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# Reconstruction of vermilion deficiencies: The running V-flap technique☆

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**Summary** Notching, or 'whistle deformity', is a common vermilion deformity among patients with cleft lips. Vermilion volume deficiency may also be present secondary to trauma or tumour excision. Herein, we present a new flap model to repair such vermilion deformities.

Six patients were included in the study. Running V-flaps prepared from the oral mucosa were used.

While the underlying cause of vermilion deficiency was cleft-lip surgery in four of the patients, the indication for surgery was trauma related in two patients. In all patients, the volume deficiency was corrected. No patient exhibited scarring, colour mismatch or asymmetry.

We believe that our new flap model can be a reliable alternative in secondary vermilion deficiencies.



Lips are one of the most important elements influencing facial aesthetics. The need for revision in cleft-lip cases has been increasingly reduced due to the development of surgical techniques, careful planning and cleft-lip operations performed by experienced surgeons. Although anatomic integrity can be achieved intra-operatively, vermilion volume deficiency of the upper lip may occur due to normal patient growth, infection of the suture line and dehiscences. Moreover, vermilion integrity may be disrupted following trauma or tumour excision. In this study, we present a flap model prepared from the oral mucosa for repairing vermilion deformities.

## Patients and methods

The technique detailed below was performed on six patients (three female and three male) aged 16—42 years. Vermilion deficiencies in the upper lip were graded

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according to the classification system established by Jian and colleagues for whistle deformities, which introduces four categories based on the degree of upper incisive teeth and gum exposure.[1] The surgery was performed under general anaesthesia in two patients due to the need for additional interventions; surgery was conducted under local anaesthesia for all other patients.

## Surgical technique

The distance between the midline of the area exhibiting vermilion deficiency in the upper lip and the vermilion of the lower lip is measured at rest. This measurement provides the required length of tissue advancement. The length of the V-flap should be 1.5 times greater than this value, and its width should enable the width of the tissue deficiency to form the V-flap floor. Those measurements are marked over the oral mucosa of the area exhibiting deformity. Running V-flaps are marked at both sides of the main V-flap in a manner ensuring half the width and length of the preceding flap (Figure 1A). If the main V-flap (Flap a) is planned to be large, then the number of following flaps should be increased accordingly. All flaps are raised off the muscles. If needed, muscle repair should be performed. Flap A is advanced to fill the defect. The donor site of flap A is closed by two B flaps raised from both sides. The donor sites of the b flaps are closed by the c flap. This procedure is continued based on the number of prepared flaps (Figure 1B). The number of running flaps are planned based on the size of the deficiency (Figure 1C).

**Patient 1**: A 16-year-old female patient who had developed a central vermilion deformity in the upper lip after a traffic accident that had occurred 10 years before. She had a grade IV vermilion deficiency with complete exposure of the incisive teeth (Figure 2A,B).
**Patient 2**: A 20-year-old female patient who had received right cleft-lip surgery when she was 2 years old. One-third of the right upper incisive teeth were exposed and, therefore, the patient was evaluated as having a grade II deformity.
**Patient 3**: A 17-year-old male patient who had received bilateral cleft-lip surgery when he was 6 months old. He had a grade III vermilion deficiency, with 2/3 of his incisive teeth exposed (Figure 3A,B).
**Patient 4**: A 42-year-old female patient with a cleft-lip who had been operated on when she was young with a grade I vermilion deficiency. Because the deficiency was of a low degree, the flap length was accordingly short (Figure 1C).
**Patient 5**: A 20-year-old male patient who had received surgery due to a complete bilateral cleft-lip when he was 2 years old. The whistle deformity was grade II.
**Patient 6**: A 38-year-old male patient who developed a vermilion deficiency of the lower lip due to trauma (Figure 4A). The lower lip was treated with the technique described above. The postoperative evaluation at

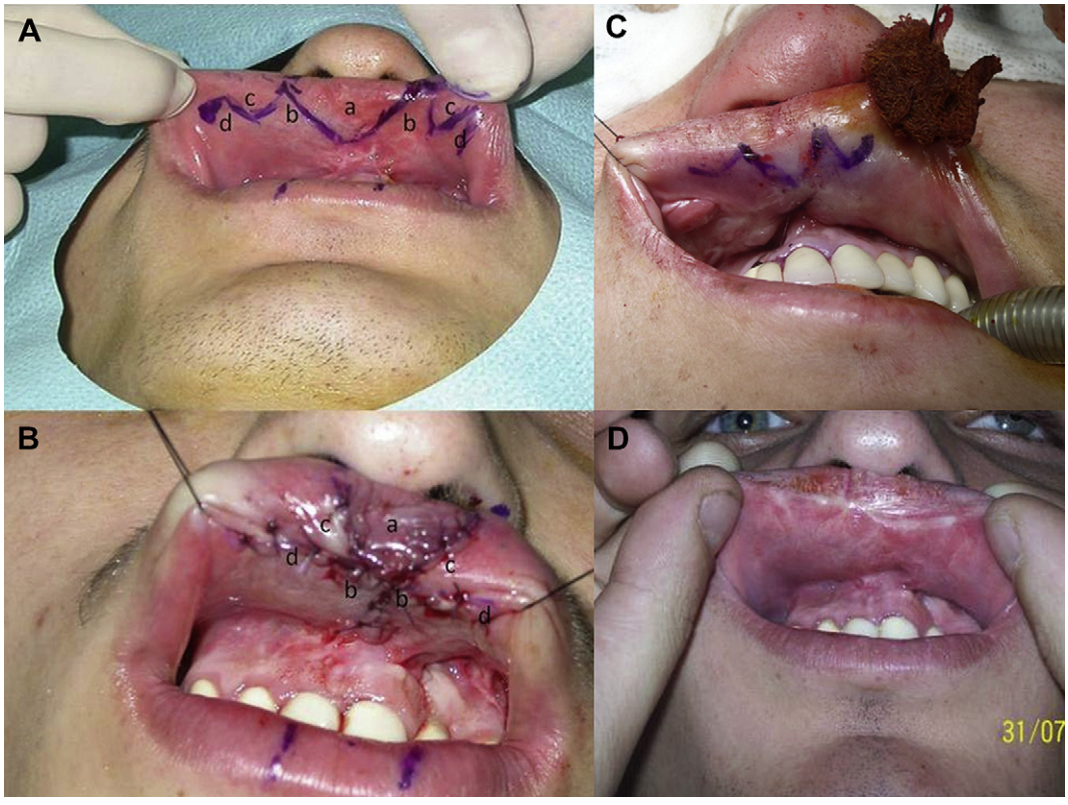


**Figure 1** A, Preoperative marking for the running V-flap. B, The appearance of the operation site following placement of the flaps. C, A patient with a Grade I vermilion deficiency. Because of deficiency was low degree, the flap length was accordingly short. D, Postoperative appearance of the mucosa at 2 years. There were no signs of contraction.