Needle Breakage during Local Anesthesia in The Oral Cavity: A Case Report

Ko Ito, Takashi Eda, Kosuke Takahashi, Fumie Yamazaki, Mai Tajima, Mayu Suzuki, Yugo Kato, Hajime Shimizu, Akinobu Aoki, Naomi Ogura, and Toshirou Kondoh

1Department of Maxillofacial Surgery, Nihon University School of Dentistry at Matsudo, Matsudo, Chiba 271–8587, Japan
2Research Institute of Oral Science, Nihon University School of Dentistry at Matsudo, Matsudo, Chiba 271–8587, Japan
3Department of Oral and Maxillofacial Surgery, Matsudo City General Hospital, Matsudo, Chiba 270–2252, Japan

Introduction

In usual dental practice, the injection of local anesthesia is absolutely necessary to relieve pain. Needle breakage during dental practice is decreasing after the advent of disposable needles; however, reportedly, it still occurs in even these days (1, 2). Here we present a case in which the needle was broken and misplaced during local anesthesia of the left maxillary first molar, and the needle moved by approximately 30 mm within one day.

Case report

A 55-year-old woman was referred to our department for the removal of a needle which had fractured in a left upper first molar lesion. She had no particular medical and family history except hyperlipidaemia. The details of the incident are described as follows: The patient received local anesthesia for being treated with pulpectomy of the left upper first molar. The general practitioner who had more than 20 years of experience at that time, folded a disposable 30 gage (30G) dental needle once at the hub and inserted the tip of the needle into the gingival vestibular of the upper first molar. That disposable needle was manufactured by Japanese certain company. During anesthetic injection, he looked outside from the oral cavity and suddenly felt a loss of tension from the injection instrument, then he immediately looked back into the oral cavity and realized that the needle was broken. In addition, the patient did not move during injection. However, the pulpectomy procedure was continued, and panoramic radiograph was taken following the procedure. The broken needle was located at the apex of the root of upper first molar. The patient was given a patient referral letter to our department requesting to remove the broken needle. The general practitioner drew a diagram detailing the position of the broken needle and instructed the patient to visit our hospital the next day (Fig. 1). At first visit to our department, we performed a panoramic radiography but did not palpate for examining to avoid moving the broken needle. Panoramic radiography revealed that the broken needle was located in front of the left coronoid process (Fig. 2). Computed tomography (CT) was performed to reveal the accurate position of the broken needle. The needle was located under the zygomatic arch where were buccal fat (Fig. 3 A–C). We planned to remove the needle under general anesthesia to ensure safety of the patient. After obtaining informed consent, surgery was performed on the same day as the first visit.
An incision was made in parallel to the mandibular ramus, and then the buccal fat was carefully dissected. The needle was found at the same place as indicated by CT. It took 21 minutes to complete the surgery (Fig. 4 A–C). After a couple of days, the pain disappeared without any complications such as trismus or paresthesia of the buccal mucosa.

**Discussion**

In recent years, instruments used for dental practice have been advanced and the safety of patients has been improved. However, these instruments may be accidentally broken, which may lead to serious complications (3). Acham et al. have very precisely reported on needle fractures during dental local anesthesia, discussing injection technique, causes of breakage, site of needle fracture, and so on (4). According to their report, the most common cause of needle breakage was sudden movement during inferior alveolar nerve block, in fact that the patient suddenly moves a head during the injection. In addition, the most frequent the site of fracture was the hub. It is described that the injection needle is deeply inserted, then the patient suddenly moves the head, huge stress is applied to the hub of the needle result in breakage. In our case, the needle broke despite the local anesthesia of the upper jaw. The dental practitioner folded the needle at the hub once. A typical 30 G dental needle has a length of about 20 mm, and it is written that the needle may break.

Fig. 1. The diagram which was drawn by the general practitioner in the patient referral letter.

The Japanese letters as “このあたりです” means “around here.”

Fig. 2. Panoramic radiograph at the first visit.

The broken needle was seen in front of the left coronoid process (Arrow).
Fig. 3. CT and three dimensional (3D) CT findings at the first visit.
A: The broken needle was seen at almost the same height as the tip of the coronoid process (Arrow).
B: 3D CT revealed the position of the broken needle sterically. Or, orbital rim; Za: zygomatic arch; Co, Coronoid process.

