

Endoscopically Assisted Removal of a Fish Bone Penetrating the Parotid Duct: An Unusual Case

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Purpose: The aim was to evaluate the efficacy of endoscopy-assisted surgery for treating a foreign body (fish bone) deeply embedded in the parotid duct.

Patients and Methods: We report the case of a 67-year-old man with diffuse swelling of the cheek and the discharge of pus from the parotid duct orifice caused by a fish bone that had penetrated into the parotid duct. The preoperative examination using ultrasonography and computed tomography showed a linear foreign body.

Results: The fish bone was thought to be embedded deeply in the parotid duct; therefore, we used a combined approach (endoscopy with open surgery), because we anticipated difficulties with endoscopic removal of the fish bone. The endoscopic view showed that the fish bone had partially penetrated the soft tissue in the parotid duct wall, but the fish bone could not be removed endoscopically. With endoscopic assistance, the impacted fish bone was removed using an intraoral surgical approach. The clinical outcome was satisfactory during a 10-month follow-up period, with no evidence of complications.

Conclusions: The combined surgical and endoscopic approach resulted in the safe and effective removal of a foreign body from the salivary duct that could not be removed using sialendoscopy alone.

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Identifying foreign bodies deeply embedded in the soft tissue can be challenging, because of the location and size of the objects and the surrounding anatomic structures. Previous reports have shown that foreign bodies such as vegetal nests, staples, pencils, and fish bones (with the last the most common) can penetrate into the oral cavity.¹⁻⁴ Before removing foreign bodies, it is essential to precisely identify the anatomic location.

Foreign bodies enter the salivary duct only in rare cases. The mechanism of penetration of the foreign bodies into a salivary gland will commonly be traumatic. A potential route of foreign body penetration is through the main salivary duct of the glands, which can cause an insidious infection in the gland. Only a

few cases of foreign bodies in the parotid duct have been reported. These have included feathers, hair, and plant foreign bodies.⁵⁻⁸

Using traditional open surgery, it has been difficult to approach the site of the foreign body, because they can move with jaw movement; thus, imaging is important to identify their precise location. Although several imaging methods have been used to locate foreign bodies, modern imaging techniques can provide only indirect visualization of the salivary glands. However, sialendoscopy provides direct visualization of the salivary duct system, facilitating the diagnosis and treatment of obstructive sialadenitis from a variety of causes. This approach has been

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considered complementary to traditional diagnostic techniques such as plain radiography, sialography, ultrasonography, and computed tomography (CT).

Su et al⁹ reported the case of a submandibular intraglandular fish bone that was removed successfully during a sialendoscopic procedure. Thus, the combination of sialendoscopy and an open surgical method could be beneficial for removing large calculi without glandular excision.^{10,11} Despite these studies, reports of using sialendoscopy to extract a fish bone from the parotid duct have been uncommon. We report the rare case of a fish bone that had penetrated into the parotid duct and was removed successfully using an intraoral surgical approach with the assistance of sialendoscopy.

Case Report

A 67-year-old man was referred to our hospital complaining of left diffuse swelling of the cheek and the discharge of pus from the parotid duct orifice. His medical history was not significant. The detailed history showed that about 3 months previously the patient had experienced sharp pain in the left buccal mucosa during a meal of fish. Because no bleeding occurred, he had considered it a minor injury. Three months later, he visited our hospital with the complaint of left buccal swelling.

The swelling was diffuse, with no definitive outline. The lesion involved the left buccal area, with its extraoral center corresponding to the intraoral location of the parotid duct orifice. Intraorally, although the left parotid duct orifice was inflamed slightly and discharged small amounts of pus, a normal volume of saliva exited the orifice when the left parotid gland was massaged. When a probe was inserted through the orifice of the left parotid duct, a deeply embedded object was palpated slightly (Fig 1). However, we did not observe skin blemishes or penetrating injuries, except for a yellowish secretion from the orifice of the parotid duct after pressure had been applied over the gland.

