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Case Report

Frostbite sequela treated by auricular composite graft

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Abstract

Introduction: Nasal defects following frostbite is not uncommon and need more complicated operations to reconstruct. Composite graft is an available and feasible treatment to replace nasal unit defects, though several factors influence transferred graft.

Case presentation: A middle age mountain climber who had suffered nasal frostbite sequela as retracted right side alar rim, referred 28 months later to reconstruct. A triangular helical chondrocutaneous graft as composite graft selected to replace defects of inner layer, supporting cartilage and outer skin. After prolonged healing phase, he had satisfied with her nose.

Conclusion: Composite grafts are save-boats in nasal reconstructions even, patient be a frostbite victum.

Key words: composite graft; alar rim defect; auricular helix; frostbite

Introduction

Acute freezing or cold events are among thermal traumas which demand special considerations. Experienced staff and improved life-saving protocols are mandatory to reach ideal outcomes. Thermal injuries and frostbite can lead to chronic stigmata and unfavorable scars which require professional approaches.

Scar contracture and nasal deformity are challenging issues among reconstructive surgeons. This is due to complex 3-dimensional structure of nose. Moreover, reconstructive requirements in outer skin, supporting cartilage and inner layer should be answered simultaneously [1]. There are solutions to overcome demands in single or staged operations, such as local, forehead or nasolabial flaps combined with cartilage grafts and at last condrocutaneous composite graft [1].

Auricular chondrocutaneous composite graft was first presented by Brown and Cannon in 1946 and has advantages like shorter time, anatomical ant textural similarity of donor site to recipient, and lake of shrinkage to be a good support [2]. However, grafts larger than 2 cm have high metabolic demand and need healthy recipient sites, especially in smokers who are prone to ischemia, and these are drawback in composite graft [3].

So, this optional treatment cannot be ignored by surgeons even in tethered burn scar tissues, and we decided to share our experience in an alar rim defect following frostbite which treated by auricular composite graft.

Case presentation

A 48 years old man referred to plastic surgery department due to right alar rim defect. He had a frostbite trauma 28 months ago while mountain climbing. Following that accident, he tolerated some operations to debride necrotic tissues of nose and thumb`s distal phalanx amputation. During this time he had supplementary treatments to improve appearance. Despite systemic and topical managements, there was a right alar rim defect which caused unacceptable view and feeling of dryness in breathing- maybe due to unhealthy mucus and turbulent air within airway (fig.1) This deformity was beside

Figure1: *48 years old climber who suffered alar rim defect following frostbite. Right: first day after frostbite. Left: 28 months later with unfavorable lateral view.*

Nasal sidewall scars of previous ischemic tissues, which was prone to destroy. Any manipulation in scared tissue might made nose in danger of more necrosis. So, we decided to choose options with minimal local incisions. A triangular composite graft including cartilage and bi-lamellar skin- outer and inner layers- of ipsilateral auricle with 15 mm diameter harvested. Donor site closed simply in layers without difficulty or deformity. Graft inset in defect was done with refreshed margins of scar tissue. A few days later, graft congestion appeared without infection signs (fig.2). Thus, conservative management continued with topical healing agents to save graft. About 17 days after operation, there was a partial necrotic cutaneous tissue. But cartilage was not exposed and survived (fig.3). Gradually, re-epithelialization continued and the wound healed in 40 days. Finally, patient was satisfied with his new nose and even enhanced quality of breathing and pleasant felling while inspiration (fig.4).

Figure2: *7 days after surgery and congested composite graft.*

Figure3: *17 days later and necrotic skin.*

Figure 4: *40 days after surgery and healed wound.*

Discussion

The normal core body temperature of a healthy adult human being at rest is 37 ° C and every decrease in peripheral temperature eventually transmitted to the body and changes this core temperature [4]. Extremities and head and neck regions are exposed to cold climate and winds and prone to freezing accidents and may suffer severe degree frostbites (5). Frostbite begins with tissue ischemia, then reperfusion and finally ended with necrosis if not treated promptly. There are numerous solutions to prevent healthy tissue loss. Datta et al (2007) used combination of

systemic pentoxyphylline with topical aloe vera and vitamin E to minimize secondary scar in their frostbite patients [5].

The use of auricular composite graft has advantage of single procedure with acceptable results. Smoking, previous radiotherapy, presence of scar, diabetes and severe atherosclerosis alter graft survival [6].

Nasal ala with 3-dimensional shape has three components to deal during reconstruction and cartilage layer is important to have strong support. Among possible donor tissues to replace, auricular composite graft has similar color and texture with adequate size [7].

Blood supply through recipient margins is the key element to enhance composite graft survival. Some recommend delaying phenomenon both in composite graft and recipient bed to reach in more areas reconstructed. Karaca et al (1994) used this approach and examined cartilage survival using Sulphur 35 in an animal study [8].

Lapalorcia (2011) described their use of bilateral grafts to reconstruct a complete dome in a burned patient with effective function with minimal morbidity of donor site (9). However, in our presented case, patient had hidden scar, too.

Auricle, is a rich source of composite graft involving helix, antuhelix, concha, and even lobule. Curvature of ear make it suitable for nose reconstruction. On the other hand, donor site can be closed with minimal deformity [1].

Our patient had experienced prolonged severe frostbite sequela involving nasal tip and both sidewalls. He had deformed alar shape and requested better appearance. Despite tethered skin in scar tissue, we debrided margins and prepared for new composite graft. Ultimate result satisfied client aesthetically and functionally.

Conclusion

Composite chondrocutaneous graft is a significant tool in hands of reconstructive surgeons even in frostbite patients.

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