

Subcutaneous Migration of a Broken Dental Needle from the Mandibular Gingiva to the Neck: A Case Report

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A 33G, 12-mm needle broke and entered the soft tissue in a 60-year old man. Panoramic X-ray imaging and cone-beam computed tomography (CT), which we performed a few hours after the breakage, revealed the needle in the soft tissue of the lower right mandibular molar. We immediately made an incision in the buccal gingiva of the lower right mandibular molar under local anesthesia and attempted to remove the needle but could not locate it. Thereafter, we adopted a watch-and-wait approach, as the patient had no subjective symptoms. Nine months later, we confirmed via CT that the needle had migrated subcutaneously to the right side of the neck. Two months later, we identified its location using C-arm fluoroscopy and removed it under general anesthesia. This report is a rare case and we are the first to document the subcutaneous migration of a fractured needle.

Key words: Dental local anesthesia, broken dental needle, subcutaneous neck, migration, C-arm fluoroscopy

INTRODUCTION

Local anesthesia is one of the most commonly used procedures in routine dental treatment to mitigate oral pain. However, needles rarely break and get lost in the tissue [1, 2]. Lost needles usually remain in the same location as the point of breakage but can occasionally enter the fascial space and migrate to a different location [3-6]. In this case, a needle lost in the mandibular gingiva was discovered a few months later in the subcutaneous tissue of the neck. We consider this to be a rare case, as there are no previous reports of subcutaneous migration of a lost needle in the literature.

CASE REPORT

Our patient, a 60-year-old man, underwent dental implant treatment in a different dental hospital. During the procedure, he experienced pain and additional infiltration anesthesia was used in the mandibular gingiva. Unexpectedly, the 33G, 12 mm needle broke and got lost in the gingiva. Attempts were made to remove the needle, but it could not be located, and the patient was referred to the Department of Oral and Maxillofacial Surgery, Tokai University Hachioji Hospital.

The patient had no subjective symptoms such as pain or trismus. Oral examination revealed mild swelling associated with the implant surgery in the gingiva around the lower right mandibular molar. However, we could not locate the lost needle. We identified a linear radiopaque structure finding thought to be the broken needle in the soft tissue adjacent to the lower right mandibular molar on a panoramic X-ray image

and cone-beam computed tomography (CT) image (Fig. 1). We immediately made an incision in the buccal gingiva of the lower right mandibular molar under local anesthesia and attempted to remove the needle, but could not locate it, because poor field of view due to tissue edema and internal bleeding, risk of mental nerve damage, and long patient surgery that the patient could not tolerate.

As the patient had no subjective symptoms associated with the lost needle and did not wish to undergo another attempt at removal, we adopted a watch-and-wait approach. A CT scan taken 3 months later confirmed that the broken needle had remained in almost the same location, alongside the platysma muscle on the buccal side of the lower right mandibular molar (Fig. 2). Another CT scan taken 9 months later showed a radiopaque finding thought to be the broken needle in the subcutaneous tissue of the right side of the neck. Thus, we confirmed that the needle had migrated.

No subjective symptoms were observed during follow-up. Moreover, the broken injection needle was not palpable.

The risk and benefits of having the needle surgically retrieved versus no treatment were thoroughly discussed with the patient. The patient was also advised that owing to the small diameter of the needle and the proximity to vital structures, there was a possibility that the needle may not be found. After being informed of all relevant information, he chose to undergo a surgical attempt to have the needle removed.

