

## Original Article

## Evaluation of modified nasal to oral endotracheal tube switch—For modified alar base cinching after maxillary orthognathic surgery

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## ARTICLE INFO

*Article history:*

Received 6 June 2016

Accepted 16 March 2017

Available online 23 March 2017

*Keywords:*

Alar base width

Cinch suture

Endotracheal tube switch technique

Upper lip length

V-Y closure

## ABSTRACT

**Background:** Soft tissue changes secondary to Maxillary orthognathic surgery are many fold. The alar flare is one among them, which affects the appearance of the patient. Cinch suture has been used to prevent alar flare; but the presence of anaesthetic tube hinders cinching. So, the study was aimed to assess an efficacy of modified nasal to oral tube switch technique for modified alar cinching to prevent alar flare after orthognathic and nasal corrective surgeries.

**Materials and methods:** Patients were randomly allocated in each group, who underwent modified alar base cinching with and without nasal to oral tube switch. Changes in alar base width, upper lip length was measured with Digital Vernier Caliper and nasolabial angle (Cotg-Sn-Ls) on lateral cephalogram at 1st, 3rd, 6th, and 12th months after surgery. The time taken and ease of tube switch were noted. The data obtained were tabulated and interpreted using a test of significance.

**Results:** Study results showed no statistical significant difference in perinasal soft changes among both groups. But tube switch appears to be beneficial to prevent alar flare.

**Conclusion:** Modified alar base cinching was performed effectively in patients with a modified tube switch technique. It increased positive results in comparison with non-shift. The technique of tube switch used is effective in prevention of alar flare. Because of small sample size and limited period of follow up, our study suggests multi centre, randomized studies to know the technical difficulties of tube switch for cinching and aesthetic results with varying anaesthetist and the surgeon's experience.

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### 1. Introduction

Facial appearance significantly influences the social acceptance and psychological well being of an individual. Nose, lips and eyes are very important structures of face contributing towards facial aesthetics.<sup>1</sup> In particular nose has key role in facial aesthetics.<sup>2,3</sup> Orthognathic surgery improves function as well as aesthetics, both aspects are equally important and achievement of one goal should not be at the cost of other.<sup>1</sup> However maxillary orthognathic and nasal corrective surgical procedures will produce significant soft tissue changes which greatly influence facial aesthetics.<sup>1–4</sup>

Weir first described alar base flaring in 1892 after Maxillary osteotomy.<sup>5</sup> Weir also proposed and executed alar base cinch suture to correct un-aesthetic soft tissue changes.<sup>5</sup> Many published literature reveal benefits of alar cinch.<sup>6–8</sup> Few modifications were suggested to overcome the conventional

cinching.<sup>8,9</sup> Extubation for the final tightening of cinch sutures and wound closure suggestions by surgeons were strongly disapproved by anesthetists because of anesthetic mishaps.<sup>10–12</sup> Alar cinching might be compromised due to the presence of nasal endotracheal tube.<sup>11</sup> Intra-operative assessment and measurement of alar base may not be accurate due to distortion of nostrils by endo tracheal tube and tightening of the cinch suture could also be restricted.<sup>11</sup> Because of these constraints alar base cinching might become imprecise arbitrary exercise which may not meet patients and surgeons expectations.<sup>11,12</sup> So, the study was planned to introduce and evaluate the efficacy of modified nasal to oral endotracheal tube switch technique for modified alar base cinching.

### 2. Materials and method

Fourteen healthy patients were randomly allocated for the study Groups (seven patients in each Group) during the year 2013–2014, among the patients referred to the Department of Oral and Maxillofacial Surgery from Department of Orthodontics and

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Dentofacial Orthopedics for maxillary orthognathic corrective surgical procedures.

### 2.1. Materials

The study used Lateral cephalogram, Photographs, Digital Vernier Caliper (Fig. 1). Methylene blue skin marker, 2-0 Prolene, 4-0 Vicryl suture material, Flexo-metallic endotracheal tube. McIntosh Laryngoscope, Bab-cock abdominal clamp was used to hold the tube in place while shifting and Modified zygomatic hook with protective tubing was used for switching the nasal tube into the oral cavity.

### 2.2. Methodology

Patients between 18–30 years with American Society of Anesthesiology (ASA) class I, II and Mallampati I, II undergoing maxillary orthognathic procedures willing to participate in the study protocol were randomly involved in Group A—Without Switch and Group B—with switch for modified alar base cinching. Patients having cleft lip, palate, history of nasal surgeries, nasal & septal pathology and trauma to facial bones were excluded to prevent bias. All patients were evaluated preoperatively for alar base width (corresponding to the widest distance from junction of alar insertion at alar facial groove seen on frontal view) clinically using Digital Vernier Caliper (Fig. 2). The legs of caliper were placed at the widest distance- point of alar insertion. Vernier caliper was used to measure upper lip length (Sn-Stms) from sub nasale to stomion superioris. Nasolabial angle (Cotg-Sn-Ls) was measured on lateral cephalogram. Nasal & nasopharyngeal airway patency was assessed using nasal endoscopy. Postoperatively, all measurements were repeated at 1st, 3rd, 6th, and the 12th month to enable accurate changes in nasolabial soft tissues.

