Facial Plastic Surgery in Pediatric Otolaryngology: Role and Outcomes

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ABSTRACT

Importance: Otolaryngologists tend to manage most surgical pathology independently as supported by their training. However, superior aesthetic outcomes and caregiver satisfaction can be achieved by routinely involving facial plastics colleagues for reconstruction after resection of pediatric head and neck masses.

Objective: To highlight the cosmetic outcomes achieved after reconstruction by facial plastics surgeons in pediatric patients who have undergone resection of a head and neck lesion

Design: Retrospective case series of 13 pediatric head and neck lesions managed at a tertiary care children’s hospital over a 12 year period

Setting: Tertiary care children’s hospital

Participants: Pediatric patient undergoing resection of a mass in the head or neck including naso-frontal dermoids, neck lesions, midface lesions, parotid lesions where complex closure was anticipated and a facial plastics surgeon was used for reconstruction. 13 pediatric patients were selected in all. The patients were chosen on a case by case basis and there were no patients that refused intervention. There was no comparison group and no one that withdrew. A referred sample was used as only these patients pre-selected based on their projected reconstructive needs were selected.

Intervention(s): The primary intervention was an aesthetically acceptable reconstruction. In order to review the intervention that was performed the information obtained included clinical presentation, radiologic findings, surgical technique used for excision and reconstruction, pre and post-operative photography, pathology and cosmetic outcomes.

Keywords: Facial plastics, Midface lesion, Pediatric reconstruction.

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Pediatric head and neck masses are unusual and generally of congenital or infectious origin. Unlike in adults, the differential diagnosis is limited, and treatment algorithms tend to lean toward conservative management when possible. When surgical excision is determined to be the preferred treatment and a cutaneous defect results, the closure can be complex and challenging. The pediatric otolaryngologist may look to their facial plastic colleagues who have a better understanding of the cosmetic aspects of head and neck reconstruction for help. There is little description of the objective cosmetic outcomes of reconstruction of the pediatric head and neck. The reconstruction after nasal dermoid excision is well described including a vertical midline approach as well as open and closed rhinoplasty approach. However, there has not been a series that describes the reconstructive efforts after excision of other head and neck lesions such as neck masses with cutaneous involvement, midface or parotid lesions. This review serves to highlight the benefits of a team approach to managing lesions that produce a cosmetic defect with involvement of the facial plastic surgeon in reconstruction. It emphasizes the key physical and psychological differences in cosmetic reconstruction of the pediatric patient with a head and neck defect.

Lesions requiring significant excision of skin and subcutaneous tissue are fortunately rare in the pediatric population, but deserve special attention due to the changing dynamics of growth. Based on the diagnosis and the decision regarding surgical excision, there should also be a plan for potential reconstruction if required and whether or not this service will be performed by the primary surgeon or a facial plastic colleague. An understanding of what defect will remain after excision is essential and can help in determination of incision planning to work toward an ideal esthetic closure. We present a series of pediatric patients who underwent excision of lesions in the head and neck in cosmetically sensitive areas and had reconstruction performed by a facial plastic surgeon. A retrospective review of 13 cases that presented to a single, tertiary institution over 6 consecutive years was performed and those that had photographic documentation and radiologic imaging were included. All patients had their primary mass of the head and neck resected by a single pediatric otolaryngologist with reconstruction by a single facial
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The children’s ages ranged from 18 months to 12 years. There were four nasofrontal dermoids, four head and neck skin lesions, three midface/orbital bony lesions, and two parotid/facial soft tissue lesions. Six patients were managed by soft tissue advancement flaps, two required complex linear closure, and two had a surgical exposure achieved with cosmetically placed incisions. Two patients needed a midface degloving approach for exposure, one required medial osteotomies and bone pate for reconstruction, and two were managed with calvarial bone grafts.

Figures 1A and B show a 2-year-old with a nasal dermoid that was excised using an elliptical incision with a vertical incision extended superiorly over the nasal dorsum. The skin over the superior portion of the cyst was deemed to be too thin to remain viable after excision, so the skin was excised with the mass creating dumbbell-shaped deformity necessitating undermining and excision of the mid portion of the defect for primary closure. The nasal superficial musculoaponeurotic system (SMAS) was used as a deep layer and the skin closed with Dermabond. Figures 2A and B demonstrate a pilomatrixoma where, after elliptical excision, the incision was extended superiorly by approximately 1.5 cm and inferiorly 1 cm with extensive undermining approximately 2 cm posterior to the auricle. This allowed advancement of the cheek flap posterior superior to hide the incisional closure in the periauricular crease with minimal tension of the skin. The technique used for this closure is similar to that used for face lifts.

Figures 3A to C demonstrate excision of a large infantile hemangiopericytoma from the right neck and periparotid region. The facial plastic surgeon elevated a composite cheek flap just deep to the SMAS to provide access for
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Figs 3A to C: (A) A large cervical hemangiopericytoma; and (B) with appearance of incision immediate post excision, and after six months (c)

resection and to preserve a healthy and viable flap. After completion of the resection, a standing cone deformity was left measuring approximately 1.5 cm. This was excised to create a linear closure within the preauricular sulcus.

Reconstructive efforts in the pediatric patient population have several unique features. Compared with adults, children's facial skin has a greater density of dermal appendages which can lead to faster reepithelialization and improved wound healing. Further contributing to this rapid wound healing in children are an increased number of fibroblasts with more rapid production of collagen and elastin.4 However, this same feature can lead to overcompensation and hypertrophic scarring. This can be particularly problematic in prepubescent children who have not yet experienced the extensive growth of adolescence. Children also have decreased epidermal-to-dermal cohesion, deficient stratum corneum, impaired thermoregulation, and an immature immune system, which overall places them at increased risk for epidermal stripping, infection, increased transepidermal water loss, and heat loss.4 It is important for the reconstructive physician to keep in mind these differences with tissue handling as well as postoperative wound care.