The surgery was decided to be performed under general anesthesia because of the fear of treatment of the patient and the possibility that the operation time

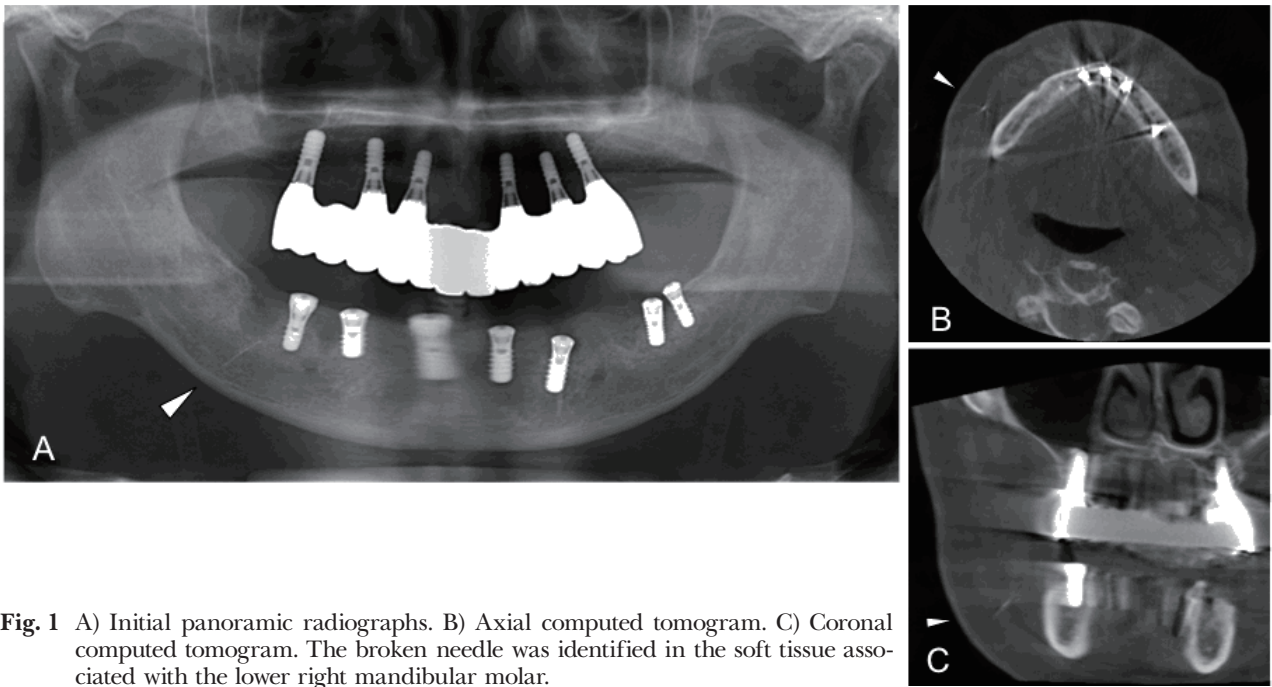


Fig. 1 A) Initial panoramic radiographs. B) Axial computed tomogram. C) Coronal computed tomogram. The broken needle was identified in the soft tissue associated with the lower right mandibular molar.