The patient was assessed preoperatively using ultrasonography and CT without contrast. The CT scan showed a low-density area along the left anterior border of the masseter muscle with linear calcification (Fig 2). No evidence was seen of an abscess. Ultrasonography showed a linear fish bone-like hyperechoic area with dilation of the parotid duct (Fig 3). The foreign body was thought to be embedded deeply in the parotid duct; therefore, we obtained preoperative consent from the patient to use a combined surgical approach, because we anticipated difficulties with endoscopic removal of the foreign body. The surgery was performed with the patient under general anesthesia. We first attempted to identify the fish bone using a 1.6-mm Marchal sialendoscope (Karl

Storz, Tuttlingen, Germany). After adequate duct dilation using salivary duct probes, the endoscopic unit was inserted into the left parotid duct orifice with continuous irrigation of isotonic saline solution through the irrigation port. After determining the location of the fish bone endoscopically, the fish bone was located partially penetrating the soft tissue in the duct wall (Fig 4A). However, the fish bone could not be removed endoscopically using microforceps. Intraoperatively, methylene blue dye was injected into the parotid duct orifice to enhance visualization. An intraoral incision was made from anterior to the left parotid papilla to the anterior border of the masseter muscle, and the parotid duct was identified by the methylene blue staining. With endoscopic assistance, the impacted fish bone was removed (Fig 4B,C). The length of the excised specimen matched that seen on the imaging studies. The endoscope was then reintroduced to rinse the duct and confirm complete removal of the foreign body. The wound was closed with the introduction and securing of an angiocatheter in the duct; the angiocatheter served as a stent to prevent postoperative stricture.

Figure 5 shows the relationship between the fish bone and the surrounding tissue. A pressure dressing was applied for 48 hours. The stent remained in place for 7 days. The patient was instructed to frequently massage the parotid gland and to take cefazolin sodium hydrate (Sefmazon, Nipro Pharma, Osaka, Japan) 3 g/day for 3 days.

The postoperative follow-up period was uneventful, and the patient was discharged from the hospital after 1 week. Postoperative ultrasonography showed resolution of the linear hyperechoic area with treatment. After discharge from the hospital, the patient was followed closely for 10 months to screen for recurrent symptoms and evaluate the salivary flow from the parotid gland. During the follow-up period, the clinical examinations showed that the affected parotid gland was normal in size and consistency, with clear normal saliva flow induced by massage. No relapses or postoperative complications occurred during the 10-month follow-up period.

Discussion

The most frequent non-neoplastic salivary disorder is obstructive sialadenitis, which has traditionally been treated by surgical removal of the gland when conservative methods have failed.¹² The ingress of foreign bodies into the salivary glands or their main ducts has been extremely rare. Previous studies have reported that foreign bodies can penetrate the orifices of Wharton's and Stensen's ducts.⁵⁻⁹ Foreign bodies in Stensen's duct have been reported far less often than those in Wharton's duct owing to the anatomic



FIGURE 1. Photograph of the left buccal mucosa. The orifice of Stensen's duct was slightly inflamed. The foreign body could be palpated using a probe at a depth of about 32 mm in the parotid duct. No penetrating injuries resulting from the foreign body were seen in the oral cavity.

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location.¹³ Surgical procedures to remove foreign bodies from the salivary duct have ranged from endoscopic extraction, intraoral and external approaches, and surgical glandular excision; the choice will depend on the location and shape of the foreign material and the presence of any associated infection.

Fish bones are one of the most common foreign bodies in the upper digestive tract and have been found mostly in the palatine tonsils, soft palate, tongue base, valleculae, and pharyngeal wall. The current case of a fish bone embedded partly in the parotid duct is uncommon. Most fish bones in the pharyngeal wall will be easily visible by direct examination; however, when impacted in the soft tissue, invasive surgery is inevitable.

The traditional diagnostic approach consists of standard radiography, which will not show radiolucency. The sensitivity and specificity of plain radiographs for detecting fish bone in the soft tissues of the neck have been previously reported.^{14,15} Davies and Bate¹⁶ reported that digital radiographs had 90% specificity and 79% sensitivity for detecting the fish bones of 10 species. In addition, several studies have reported the usefulness of CT for detecting impacted fish bones.^{17,18} Moreover, CT will not only confirm the existence and location of impacted fish bones, but can also enable visualization of any resulting damage to neighboring structures. In addition, Akazawa et al¹⁹ reported 100% sensitivity and 100% specificity for CT images obtained from 76 cases of esophageal fish bones.

