TITLE: Auricular Reconstruction
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Auricular reconstruction is a challenging reconstructive entity complicated by the high ratio of skin coverage to cartilage, inconsistent blood supply, and complex three-dimensional structure with subtle topographic details. The goal of reconstruction of the pinna is normal appearance, position, and symmetry with respect to the contralateral ear. Realistic expectations must be established with the patient prior to undertaking reconstruction.

In order to plan and perform a successful repair, several principles are important to apply:

1. The relationship of the periauricular skin and postauricular sulcus should be preserved with reconstructive efforts.

2. Thin and well-vascularized skin is a necessity. Furthermore, scar tissue, poorly vascularized tissue, and noncompliant skin must be replaced.

3. The surgeon must be able to anticipate the immediate and delayed consequences of tissue manipulation. Consider the effect of tissue manipulation on hair-bearing skin, but do not allow this to compromise your ultimate quest for contralateral symmetry as hair-bearing skin can be eliminated at a secondary stage.

Psychosocial Impact

Auricular reconstruction has been shown to have a significant psychosocial benefit in the majority of patients treated, despite donor-site morbidity and a range of technical results. This was established by Horlock et al in a retrospective review. The sample group included patients with congenital or acquired auricular deformities that had either autogenous or osteointegrated reconstruction. There was significant psychosocial morbidity causing reduced self-confidence associated with auricular deformity. Teasing was prominent and the main motivation for surgery in children, while dissatisfaction with appearance was the main motivation for surgery in adults. Surgical intervention resulted in improved self-confidence, thus enhancing social life and leisure activity.

Embryology

During the sixth week of gestation, the auricle begins to arise from the first and second branchial arches. The anterior hillocks from the first branchial arch give rise to the tragus, the root of the helix, and the superior helix. The posterior hillocks from the second branchial arch give rise to the antihelix, the antitragus, and the lobule. The concha and the external auditory meatus is formed from the first branchial groove.

Anatomy

The ear is morphologically unique. The skeletal structure is composed of auricular elastic fibrocartilage which composes the upper two-thirds of the auricle. Auricular cartilage is flexible, yet it maintains form. The cutaneous coverage of the anterior-lateral surface of the ear differs from the posterior-medial surface. The anterior-lateral surface skin of the auricle lacks subcutaneous tissue and is adherent to the perichondrium. A layer of fascia containing a subdermal plexus of vessels separates the skin from the perichondrium. The posterior-medial surface skin has a deep subcutaneous fat layer that causes it to be less adherent to the cartilaginous framework.

The topographic features of the ear are incredibly important when considering reconstructive options. They are as follows:

- Helix: prominent auricular rim
- Antihelix: prominence anterior to helix
- Fossa triangularis: superior space between superior and inferior antihelical crus
- Scapha: depression between helix and antihelix
- Concha: deep cavity posterior to external auditory meatus
    - Cymba conchae: portion superior to crus of helix
    - Cavum conchae: portion inferior to crus of helix
- Crus of helix: beginning of helix that divides concha
- Tragus: anterior to concha and partially covering external auditory meatus
- Antitragus: posteroinferior to tragus: separated by intertragic notch
- Lobule: inferior to antitragus

The blood supply of the auricle is supplied mainly by branches of the external carotid artery which include the superficial temporal artery and the occipital artery which gives off the posterior auricular artery. The posterior-medial surface of the ear is supplied by the posterior auricular artery. The anterior-lateral surface of the ear is supplied by both the posterior auricular artery and the superficial temporal artery, creating two arterial networks. The triangular fossa and scapha are supplied by the network arising from the superficial temporal artery. The concha is supplied by the network arising from the posterior auricular artery. Consideration should be given to the blood supply when planning and designing flaps. Venous drainage is via the postauricular vein, which drains into the external jugular vein. Supplemental venous drainage flows into the superficial temporal and retromandibular veins. Lymphatic drainage of the auricle is to the preauricular, infraauricular, and mastoid lymph nodes.

