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IDEAS AND INNOVATIONS

Reconstructive

Control of the Suborbital Cheek in Pediatric Patients: Working in the Deep Plane

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Background: Reconstruction of suborbital cheek and lower eyelid defects can be challenging in pediatric patients due to the need for lower eyelid support, lack of reliable local tissue, and difficulties of scar concealment. The deep-plane cervicofacial rotation-advancement flap is a useful technique for cheek reconstruction in adults; however, its utility in the pediatric population has not been described.
Methods: Experience using the deep-plane Schrudde flap for large suborbital defects in pediatric patients is presented.
Results: Safe flap elevation and successful reconstruction requires utilization of critical anatomic landmarks, a standardized sequence of dissection and appropriate fixation.
Conclusion: The deep-plane Schrudde flaps is a useful technique for reconstructing otherwise challenging defects of the suborbital zone in pediatric patients.
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INTRODUCTION

Reconstruction of the suborbital cheek remains a challenging endeavor. Repairs in this region yield visible asymmetry on frontal view and require large local flaps to provide adequate tissue without violating the cheek aesthetic subunit. Although the subcutaneous cervicofacial flap has been used for larger defects in this region,[1–3] simple skin flaps will often not reliably reach the nasojugal region without increased risk of complications.

Translation of composite rhytidectomy techniques[4] to cheek reconstruction[5,6] allowed for improvement in perfusion and mobilization of the cervicofacial flap with subsuperficial musculoaponeurotic system (SMAS) dissection and release of the retaining ligaments in the cheek. The Schrudde angle rotation flap[7] was similarly adapted to the deep plane to improve blood supply and allow for readvancement.[8] Deep-plane cervicofacial advancement has been utilized to treat a variety of facial defects[9–11]; however, its use for suborbital reconstruction in the pediatric population has not been well described.

SURGICAL TECHNIQUE

Flap Design

The Schrudde flap is designed with the initial flap incision carried straight posteriorly,[8] without an upward slant as in a Mustardé flap, for a distance equal in length to the upper defect width. The incision is then angled downward toward the mid-tragus and along the anterior ear. The incision proceeds around the lobule and a 60- to 80-degree advancement triangle is designed behind the ear, which is transposed and trimmed anterior to the tragus to close the preauricular defect. The lobule is not inset to allow the earlobe to autotube. Additional dog-ear excision behind the ear and drain placement is performed at this part of the closure. The medial excision is designed so the dog-ear is removed in the nasolabial fold as needed.

Flap Elevation

Specific anatomic methods make elevation of this flap reliable and straightforward. The zygomaticus major is initially approached from the suborbicularis plane into the prezygomatic space. This structure is readily visible in infants (Fig. 1) and serves as the most important landmark for elevation of the composite facial flap, marking the transition of dissection to the subcutaneous plane. A vertical line is dropped from the lateral orbital rim as a reference for the origin of the zygomaticus major. The superior aspect of the flap is incised at this point and blunt dissection is carried through the orbital orbicularis overlying the zygomatic body to identify the muscle at its origin.

The upward and forwardly advancing flap is subsequently elevated starting laterally in the subcutaneous plane and transitioned to a sub-SMAS plane around 1 cm anterior to the tragus.[12] Dissection proceeds medially using oblique spreading with blunt scissors to protect facial nerve branches on the downside. Around 3.5 cm along the zygomatic arch, zygomatic cutaneous retaining ligaments are reached and released. Dissection then transitions superficially to the subcutaneous plane to proceed over the zygomaticus major and join the prior prezygomatic dissection.

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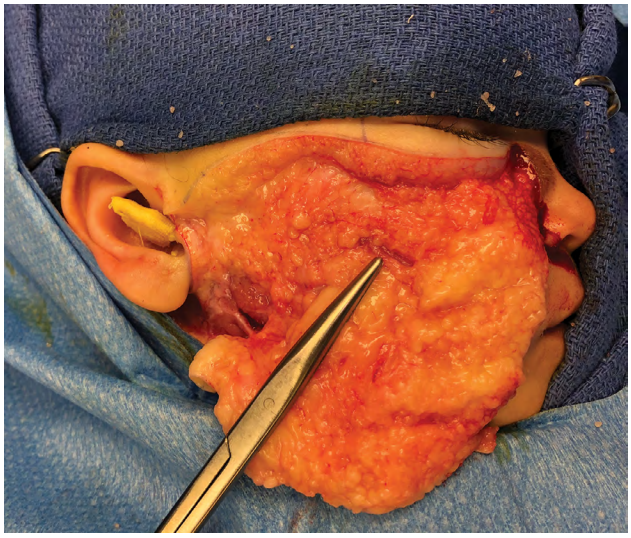

Fig. 1. Intraoperative photograph after elevation of a cervicofacial flap in the deep plane in a 15-month-old patient (case example). Scissors point to the readily identifiable zygomaticus major that serves as a critical landmark for transitioning the dissection from the sub-SMAS to the subcutaneous plane. The origin of the zygomaticus major is reliably identified using a vertical line dropped down from the lateral orbital rim.

