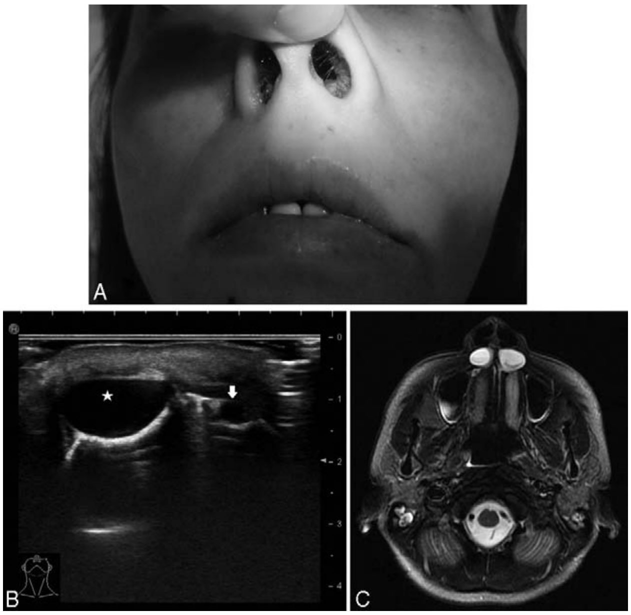

FIGURE 1. (A) The left upper lip was swollen and left nasal floor was elevated. (B) Transcutaneous ultrasonography showed an oval, well-defined, homogenous anechoic cystic lesion in the left anterior nasal floor abutting the maxilla bone. (Star) The solid component is little. Right ruptured nasolabial cyst was much smaller. (Arrow) (C) Magnetic resonance imaging revealed homogeneous hypointensity on T1-weighted image and hyperintensity on T2-weighted image.

include plain radiography, CT, and MRI. Plan radiography is easy to obtain. However, it is difficult to detect or diagnose nasolabial cyst on plain radiography, and even the bony erosion was significant. Currently, CT or MRI is the best imaging modalities to diagnose and evaluate the nasolabial cyst. Nasolabial cyst on CT is a well-defined oval-to-round low-density cystic lesion near pyriform aperture. On MRI, nasolabial cyst is a well-defined cystic lesion. The images on T1 and T2-weighted studies are various, which depend on the proportion of keratin and viscous fluid within it.[1,10] However, CT and MRI are relatively costly, time-consuming, and inconvenient imaging tools for nasolabial cyst, especially in the office-based clinical setting. Besides, CT and MRI have the issues of radiation and electromagnetic exposure, respectively.

In recent years, high-resolution US is becoming more popular in clinical practice of otolaryngology head and neck surgery. More otolaryngology head and neck surgeons perform US for thyroid gland diseases, cervical lymph nodes, major salivary gland disease, and other specific purposes in their clinic.[11,12] Ultrasonography may be a good imaging study for diagnosis of nasolabial cyst because the cyst is near the facial skin without the barrier between the ultrasound scanner and the lesion. Reviewing the literature, US was mentioned for 5 patients with nasolabial cyst.[1] From the experience of the current patient and literature, US showed that nasolabial cyst was a well-defined, regular-shaped, homogenous hypoechoic, or anechoic lesion near the facial skin and abutting the maxilla bone with little solid component and without internal vascularity. It is necessary to distinguish between nasolabial cyst and other anterior nasal tumors above maxilla, including lymph nodes, hemangioma, and other tumor lesions. On US, it is not difficult to do differential diagnosis between them because hemangioma should be considered US finding of solid component and internal vascularity, and lymph nodes are impressed as a solid lesion with a linear hilum.[13–15] Hence, transcutaneous US could be a simple, office-based imaging study to detect and define nasolabial cyst completely for surgical purposes.

CONCLUSION

The diagnosis of nasolabial cyst is based on clinical features, imaging studies, and histology. The most common image studies include plain radiography, CT, and MRI, which are relatively costly, time-consuming, and inconvenient imaging tools. We report a 46-year-old woman with bilateral infected nasolabial cysts which is diagnosed by US without radiation and electromagnetic exposure. Transcutaneous ultrasonography could be a simple, first-line imaging study for real-time diagnosis of nasolabial cyst in an office-based clinical setting.

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OPEN

Clinical Application of a Pedicled Forearm Flap in the Reconstruction After Oral Cancer Resection

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Objective: To investigate the clinical application of a pedicled forearm flap in the reconstruction of soft tissue defects after oral cancer resection.