The auricle has sensory innervation from the following nerves: the greater auricular nerve (C2-3), the auricular-temporal nerve (V3), the lesser occipital nerve, and a branch of the vagus nerve (Arnold's nerve) . The greater auricular nerve divides into an anterior branch, which innervates the lower half of the lateral auricle, and a posterior branch, which innervates the lower half of the medial auricle. The auricular-temporal nerve innervates the superolateral surface of the auricle. The lesser occipital nerve innervates the superomedial surface of the auricle. Arnold's nerve innervates the concha.

The dimensions and proportions of the auricle are critical for reconstruction. The vertical height of the ear is roughly equal to the distance from the lateral orbital rim to the helical root at the level of the brow. The width of the ear is approximately 55% of its height. The helical rim protrudes between 20 and 30 degrees from the skull, which corresponds to 1 to 2.5cm. The vertical axis of the ear is tilted posteriorly (when relating the apex of the helix to the lobule) 15 to 20 degrees. The superior level of the ear is at the same height as the lateral brow. The inferior aspect of the ear is at the same height as the nasal base.

General Reconstructive Principles

Auricular reconstruction is dependent upon the defect. Auricular defects can be classified into the following categories: cutaneous and cutaneous-cartilaginous which can be full-thickness defects.

Cutaneous defects of the adherent lateral auricular surface can rarely be closed primarily. These defects are best treated with skin grafts provided there is intact perichondrium. The contralateral postauricular skin can serve as a full-thickness skin graft donor site. When lateral perichondrium is lost due to the nature of the defect, the cartilage may be removed if it is not a determinant of auricular shape, and the full-thickness skin graft can be placed on the medial perichondrium or medial skin. Medial cutaneous defects involve a more pliable skin and are often repaired by primary closure. For the same reason, medial auricular skin is an excellent donor site for a full-thickness skin graft, as previously mentioned.

Cutaneous-cartilagenous defects may have preserved skin on one side of the defect or it may be a full-thickness defect. The main difference between this type of defect and a cutaneous defect alone is the alteration in auricular shape often caused by loss of supporting structure. Small defects may be amenable to primary closure once the defect has been converted to a full-thickness wedge excision. The decision is based on defect size and location, keeping in mind that a loss in vertical height of the auricle is inevitable. Generally, small defects in the helix or antihelix less than 0.15cm are best treated with wedge excision and primary closure. When this is performed, some central conchal cartilage must be excised to alleviate circumferential tension and prevent cupping of the auricle. Defects between 0.15cm and 2cm involving the helix or antihelix may be reconstructed by using a composite graft from the contralateral ear. In order to maintain symmetry between the auricles, the graft should be one-half the height of the defect. However, use of this technique potentially compromises the contralateral auricle, and is therefore not a first choice in reconstruction.

Many local flaps have been described for repair of full-thickness auricular loss. Basic principles of design prevail in most of the flaps ranging from chondrocutaneous advancement flaps to retroauricular island transposition flaps to tubed flaps. Vascular supply must be maintained and decreased tension with closure is necessary for viability. All flaps used to reconstruct the auricle must provide cutaneous coverage and maintain auricular structure including form and size. Regional flaps should be considered in place of local flaps when the vertical height of the auricle is decreased by more then 2cm. The most versatile regional flap used in auricular reconstruction is the temporoparietal fascia flap. This flap is often combined with an autogenous cartilage graft as a framework and can provide the required thin, highly vascular recipient site for a split-thickness skin graft.

Auricular Reconstruction Based on Defect Location

Conchal Bowl and Helical Root Defects

Conchal bowl cutaneous defects can be repaired with skin grafting. Likewise, when perichondrium or cartilage is absent, but skin remains on one side of the defect, skin grafting is used for repair. Conchal cartilage is not necessary for auricular form and can be resected without structural compromise. The retroauricular island transposition flap may be used for lateral skin and cartilage deficits. This same flap can be used in full-thickness defects involving both the medial and lateral conchal skin and conchal cartilage by bivalving the flap. Defects of the helical root can be reconstructed using a helical advancement flap which includes advancing lateral skin and cartilage down towards the deficient area.

