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Technical note: Self Irrigation Device for intra-oral home care

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Abstract

Following surgical treatment of a jaw cyst, bony cavities are formed. These cavities are prone to infection when they communicate with the oral environment. Hence, proper irrigation is a crucial aspect of post-surgical care, as it helps to reduce debris buildup and the risk of infection. However, the irrigation method of using a cannula is ineffective due to poor patient compliance. In response, we present a novel solution to this problem.

Innovation:

Surgical treatment of a large jaw cyst inevitably results in the formation of a bony cavity. In the presence of communication between the oral and bony cavities, regular irrigation is essential to prevent debris buildup and reduce the risk of infection.[1] Our patients have been instructed to irrigate the cavity at least five times daily. However, they have difficulties with the cannula method.

With the cannula method, patients must first visualize the bony defect in front of the mirror, then position, and hold the cannula tip in place during irrigation and repeat these steps. Furthermore, posterior defects make access and visualization difficult for patients (Fig 1). In addition, patients frequently injure the soft tissues around the cavity and tend to kink the cannula as a result of manipulation of the cannula. Older patients are more susceptible to this, possibly due to reduced manual dexterity. The inaccurate positioning and kinking of the cannula hinder optimal cleaning of the cavity, as observed during follow-up visits. Further inquiries revealed that patients had poor compliance with the cannula method.

To address the challenges of the cannula method, we developed a patient-specific, custom-made irrigation device that is both effective and patient-friendly. This device ensures the precise placement of the irrigation tip into the bony defect, making the irrigation process easier and more comfortable for patients. During irrigation, patients only have to wear the splint and press on the syringe's plunger. This eliminates the need for visual positioning and reduces the risk of injury to the surrounding gingiva. The device is made from a 1.0mm soft acrylic splint, rubber tubing from a venipuncture scalp vein, and dental floss, all medically approved materials. (Fig 2).

Advantages

This custom-made device removes patients' guesswork during irrigation, allowing for precise delivery of the irrigants into the defect. Compared to the cannula method, patients do not need to manipulate the device during irrigation, which reduces the risk of kinking of the tube. During irrigation, patients only need to wear the splint and then press the plunger of the syringe. The ability to achieve direct, reproducible irrigation is its most important feature. In addition, the longer length of the tube allows for attachment of the syringe extra orally, making it easier for patients to operate (Fig 3). All of these allow for repeated irrigation of the cavity without the need to reposition the irrigation tip. Following a demonstration session, all our patients could operate the device. Most patients use the device more than the recommended five times daily because of its ease of use.

The cost analysis shows that the product is cost-effective. The rigid plastic cannula, which kinks easily, is often damaged with use and requires frequent replacement. In contrast, our patients required only one set of the device until the completion of treatment. We do not foresee any risks associated with the use of our device.

Significance

Debris buildup due to improper irrigation can result in secondary infections and poor wound healing, which requires intervention. This device allows patients to perform efficient home irrigation. We observed that all patients on this device had excellent wound hygiene compared to the conventional cannula method. Hence, it should be considered for patients requiring long-term home irrigation.

Evidence:

To date, we have used this device on 6 patients. We assessed patients' compliance, satisfaction, and the presence of debris in the defect. Patients' compliance was measured as compliant or non-compliant with the irrigation regimen. Patients' satisfaction was rated as 'Satisfied' or 'Unsatisfied'. Clinical debris assessment was categorized as '0' when no debris was seen or '1' when there was a visible presence of debris.

All patients on the cannula rated it unsatisfactory and were not compliant with the irrigation regimen. The same patients were then issued with our device. They all were compliant with the irrigation regimen and rated it satisfactory. As for the debris assessment, we found patients who were using the cannula had a higher debris score.

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All authors have read and agreed to the submission of the manuscript.

Patient consent

Written consent was obtained from the patient for the publication of clinical photos.

Conflict of Interest

None

References

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Figure legends.

Figure 1. Deep lower left posterior cavity post enucleation of cyst.

Figure 2. Self-Irrigation Device

Red arrow: Extension of the tube into the bony defect.

Yellow arrow: Dental floss

Figure 3. Clinical application of the device.

Red arrow: End of the tube inside the defect.