Methods: A retrospective analysis was performed on 31 patients with oral cancer in the Affiliated Stomatology Hospital of Kunming Medical University. The patients underwent repair of soft tissue defects, resulting from oral cancer resection, using a pedicled forearm flap. Patients were followed up for 3 months to 3 years to observe the survival rate of the pedicled forearm flap and the recovery of the patient's appearance and oral function.

Results: The pedicled forearm flap survived in 30 patients (96.77%), and 3 patients showed flap vascular crisis (9.67%; 2 patients were successfully rescued). The articulation, chewing, and swallowing function of the patients were improved after surgery.

Conclusion: The pedicled forearm flap has advantages in terms of color and texture, its moderate thickness, long vascular pedicle, good blood supply, and strong infection resistance. It has a high survival rate and is an excellent skin-muscle flap suited to the repair of soft tissue defects after oral cancer resection.

Key Words: Oral cancer, pedicled forearm flap, tissue defect

The oral and maxillofacial region is a very important part of the human body. It represents the beginning of the digestive tract, and connects the nasopharyngeal region with language, breathing, chewing, swallowing, and other important functions. Therefore, repair of postoperative defects in the oral and maxillofacial region is crucial to postsurgery quality of life.

With the development of microsurgery, the forearm free flap has become the first choice for the reconstruction of oral and maxillofacial soft tissue defects. The flap has the advantages of providing a constant anatomy, requiring simple preparation, having a comparable larger vascular caliber, and allowing easy anastomosis. Thus, it is the best choice for repairing defects of the tongue body and the floor of the mouth, the buccal, gingival, and throat side, and the soft palate region.[1] In the truest sense, use of the forearm free flap can achieve functional reconstruction, effectively repairing disorders of the oral form and function caused by soft tissue defects, which has a major psychological impact and causes a reduction in quality of life.[2]

Here, we describe the clinical application of a pedicled forearm flap for the reconstruction of soft tissue defects after oral cancer operation in 31 patients treated at our hospital since 2012.

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PATIENTS AND METHODS

Patients

Thirty-one patients with oral cancer attending the Affiliated Stomatology Hospital of Kunming Medical University, who underwent repair of soft tissue defects after oral cancer resection using a pedicled forearm flap, from July 2012 to July 2016, were included. Of these patients, 19 were male and 12 were female; patients were aged between 39 and 69 years, with a mean age of 54 years. There were 13 patients of tongue carcinoma, 7 patients of buccal carcinoma, 7 patients of mouth floor carcinoma, and 4 patients of gingival carcinoma. In terms of TNM stage, 24 patients were $T_1N_0M_0$ and 7 patients were $T_2N_0M_0$ (Table 1). The preoperative diagnoses were confirmed by pathological examination in all patients.

Operation Procedure

Under general anesthesia via nasoendotracheal intubation, all the patients underwent 2-team surgery simultaneously.

Recipient Site (performing functional neck lymph node dissection and removal of the primary tumor): Using a modified lateral lip–submandibular approach, the initial incision began from the lower lip vermilion, approximately 0.5 cm from the ipsilateral cheilion, and then descended downward and backward along the nasolabial sulcus to about 1.5 cm beneath the inferior edge of the mandible (Fig. 1A). Soft tissue was isolated from the depth of the platysma to the lower edge of the mandible; the external jugular vein was ligated at the superficial layer. In the deeper layer, the facial artery, the posterior facial vein, and the internal jugular vein were located and protected for blood vessel anastomosis. The sternocleidomastoid muscle was revealed and lateral traction was consistently applied. The lymph and cellular tissue was cleared away between the internal jugular vein and the carotid bifurcation, and the lymph node and lymphoid tissue was also cleared away around the internal jugular vein, the anterior cervical and deep cervical arteries. Then, toward the jaw and chin, the submandibular gland, lymph node, and lymphoid tissue of the submandibular and submental region were removed (Fig. 1B). After cleaning away the fat and lymphoid tissue outside the carotid sheath in the carotid triangle, the tunica was carefully opened, dissected, and separated along both sides of the internal jugular vein; it was then fully freed after the internal jugular vein was pulled forward,

TABLE 1. Patient Characteristics

Characteristic	Number
Sex	
Male	19
Female	12
Age (yr)	
>50 years old	18
≤50 years old	13
Pathologic type	
Squamous cell carcinoma	30
Adenoid cystic carcinoma	1
Tumor location	
Tongue	13
Buccal	7
Mouth floor	7
Gingival	4
TNM stage	
$T_1N_0M_0$	24
$T_2N_0M_0$	7

FIGURE 1. Operation procedure of functional neck lymph node dissection and forearm free flap transplantation. (A) The modified lateral lip-submandibular approach. (B) Lateral functional neck dissection. (C) The design of pedicle forearm flap. (D) The harvested pedicle forearm flap. (E) Free forearm flap transplantation to the oral cavity. (F) Abdomen free skin graft in the forearm donor site.