Fig. 4. Intraoperative photographs and extracted broken needle
A, C: Incision was made parallel to mandibular ramus and the buccal fat was carefully dissected. The broken needle was found imbedded in the fat tissue.
B: The fragment was 30G needle, and the length was approximately 20 mm.
easily with being folded a couple of times in the instructions. Okazaki et al. reported a case of disposable dental 30G needle breakage with being folded (5). Therefore, the needle should be used without being folded. It is certain that in case a needle breakage occurs, a removal procedure should be performed as soon as possible. In this case, however, the dental practitioner did not remove the broken needle, although he noticed the needle had broken. It is considered that he had no risk perception factor which is possible of moving the needle and having serious condition to the patient. Supposing from the diagram on the patient referral letter, the broken needle had advanced about 30 mm posteriorly from the upper first molar to the buccal fat pad internally within one day of ordinary life. In other words, it became clear that the broken needle would move only by the movement of the muscles due to conversation, chewing, and swallowing. Previous reports have noted that broken needles have advanced to life-threatening sites, such as the external auditory canal (6), internal carotid artery (2), and skull base (7). One report states the longest migration of the broken needle from the insertion point; the broken needle used for inferior alveolar nerve block was found in the vicinity of the shoulder joint three weeks later (8). We did not palpate for the needle in consideration of the movement of the broken needle. Because the tip of the needle is too sharp and the broken part is rough, it may be able to only advance forward. To the best of our knowledge, as evidence of this, there have been few cases describing the needle sticking back out spontaneously (9), namely, there is a possibility that the needle may easily move by palpation as a medical examination. Therefore, both of clinical examination and surgery must be performed very carefully. Previous reports show the efficacy of intraoperative CT (10) and 3D navigation system (4) to remove the broken needle, but not all facilities have these inspection devices. At least CT should be performed before operation for removal.

**Conclusion**

We report a case of needle breakage during local anesthesia in the oral cavity. If the general practitioner breaks a needle and accidentally misplaces it, the patient should be promptly and calmly transported to a facility where appropriate radiological examination and proper surgery will be performed.

**Acknowledgments**

The authors would like to thank Dr. Mutsumi Kawashima for her invaluable assistance in creating the figures.

**References**

1. You JS, Kim SG, Oh JS, Choi HI, Jih MK: Removal of a fractured needle during inferior alveolar nerve block: two case reports. J Dent Anesth Pain Med, 17: 225–229, 2017.
2. Giurintano JP, Somerville J, Sebelik M, Hoit D, Michael LM 3rd, Shires CB: Endovascular Extraction of a Needle from the Internal Carotid Artery: A Novel Approach to a Controversial Dental Misadventure. J Neurol Surg Rep, 78: e106–e108, 2017.
3. Brooks J, Murphy MT: A novel case of a broken dental anesthetic needle transecting the right internal carotid artery. J Am Dent Assoc, 147: 739–742, 2016.
4. Acham S, Truschnegg A, Rugani P, Kirnbauer B, Reinhacher KE, Zemann W, Kojiku L, Jakse N: 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, 23: 1109–1119, 2019.
5. Okazaki Y, Hanaue N, Sato K, Takada A, Morisaki S, Kuramoto C, Watanabe Y, Ozawa Y, Morimoto M, Tonogi M, Yanane G: Case of accidental insertion of broken needle during local infiltration anesthesia (abstract written in English). The Shikawa Gakuho, 107: 331–335, 2007.
6. Ribeiro L, Ramalho S, Gerós S, Ferreira EC, 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, 117: e436–e437, 2014.
7. Prado FB, Caria PFH, Martins EC, Daruge E: Dental broken needle migration to the skull base, Anatomical considerations and prevention. J Morphol Sci, 27: 98–101, 2010.
8. Nakamura T, Tanaka S, Kanda S, Suzuki H, Nishimura H, Ishii T, Kaneko K: A case of broken dental needle at intra-oral inferior alveolar nerve block: The broken needle moved toward shoulder joint (abstract written in English). Nihon Univ J oral Science, 17: 288–292, 1991.
9. Rahman N, Clarke M, Stassen LF: Case report: man-
agement of broken dental needles in practice. J Ir Dent Assoc, 59: 241–245, 2013.
10. Catelani C, Valente A, Rossi A, Bertolai R: Broken anesthetic needle in the pterygomandibular space. Four case reports [English, Italian]. Minerva Stomatol, 62: 455–463, 2013.