Ultrasonography is a first-level noninvasive imaging technique for the study of salivary gland diseases, especially in the case of sialolithiasis.²⁰ Some foreign bodies will be radiographically undetectable, and the accuracy and availability have made ultrasonography an excellent modality for evaluating radiolucent foreign bodies.²¹ However, the specificity and sensitivity will depend on the experience and expertise of the examiner, and the detection rates have varied greatly among studies.

The diagnostic gap was filled by the recent introduction of sialendoscopy, which allows direct visualization of the intraluminal causes, such as calculi, foreign bodies, or polyps.²² Endoscopy has increased in popularity and thus has been accepted widely in most surgical fields as a minimally invasive technique. Sialendoscopy was first introduced into clinical practice in 1991 as a minimally invasive technique, and a 0.7-mm flexible endoscope was used to remove salivary stones with Dormia baskets.²³ Since then, various devices have been developed with different diameters and equipped with working channels and irrigation ports. Interventional sialendoscopy can be an intraductal procedure or an extraductal approach that is endoscopically assisted.

Despite the development of sialendoscopy, a number of cases have been difficult to treat using only an intraoperative approach. In general, involvement of the sialoliths, the posterior portion of Stensen's duct, large stones in the middle or posterior parotid duct, and intraparenchymal sialoliths have been considered the most difficult cases. The key factor when performing endoscopic mechanical extraction is the foreign body's connection to the ductal wall. In the present case, because endoscopic retrieval showed that the fish bone had impacted deeply into the ductal wall, it was impossible to remove it using endoscopic methods only. We performed a combined approach (endoscopy with an open surgical approach) to extract the fish bone. In obstructive sialadenitis, especially in sialolithiasis, Nahlieli et al¹⁰ reported using the combined approach for parotid stones in 12 patients. Since then, a number of new combined approaches have been proposed for extraductal sialolithotomies, including intraductal or extraductal techniques. In Stensen's duct, the problematic area is posterior to the curvature of the duct around the masseter muscle. In the present patient, without the help of endoscopic visualization, it would have been extremely difficult to locate the fish bone and remove it by surgery alone. Several studies have reported antibiotic therapy after a sialendoscopic approach administered orally for about 7 days.^{10,24,25} In our limited experience, because of the presence of a fish bone, which can be a source of infection, and because the patient had a history of

