

2-Octyl-Cyanoacrylate Skin Adhesive Used as a Splinting Material in Auricular Surgery

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How to cite this paper: Yamamoto, N., Yanagibayashi, S., Yoshida, R., Ogi, H., Takikawa, M., Nishijima, A. and Maruyama, E. (2016) 2-Octyl-Cyanoacrylate Skin Adhesive Used as a Splinting Material in Auricular Surgery. *Modern Plastic Surgery*, 6, 21-26.

<http://dx.doi.org/10.4236/mps.2016.64004>

Received: August 16, 2016

Accepted: September 9, 2016

Published: September 12, 2016

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Abstract

In cases of auricular surgery, postoperative dressings are thought to be important for keeping auricular contour and in helping to prevent from dressing failures due to edema or subcutaneous hematoma, which may result in fibrous or cartilaginous proliferation. However, it is often difficult to achieve success with standard dressings because of the complicated shape of the auricle. We used 2-octyl-cyanoacrylate skin adhesive to dress the auricle after different types of auricular procedures (five cases of cryptotia, two of prominent ear, two of severe auricular laceration, two of skin grafting and one of flap repair of the partial auricle defect). The 2-octyl-cyanoacrylate skin adhesive was applied to the suture line and the operated and peripheral areas for wider coverage. No dressing materials were placed over the surface. In all cases, the desired outcome was achieved, without subcutaneous hematoma, wound dehiscence, and wound infection. Contact dermatitis caused by the skin adhesive was not observed in any of the cases. Dressing and splinting after auricular surgery can be simply and successfully achieved using 2-octyl-cyanoacrylate skin adhesive. There is no need for more complicated dressings and post-surgical dressing changes, resulting in higher patient satisfaction.

Keywords

Auricular Surgery, Postoperative Dressings, Splinting Material, 2-Octyl-Cyanoacrylate Skin Adhesive

1. Introduction

It is standard practice of many surgeons to leave the ear undisturbed and supported with a dressing until the surgical wound thoroughly heals to maintain the shape

achieved after surgery. The concern is that if the dressing fails, then any fine auricular details may be lost because of soft-tissue edema, subcutaneous hematoma or seroma, which can lead to fibrous proliferation or cartilaginous deformity. However, applying these dressings is often laborious and difficult because of the irregular and complicated shape of the ear and the presence of hair close to the surgical area.

The skin adhesive 2-octyl-cyanoacrylate has the properties of an adhesive and a surface barrier [1]. When it is applied to the skin surface, it coagulates, hardens, adheres, and then peels off naturally. We have used 2-octyl-cyanoacrylate adhesive after auricular surgery to fix the operated area and to maintain auricular contour. Here, we report our use of 2-octyl-cyanoacrylate adhesive as a dressing after various types of auricular procedure.

2. Patient and Methods

We used 2-octyl-cyanoacrylate skin adhesive (Dermabond; Johnson and Johnson Co. Ltd.) in 12 cases of auricular surgery. These included; five cases of cryptotia, two prominent ears, two severe auricular lacerations, two skin graftings and one flap repair for a partial ear defect. Patient age ranged from 5 to 92 years.

Techniques

Immediately after completion of the wound suture, 2-octyl-cyanoacrylate skin adhesive was applied to the suture line and the adjacent area. Fixation techniques such as through-and-through sutures tied over gauze pledgets were not used. After the cyanoacrylate skin adhesive was applied, no dressing materials were placed on the surface of the skin. If the patient was a child, a foam pad with the inner portion excised was placed around the auricle at night in order to prevent the surgical site from being compressed during sleeping for 3 days after surgery.

Shampooing and face washing were permitted 1 day after surgery allowing to get wet. The skin adhesive was either removed or naturally peeled off at 2 - 4 weeks following surgery. The adhesive was applied only once, immediately after skin closure, and was not reapplied after peeling.

3. Results

In all cases, healing was uneventful and excellent contour could be obtained. There was no wound infection, subcutaneous hematoma, wound dehiscence, or major skin necrosis. Contact dermatitis caused by the skin adhesive was not observed in any of the cases. All of the patients had higher satisfaction because the post-surgical care was very simple and because complicated and bulky dressing was not needed.