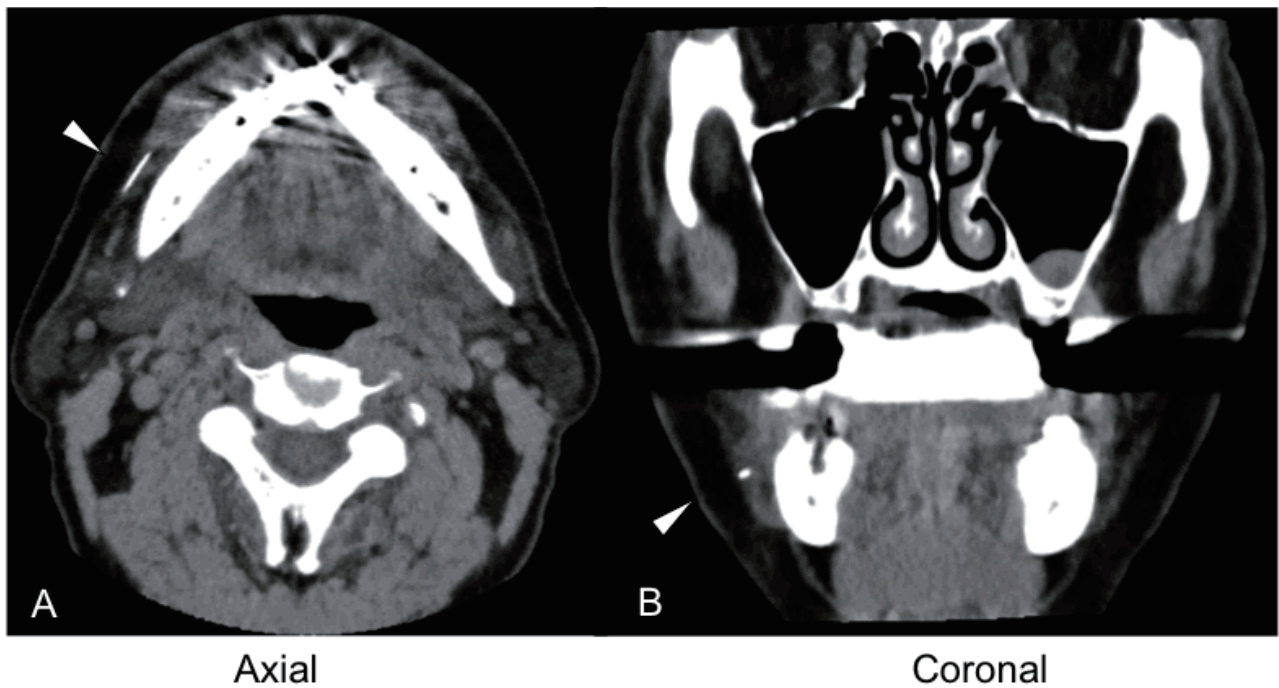


Fig. 2 A, B) A CT image 3 months after breakage. The broken needle remained almost in the same location, alongside the platysma muscle on the buccal side corresponding to the lower right mandibular first molar.

would be long if the broken needle was not found.

Therefore, 11 months after the loss of the needle and after confirming the needle's location again with CT, we identified its position using C-arm fluoroscopy and removed it under general anesthesia (Fig. 3, 4). The needle was located in the subcutaneous tissue and there were no inflammatory changes in the surrounding area. The removal took 13 minutes, with no blood loss and minimal invasion. The retrieved needle was the smallest of its kind, i.e., 33G thick and 12 mm long. The needle had fractured at its hub with a resid-

ual bend at the breakage point (Fig. 5).

DISCUSSION

Earlier, dental needles were commonly reused and metal fatigue was cited as the main cause of needle breakage [7]. Now, needles are disposable and made of stainless-steel alloy, which has largely reduced the risk of breakage [8]. However, there are a number of reports of needles breaking and becoming lost during dental anesthesia [9]. Acham *et al.* summarized the details of 36 reports on 59 cases of needle breakage