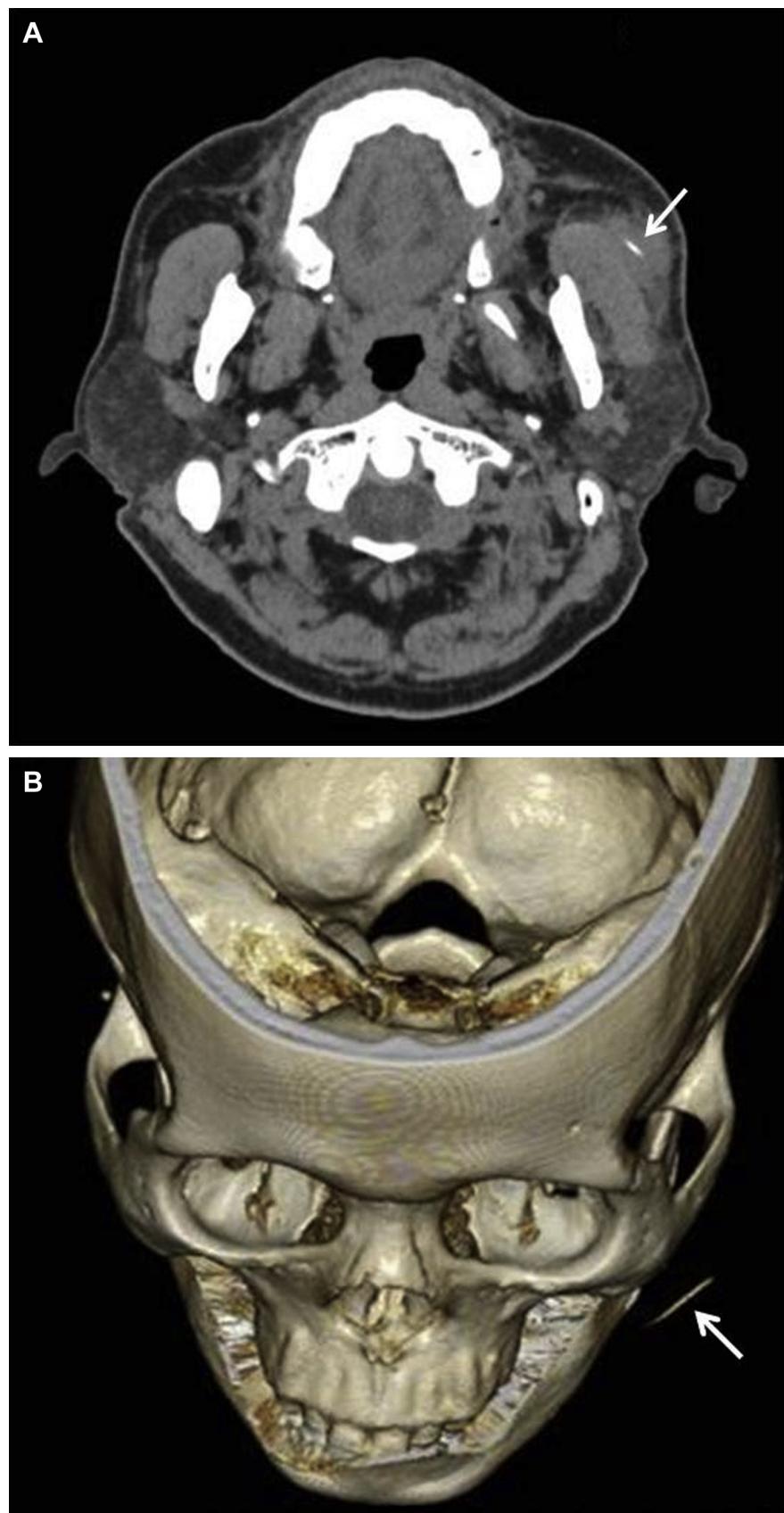


FIGURE 2. A, Axial computed tomography (CT) scan showing a portion of linear calcification in the left anterior masseter muscle with a low-density area (arrow). B, A 3-dimensional CT image showing linear calcification (arrow).

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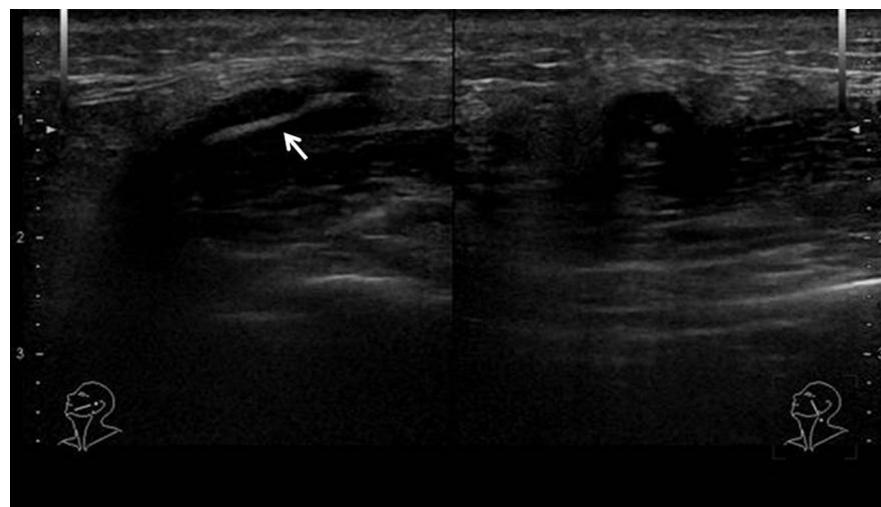


FIGURE 3. Ultrasound scan showing a linear foreign body-like hyperechoic area (16.0×0.9 mm; arrow).