#### 2.2.1. Tube switch technique

The technique of tube switch used in this study was modified using protected zygomatic hook<sup>13</sup> in Group B patients for modified alar cinch to prevent alar base flaring. The technique was adopted from the study by Toshitaka Muto.<sup>12</sup> In our study, the technique of switch is modified using available instrument is well explained elsewhere.<sup>13</sup> The switch has been performed to move the nasal endo tracheal tube into the oral cavity to facilitate accurate and

predictive cinching. The procedure of the switch in this study is as follows, after fixing of bony segments at predetermined points using surgical occlusal stent, the temporary inter maxillary fixation removed to facilitate the switch, in turn helps for proper cinching.<sup>13</sup> Babcock abdominal clamp was used to stabilize the endo tracheal (ET) tube (Fig. 3). Modified zygomatic hook with protective tubing was used for nasal to oral switching<sup>13</sup> (Fig. 4). The connector was reattached to the ET tube which was secured to the lower lip/chin area with tape.<sup>13</sup> Later the modified alar cinch procedure performed in the absence of tube in nasal cavity for accurate cinching.

Prolene (2-0) suture material was used for modified alar cinch and Vicryl (4-0) for V-Y closure of lip in both the Groups. Nasolabial soft tissue changes were assessed at 1st, 3rd, 6th, and 12th month postoperatively. Alar base was marked using methylene blue ink before operation. 2-0 Prolene suture was inserted from levator and nasal muscles, including periosteum and passed through the nasal septum approximately 10 mm posterior to the anterior nasal spine. After passing through para-nasal muscles and periosteum, the suture was run back through nasal septum again to original entrance side and tied. The vestibular incision was closed in V-Y fashion in both the groups. The study considered the absence and presence of nasal tube for the effectiveness of cinch to prevent alar flaring.

### 3. Results

The mean age of male and female were 19.75 years (SD–2.4) and 22.5 years (SD–3.8) respectively. The total mean age of males and females was 21.71 (SD–4.8) (Table 1). On comparison, the difference of alar base width between Groups A & B (Tables 1 and 2) at different time intervals were statistically not significant, but the upper lip length and nasolabial angle (Table 1) were shown statistically significant results. Nasolabial angle at 1st & 3rd month post-op in Group A mean difference was 0.71° (p value–0.478) and in Group B was mean difference 1.29° (p value–0.343) (Table 2) both were statistically not significant.

### 4. Discussion

Alar base cinching is essential because of soft tissue changes associated with maxillary osteotomy which includes increased alar

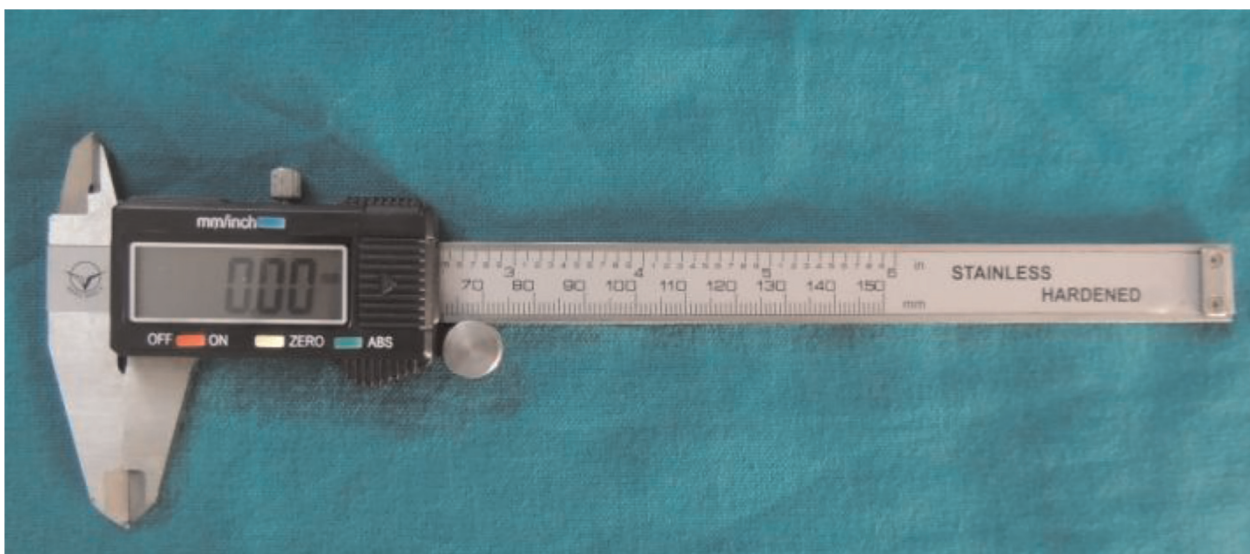


Fig. 1. Showing Digital Vernier caliper used to measure the alar base width and upper lip length.

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