



Decompression Device Using a Stainless Steel Tube and Wire for Treatment of Odontogenic Cystic Lesions: A Technical Report

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Abstract

Decompression is considered an effective treatment for odontogenic cystic lesions in the jaw. A variety of decompression devices are successfully used for the treatment of keratocystic odontogenic tumors, radicular cysts, dentigerous cysts, and ameloblastoma. The purpose of these devices is to keep an opening between the cystic lesion and the oral environment during treatment. The aim of this report is to describe an effective decompression tube using a stainless steel tube and wire for treatment of jaw cystic lesions.

Key words: Decompression, Jaw cysts, Marsupialization

Introduction

Decompression for jaw cystic lesions is an effective treatment, especially when the size of the lesion is large, such that complete removal may be difficult, or when it would be proximal to vital structures such as the inferior alveolar neurovascular bundle, maxillary sinus, or inferior border of the mandible[1-4]. This technique minimizes the size of the cystic lesions by reducing its osmotic pressure, favors the formation of new bone tissue, and causes fewer complications than enucleation, curettage, and resection[5,6]. For successful decompression treatment, maintenance of a surgical opening between the cavity of the lesion and the oral environment is required[1,6-8].

Numerous devices and adaptation methods were suggested and successfully used for maintaining the opening during decompression. The common materials used for making decompression devices are acrylic stents, nasopharyngeal airways, polyethylene tubes, nasal cannula, Luer syringes, and polyethylene intravenous tubes[9]. These devices are secured by sutures, wiring, or fixation with screws. However, most techniques are associated with some problems and complications including long-term follow-up, soft tissue trauma, malpositioning of the tube, inappropriate tube size, loosening of sutures, mastication interference, and difficult oral hygiene[8,9]. The aim of this technical report is to present a new effective decompression tube and securing method for treatment of cystic

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lesions in the jaw.

Case Report

We use a stainless tube and a 0,25 mm orthodontic ligature wire for our decompression device. The tube has an outer diameter of 3,0 mm and an inner diameter of 2,5 mm. An orthodontic ligature wire is required for securing the tube.

The ideal tube length is determined by radiographic examination such as cone beam computed tomography and panoramic radiography.

The prepared stainless tube is cut to suitable length based on the radiographic views. We make a loop from one end of a stainless steel wire on the top part of the tube that will be exposed in the oral cavity, and coil the other part of the wire around the tube. The wire is soldered to the tube using a torch and silver solder for adaptation of the loop and a funnel-like shape of this part of the device. The soldered part is trimmed, smoothed, and polished to a shape that impedes displacement of the device into the lumen of the cystic lesion (Fig. 1).

Under local anesthesia, an incisional biopsy of the lesion is performed at decompression, and the device is inserted into the cyst cavity for continuity between the cavity and the oral environment and daily irrigation of the cyst during decompression. A ligature wire is passed through the loop on the upper part of the device, and the tube is secured with the wire around the cemento-enamel junctions of the



Fig. 1. Illustration of the decompression device.

adjacent tooth in the pathologic area (Fig. 2).

We instruct patients about how to irrigate the cavity with a syringe during the long treatment period. Patients are asked to present every two months for clinical and radiographic examinations. When necessary, the tube length can be adjusted if the bone cavity decreases in size.

Discussion

Several decompression devices and securing methods of the devices for cystic lesions in the jaw are described in the literature. Tolstunov[1] suggested five ideal characteristics for decompression devices: a design that prevents the device from falling into the bone cavity or dropping out at the end of the procedure; does not interfere with daily mastication; easily fixed to the soft tissue through sutures; easy to clean the cystic cavity daily by the patient or staff; and hygienic, not accumulating food particles over the time of its function. Catunda *et al.*[6] described some additional criteria including a shape for retention, easy adaptation and removal, smooth surface to impede food and allow easy cleaning, low cost, easy irrigation of cavity, and easy visualization during radiographic examination.

The decompression tube using a stainless steel tube and wire fulfills these characteristics and possesses the following advantages: 1) radiopacity of the device allows estimation of the length, size, and position within the cavity. Thus, clinicians can determine easily the timing of length adjustment, reposition, or removal of the device; 2) because of



Fig. 2. Photograph after positioning the stainless steel device, showing a funnel shape of the upper part of the device and securing by wiring.



Fig. 3. The device cannot be installed in the center of the cavity.



Fig. 4. The device may be obstructed by the regenerated tissues in the margin of the cavity as the bone regenerates during decompression.

smooth surface and texture, accumulation of food and plaque is impeded and cleaning is easy; 3) a funnel shape of the upper part positioned above the gingiva prevents the device from falling into the cavity; 4) when secured by wiring through a loop, the device allows some mobility so clinic staff can control a degree of device mobility as required from rigid to movable state. When the device is inserted into the cystic lesion, clinicians cannot always center it in the cavity (Fig. 3). If the device is firmly anchored, it may be obstructed by the regenerated tissues in the margin of the cavity as the bone regenerates during decompression (Fig. 4). Therefore, mobility of the decompression tube is necessary in certain circumstances. Also, patients can carry out daily self-irrigation more easily due to the mobility; 5) because it is secured with an 0.25 mm orthodontic ligature wire, the device can be installed under local anesthesia and eliminated or adjusted without any anesthesia. Also, due to the thinness of orthodontic ligature wire, with a proper tooth brush instrument, an anchor tooth can avoid gingivitis. Furthermore, this device can be easily set or detached from the tooth for adjustment or repositioning or cleansing; 6) this decompression technique is not traumatic to surrounding soft tissue from sutures; 7) it is relatively



Fig. 5. The decompression device was removed.

cheap and does not interfere with mastication and occlusion; and 8) it can be universally fabricated in advance and commoditized. Because the prefabricated device can be used immediately after adjusting of the length of the tube, clinicians may reduce cost, time, and effort required for this treatment. It is thought that the device can be commoditized in three types, including a universal standard type, a flat entrance type for posterior teeth, and a small diameter type for anterior teeth. This device will be quite useful, simple, hygienic, and effective for odontogenic cystic lesions during the long treatment period (Fig. 5).

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