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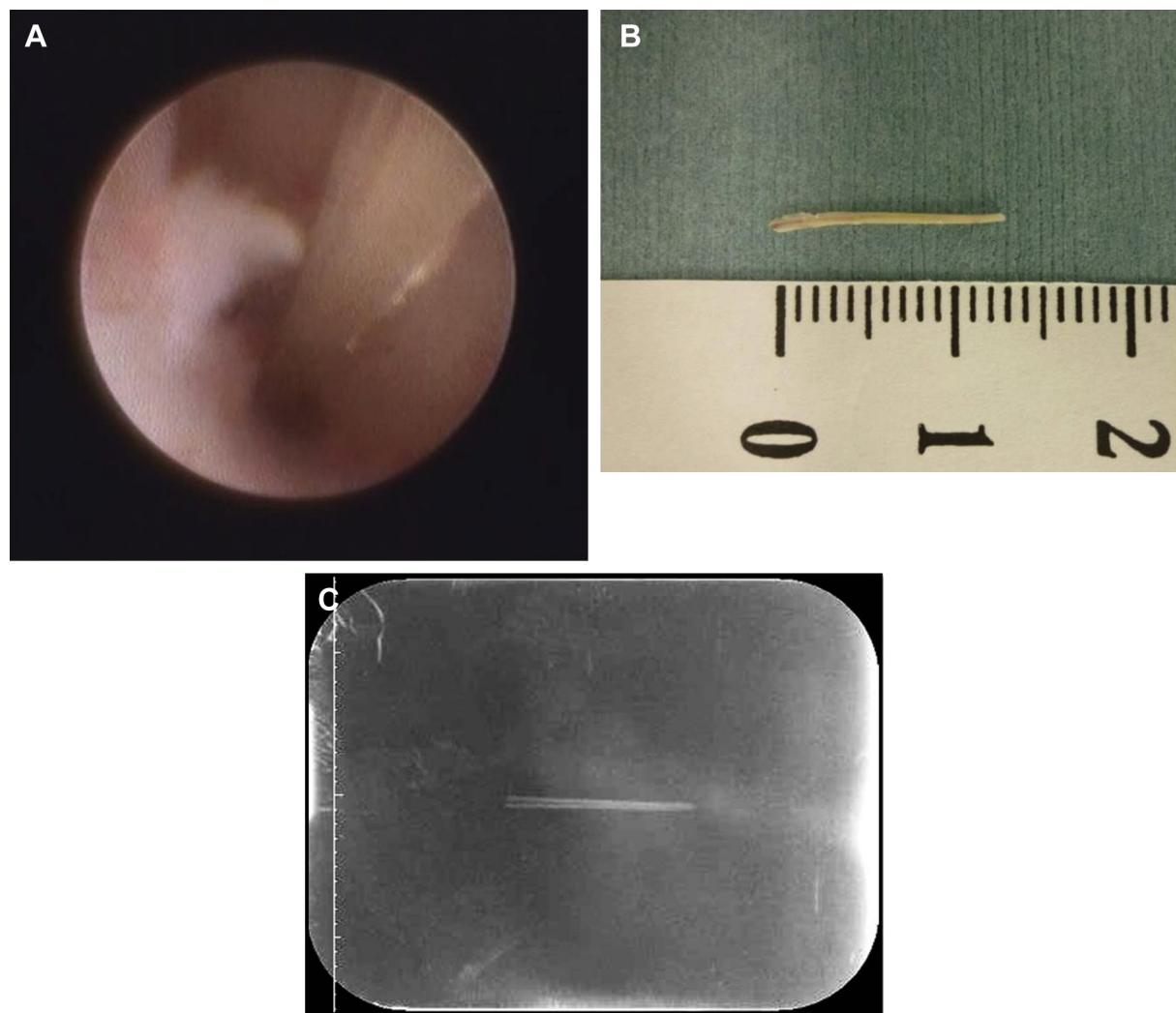


FIGURE 4. A, Endoscopic view of the fish bone from Stensen's duct. B, The fish bone that had penetrated the parotid duct. C, Radiograph of the removed fish bone.

