is not found. The major blood supply to the anterior mandible is from the facial artery via the periosteum. The authors' case was an osseous distraction in an atrophic mandible. The report did not indicate whether there was indeed a reformed arterial supply or if the vascular supply was periosteal. The hemorrhage the

---

authors encountered seemed to be minor, so it was controlled by electrocautery. Larger arterial hemorrhages may not be controlled by electrocautery.

There is much anatomic variation in the floor of the mouth anatomy, and these important anatomic spaces should be understood by the implant surgeon.

Dennis Flanagan, DDS, MSc  
Connecticut Dental Groups  
Willimantic, Conn

## REFERENCES

1. Sakka S, Krenkel C. Hemorrhage secondary to interforaminal implant surgery: anatomical considerations and report of a case. *J Oral Implantol*. 2013;39:603–607.
2. Flanagan D. Important arterial supply of mandible. *J Oral Implantol*. 2003;29:165–173.
3. Isaacson TJ. Sublingual hematoma formation during immediate placement of mandibular endosseous implants. *J Am Dent Assoc*. 2004;135:168–172.
4. Flanagan DF. Implants and arteries. *J Am Dent Assoc*. 2004; 135:566.
5. Durham JA. Oral cavity. In: Standring S, ed. *Gray's Anatomy: The Anatomical Basis of Clinical Practice*. Edinburgh: Elsevier; 2005: 607.