Upper One-Third Auricular Defects

The upper one-third of the auricle can be concealed by hair to conceal a cosmetic defect. However, in many patients this portion of the ear has a functional purpose in supporting eyeglasses. Options for reconstruction of these defects include primary wound closure, full-thickness skin grafts, helical advancement flaps, retroauricular and preauricular tubed flaps, and the use of autogenous cartilage framework combined with temporoparietal fascia and split-thickness skin graft coverage. Again, the choice of the flap is dependent upon the size and location of the defect.

Middle One-Third Auricular Defects

Defects of the middle one-third of the auricle are often obvious. Small defects may be closed primarily by converting the defect into a wedge. This has a direct impact on vertical height. Some larger defects are amenable to repair with helical chondrocutaneous advancement flaps. Tubed flaps should be limited to helical reconstruction only due to the lack of a cartilaginous framework for support. Larger defects are reconstructed using a two-stage retroauricular composite flap using full-thickness retroauricular skin and autogenous cartilage. The cartilage is usually harvested from the nasal septum or contralateral or ipsilateral conchal cartilage.

Lower One-Third Auricular Defects

The lower one-third of the auricle is easiest to reconstruct due to the pliability and laxity of auricular and periauricular skin in this area. Up to half of the lobule can be resected and closed primarily with minimal deformity. The lobule can also provide tissue for advancement flaps. Reconstruction of the entire lobule is more difficult. When defects involve the entire lower one-third of the auricle, a multi-staged reconstruction involving autogenous cartilage grafting becomes necessary.

PreauricularDefects

Options fro repair of preauricular defects include primary closure, advancement flaps, and transposition flaps. Careful planning can result in the scar resting in the preauricular crease. The facial nerve should always be kept in mind when addressing these defects.

Large Auricular Defects

Auricular defects that exceed one third of the auricle are increasingly difficult to reconstruct. Multiple techniques are necessary including autogenous cartilage grafting, skin grafting, and the temporal parietal fascia flap. In certain circumstances, local skin may be adequate for coverage, but this is not the norm as the associated skin is usually absent or scarred.

Etiology

Auricular Hematoma

An auricular hematoma occurs due to blunt auricular trauma. If untreated or improperly treated, it will result in cauliflower ear. Auricular hematoma potentially can result in infection, cartilage necrosis, contracture, and neocartilage formation. The actual location of the hematoma has been debated and is either between the perichondrium and cartilage or intracartilaginous. A graduated treatment approach is employed dependent on the severity of the injury and the time from the initial insult. Small hematomas discovered acutely typically require needle aspiration and a bolster dressing. Aspiration is not possible a few days post-injury because the hematoma becomes a coagulated clot. After one week, the clot breaks down and aspiration is a gain possible. Larger hematomas may require an open approach or drain placement. Further treatment involves removal of all neocartilage and fibrous tissue through aggressive debridement.

Human Bites

Human bites involve the head and neck approximately 20% of the time with the ear accounting for 67% of them. The treatment goals are infection prevention and healing with good cosmesis. Human bites have a higher infection risk than bites of other mammals due to the abundant human oral flora. The infection rate in facial human bites is lower than bites in other anatomic areas due to increased vascularity in the head and neck. Recommendations have been made that treatment should be both medical and surgical including 48 hours of intravenous antibiotics and delayed surgical closure (>24 hours postinjury) to prevent infection.

Skin Cancer

The most common locations for auricular cancer are the helix, posterior surface of the ear, and antihelix. Greater than 70% of auricular skin cancer at time of presentation has an area of less than 3cm. Malignant lesions of the ear account for approximately 6% of all head and neck skin cancers.

