

# Supracrural Ligament Graft in Rhinoplasty

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## Abstract

Irregularities of the nasal dorsum or tip are a potential risk after rhinoplasty. Patients with thin skin are considered to be at a higher risk of these irregularities. Different materials and grafts to address areas that may result in a contour irregularity postoperatively include diced or crushed cartilage, temporalis fascia, fascia lata, and AlloDerm. We describe a new graft, the supracrural ligament graft, which can be used to camouflage or add bulk during primary rhinoplasty. The graft is harvested easily during the initial exposure and does not require additional surgical sites or extra dissection. In this research, we described the use of the supracrural ligament graft in 49 patients. We found the average graft size to be  $0.6 \times 0.4$  cm. The graft was used in the following locations: nasal tip (49%), radix (40%), and nasal dorsum (10%). No complications were seen using the graft in any of the 49 patients. In conclusion, the supracrural ligament graft is a safe, simple, and effective camouflage graft for commonly encountered irregularities in rhinoplasty. Common areas of use include the nasal dorsum and nasal tip. Routine harvest of this graft may obviate the need to use either additional grafting material or an additional surgical site to help camouflage areas of concern in thin skin patients.

## Keywords

- rhinoplasty
- graft
- ligament
- dorsum
- radix

Irregularities of the nasal dorsum or tip are a potential risk after rhinoplasty. Patients with thin skin are considered to be at a higher risk of these irregularities, as thicker skin helps camouflage areas of concern. Different materials and grafts to address areas that may result in a contour irregularity postoperatively include diced or crushed cartilage, temporalis fascia, fascia lata, and AlloDerm.<sup>1</sup> These are time-tested and potentially require cartilage or a second surgical site, adding time and potential morbidity to the operation. The ideal graft would be easy to harvest, be accessible in the same operative site, have low long-term resorption rate, and be soft.

The soft tissue between the medial and intermediate crura is part of the superficial musculoaponeurotic system and goes by many names including Pitanguy's ligament, interdomal ligament, interdomal sling, dermocarilagenous ligament, and intercrural soft tissue ligament.<sup>2,3</sup> Courson and Adamson described using this soft tissue as a free tissue graft for

coverage of contour irregularities and coined the term *intercrural fascia graft*.<sup>4</sup> This graft is dissected from the level of the domes, off the intermediate and medial crura, down the caudal septum, and, finally, freed inferiorly off the nasal spine. They found this graft useful in primary rhinoplasty patients and most commonly placed them at the nasal tip.

We describe a new graft termed, the *supracrural ligament graft*, which is anatomically different than that previously described by Courson and Adamson. This graft can be harvested in a simple and expedient fashion when opening the nose. We describe this technique in 49 primary rhinoplasty patients.

## Surgical Technique

The senior author most commonly uses the open approach for primary and revision rhinoplasty. Standard transcollellar and marginal incisions are made and the skin–soft



**Fig. 1** Open rhinoplasty approach with Pitanguy's ligament isolated.



**Fig. 2** The supracrural ligament graft is harvested first with the superior cut in the subcutaneous plane. Forceps are seen grasping the soft tissue graft material after this cut has been made.

tissue (SST) envelope is elevated in a standard fashion along the lower lateral cartilages. As the SST envelope is elevated over the domes, dissection is performed in the subcutaneous plane through the decussating fibers. Pitanguy's ligament is then isolated (► **Fig. 1**), and the soft tissue above the domes sharply are dissected superiorly close the nasal skin (► **Fig. 2**). This superior cut requires the surgeon to be out of plane and above the true subperichondrial plane. This dissection plane is reestablished just above this supratip area, and the rest of the midvault and nasal bones are exposed in the standard fashion. Once the nose is fully open, the soft tissue is grasped and sharply cut inferiorly at the level of the domes (► **Fig. 3**). This soft tissue graft is then kept in saline during the case until it is used. When using the graft, it is placed at the end of the case just before the final redraping of the SST envelope and closing. We do not secure the graft with any suture or other fixation material. It is important that the nose is not manipulated after placement as the graft could move from its intended location.

## Discussion

We describe the use of the supracrural ligament graft in 49 patients. We found the average graft size to be 0.6 cm × 0.4 cm (► **Fig. 4**). The graft was used in the following locations: nasal tip (49%), radix (40%), and nasal dorsum (10%). The most common reasons for its use on the nasal tip

include thin patient skin and desire to improve tip projection. The sole reason for use on the radix was to augment the height of the radix. The most common reasons for use on the nasal dorsum include dorsal contouring, unilateral camouflage graft, and supratip augmentation. No complications were seen using the graft in any of the 49 patients.