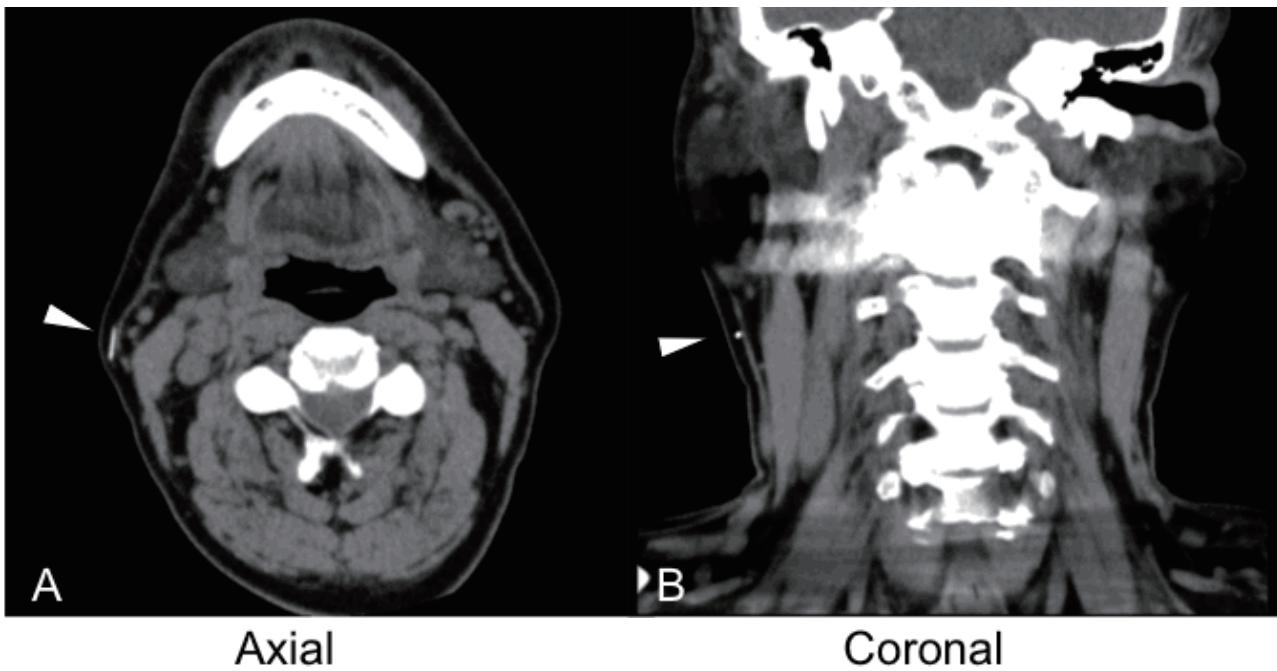


Fig. 3 A CT image 11 months after breakage. The broken needle has subcutaneously migrated to the right side of the neck, in the tissue above the platysma fascia.

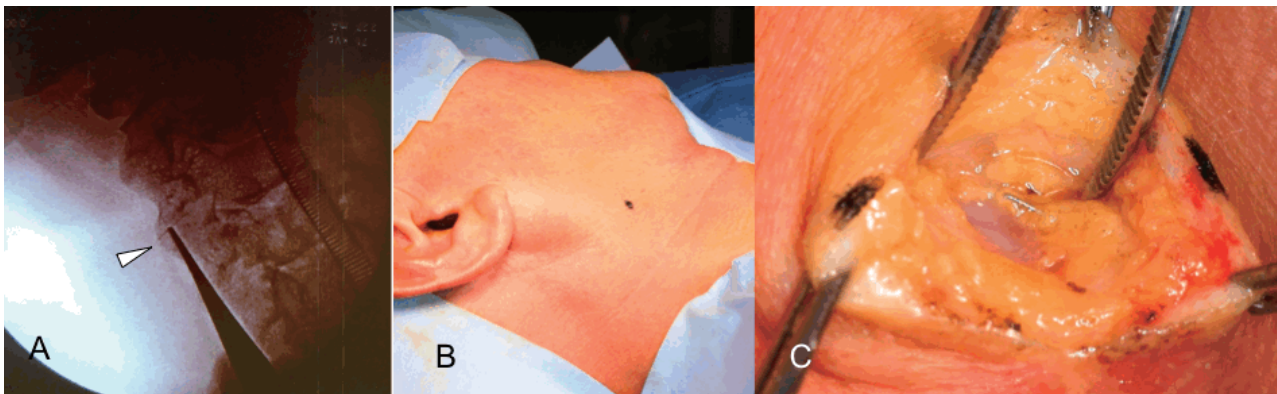


Fig. 4 A) The broken needle was confirmed with C-arm fluoroscopy. B) The site of the broken needle was marked. C) The broken needle was found in the subcutaneous tissue above the platysma fascia.

during dental anesthesia from 1980 to the present day [10]. The results showed that breakage was most common with 30G needles (77.5%), followed by 27G needles (20%). The hub was the point of breakage in 11 out of the 12 cases that described the point of the break. In this case, the needle was a 12 mm 33G needle, which is the thinnest and shortest needle currently used for dental procedures. This needle fractured at the hub and there was a residual bend at the breaking point.