Techniques in Auricular Reconstruction

Cartilaginous Reconstruction with Costal Cartilage

Reconstruction of the auricular framework can be performed using autogenous cartilage or alloplastic implants. Some reconstructive surgeons speculate that patients adjust better, both physically and psychologically, to reconstruction with autogenous tissue compared to alloplastic implants. Additionally, alloplastic implants have the risk of extrusion and a higher rate of infection. When patients are over 60 years old, consideration must be given to the fact that cartilage is more brittle and may be ossified depending upon location. Costal cartilage provides a reliable donor site for autogenous cartilage, specifically the sixth, seventh, and eighth rib cartilage. The synchondrosis between the sixth and seventh ribs serves as the body of the framework, while the eighth rib accounts for the helix. Determination of the size and shape of the framework is obtained by making a template from the contralateral ear. The sixth and seventh ribs are contoured to create the concha, antitragus, and curve of the antihelix. The eighth rib cartilage is freed of perichondrium on one side and contoured to form the helix. The helix is fixed to the framework and the antihelix and fossa triangularis are created using gouges. Once the cartilaginous framework has been fashioned, thin, vascular, hairless tissue capable of accepting skin grafts must be used to cover the cartilage. The temporoparietal fascia flap satisfies all of these criteria. Other advantages of the temporoparietal fascia flap include the large quantity of tissue that can be harvested (14 X 12cm) and the fascia may be transferred to the contralateral auricular region using microvascular techniques.

The temporoparietal fascia flap is composed of superficial temporal fascia which is continuous with the superficial musculoaponeurotic system (SMAS) and the deep galea. The temporoparietal fascia is deep to the skin and subcutaneous tissue. It should not be confused with the deeper temporalis fascia which surrounds the temporalis muscle. The temporoporietal fascia is 2 to 3mm thick over the parietal area and is highly vascular. The blood supply is consistent and comes from the superficial temporal artery. In order to harvest the temporoparietal fascia flap, a 6cm vertical incision is made in the scalp immediately above the auricular defect to expose the temporoparietal fascia. Elevation of the flap should be performed in the loose connective tissue or areolar tissue which is between the temporoparietal fascia and the temporalis fascia. If this plane is maintained, it is deep to the hair follicles and will avoid alopecia. The vascular pedicle of the flap is identified and protected. The frontal branch of the facial nerve is the anterior limitation of flap elevation. The posterior aspect of the flap is elevated to the posterior branch of the superficial temporal artery. The flap is rotated 180 degrees in an arc that is rotated superiorly to inferiorly so that the lateral surface of the flap lies medially along the defect. The edges of the flap are tucked under the existing skin edges. Split-thickness skin grafts are then applied to the flap. Optimal drainage is supplied by a suction drain. The temporoparietal fascia flap often obliterates the supraauricular sulcus. As a result, a second stage procedure is often necessary to recreate this sulcus.

Biomaterials

Reconstruction of the total external ear has two major approaches- alloplastic prosthesis implantation and autogenous cartilage grafts. The advantages of alloplastic implants include widespread availability, consistent predetermined shape, and shortened operating time. The disadvantages are increased risk of infection, extrusion, biocompatibility, and uncertain long-term durability. To counteract some of the disadvantages, tissue engineering is being investigated using predetermined biodegradable polymers and cell isolates. Additional advantages include minimized donor site morbidity, precise creation of a complex structure, donor tissues identical to recipient tissue, and the potential for implant growth.

Porous Polyethylene Implant (Medpor)

There are multiple alloplastic auricular implants including silicone, polypropylene, and polyethylene. The porous polyethylene implant has several advantageous qualities for auricular reconstruction as it can be easily shaped, sterilized, and implanted underneath appropriate soft tissue coverage. Additionally, it is non-toxic and causes little foreign body reaction. Most importantly, this implant allows for tissue ingrowth into the material which anchors it into position and provides resistance to infection.