The psychosocial effects of poor wound healing can affect a child's self-image.5 Children with facial scars may be avoided or stigmatized by their peers and may be at risk for low peer acceptance.6 Demellweek et al7 demonstrated that children with facial disfigurements may be stared at; face teasing, ridicule, and isolation; and be targets for bullying. Many of the studies in poor head and neck wound healing have been conducted in burn victims, and the emotional disturbances as a result from these injuries is dramatic and well documented.8 The face is an important part of a child's ability to interact with the world around them, and this can be altered with significant scarring. Young children are in the process of forming a concept of self-image, and this can be dramatically impacted by any type of physical disfigurement. These children can be at risk for emotional and psychologic disturbances that can limit mental growth and development.9 Bakker et al performed a systematic review of the literature on emotional, behavioral, and social outcomes on children after scaring induced from burns. They concluded that child anxiety, traumatic stress reactions, and behavioral problems were identified in the first months after the event. More significantly, they noted that a subset of children had long-term psychological problems with anxiety, depression, and difficulty with social functioning.10 Extrapolating data from craniofacial reconstruction literature, it has been shown that improving a patient's facial characteristics at a young age can prevent psychosocial trauma from society.11 When evaluating children that have undergone intervention for cleft lip/palate, it has been demonstrated that a subset of children who are dissatisfied with their appearance will have lower self-concepts and self-esteem.12 Therefore, it is important that reconstructive efforts are maximized at the initial surgery with avoidance of need for revision reconstructive efforts at a later date. An ideal reconstructive effort is essential in the pediatric population and challenging cases can often benefit from expertise of a facial plastic trained otolaryngologist. An understanding of the wound healing and psychosocial differences in children compared with adults is important, as it allows the surgical team to set realistic expectations during preoperative counseling as well as select the most appropriate operative technique to maximize successful outcomes.

At our institution, we find it helpful to have an open preoperative discussion regarding the reconstructive efforts for the child. A well-informed parent is more likely to be satisfied with their child's surgical care. Understanding that there is involvement of a team that focuses not only on removing the mass or disease but detailed planning with the goal of achieving the maximal esthetic outcome is reassuring to the parents and can build upon
the parent–physician relationship. Bennett11 found that a discussion regarding family expectations particularly regarding potential stigmata of facial disfigurement can lead to improved management as the patient proceeds through the healing process. If a family has attributed negative social events to the patient’s facial mass or deformity, then they may have expectations that intervention will alleviate these events. Oftentimes, a family may not be as readily forthcoming with this information and a more probing and in-depth discussion can be of benefit. If there does appear to be underlying concern about the social stigma associated with the mass or reconstruction, then it may be helpful to have assistance from a mental health professional.11 An extensive preoperative discussion also allows an opportunity to discuss the possibility of revision surgery for ideal esthetic outcome should it be necessary in the future.

There should be an appropriate discussion between the pediatric otolaryngologist and the reconstructive team regarding incision planning prior to surgery. A detailed understanding of the major esthetic subunits of the face as well as their subunits can help with planning for incision placement and hiding the scar. Ideally incisions should be made within or parallel to the relaxed skin-tension lines. These may be less visually distinct in the pediatric face and neck but should be anticipated as the face grows and matures. For more complex reconstruction, particularly with involvement of the bony facial structure, there must be a balance between donor site morbidity and overall esthetic outcome. These concepts are better understood and managed by a facial plastic surgeon. Calvarial bone is considered the graft material of choice for reconstruction and managed by a facial plastic surgeon. Calvarial bone is the graft material of choice for reconstruction and considered the graft material of choice for reconstruction and managed by a facial plastic surgeon. Calvarial bone is the graft material of choice for reconstruction and managed by a facial plastic surgeon. Calvarial bone is the graft material of choice for reconstruction and managed by a facial plastic surgeon. Calvarial bone is the graft material of choice for reconstruction and managed by a facial plastic surgeon. Calvarial bone is the graft material of choice for reconstruction and managed by a facial plastic surgeon. Calvarial bone is the graft material of choice for reconstruction and managed by a facial plastic surgeon. Calvarial bone is the graft material of choice for reconstruction and managed by a facial plastic surgeon. Calvarial bone is the graft material of choice for reconstruction and managed by a facial plastic surgeon. Calvarial bone is the graft material of choice for reconstruction and managed by a facial plastic surgeon. Calvarial bone is the graft material of choice for reconstruction and managed by a facial plastic surgeon. Calvarial bone is the graft material of choice for reconstruction and managed by a facial plastic surgeon. Calvarial bone is the graft material of choice for reconstruction and managed by a facial plastic surgeon. Calvarial bone is

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involvement of the facial plastic surgeon will enable careful monitoring of cosmetic aspects of treatment over the long term. There are extensive treatments available for creation of an ideal scar which may not be available in a regular pediatric otolaryngology practice, and discussion of them is outside the scope of this article. The team approach facilitates this evaluation and discussion which is then built into the surgical and postoperative plan.

The facial plastic surgeon complements the pediatric otolaryngology team by adding a skill set based on aesthetic and reconstructive principles as well as a familiarity with delicate soft tissue closure technique, scar concealment and management, and complex approaches to the craniomaxillofacial skeleton. The cases highlighted in this series present a concept of using a multidisciplinary team for the care of pediatric patients who require resection of cervicofacial lesions resulting in cosmetic defects and undergoing planned reconstruction. This results in superior patient care and satisfaction. Further studies with the use of validated questionnaires for parents regarding the esthetic outcome could yield quantifiable results. It can be used as a model for implementation at institutions where these resources are available.

REFERENCES