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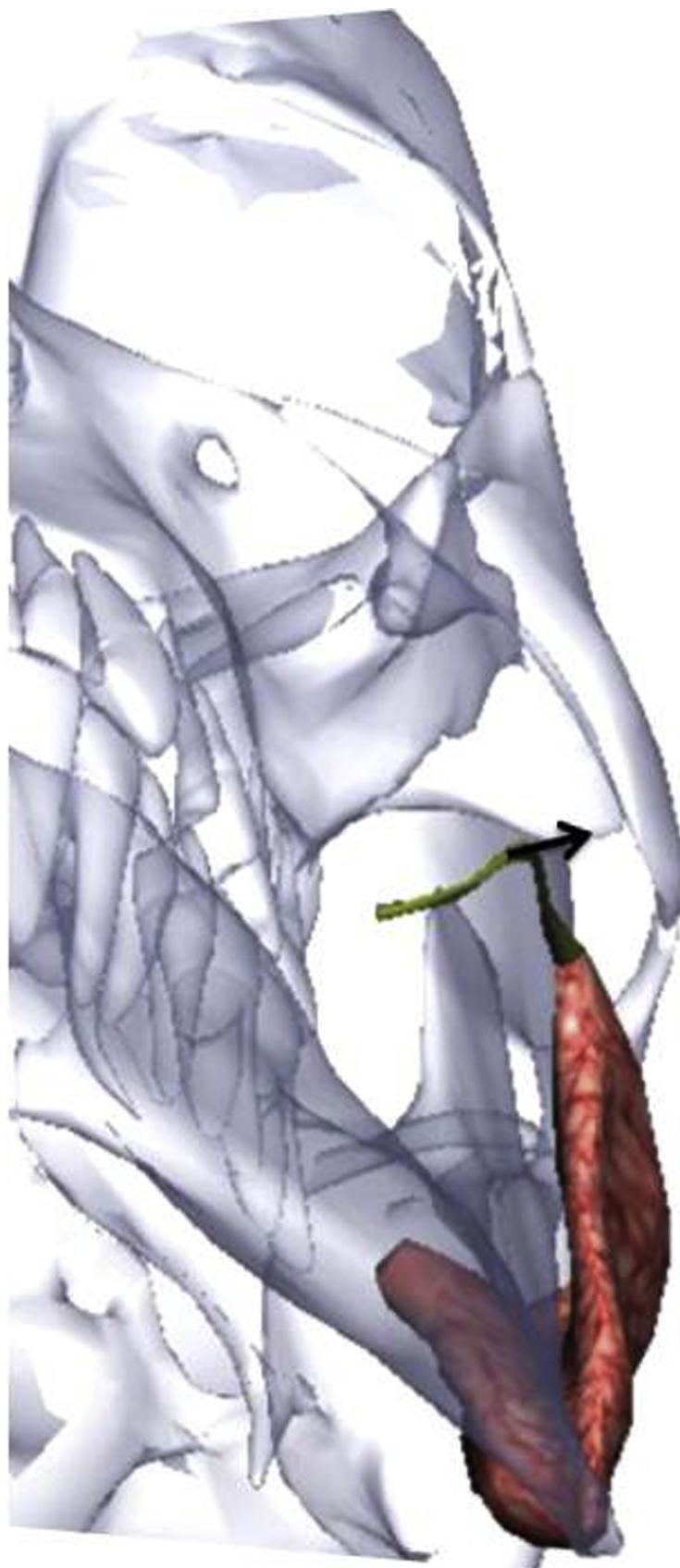


FIGURE 5. The location of the fish bone embedded in the parotid duct. The arrow indicates the direction of the penetration of the fish bone into the adjacent soft tissue.

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localized infection, he was treated with intravenous antibiotics to prevent perioperative infection.

The complications of sialendoscopy have generally been acceptable. The most frequent side-effect has been transient glandular swelling due to irrigation with physiologic solution in most cases. Duct perforations, ductal strictures, postoperative infections, basket entrapment, and bleeding have also been described.²⁶ These potential postoperative complications, such as stricture of the main duct, can be prevented by inserting a polyethylene stent after an endoscopic procedure. Previous studies have recommended that the stents should remain in the duct to prevent postoperative stricture for about 2 weeks postoperatively.^{24,27} In our patient, the stent was removed 1 week postoperatively because of the condition of the local soft tissue and endoscopic findings.^{25,28} Transfacial sialendoscopic approaches can result in facial nerve dysfunction in the buccal branches and facial scars.

In our limited experience, removing an impacted fish bone from a salivary duct using an endoscopically assisted transoral surgical approach had excellent results without complications.

In conclusion, endoscopic-assisted surgery can be a viable alternative to traditional surgery to manage foreign bodies in the salivary duct.