Microvascular Techniques

Auricular injury involving sub-total or complete amputation makes for a more complex reconstruction. Microvascular techniques have been described in complete amputations in order to avoid necrosis and distortion of auricular cartilage due to a lack of blood supply. Arterial anastomosis makes use of the primary supplying branches off of the external carotid which are the superficial temporal artery and the posterior auricular arteries. Venous anastomosis is also important and is often more difficult than arterial anastomosis. Previous literature describes of a technique with arterial anastomosis without venous anastamosis. Use of this technique emphasizes the importance of thorough debridement of non-vital tissue to allow venous channels to form between the replant and the recipient bed.

Microsurgical replantation of the ear is technically challenging, but it allows for a single procedure option for auricular reconstruction. A more natural appearing pinna usually results with this technique compared to other techniques for auricular reconstruction. Important prerequisites for successful replantation include short ischemic intervals, appropriately preserved amputated parts (in saline on ice), and compliant patients. Upon performing microsurgical replantation, secondary reconstruction options should be preserved including the postauricular skin, the temporoparietal fascia, and the main superficial temporal vessels. Small vessel caliber makes this procedure challenging. The best results can be achieved with anastomosis of both the artery and vein. However, identification of a suitable vein and venous anastomosis is especially difficult. The necessity of venous repair has been questioned for ear replants. Studies have demonstrated that venous connections form in one week through neovascularization. It is the belief of several surgeons that failure of ear replantation without venous anastomosis is due to inadequate debridement, which in turn impacts neovascularization. Additionally, wider area of contact is believed to improve neovascularization which could be provided with ear replantation by removing postauricular skin. An ear replant with venous insufficiency needs venous drainage such as leeches or skin punctures.

Nonmicrosurgical Reconstruction: Mladick and Baudet Techniques

Microsurgical techniques have been reported in the literature for auricliar reattachment, but significant complexity limits wide practice of this technique. On the other end of the spectrum, simple reattachment as a composite graft is almost certain to fail. As a result, numerous techniques have evolved to improve survival of the replanted ear. In 1971, Mladick et al proposed the principle of a retroauricular pocket for non-microsurgical replantation. The amputated part was completely deepithelialized, followed by anatomic reattachment and burial in a retroauricular pocket. A second stage procedure involved elevation of the replanted cartilage from the retroauricular pocket and split-thickness skin grafting. In 1972, Baudet et al reported a case of ear replantation where the posterior pinna skin is excised from the amputated portion of the auricle, fenestrations are made in the cartilage to allow improved vascular access to the anterior pinna skin, and a postauricular skin flap is elevated. The anterior skin is then sutured to the amputated stump and to the postauricular flap. After three months, the ear is elevated and the postauricular area is reconstructed with a split-thickness skin graft.

Venous Congestion: Leeches

Use of leeches for medicinal blood letting dates back to 200BC and remained popular well into the 19^{th} century. Popularity waned in the late 19^{th} century and the first 75 years of the 20^{th} century. Modern surgical techniques including pedicled and microvascular free tissue transfer have caused the use of leech therapy to reemerge. Blood-letting allows for a temporary bypass of venous outflow obstruction until revascularization from the surrounding soft tissues will allow the flap to survive. The mechanism behind the use of leeches lies in the affect of the anticoagulant called hirudin in the saliva of the leech. Hirudin provides a prolonged decongestive effect on a tissue flap by decreasing venous engorgement, decreasing capillary pressure, and increased tissue perfusion. Due to the above properties, leech therapy can be helpful with avulsion injuries to the face where arterial blood supply is present, but venous outflow is lacking. The sparing of soft tissue provides optimal results. Leech therapy duration is based upon clinical evaluation of the involved tissue; if the tissue remains pink and viable, the leeches are no longer necessary. Once instituted, the leeches are replaced every 6 to 8 hours. Patients undergoing leech therapy should be placed on broad-spectrum antibiotics and prophylaxis against *Aeromonas hydrophilia* infection (second generation or greater cephalosporin, aminoglycosides, trimethoprim-sulfamethoxazol, or ciprofloxacin). Hematocrit must also be monitored in these patients. Skin punctures have also been described for venous congestion.

