Unfavorable Results After Free Tissue Transfer to Head and Neck

Lessons Based on Experience from the University of Toronto

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• Free tissue transfer • Unfavorable result • Oral cavity • Mandible • Maxilla • Facial reconstruction • Skull base reconstruction

KEY POINTS

- When performing head and neck reconstructions precise knowledge of function and aesthetic requirements of each specific area is mandatory. Careful assessment of what is missing and replacing like with like is essential.
- Development of microsurgical techniques has enabled reconstruction of more complex defects with better functional and aesthetic results.
- Microsurgical techniques have not been able to prevent unfavorable outcomes as they have allowed ablative surgery that was previously not possible due to the lack in reconstructive abilities.
- Functional as well as aesthetic suboptimal results can lead to major impairment of quality of life. The awareness of all possible adverse effects characteristic to each anatomic site is the key to avoiding and managing them.

INTRODUCTION

Head and neck surgery has improved through significant changes and development over the past decades. Factors contributing to this favorable progress include better understanding of anatomy, improved preoperative imaging, more precise delivery of radiation, and advances in surgical technique.[1] Development of microsurgery has enabled reconstruction of virtually any defect after ablative surgery. The foundation for success in head and neck surgery is the restoration of function and aesthetics for which microsurgical reconstruction is often the method of choice. With free tissue transfer, it is possible to replace ablated tissues with similar well-perfused tissues and reconstructions can be individually planned to fulfill the tissue requirements of the defect. Microvascular reconstruction has become a reliable way to recreate ablated tissues, as microvascular success rate is approximately 97% in most high-volume centers.[2–4]

The definition of an acceptable result in head neck surgery has evolved over time. From the earlier simple need to fill the hole, we have advanced to a fuller understanding of the need to

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exactly specify the defect and missing components. In reconstructing the form and function of the ablated tissues, failure to appreciate the unique features of individual tissues will most likely lead to suboptimal outcome.[5] Unfavorable results in head and neck free flap surgery are more than just a failed flap but also include cases in which reasonable restoration or acceptable aesthetics have not been achieved. In addition, an unfavorable result has been obtained if unacceptable donor site morbidity or patient dissatisfaction is present.

The purpose of the current article is to provide an overview of the functional and aesthetic unfavorable results of head and neck reconstruction, and provide suggestions on how to address these issues. Understanding the consequences of an unsuccessful reconstruction provides the foundation for proper planning and personalized approach to reconstruction of lost structures.

UNFAVORABLE RESULTS IN ORAL CAVITY RECONSTRUCTION

The oral cavity is composed of the floor of the mouth, the anterior two-thirds of the tongue, buccal mucosa, hard palate, mandibular and maxillary alveolar ridges, and retromolar trigones. The oral cavity is bordered by the lips anteriorly, and the base of the tongue and soft palate posteriorly. All these different structures have unique properties that will be affected by ablative surgery. These properties include important roles in speech, taste, and mastication. The structures of the oral cavity are also used for breathing, facial expressions, and social interactions. Partial resection of many of these functional structures is frequently required to achieve disease control.[5] An unfavorable result in oral cavity reconstruction is more often a problem of function than aesthetics. Speech can become unintelligible and impair social life. Also, ability to chew and swallow food can be severely affected. Suboptimal results can have serious effects on the patient's quality of life.

Floor of Mouth

When planning a reconstruction of the floor of the mouth, it is important to acknowledge that no one part can be reconstructed without it having an effect on the other parts. The main issues in designing the reconstruction are restoring the buccogingival and/or labiogingival sulcus of adequate depth, avoiding excessive height of the floor of the mouth, and allowing optimal tongue mobility by restoring exactly what has been removed.[5] Major indications for floor of the mouth flap reconstruction are to close defects that communicate with the neck to prevent vascular blow out caused by salivary contamination of the major vessels, and to achieve coverage of exposed mandibular bone which may not remucosalize spontaneously especially in the setting of radiation therapy.[6]

The precise planning and careful analysis of what is missing will prevent the reconstruction with a flap that is either too small or too large. In either condition, with excessive bulk or too much tension, the mobility of the tongue is affected, having a significant impact on both the speech and swallowing. This emphasizes the importance of using a flap of adequate thickness. The radial forearm flap is still the most popular flap when a thin reconstruction of the floor of the mouth is needed, although the anterolateral thigh flap has gained increasing popularity.[7] One option is to reconstruct a floor of the mouth defect with a fascial or muscle flap and let it reepithelialize by the surrounding mucosal surface. These non–skin bearing flaps can be subject to considerable contraction as a result of wound-healing forces. In the presence of radiation, remucosalization may not occur.[5] Xerostomia following radiation is a common problem and jejunal patches and colon patches have been used for floor of the mouth reconstruction in an attempt to address this debilitating condition. Although these flaps are thin and have the ability to produce mucus, the risk of donor site morbidity and limited ability to endure radiation have prevented them from being widely used.[1]

In the case of an unsatisfactory result after reconstruction, revision may become necessary. The second procedure is typically required to reduce bulkiness or add tissue to gain mobility or depth. When performing de-bulking, one must beware of creating too much tension on tissues or exposing intraoral bone. If the sulcus is too shallow or the tongue movement is limited, additional tissue needs to be brought in. This can range from a full-thickness skin graft to local flaps or even a new free flap (**Fig. 1**). Sometimes simple release of scar tissue will improve movement of the tongue, but careful patient selection is critical, as in some cases this release will diminish the function of the tongue, as remaining tongue function can be dependent on the fixed less-mobile position (**Box 1**).[5]

Tongue

The tongue has a highly specialized function and reconstruction can be challenging. The aim of the reconstruction is to restore and/or maintain the