



Tragal cartilage augmentation in repair of cleft palate, a new technique and its clinical implications

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ABSTRACT

Background: Cleft palate is one of the most common congenital anomalies of the head and neck worldwide. In addition to the evident feeding and growth problems, patients are involved with and suffer from speech, hearing and dental problems. Many surgical techniques and modifications have been advocated to improve functional outcome and aesthetic results, aiming at normal speech, minimizing growth disturbances, and establishing a competent velopharyngeal sphincter. Despite the variety of techniques described for repair of the clefts, there is still a relatively high incidence of postoperative fistula reaching up to 35%. This is mainly related to type and degree of the defect, and type of surgical repair.

Objectives: To evaluate the efficacy of placement of tragal cartilage free graft between the oral and nasal mucosal layers of the neo-palate in improving success rates, and anatomical and functional outcomes in repair of cleft palate with reduction of the extent of dissection.

Patients and methods: Fourteen patients were managed by our technique, only in large cases minimal von Langenbeck lateral release incisions were made. In all cases a tragal cartilage graft was interpositioned and fixed to the muscle layer of the neo-palate, 2–3 extramucosal trans-muscle sutures were placed for 3–4 weeks if needed, and the patients were followed up for a minimum of 12 months during which functional and anatomical assessments were done.

Results: Results, including both anatomical and functional outcomes, were favorable with no gross failures, permanent significant fistula formations (one case with minor non-significant fistula), nor donor site co morbidities.

Conclusion: The use of tragal cartilage free graft to augment the area at the junction between the hard and soft palate appears to be a safe and effective method in repair of cleft palate that reduces the incidence of postoperative palatal fistulae, without donor site comorbidities.

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1. Introduction

Cleft palate is a congenital deformity that causes a multitude of problems that represents a special challenge to the medical community. Speech production, feeding, maxillofacial growth, and dentition are just a few of the developmental stages that may be affected and need special care. A significant number of patients with cleft palate have associated syndromes that may result in cardiac, limb, or other system defects. Psychological effects on both the patient and the parents are important aspects that also need to be addressed [1–3].

Although cleft palate deformity was described hundreds of years ago, to this day, no agreed-upon management algorithm exists for patients with cleft palate [4].

Children born with a cleft of the palate should undergo surgical repair unless otherwise contraindicated. When surgical techniques were described, the goals were to perform anatomical and functional repair of the soft palate through closure of the defect and repositioning of the abnormally oriented and attached muscles. This anatomic repair attempts to facilitate the development of normal speech [5].

The use of tragal cartilage in repair of cleft palate defects as part of the primary repair has not been used by review of the literature, and the validity of using such a graft to avoid or minimize the use of pushback or lateral release incisions has not been tested, thus we designed a technique which uses tragal cartilage as a free graft to fill the defect in the junction between the soft and hard palates, and reduce the need for lateral release incisions aiming at minimizing the vascular impairment from excessive dissection, which might contribute to the development of palatal fistulae, and act as a template for growth of the mucosa of the palate even if defects persist after closure of the layers.

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2. Patients and technique

2.1. Ethical considerations

This study was approved by the ethical and moral committee of Ain-Shams University, provided the patients' parents agreed and consented on the surgery, knowing that this was a new technique, and with results to be reviewed by the committee every 3 months.

2.2. Level of evidence

Ib (Individual inception cohort study with >80% follow-up).

This work was performed as an "Individual inception cohort study". Fourteen patients (9 males and 5 females) were included in this research (including all patients coming to E.N.T. department at Ain-Shams University Hospitals, Cairo, Egypt), during the period January 2008 to November 2008. The patients' ages ranged from 9 months up to 11 years. Patients were graded according to system applied by Shah and Wong [6], all our patients were grade II, having clefts of the palate only.

Ten primary cases were included, and four cases with large palatal fistulae (due to failed fusion) after 9–60 months from primary intervention, for one of them this was the second revision surgery. All four revision cases were manifesting speech and nasal regurgitation problems. Preoperative prerequisites were fulfilled for all patients including stable general condition, Hemoglobin percent of at least 10 mg/dl, and oro-nasal area clear from infection.

Postoperatively patients were allowed soft high protein diet soon after complete recovery. Systemic antibiotics and analgesic anti-inflammatory agents were also given. Patients were discharged from the hospital 24–72 h after surgery, and seen twice weekly by the surgeons for the immediate postoperative 2 weeks, then followed up on monthly basis for the first 6 months, then bimonthly, till at least continuing 12 months from the surgery (for the last case done).