Antithrombotic Agent: Dextran

Dextran is a heterogeneous polysaccharide that is used after microsurgery for its antithrombotic effects on the microcirculation including alterations of platelet activity and fibrin network formation. The main advantage of dextran over other antithrombotic agents such as heparin and aspirin is the relatively lower risk of post-operative bleeding and hematoma formation. There is no clinical evidence to support the efficacy of dextran following free tissue transfer.

TPFF

The temporoparietal fascia is the most superficial fascial layer beneath the subcutaneous fat in the temporal region and is continuous with the superficial musculoaponeurotic system (SMAS) inferiorly and the galea superiorly. The superficial temporal artery supplies this area of the scalp and maintains a consistent posterior branch on which the temporoparietal fascial flap (TPFF) is normally based. The TPFF is a lateral extension of the galea and is continuous with the superficial musculoaponeurotic system of the face. It inserts on the zygoma. The TPFF has been extensively used in auricular reconstruction. The flap ranges from 2 to 4 mm in thickness and can be harvested in dimensions up to 17x14 cm. The TPFF is separate from the temporal muscle fascia, which is a thin layer of areolar tissue. The temporal muscle fascia is continuous with the pericranium above the superior temporal line. The TPFF is supplied by the STA, a terminal branch of the external carotid artery, which ascends behind the ramus of the mandible and becomes superficial 4 to 5 mm in front of the tragus. The STA lies anterior to the external ear and supplies the scalp, the external ear, face, and the parotid gland. In the majority of cases, the STA divides approximately 2 to 3 cm superior to the root of the helix into anterior (frontal) and posterior (parietal) branches. Before dividing, the artery gives rise to the middle temporal artery that supplies the temporal muscle fascia. The terminal course of the vascular pattern is variable. To protect the frontal branch of the facial nerve, the TPFF is normally raised on the posterior branch of the STA. The anterior branch is ligated approximately 3 to 4 cm from its takeoff. The distal STA arborizes over the parietal and temporal regions. The STA runs beneath the subcutaneous tissue and within the TPFF up to 12 cm above the superior attachment of the auricle. In this area of the scalp, the vessels become more superficial and anastomose with the subdermal vascular plexus. Because of the vascular architecture, this area represents the most cephalad extent of flap dissection. The superficial temporal vein runs parallel to the artery and slightly superficial to it in the majority of cases. The sensory innervation of the scalp in the area of the STA is supplied by the auriculotemporal nerve

TPFF Harvesting

The TPFF is harvested through a temporal extension of a preauricular (supratragal) facelift incision. The temporal extension should follow the curvilinear temporal line within hear bearing scalp. Dissection proceeds in a subcutaneous plane over the temporoparietal fascia to the zygomatic arch and frontal nerve. This dissection is best done sharply to avoid injury to the underlying superficial temporal vessels. The fascia is incised along the periphery of the dissection to match the dimensions of the defect. The flap can then be transposed or turned down and sutured to the periphery of the cutaneous defect. A split-thickness skin graft (usually harvested from the medial forearm or the lateral thigh) can then be applied to the TPFF.

Disadvantages of the TPFF include injury to the frontal branch of the facial nerve, hair loss from subdermal dissection, and ischemic necrosis of the distal flap if harvested beyond the temporal line.

Full-Thickness Skin Grafting

A prospective study performed in Australia between 1993 and 2002 monitored patients receiving Moh’s Micrographic Surgery for skin cancer removal followed by full-thickness skin graft repair. A total of 2673 patients were treated with the above criteria, of which 216 were auricular defects (8.1%). Eleven of these patients (5.1%) had complications including graft contracture, bleeding/hematoma, infection, and partial or complete failure.