The most commonly used method was conduction anesthesia for the mandibular nerve advocated by Gow-Gates and Vazirani-Akinosi, while normal infusion anesthesia was used for a small number of cases. Almost all the breakages were caused by sudden patient movement but some were caused by needle bending.

There remains some debate regarding management of a broken dental needle. Some advocate leaving the needle fragment in place as long as the patient is asymptomatic. Surgical exploration to retrieval needle

fragment can itself lead to additional neurologic and tissue injury. However, most believe that a broken needle should be removed not only because of medicolegal implications but also because of the risk of needle migration to damage vital structures in the head and neck [9].

Lost needles almost always remain in the same location as the point of breakage but can migrate within the tissue. In particular, there have been reports of needles that were lost within the pterygomandibular space and migrated to the base of the skull and the external auditory meatus, and needles that migrated from the lingula region to the superficial posterior auricular area [3-6]. In this case, the needle broke during the administration of local anesthesia to the gingiva surrounding the mandibular molar and was lost in the soft tissue. The break did not occur due to patient movement, but because of the needle's short length and thin diameter. Therefore, it underwent metal fatigue and was lost as a result of being inserted till the hub. The needle was confirmed to be in the same

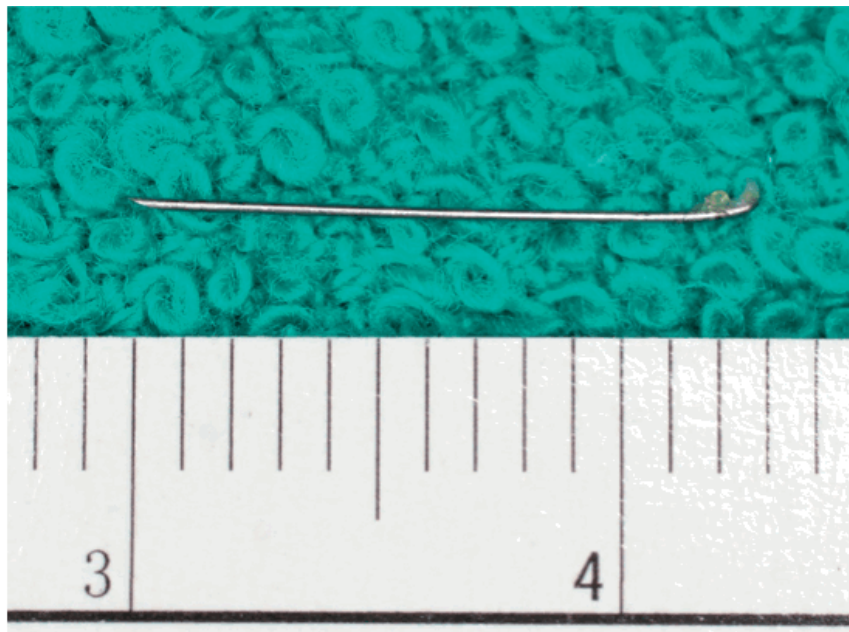


Fig. 5 The broken needle was 33 G thick and 12 mm long with a residual bend in the hub.

location via imaging diagnostics immediately after it was lost. No needle movement was seen on a CT scan that was taken 3 months later. However, a CT taken 9 months after the breakage revealed that the needle had migrated to the subcutaneous region on the right side of the neck.

Tissue spaces such as the pterygomandibular space consist of loose connective tissue and it is believed that lost needles may migrate due to chewing and swallowing movements [6]. In this case, the needle was located above the platysma muscle fascia and it migrated within the same tissue layer to the subcutaneous tissue on the right side of the neck. The platysma muscle is broadly distributed from the face to the neck but exhibits only mild contractions. Therefore, it was assumed that the needle migrated slowly over a long period of time. It is unlikely that the lost needle migrated with muscle contraction alone and other stimuli from the surface of the facial skin, such as face washing or shaving, may have been involved in the needle migration.