2.3. Surgical technique (Figs. 1 and 2)

After the nasal mucosal layer was freed with separation of nasal mucosa, the muscle layer was separated. Oral mucosal layer flaps were created, one side of the created nasal mucosal flaps was denuded for 2–3 mm, and the denuded flap side was undersutured with 3-0 vicryl horizontal mattress sutures, if approximation was impossible without tension, the area that was under stress was planned to be included in the area filled by the cartilage graft.

A sheet of tragal cartilage harvested according to the size of the defect (with a minimum size of 0.8 cm × 0.8 cm) was interposed between the nasal mucosal layer and oral mucosal layer, filling the rhomboid junction between soft and hard palate, the cartilage was sutured to the undermined muscle layer laterally, and again to the mucosal layer on its nasal surface laterally and posterior for support, then the oral mucosal layer was closed separately, also using 3-0 vicryl horizontal mattress sutures. This arrangement was planned to supply this area with three layers providing a tough and stable repair.

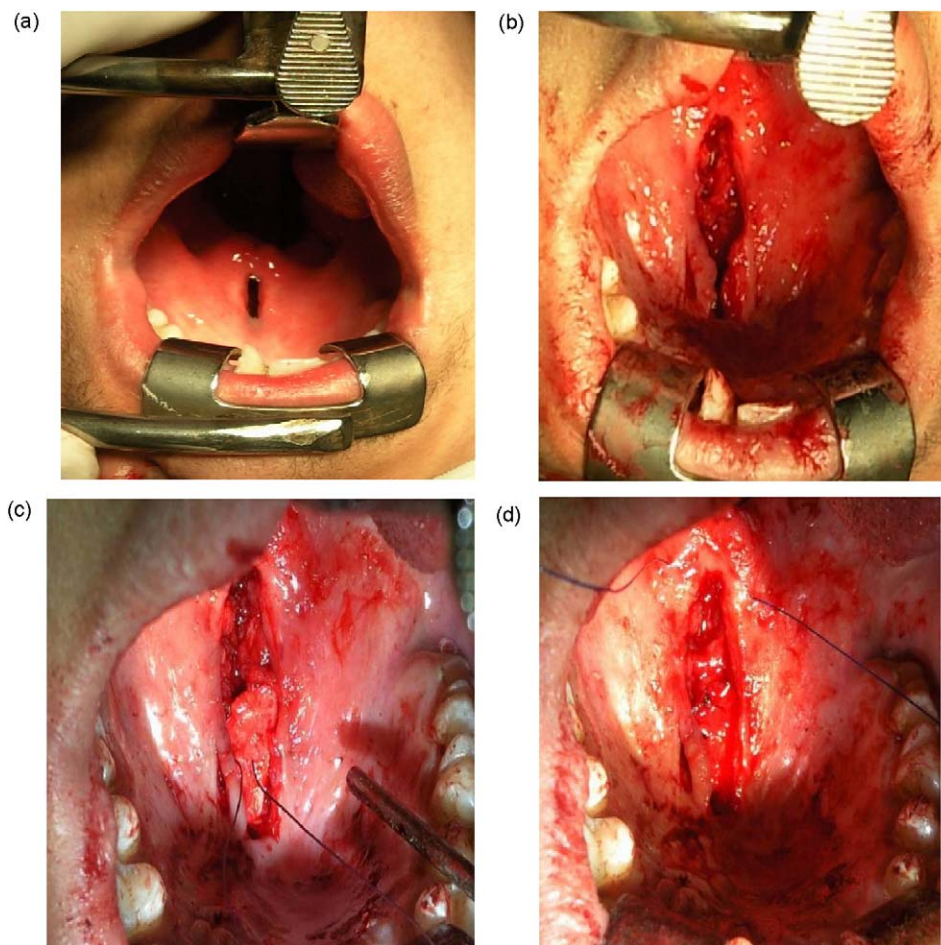


Fig. 1. A revision case corrected by the tragal cartilage technique, without lateral release incisions. (a) Preoperative picture; (b) after freshening the edges of the cleft and undermining the mucosal layers, the nasal mucosal layer is closed by inverted mattress sutures; (c) the cartilage graft is fixed by sutures to the muscle layer; (d) the final position of the fixed cartilage graft.

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