Skin Grafting

The skin graft is a fundamental reconstruction option for coverage of surgical defects. A skin graft is defined as a cutaneous free tissue transfer that has intentional separation from a donor site followed by transplantation to a recipient site. The ultimate survival of a skin graft depends upon ingrowth of capillaries from the recipient site. Keeping this in mind, avascular recipient beds including exposed bone, cartilage without perichondrium, tendon, nerve, and fascia are not ideal recipients. Skin grafts generally are used when healing by secondary intention or primary closure is not a suitable option or when skin laxity prohibits the use of a skin flap.

There are three primary types of skin grafts: full-thickness skin grafts (FTSGs), split-thickness skin grafts (STSGs) and composite skin grafts. FTSGs consist of the entire epidermis and dermis with or without small amounts of subcutaneous tissue. STSGs consist of the entire epidermis of the skin with a variable amount of dermis and are classified by thickness. Composite grafts contain tissues from two or more germ layers (skin and cartilage).

Graft survival is dependent upon the establishment of a blood supply from the recipient site. The first 24 hours involves sustaining the graft by imbibition. Approximately 48 to 72 hours after grafting vascular anastomoses between the recipient bed and donor graft begin to form in a process called inosculation. Circulation is restored to the graft within 4 to 7 days.

FTSGs are relatively easy to harvest and easy to secure to the recipient site. They tend to be more prone to necrosis than STSGs, yet FTSGs tend to contract less than STSGs. FTSGs are excellent for the repair of defects on the nasal tip, dorsum, ala, and sidewall, as well as on the lower eyelid and ear. FTSGs should not be placed into infected wounds and smoking is a relative contraindication. Donor sites shoud be carefully chosen to match the texture, thickness, and color the recipient skin. Common donor sites for facial defects include preauricular, postauricular, supraclavicular, and calvicular areas. The recipient site must be clean and not actively bleeding. FTSGs must make direct contact with the underlying wound bed and must be immobilized in the post-operative period (typically with a bolster which should be in place for 1 week) to prevent separation of the graft from the recipient site. FTSGs are sewn into place with deep basting sutures and perimeter sutures. Complete or partial graft failure is the main complication of FTSG which results from hematoma, graft-bed contact disruption, infection, smoking, and excessive electrocoagulation of the wound base. If necrosis does occur, the tissue should not be debrided as it acts as a scaffold.

STSGs lack their innate vascular and adnexal structures. They are classified as thin, medium, and thick based on thickness. STSGs can be meshed to increase surface area coverage. They offer better survival characteristics than FTSGs due to reduced nutritional requirements. STSG should be a last resort when cosmesis is of primary concern. Additionally, STSG is the least durable form of wound closure and can experience contraction, pigment variation, and creation of an additional wound. Donor site is chosen based on desired size, the patient’s ability to care for the site, impact on patient’s activity, and cosmesis. STSGs are secured using basting and perimeter sutures. Dressings are placed to prevent shearing because if shearing of the graft occurs within the first twenty-four hours, graft failure is almost certain. Revascularization of STSGs takes about 3 to 5 days. Acute complications are identical to FTSGs. Additionally, contraction is a common and unpredictable occurrence. Composite grafts are an option in specific auricular defects with the donor site being the contralateral ear.

Complications

Standard complications with auricular reconstruction apply including infection, hematoma, scarring, and poor cosmetic outcome. When the auricular cartilage is involved in the injury or the repair, the risk of perichondritis and chondritis must be considered. Inflammation of the perichondrium or cartilage after trauma predisposes to tissue ischemia and the development of Pseudomonas infection, which may ultimately lead to suppurative chondritis. Liquefactive necrosis can then ensue leading to devastating complications. Therefore, manipulation of the cartilage should be performed carefully under sterile conditions with antibiotic prophylaxis.

Conclusion

Every ear defect is unique. Many options are available for reconstruction of auricular defects including direct closure, secondary epithelization, FTSG, composite grafts, and local flaps including direct advancement, rotational flaps, transposition flaps, and subcutaneous island flaps. Factors to consider prior to choosing a reconstructive plan include size, location, depth, medical history, smoking history, and esthetic concerns.

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