Case 1

Case 1 was a 7-year-old girl who required corrective surgery for a right cryptotia. The skin incision was made along the helix, and then the auricular skin of the upper one-third of the auricle was undermined on the perichondrium. Next, the temporal area was undermined distally from the incision. The undermined temporal and were advanced, and the exposed ear cartilage was redraped with the undermined auricular

skin. They were sutured to the bottom of the postauricular skin defect to make a temporal-auricular sulcus.

After completion of the wound suture, 2-octyl-cyanoacrylate skin adhesive was applied. The suture line and the outer and back sides of the upper portion of the auricle were widely coated with the 2-octyl-cyanoacrylate skin adhesive. This fixed the undermined area and maintained its configuration after surgery.

Two weeks after surgery, the stitches were removed and the adhesive coating was peeled away. Correction of the cryptotia and contour of the auricle were successfully achieved (**Figures 1-3**).

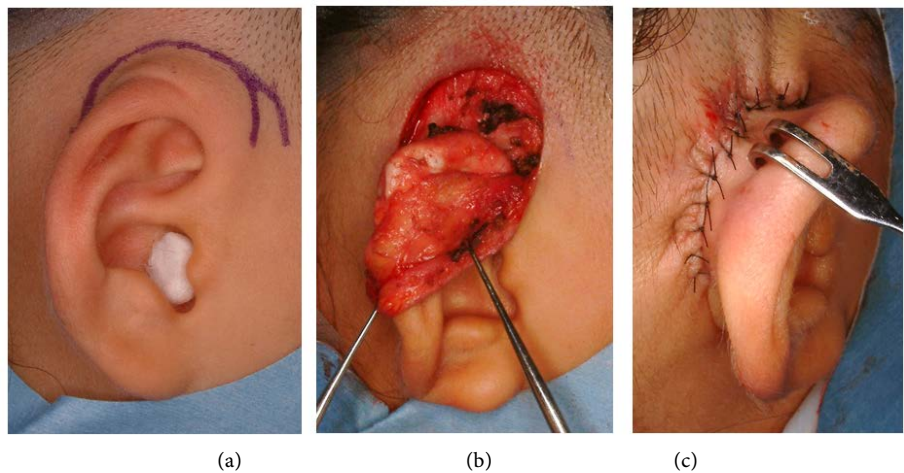


Figure 1. Case 1. (a): Preoperative view. The skin incision line is marked; (b): Intraoperative view. Temporal area, postauricular area, and upper one-third of the auricle were undermined; (c): View of the suture line on completion of surgery.



Figure 2. Case 1. One week after surgery. Upper half of the auricle and suture line were coated with 2-octyl-cyanoacrylate skin adhesive. Excellent contour was demonstrated without soft tissue edema and subcutaneous hematoma.

Case 2

Case 2 was an 85-year-old man who had basal cell carcinoma arising from the helix. The tumor was excised together with the perichondrium and the defect was then covered with an artificial dermis.

After histological examination of the excised specimen, the defect was closed by a full-thickness skin graft harvested from the pre-auricular area. The skin graft was sutured to the defect using an absorbable suture. A tie-over dressing was not used. Subsequently, the 2-octyl-cyanoacrylate skin adhesive was applied directly to the skin graft, the adjacent skin and the donor site.

Approximately 2 weeks after surgery, the adhesive began to separate. The skin graft healed and the final result was satisfactory (**Figure 4**).



Figure 3. Case 1. Four months after surgery.