CASE EXAMPLE

Fifteen-month-old girl with a congenital nevus of the right suborbital cheek (12 cm^2) extending onto the right nasal sidewall (Fig. 2). A single-stage deep-plane cervicofacial flap was designed to extend to the most medial aspect of the cheek. The excised dog-ear from the nasolabial fold was used to resurface the nasal sidewall subunit. Lower lid support was provided with fixation of the flap to the lateral orbit periosteum.

DISCUSSION

The cheek is best reconstructed by adjacent tissue transfer from neighboring areas of the face as opposed to a thin expanded flap.[13] The suborbital cheek, especially in children, pushes the limits of traditional reconstructive modalities due to skin reliability and lower eyelid concerns.

Variations of subcutaneous Mustardé rotation flaps have been used to reconstruct the suborbital cheek.[14,15] When defects extend farther toward the midline, the limitations of random-pattern cutaneous flap become more evident. Mustardé flap incisions must be carried cephalad initially, and usually result in the formation of a preauricular defect. Restrictions with mobility and perfusion are overcome by flap design with wide bases, flaps with perforators, or flaps that extend into the neck and beyond to recruit tissue.

The most distal aspects of large random-pattern flaps are inherently unreliable. This is problematic with suborbital reconstruction as the most tenuous part of the flap is usually either adjacent to, or partially used to reconstruct the lower lid. The inclusion of the SMAS and platysma as a composite flap with deep-plane dissection significantly improves its vascularity[16] and reliability.

Elevation of the Schrudde flap in the deep plane also facilitates upward and medial mobility of the flap. The Schrudde flap incisional scars are hidden along the nasojugal area, in the nasolabial fold, under the lobule and behind the ear. Furthermore, elevation in the deep-plane allows the Schrudde flap to be readvanced by redesigning a retroauricular triangular extension.

The use of V-Y flaps has also been described to treat defects of the suborbital cheek.[17,18] This flap is a good reconstructive option for smaller defects in older patients with redundant skin; however, its utility is more limited in large defects and young patients. The incisions result in a second vertical linear scar across the malar eminence that must often be carried below the commissure.

Drawbacks of deep-plane dissection include the risk of injury to the facial nerve branches. Standardized use of critical landmarks including the zygomaticus major, orbicularis oculi, and retaining ligaments of the cheek allows the surgeon to remain in the correct dissection plane. In addition, the suborbicularis approach to the zygomaticus major allows the surgeon to safely delineate the

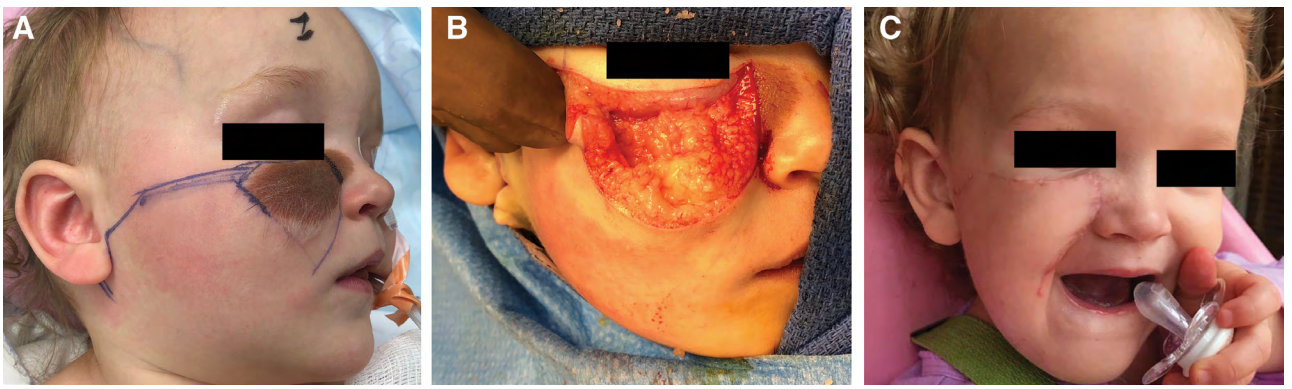

Fig. 2. Case example of deep-plane Schrudde flap utilized for reconstruction after suborbital nevus excision. A, 15-month-old girl with congenital nevus of the right suborbital cheek and nasal sidewall. Flap design with retroauricular triangle advancement and excision of dog-ear in the nasolabial fold. B, Suborbital defect excision and elevation of flap. C, Postoperative result at 12 months after surgery. The flap was inset without tension and had good perfusion throughout the postoperative course. A full thickness skin graft from the nasolabial dog-ear excision was used to resurface the nasal sidewall subunit defect.

appropriate transition in dissection planes. An appropriate technique with oblique spreading with blunt scissors is also crucial.

CONCLUSIONS

The deep plane angle-rotation flap can be used to successfully treat large suborbital defects in pediatric patients. Benefits of this flap over traditional subcutaneous cervicofacial flaps include improved vascularity and flap-tip reliability, increase mobility, limited scar burden, deep tissue support and the ability to provide a single-stage reconstruction in cases that may otherwise require tissue expansion. These characteristics have proven particularly useful in the pediatric population to minimize complications and improve aesthetic results. Success of the flap relies on utilization of critical anatomic landmarks to guide dissection as well as meticulous dissection technique.

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