The senior author routinely harvests this graft in all primary rhinoplasty patients. It may also be harvested in an endonasal fashion with proper dissection over the domes. It is important to note that this graft is a different, albeit smaller, graft than the intercrural fascia graft described by Courson and Adamson. More important than the technical difference between grafts is the rationale why the senior author harvests the supracrural ligament graft in all primary rhinoplasties and not the intercrural fascia graft. By dissecting the soft tissue attachments between the medial crural, down to the nasal spine, and back toward the septum, a soft tissue deficiency can be created that is noticeable externally through the skin. This manifests as a visible depression between the medial crura and needs to be filled in with either soft tissue or a columellar strut. Additionally, violating tip support mechanisms for a graft that may not be used does not align with our goals of limiting dissection and tip destabilization during rhinoplasty. Therefore, while more grafting tissue is always desirable (intercrural fascia graft), we believe that it needs to be performed in specific cases and not routinely employed in all rhinoplasties.





**Fig. 3** The supracrural ligament graft is harvested with the inferior cuts at the level of the domes



**Fig. 5** Supracrural ligament graft in place over the nasal tip.



**Fig. 4** Supracrural ligament graft.



**Fig. 6** Lateral view of the supracrural ligament graft in place over the nasal tip.

The supracrural ligament graft is well suited for small irregularities commonly encountered along the dorsum and nasal tip (►Figs. 5 and 6). Dorsal irregularities are common after dorsal reduction. Thus, careful attention must be paid to smoothing the bridge of the nose with all bony edges and/or cartilage pieces and must be addressed to avoid these contour irregularities. If contour irregularities exist, the ligament graft is well suited to camouflage or augment an area of concern on the dorsum. Crushed cartilage grafts are commonly used; however, there is a risk of contour irregularities and the graft

being palpable. Thus, it is the senior author's preference to not use crushed cartilage grafts on the nose if they can be avoided.

When radix augmentation is needed, the ligament graft is perhaps the best-suited material. It is typically the appropriate size for the radix, provides more bulk than a fascia graft, and is much softer than crushed cartilage. The ligament graft is also very useful to help camouflage small midvault asymmetries. Properly placed soft tissue on the side of concern can effectively mask a small deviation. We have also used this graft to augment the supratip when the tip–supratip relationship is not in harmony. If it is felt that the tip complex is too high compared with the supratip, placement of this graft in the supratip allows a smooth transition and avoids the use of crushed cartilage in this area.

Manipulation of the lower lateral cartilages can also result in edges or irregularities in the cartilage that can result in bossae postoperatively. In certain skin types, these may not become noticeable. However, in high-risk patients with thin skin, a graft of either crushed cartilage or temporalis fascia is commonly used. As we have discussed previously, crushed cartilage grafts are not our preference. While fascia has a good texture and thinness for the nasal tip, it does require an additional surgical site and adds potential complications such as alopecia. The supracrural ligament graft is very useful in these cases as it is thin, soft, and harvested while opening the nose. It is important to note that patients with thin skin have the least amount of graft material to harvest. Thus, in cases where the most tissue is desired is where you will get the smaller grafts. This is a challenge and frequently leads to the surgeon using the graft at only one location (tip, radix, dorsum, etc.) even if there was an additional area of concern. It is important to realize the limitations of this graft and use other techniques, when necessary, if the supracrural ligament graft does not adequately address the issue. All cases were performed on primary rhinoplasty patients as availability of this tissue in revision rhinoplasty cases is highly variable depending on the approach and dissection done.

While we certainly are not the first surgeons to use this part of Pitanguy's ligament as a soft tissue graft, we are the first, to our knowledge, to describe it in the literature. We believe it is important to describe this technique in the literature for the benefit of readers who have not been exposed to this useful graft. There are also important limitations of this study. Our primary outcome was complications seen in a series of patients, but we did not look at graft resorption or quantify the amount of tissue bulk each graft provided. This would be an important study to understand how much soft tissue projection either over the radix, dorsum, or tip, one can achieve with this graft and how long-lasting its effects are.

## Conclusion

The supracrural ligament graft is a safe, simple, and effective camouflage graft for commonly encountered irregularities in rhinoplasty. The graft can be easily obtained during initial exposure of the nose and does not require an additional harvest site. Common areas of use include the nasal dorsum and nasal tip. Routine harvest of this graft may obviate the need to use either additional grafting material or an additional surgical site to help camouflage areas of concern in thin skin patients.

## Conflict of Interest

None declared.

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