
Techniques in Cosmetic Surgery

In Situ Split Costal Cartilage Graft Harvesting through a Small Incision Using a Gouge

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A costal cartilage graft is one of the most useful materials in reconstructive plastic surgery. In this article, a technique of in situ split costal cartilage graft harvesting through a small incision (2 to 3 cm) using a gouge is described. The technique used has many advantages: it is a simple technique, is easy to learn, and can be performed quickly through a small incision. By avoiding complete costal cartilage graft harvesting, the associated potential complications such as pleural perforation, chest wall deformities, long-lasting postoperative pain, and incisional scar length are reduced. This technique will be useful in selected cases for which a complete block of costal cartilage graft is not needed. (*Plast. Reconstr. Surg.* 106: 932, 2000.)

Autologous cartilage is a versatile tissue that can be harvested from different donor sites. Donor-site morbidity should be considered when the cartilage graft is planned. The factors that determine donor-site selection are based on the amount and quality of cartilage needed, morbidity of the donor site, and experience of the surgeon.

The usual sources of cartilage grafts are nasal septal cartilage, ear cartilage, and costal cartilage. Costal cartilages are commonly used in the reconstruction of the ear, severe nasal deformities, and restoration of the facial bone contour.¹⁻⁴

Several techniques are available to harvest costal cartilage.^{1,5-7} The traditional methods are associated with the risks of pneumothorax, bleeding, chest wall deformities, persistent postoperative pain, and long scar.^{4,6} We describe a simple technique of in situ split costal cartilage harvesting using gouges. The simplicity and decreased risks of costal cartilage harvesting-associated complications are stressed.

MATERIALS AND METHODS

The technique was used by the senior author over a 10-year period to reconstruct the nose (Fig. 1) and restore facial bone contour in 30 patients, on whom we did not need whole costal cartilage.

SURGICAL TECHNIQUE

A transverse or slightly oblique incision of approximately 2 to 3 cm is placed in the sixth intercostal space or inframammary fold of female patients. After incision of the skin and subcutaneous tissue, the external oblique and rectus abdominis muscles are divided. The anterior surface of the sixth or seventh costal cartilage is exposed, and the perichondrium is dissected and elevated over the superior and inferior edges of the cartilage. Two parallel marks are then made on the anterior surface of the cartilage whose width and length are dependent on the amount of graft needed (Fig. 2). The cartilage is incised in partial thickness through the parallel marks. The depth of the incisions depends on the thickness of the cartilage graft layers required. The area between these two incisions is harvested by a gouge inserted on the lateral side and progressed, gently splitting the cartilage from the lateral to the medial side (Fig. 3, *above, left and right, and center, left*). During this maneuver, care is taken not to bend the graft. This harvesting is continued to obtain several layers of cartilage grafts (Fig. 3, *center, right*). The posterior segment of the costal cartilage with its perichondrium is left intact (Fig. 3, *below*). After a sufficient amount of cartilage has been harvested,



FIG. 1. A harvested cartilage graft to be used in the reconstruction of the nasal dorsum.

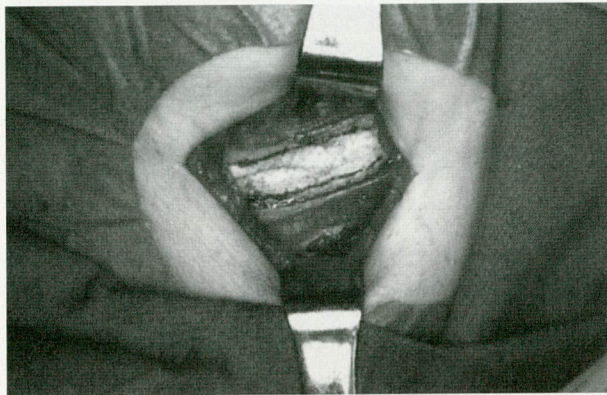


FIG. 2. Two parallel marks are made on the anterior surface of the costal cartilage after the perichondrium is dissected and elevated.

the dissected perichondrium is repaired with a 4-0 Vicryl (polyglactin, Ethicon, Somerville, N.J.) in running suture. The incision is closed in anatomic layers, and the skin is closed with a 5-0 Vicryl intracuticular suture.

DISCUSSION

There has been no pneumothorax, infection, hematoma, or donor-site morbidity in any of our patients during 10 years of experience.

Cartilage graft is commonly used for the reconstruction of primary and secondary deformities. Costal, nasal septal, and auricular cartilages are well-known sources of cartilage graft. Auricular cartilage is well adapted to lower eyelid reconstruction and is also used in orbital floor and nasal reconstruction.⁸⁻¹⁰ Septal nasal cartilage is mostly used for nasal reconstruction.⁴ Both auricular and septal cartilages are of limited supply, and they may become insufficient.⁴ When a large amount of cartilage or solid cartilage is needed for a graft, as in the cases of facial bone contouring and nasal re-

construction, especially when septal cartilage is not available, costal cartilage is suitable.²⁻⁴ Complete costal cartilage harvested from the seventh to ninth ribs has been used for ear reconstruction.¹

Traditional costal cartilage harvesting may be associated with pulmonary complications and chest wall deformities and requires larger exposure, needs a longer incision, and is also time consuming.^{4,6} In this group of patients, the healing process is longer and postoperative pain is accentuated and long lasting. After complete costal cartilage harvesting, closure of the perichondrium is essential, otherwise cartilage regeneration will be incomplete and chest wall deformities will develop.^{6,11}

In most nasal reconstructions, a complete block of costal cartilage is not required. Many young plastic surgeons approach this type of cartilage graft harvesting cautiously because of the related complications and morbidities. With this partial-thickness cartilage graft, because the posterior segment of the cartilage is left intact, the perichondrium closure is easier. Postoperative pain is less, healing is more rapid, and the incision scar is small, which is better accepted by the patient.

