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A new primary cleft lip repair technique tailored for Asian patients that combines three surgical concepts: Comparison with rotation–advancement and straight-line methods

Emi Funayama, Yuhei Yamamoto, Hiroshi Furukawa, Naoki Murao, Ryuji Shichinohe, Toshihiko Hayashi, Akihiko Oyama*

Department of Plastic and Reconstructive Surgery, Hokkaido University Graduate School of Medicine, Kita-15, Nishi-7, Kita-ku, Sapporo, 060-8638, Japan

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ABSTRACT

Various techniques have been described for unilateral cleft lip repair. These may be broadly classified into three types of procedure/concept: the straight-line method (SL; Rose-Thompson effect); rotation–advancement (RA; upper-lip Z-plasty); and the triangular flap method (TA; lower-lip Z-plasty). Based on these procedures, cleft lip repair has evolved in recent decades. The cleft lip repair method in our institution has also undergone several changes. However, we have found that further modifications are needed for Asian patients who have wider philtral dimples and columns than Caucasians, while following the principles of the original techniques mentioned above. Here, we have incorporated the advantages of each procedure and propose a refined hybrid operating technique, seeking a more appropriate procedure for Asian patients. To evaluate our new technique, a comparison study was performed to evaluate RA, SL, and our technique.

We have used our new technique to treat 137 consecutive cleft lip cases of all types and degrees of severity, with or without a cleft palate, since 2009. In the time since we adopted the hybrid technique, we have observed improved esthetics of the repaired lip. Our technique demonstrated higher glance impression average scores than RA/SL.

1. Introduction

The ideal repair of a unilateral cleft lip should provide symmetry and minimize scarring. Various techniques for unilateral cleft lip repair, including minor refinements, have been described. These can be classified broadly into three types of procedure or concept: 1) the straight-line method (SL; Rose-Thompson effect) (Rose, 1891; Thompson, 1921; Fisher, 2005); 2) rotation–advancement (RA; upper-lip Z-plasty) (Millard, 1958) and 3) triangular flap method (TA, lower-lip Z-plasty) (Tennison, 1952; Randall, 1959) (Fig. 1). In a previous study (Sitzman et al., 2008), use of the RA method, with or without modifications, and the SL method, as modified by Fisher (Fisher, 2005), were demonstrated to be major trends. However, both the RA and SL methods were developed from the original method into modern repair techniques using the Tennison-Randall triangular flap technique (TA) to create a symmetrical vermilion border. Each procedure has advantages and disadvantages (Greives et al., 2014).

Rotation–advancement, as originally described (Millard, 1958) or with minor variations, may still be the most prevalent technique because of its advantages and its versatility with regard to cleft type (Sitzman et al., 2008). However, it has the risk of a conspicuous transverse scar at the alar base. These scars are more noticeable in Asians than in Caucasians (Nakajima et al., 2008). Furthermore, scar drooping may be observed after a few years postoperatively. The original straight-line method (Rose, 1891; Thompson, 1921) has a postoperative scar that runs vertically, but it destroys the contour lines of the upper lip, such as the cutaneous roll, philtral column, and nostril sill (Onizuka et al., 1991). Although disadvantages associated with vertical scar contracture, such as notching of the lip, have also been demonstrated (Sykes and Tollefson, 2005), Fisher's anatomical subunit

* Corresponding author. Tel.: +81 11 706 6978; fax: +81 11 706 7827.
E-mail address: akihiko.oyama@mac.com (A. Oyama).