It goes without saying that panoramic X-rays and CT scans are effective in locating lost needles [7]. The use of CT, magnets, metal detectors, and navigation systems has also been reported, but in many cases C-arm fluoroscopy has been used, which was also used by us for retrieval [2-5, 8-10]. In this case, the needle was lost in the subcutaneous tissue of the side of the neck, which is an extremely shallow location, so identification and retrieval were straightforward. However, 95% of the other clinicians have also successfully retrieved lost needles, which was made possible by the effective use of C-arm fluoroscopy [9]. Reported complications after retrieval included trismus and mandibular nerve sensory disorder, but many cases reported no complications, which suggests that lost needles should be removed proactively.

Migration of needles lost in tissue spaces has been previously reported, but there are no reports of subcutaneous migration, therefore, this is considered to be

an extremely rare case. Thus, by reporting this case, we are significantly contributing to the present scientific literature.

Finally, key points in the prevention of this complication include the following: avoid using finer-diameter needles for mandibular blocks; avoid bending needles; and never completely insert the needle to the hub.

CONCLUSIONS

A needle broke during administration of local anesthesia to the mandibular gingiva, and the needle was lost. Nine months later the lost needle had migrated to the subcutaneous tissue of the neck and was then relatively easily removed using C-arm fluoroscopy. Migration of needles lost in tissue spaces has been reported, but there are no reports of subcutaneous migration, so this is considered to be an extremely rare case.

CONFLICT OF INTEREST STATEMENT

The authors declare that there are no conflicts of interest associated with this manuscript.

REFERENCES

- 1) Pogrel, M.A. Broken local anesthetic needles: a case series of 16 patients, with recommendations. *J Am Dent Assoc.* 2009; 140: 1517-1522.
- 2) Augello, M., von Jackowski, J., Grätz, K.W., Jacobsen, C. Needle breakage during local anesthesia in the oral cavity--a retrospective of the last 50 years with guidelines for treatment and prevention. *Clin Oral Investig.* 2011; 15: 3-8.
- 3) Ho, A.S., Morzaria, S., Damrose, E.J. Management of intraoral needle migration into the posterior cervical space. *Auris Nasus Larynx.* 2011; 38: 747-749.
- 4) Altay, M.A., Jee-Hyun Lyu, D., Collette, D., Baur, D.A., Quereshy, F.A., Teich, S.T., *et al.* Transcervical migration of a broken dental needle: a case report and literature review. *Oral Surg Oral Med Oral Pathol Oral Radiol.* 2014; 118: e161-e165.
- 5) Rahman, N., Clarke, M., Stassen, L.F. Case report: management of broken dental needles in practice. *J Ir Dent Assoc.* 2013; 59: 241-245.
- 6) Ribeiro, L., Ramalho, S., Gerós, S., Ferreria, E.C., Faria e

- Almeida, A., Condé, A. Needle in the external auditory canal: an unusual complication of inferior alveolar nerve block. *Oral Surg Oral Med Oral Pathol Oral Radiol.* 2014; 117: e436-e437.
- 7) Villalobos, M.I., Leite, T.C., Barra, S.G., da Cunha Werneche, D.T.P., Manzi, F.R., Cardoso, C.A. Radiographic and computed tomography monitoring of a fractured needle fragment in the mandibular branch. *Imaging Sci Dent.* 2017; 47: 63-68.
- 8) Ethunandan, M., Tran, A.L., Anand, R., Bowden, J., Seal, M.T., Brennan, P.A. Needle breakage following inferior alveolar nerve block: implications and management. *Br Dent J.* 2007; 202: 395-397.
- 9) Lee, T.Y., Zaid, W.S. Broken dental needle retrieval using a surgical navigation system: a case report and literature review. *Oral Surg Oral Med Oral Pathol Oral Radiol.* 2015; 119: e55-e59.
- 10) Acham, S., Truschneegg, A., Rugani, P., Kimbauer, B., Reinbacher, K.E., Zemmann, W., *et al.* Needle fracture as a complication of dental local anesthesia: recommendations for prevention and a comprehensive treatment algorithm based on literature from the past four decades. *Clin Oral Investig.* 2019; 23: 1109-1119.