The harvested cartilage grafts can be placed in the alar region as a thin layer and also can be used as a spreader graft in those with impaired internal nasal valves. Again the small segments of the costal cartilage can be diced into small pieces and wrapped in Surgicel (oxidized regenerated cellulose, Ethicon) to be used as a "Turkish delight" in the reconstruction of the nasal dorsum.^{12,13} It can also be used as a strut graft in the reconstruction of columella.

Endoscope-assisted costal cartilage harvesting through a small skin incision has been described, providing a better remote access incision site while reducing the risk of pleural laceration; however, it needs special instrumentation and experience.⁵ Our technique is simple, can be performed quickly (reducing the time of surgery), requires no complicated instruments, and can be learned easily. Additionally, an adequate amount of cartilage graft can be obtained through a small incision. We think that, with the utilization of this simple technique, there will be more interest in using autogenous cartilage graft instead of alloplastic implants.

In conclusion, when whole costal cartilage is not necessary, we prefer to harvest the cartilage

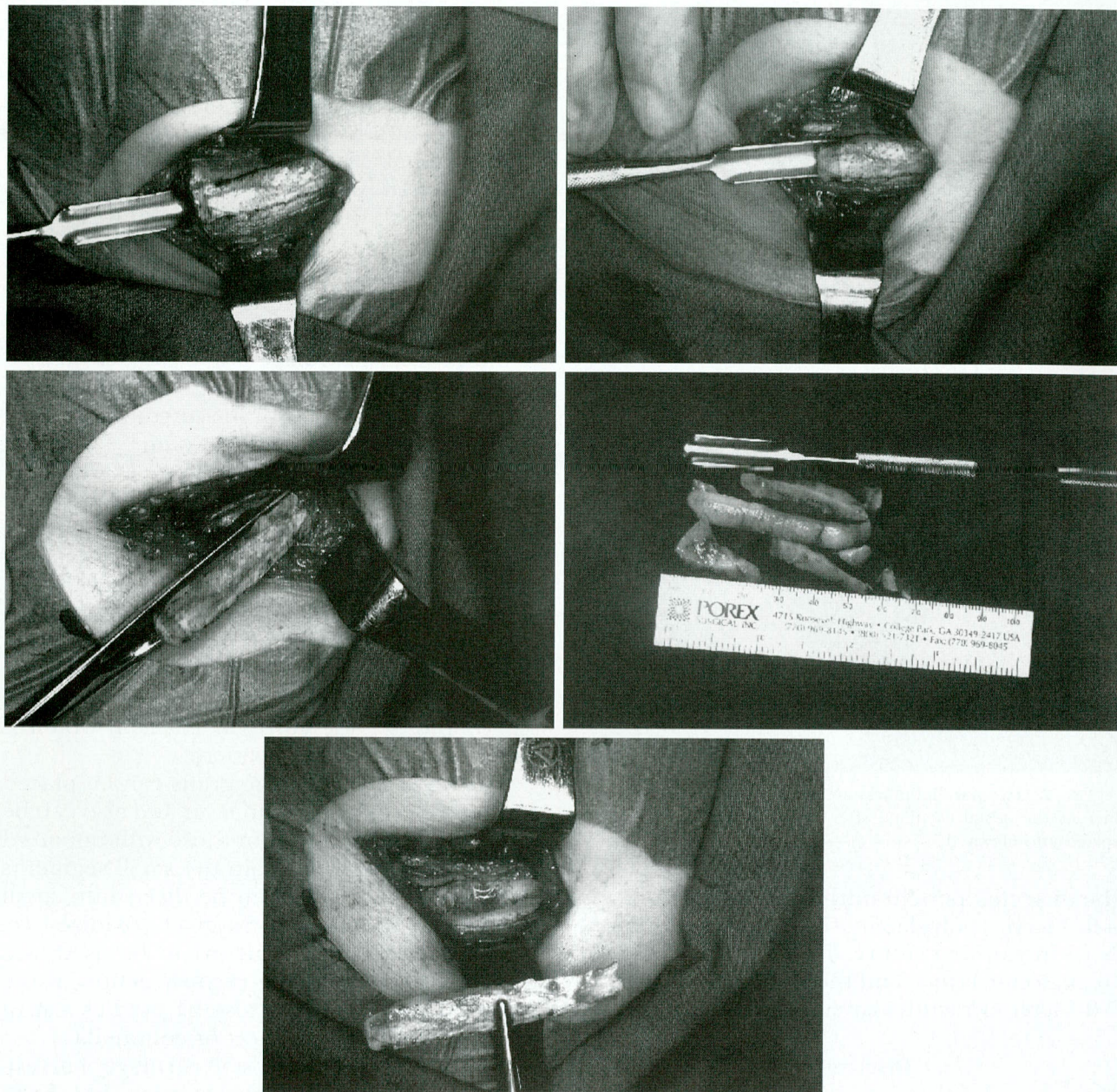


FIG. 3. (Above, left) A gouge is inserted on the lateral side. (Above, right, and center, left) The gouge is progressed, gently splitting the cartilage from the lateral to the medial side. (Center, right) Layers and segments of the cartilage grafts of different thicknesses and sizes are harvested. (Below) Cartilage graft harvesting is completed. The posterior segment of the cartilage with its perichondrium is left intact.

layers and chips through a small incision by using a gouge. We hope that this simple technique will provide an alternative approach to our surgical armamentarium.

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