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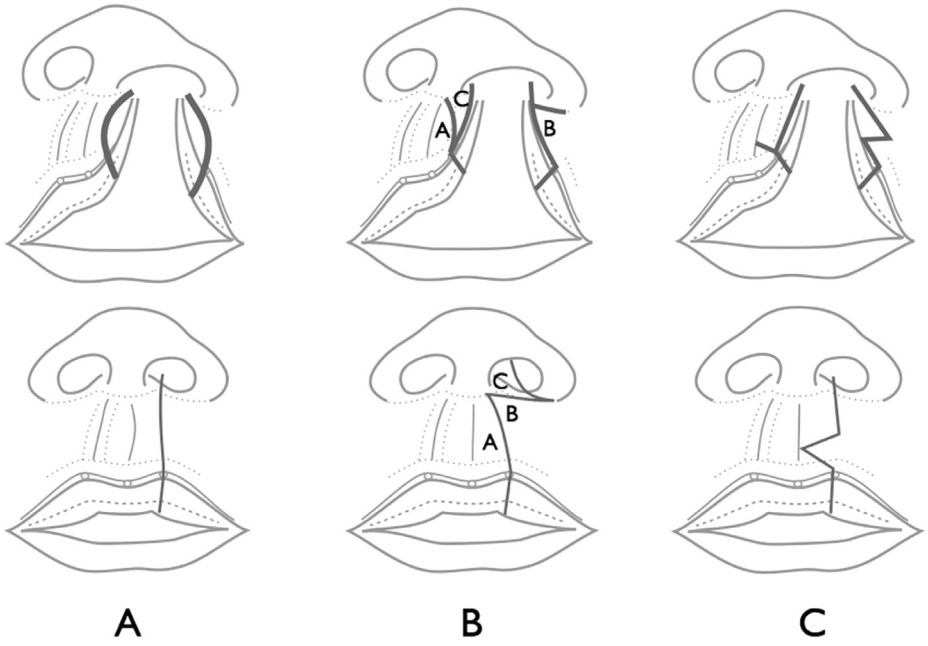

Fig. 1. Primary cleft lip repair. Straight-line (Rose-Thompson) method (A). Rotation–advancement method (B). Triangular flap method (C).

approximation technique (Fisher, 2005), which uses the Rose-Thompson lengthening effect, addresses those problems and seems to be an improvement. However, Fisher's method may not be suitable for Asians who have wider philtral columns than Caucasians. Specifically, the marginal incision may be inappropriate for Asian patients; excessive tissue loss at cleft margins is fatal to producing symmetry of the contour of the lip, such as the philtral column and ridge. Ultimately, the goal is to remove the impression of a cleft lip. Preliminarily, before establishing a modification for Asians, we reviewed postoperative cleft lip patients who had been treated at our institution to investigate which factor(s) most influenced the identification of the presence of a cleft at a quick postoperative glance. Considering the results, we went back to basics and sought to determine how best to incorporate the fundamental concepts from these three original techniques—the Rose-Thompson effect from SL, the upper-lip Z-plasty from RA, and the lower-lip Z-plasty from TA—to produce a better modification for Asian patients. Here, we propose a new tailored technique combining these surgical concepts and advantages. Subsequently, to evaluate our new technique, a comparison study (RA versus SL versus our new technique) was performed.

2. Material and methods

2.1. Preliminary analysis of postoperative glance impression of cleft lips

2.1.1. Scope

Which factor(s) most influence the identification of the presence of a cleft at a quick postoperative glance? Before establishing a modified technique for Asians, we reviewed postoperative cleft lip patients who had been treated at Hokkaido University Hospital, focusing on correlations between glancing impressions and various independent parameters. An analysis was made of 40 consecutive patients who underwent primary unilateral cleft lip repair: 20 patients were treated with RA with a small triangular flap

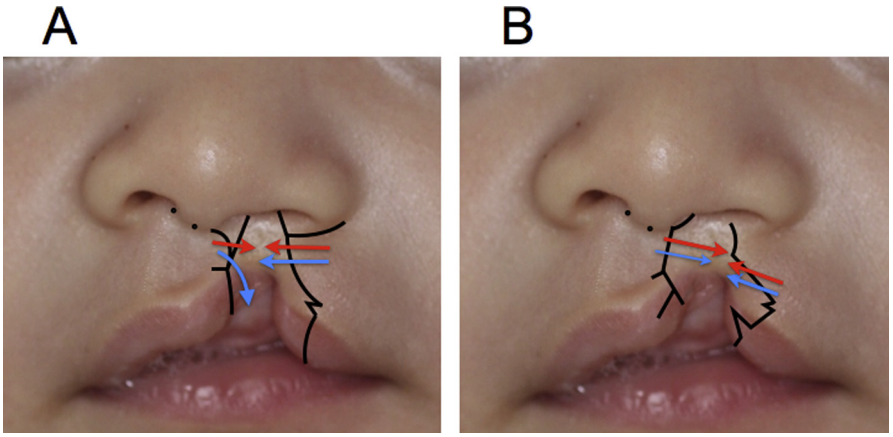

Fig. 2. Primary cleft lip repair. Rotation–advancement method with small triangular flap (A). Straight-line method based on Fisher method (B). Black lines indicate incisions. Arrows show directions of reconstructed muscle (red line) and main skin flap (blue line).