FIGURE 2. Postoperative wound healing. (A) The lateral view 1 month after the operation, showing postoperative wound healing of the oral, maxillofacial, and neck region. (B) The frontal view 2 months after the operation, showing that the forearm flap had 1-stage healing. (C) The frontal view 20 days after the operation, showing that the forearm donor site had healed well. (D) The frontal view 3 months after the operation, showing that the forearm donor site had healed well.

and the adipose and lymphoid tissues of intrathecal and perivascular region were cleared away. Finally, the neck operation region was flushed with copious amounts of physiological saline. Light iodophor was used to rinse the oral cavity, and the primary tumor lesion resected with an enlarged margin of about 1.0 cm. From the edge of the tumor lesion, a biopsy sample was taken intraoperatively and frozen.

Donor Site (performing forearm free flap transplantation): The location of the radial artery and cephalic vein was marked on the surface of forearm for a length of about 6 and 5 cm, respectively, using methylene blue. Then, the marked blood vessels were used as the axis to design a spindle-shaped free flap with a size similar to the recipient site (length: ca. 5 cm, width: ca. 4 cm), using methylene blue. Finally, a 10-cm line was marked at the proximal part of the spindle-shaped free flap (Fig. 1C).

During surgery, the radial artery, radial vein, cephalic vein, and cutaneous nerve were first located, and the vascular pedicle, about 15 cm long, separated (Fig. 1D). The radial artery and the cephalic vein were each ligated, and the cutaneous nerve was carefully protected during the operation.

Then, the prepared pedicled forearm free flap was moved to the area of the oral recipient site, and it was verified that the facial artery and the posterior facial vein were in good condition. Microsurgical anastomosis of the radial artery and cephalic vein to the facial artery and posterior facial vein, respectively, was then performed. During surgery, the blood vessels were frequently washed with diluted heparin sodium salt solution to avoid formation of thrombi in these blood vessels. Eventually, the flap was closed and sutured to the area of the oral recipient site (Fig. 1E). Copious amounts of physiological saline were used to flush the wound area. It was ascertained that there were no obvious bleeding points, and 2 negative-pressure drainage balls were placed under the sutured wound region.

Next, a full-thickness skin flap, spindle-shaped and with a size of about 4 cm × 5 cm, the same size as the forearm flap, was made in the lower abdomen. This was transferred to the forearm wound area to repair forearm skin flap, and the wound closed by suturing (Fig. 1F), and with bandage pressure.

Finally, routine postoperative tracheotomy was performed.

RESULTS

In this study, 31 patients were followed up for 3 months to 3 years. The pedicled forearm flap survived in 30 patients (96.77%), vascular crisis occurred in 3 patients (9.67%, 2 patients with successful rescue). Postoperatively, the oral cavity, neck, and forearm wounds underwent 1-stage healing (Fig. 2), without salivary fistula, chyle leakage, or infection complications.

Among the 3 patients with vascular crisis, postoperative exploration found that, in 2 patients, the vascular crisis was due to folding and compression of the vascular anastomosis, and in the remaining patient, it was caused by flap hematoma.

During the follow-up period, 1 patient died of cancer metastasis to the lung 2 years after surgery, and the remaining 30 patients were satisfied with the local appearance and function; the articulation and swallowing function of the patients were improved greatly.

DISCUSSION

A forearm free flap can be used to repair defects of oral and maxillofacial soft tissue, and is commonly used to repair large tissue defects after oral cancer surgery.[3] A forearm flap has the advantage of suitable color and texture, moderate thickness, a long vascular pedicle, a good blood supply, and strong resistance to infection, and can be used to form a composite tissue flap for the reconstruction of a large oral and maxillofacial defect as well as perforating defects. The forearm flap contains an arterial trunk network.[4] The blood supply of the radial skin flap is mainly supplied by the radial artery, which has 2 constant companion veins. The cephalic vein is the main reflux superficial vein of the forearm flap, and the cephalic vein or radial vein can be used for venous return in the forearm flap. The diameter of the cephalic vein is sufficiently wide, and the wall of the vein is moderately thick, to be a good match for the head and neck veins. The cephalic vein is often selected in clinical use for vascular anastomosis, but when making the skin flap, the cephalic vein and the fascia tissue between the radial artery and radial vein should be retained as much as possible. If necessary, we even use both the cephalic vein and the radial vein.[5] It has been reported in the literature that free tissue flap transplantation with these 2 venous anastomoses is the most reliable method for preventing secondary thrombosis, and can effectively prevent or reduce the probability of free flap vein crisis. Even if one vein were to become blocked, sufficient reflux could be achieved through the other vein, improving the success rate of this free tissue flap transplantation.[3]