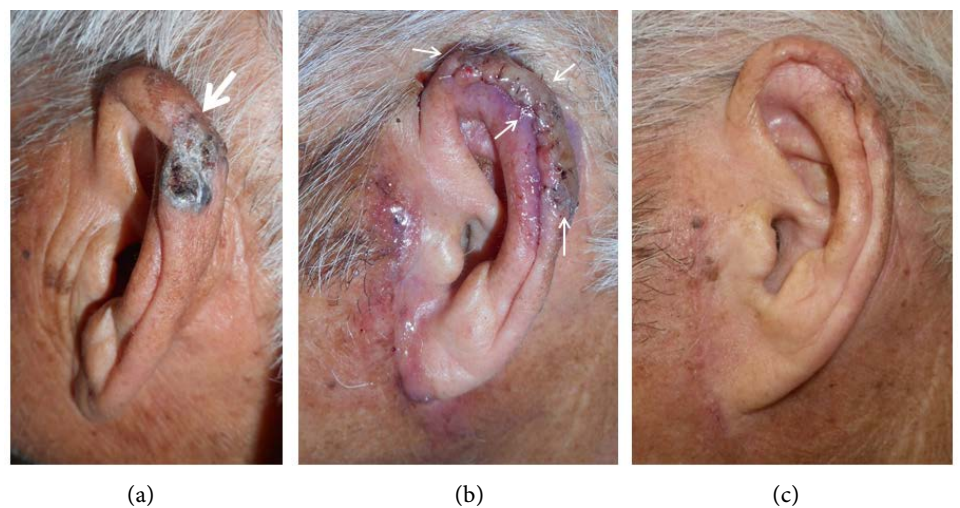


Figure 4. Case 2. (a): Preoperative view. BCC arising on the helix is seen; (b): View immediately after surgery. The skin graft, the peripheral area, and the skin harvest site were coated with 2-octyl-cyanoacrylate skin adhesive; (c): Three months after surgery.

4. Discussion

The importance of dressing after auricular surgery is well known. Currently, through-and-through sutures tied over gauze pledgets or bolster sutures [2] are widely accepted to maintain the shape achieved after auricular surgery. On the other hands, such conventional dressing methods or compressive dressings using an elastic tape are complicated and time-consuming. The bulkiness of these dressings is sometimes undesirable to patients. To solve these problems, silastic foam dressings [3] and hydrocolloid materials [4] have been used. However, these have not become widely adopted. In our patients, cyanoacrylate as an adhesive material was successfully used to fix the auricle. Successful dressing and splinting were achieved by simple procedures. Patient satisfaction was high because complicated dressings and dressing changes after surgery were not needed and because showering and shampooing were possible soon after surgery due to the surface barrier effect.

There have been many previous reports of the use of 2-octyl-cyanoacrylate skin adhesive in the auricular region for otological procedures [5], prominent ear correction, and otoplasty [6]-[10]. It has also been used to close incisions [5], dress sutures lines and gluing the pinna against the postauricular skin [6]-[10]. It is expected to be an alternative to the head bandage after surgery [7] [8]. In addition, our experience demonstrates that 2-octyl-cyanoacrylate skin adhesive can also be used as a splinting material for auricular surgery. With regard to the use for a microtia cartilage reconstruction, we have no experience as yet.

In all of our cases, the skin adhesive peeled off at either 2 or 4 weeks following surgery. Although coating with cyanoacrylate was not repeated, the results were successful. We therefore believe that a single application is sufficient for preventing subcutaneous hematoma, seroma, and soft tissue edema.

The price of a Dermabond is 2000 yen in Japan (equivalent to 18 USD at today's exchange rates). The simple application of cyanoacrylate skin adhesive can reduce operating times and the effort required by the surgeon. There is also no need for post-surgical dressing changes. So we think that the cost of the proposed method is not high.

We are of the opinion that the 2-octyl-cyanoacrylate skin adhesive could be useful in cases in which the surface configuration of surgical sites should be maintained after surgery and when postoperative dressings are difficult, such as in umbilical plasty, nipple plasty, and auricular surgery. Furthermore, it has the effect of occlusive dressings on incision wounds [10]. Small gaps at the incision edge will remain, even if a surgeon sutures finely. Under dry conditions, these are minimally desiccated and necrose. Healing finally occurs with minor scars. Occlusive dressings prevent dehydration in these gaps, resulting in inhibition of this phenomenon [11].

5. Conclusion

2-octyl-cyanoacrylate skin adhesive can be considered not only a skin adhesive but also a dressing and splinting material for auricular surgery.

Conflict of Interest

The first author orally presented the content of this article at the seminars supported by Johnson and Johnson, Japan, during the annual meetings of academic societies related to surgery and received lecture fees.

The other authors have no conflict of interest associated with this manuscript.

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