Rehabilitation of a Large Nasal Defect: the “Digilog” Approach

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References

Introduction

Surgical repair of maxillofacial defects often requires concomitant prosthetic treatment to improve one’s quality of life and self-esteem. For defects of neoplastic origin, prosthetic rehabilitation must be meticulously coordinated with surgical resection, chemotherapy and radiation[1]. In this case report, a digital to analog “digilog” approach was utilized for the prosthetic rehabilitation of a patient with a large nasal defect. Due to the compromised blood supply and fibrosis of the patient’s extensively irradiated tissues, implant therapy was not recommended[2]. Using 3D imaging and a digital planning software, a minimally invasive treatment plan for the fabrication of a conventional nasal prosthesis was pursued.

Initial frontal

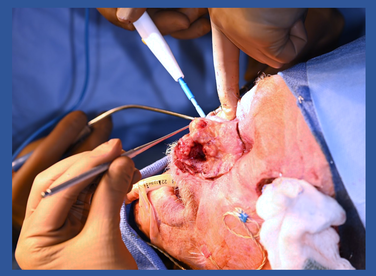
Initial left lateral

Patient Presentation

A 63-year-old Hispanic male presented to Montefiore Medical Center with basal cell carcinoma of the nose and squamous cell carcinoma of the left temple. He underwent ablative surgery including: total rhinectomy, partial maxillectomy, left temple dissection and sentinel lymph node dissection. Following resection, he had plastic reconstruction with a local advancement flap to partially cover the mid-facial defect . A 3D facial camera and digital platform, MirrorMe3D, was then used to treatment plan his rehabilitation with a removable nasal prosthesis.

Treatment Plan

Pre-operative: resection margins



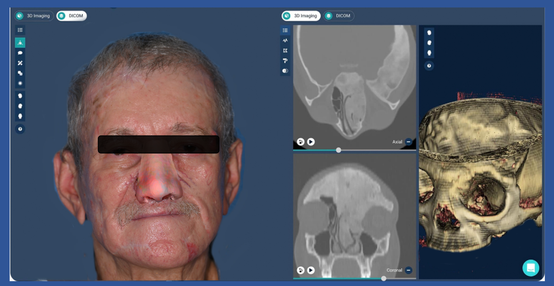
Operative: total rhinectomy procedure

Post-ablative surgery: partial closure of right maxillectomy

3D printed scaffold and nasal recon wax-up design using MirrorMe3D software

MirrorMe3D Digital Plan

MirrorMe3D is an encrypted, digital planning platform designed for health care providers involved in the reconstruction and rehabilitation of patients with maxillofacial defects. It allows for the merging of STL, DICOM and TOM files to create customized, 3D printed surgical guides and prosthetic templates. It features a mobile device app for patients to upload post-operative photos that sync directly to their imaging and case data so that they can evaluate their treatment. In this rehabilitation, post-operative photos were made with a facial camera and used with the patient’s CT scan to design a personalized 3D printed PMMA scaffold for the manual wax-up of an acrylic based, silicone-veneered nasal prosthesis[4,5].



Digital plan for an anatomical and mechanical retained, acrylic and silicone nasal prosthesis

Discussion

Psychological distress is a common sequela of facial disfigurement. The goals of maxillofacial rehabilitation are to mitigate distress and promote psychological well-being by returning a degree of normalcy to one’s appearance (cosmesis)[6]. In a multidisciplinary approach, oncology patients undergoing ablative surgery, reconstructive surgery and radiation therapy, can be rehabilitated with a conventional facial prosthesis that supports their overall and mental health. The success of treatment is contingent upon creating a comfortable and retentive prosthesis that replicates natural anatomy and is psychologically accepted by the patient[7].