The quality of vascular anastomosis is the key to survival of the flap. It is necessary to cut the vascular terminus flat and remove the adventitia of the vascular terminus for 2 to 3 mm before the vascular anastomosis.[6] If a vascular spasm occurs during the operation, it is necessary to use lidocaine heparin saline to flush and clear the small blood clot inside the vessels. Furthermore, it is important to ensure that no tension, no torsion, and no thrombosis occur in the blood vessels at the anastomotic site. After anastomosis of the blood vessels, the patency should be assessed immediately, and when the surface of the recipient site is closed, the patency of the blood vessels should be evaluated again. If vascular patency is not optimal, testing should be repeated, and if necessary, vascular anastomosis should be performed again.[7]

Careful postoperative nursing is also an important factor in the success of forearm free flap transplantation. The early observation of any vascular crisis is particularly important. Vascular crisis occurs mostly in the first 24 to 72 hours postoperatively, and particularly in the first 24 hours after the operation. Thrombi form mainly due to obstruction of venous return. It has been reported that if surgical exploration is performed within 4 to 6 hours when vascular crisis occurs, the success rate of rescue success is about 30%.[8]

Except for the vascular crisis that occurred in 3 patients (2 patients with successful rescue), the remainder of the surgeries in this group were successful, and the total graft survival rate was about 96.77%. This emphasizes that the free forearm flaps have a high survival rate in the reconstruction of soft tissue defects after oral cancer resection. In this group of patients, the shape of the skin flap was good, the color was normal, and the flap did not show any marked distension. Compared with previous patients, the oral function of the patients in this group was markedly improved.

In conclusion, the pedicled forearm flap is a useful skin flap for repairing soft tissue defects after resection of oral cancer, and its clinical application should be promoted.

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RadioVisioGraphy: A Simplified Nasal Bone Radiographic Imaging Tool

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Abstract: Nasal fractures account for approximately 50% of all facial fractures. Although nasal fractures are the most common facial fracture, they often go unnoticed by physicians and patients. A simple radiographic imaging of the isolated nasal bone can be done by RadioVisioGraphy dental imaging system with high resolution and less radiation.

Key Words: Nasal fractures, nasal radiography, RVG imaging

Nasal fractures account for approximately 40% of all bone injuries and 50% of all facial fractures. Although nasal fractures are the most common facial fracture, they often go unnoticed by physicians and patients. If untreated, nasal fractures can result in unfavorable appearance and they account for the high percentage of rhinoplasty procedures. Isolated nasal fractures are treated on the basis of the physical examination alone. A simple radiographic imaging of the isolated nasal bone can be done by RadioVisioGraphy (RVG) digital dental imaging system.

The RVG imaging system[1] commonly used in dentistry to take intraoral periapical radiographs features the latest innovations in digital radiography, delivering the highest image resolution ($>$ 20 lp/mm). A regular intraoral x-ray generator is used with a 200 mm cone with a 55 mm aperture which operates at 60 to 70 kV and 8 mA and exposure time of 2 to 3.2 seconds which is either pedestrial, wall-mounted, or portable hand-held (Fig. 1A). RadioVisioGraphy consists of a sensor, monitor, and microcomputer components (Fig. 1B). The sensor has a sensitive area of 275 mm $\times$ 182 mm. The radiation dosage is extremely lesser than the larger skull radiographs. The results are faster and better with no loss in image quality. The sensors are packed in shock-resistant patients and silicon padding offers protection from falls, bites and its waterproof as well, thus safely can be cold sterilized.

The lateral nasal view is probably best for depicting old and new fractures of the nasal bones. The RVG system can be used effectively for a lateral view of isolated nasal bone as shown in Figure 1C. The radiograph shows a very high resolution, can be magnified and viewed by contrast adjustment as well. The sensor can be conveniently kept inside a small polythene cover or inserted in a gloves cut during usage to avoid contamination. The RVG imaging system can be conveniently used in bedside or outpatient settings. Thus, RVG used in dentistry is a simple,

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