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References

1. Marchal F, Kurt AM, Dulguerov P, et al: Retrograde theory in sialolithiasis formation. *Arch Otolaryngol Head Neck Surg* 127:66, 2001
2. Takaoka K, Hashitani S, Toyohara Y, et al: Migration of a foreign body (staple) from the oral floor to the submandibular space: Case report. *Br J Oral Maxillofac Surg* 48:145, 2010
3. Nakagawa H, Kimura H, Junicho M, et al: Unusual parotid gland foreign body. *Int J Pediatr Otorhinolaryngol* 51:191, 1999
4. Abe K, Higuchi T, Kubo S, et al: Submandibular sialadenitis due to a foreign body. *Br J Oral Maxillofac Surg* 28:50, 1990
5. Pascoe MG: Acute suppurative parotitis secondary to a foreign body (feather). *Can Med Assoc J* 72:35, 1955
6. Planté P, Le Balle JC, Crouzette P, et al: Suppurative parotitis caused by a foreign body in a 4-year-old child. *Rev Stomatol Chir Maxillofac* 87:174, 1986
7. Trinick RH: Parotitis due to unusual foreign body in parotid duct. *BMJ* 1:13, 1945
8. Sinopidis X, Fouzas S, Ginopoulou A, et al: Foreign body migration through the parotid duct causing suppurative parotitis. *Int J Pediatr Otorhinolaryngol* 6:87, 2011
9. Su YX, Lao XM, Zheng GS, et al: Sialoendoscopic management of submandibular gland obstruction caused by intraglandular foreign body. *Oral Surg Oral Med Oral Pathol Oral Radiol* 114: e17, 2012
10. Nahlieli O, London D, Zagury A, et al: Combined approach to impacted parotid stones. *J Oral Maxillofac Surg* 60:1418, 2002
11. Walvekar RR, Bomeli SR, Carrau RL, et al: Combined approach technique for the management of large salivary stones. *Laryngoscope* 119:1125, 2009
12. Lustmann J, Regev E, Melamed Y: Sialolithiasis: A survey on 245 patients and a review of the literature. *Int J Oral Maxillofac Surg* 19:135, 1990
13. Pratt LW: Foreign body of Wharton's duct with calculus formation. *Ann Otol Rhinol Laryngol* 77:88, 1968
14. Ngan JH, Fok PJ, Lai EC, et al: A prospective study on fish bone ingestion: Experience of 358 patients. *Ann Surg* 211: 459, 1990
15. Lue AJ, Fang WD, Manolidis S: Use of plain radiography and computed tomography to identify fish bone foreign bodies. *Otolaryngol Head Neck Surg* 123:435, 2000
16. Davies WR, Bate PJ: Relative radio-opacity of commonly consumed fish species in South East Queensland on lateral neck x-ray: An ovine model. *Med J Aust* 191:677, 2009
17. Eliashar R, Dano I, Dangoor E, et al: Computed tomography diagnosis of esophageal bone impaction: A prospective study. *Ann Otol Rhinol Laryngol* 108:708, 1999
18. Braverman I, Gomori JM, Polv O, et al: The role of CT imaging in the evaluation of cervical esophageal foreign bodies. *J Otolaryngol* 22:311, 1993
19. Akazawa Y, Watanabe S, Nobukiyo S, et al: The management of possible fishbone ingestion. *Auris Nasus Larynx* 31:413, 2004
20. Yoshimura Y, Inoue Y, Odagawa T: Sonographic examination of sialolithiasis. *J Oral Maxillofac Surg* 47:907, 1989
21. Jacobson JA, Powell A, Craig JG, et al: Wooden foreign bodies in soft tissue: Detection at US. *Radiology* 206:45, 1998
22. Witt RL, Iro H, Koch M, et al: Minimally invasive options for salivary calculi. *Laryngoscope* 122:1306, 2012
23. Katz P: Endoscopy of the salivary glands. *Ann Radiol (Paris)* 34: 110, 1991
24. Nahlieli O, Shacham R, Bar T, et al: Endoscopic mechanical retrieval of sialoliths. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 95:396, 2003
25. Hasson O: Sialoendoscopy and sialography: Strategies for assessment and treatment of salivary gland obstructions. *J Oral Maxillofac Surg* 65:300, 2007
26. Walvekar RR, Razfar A, Carrau RL, et al: Sialendoscopy and associated complications: A preliminary experience. *Laryngoscope* 118:776, 2008
27. Karavidas K, Nahlieli O, Fritsch M, et al: Minimal surgery for parotid stones: A 7-year endoscopic experience. *Int J Oral Maxillofac Surg* 39:1, 2010
28. Liu DG, Zhang ZY, Zhang Y, et al: Diagnosis and management of sialolithiasis with a semirigid endoscope. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 108:9, 2009