



ASRM Scientific Paper Presentations: Complex Non-Microsurgery Reconstruction

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26. Fasciocutaneous Flap Reinforcement of Ventral Onlay Buccal Mucosa Grafts Enables Neophallus Revision Urethroplasty

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Abstract

Purpose: Urethral strictures or fistulas are common complications after phalloplasty. Neourethral defects pose a difficult reconstructive challenge using standard techniques as there is generally insufficient ventral tissue to support a graft urethroplasty. We report our experience with local fasciocutaneous flaps for support of ventrally placed buccal mucosal grafts (BMG) in phalloplasty.

Methods: A retrospective review of patients who underwent phalloplasty and subsequently required revision urethroplasty using BMG between 2011-2015 was completed. Techniques, complications, additional procedures, and outcomes were examined.

Results: Three patients previously underwent phalloplasty with sensate radial forearm free flaps (RFFF): two female-to-male (FTM) gender reassignment, and one oncologic penectomy. Mean age at revision urethroplasty was 41 years (range 31-47). Complications requiring surgery were: one meatal stenosis, four urethral strictures (mean length 3.6±2.9cm), and two urethrocutaneous fistulas. The urethral anastomosis at the base of the neophallus was the predominant location for complications: 3/4 strictures, and 2/2 fistulas. Medial thigh (2) or scrotal (1) fasciocutaneous flaps were used to support the BMG for urethroplasty. One stricture recurrence at three years required single stage ventral BMG urethroplasty supported by a gracilis musculocutaneous flap. All patients were able to void from standing at mean follow up of 8.7 months (range 6-13). Two patients (66%) subsequently had successful placement of a penile prosthesis.

Conclusions: Our early results indicate that local or regional fasciocutaneous flaps enable ventral placement of BMG for revision urethroplasty after phalloplasty.

Evidence: Therapeutic level IV

27. Pedicle Transverse Colon Flap for Vaginal Reconstruction: Clinical Outcomes and Sexual Function Evaluation

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Introduction: Vaginal reconstruction is indicated in congenital vaginal agenesis, sexual development disorders, sex-reassignment and following pelvic tumor resection or trauma. Different surgical options have been described for vaginal reconstruction. Herein, we present the clinical outcomes and sexual function evaluation using the transverse colon flap (TCF) for vaginal reconstruction.

Methods: Retrospective review of patients who underwent vaginal reconstruction using the pedicle TCF. Demographics, etiology, OR time, length and width of the neovagina and surgical outcomes were recorded. Sexual function was measured using the Female Sexual Function Index (FSFI) questionnaire one year after surgery. The variables measured were: sexual desire, arousal, lubrication, orgasm, satisfaction and pain during sexual intercourse. For each variable, a score was calculated and the total score was obtained by adding the six scores. A total score more than 25 was considered normal and a total score of less than 25 was considered sexual dysfunction.

Results: Five patients were reconstructed using the pedicle transverse colon flap. Average age was (31.6, range: 15-55 years). Three of the five patients were for sex reassignment and two were congenital absence of vagina. The average OR time was (10.1 hours; 8-12.5 hrs). The average length and width of the flaps was 15 cm and 2.8 cm respectively (Figure-1). During a 12-year follow-up, two complications were reported: one patient had pain due to narrowing at the inlet, which required re-intervention and one patient had excessive amount of secretions in the first month which subsided at the third month. The mean FSFI score was 28 (range 27-29) (Table 1). One patient was not able to answer the FSFI test due to her age (15 yo). However, most of the patients (80%) achieved a normal sexual function, sexual desire (80%), sexual arousal (70%), adequate lubrication (80%), maintain orgasm (70%), were satisfied with their sexual life and sexual relationship (72%) and reported few episodes of pain with a low level of discomfort during and after intercourse (83%).

Conclusion: The pedicle transverse colon flap is an alternative method for vaginal reconstruction. Although our sample size is small, we were still able to achieve a normal sexual function in all of our patients with minor complications. However, further studies with a higher number of patients are necessary in order to improve patient's sexual life, sense of femininity and self-esteem.

Table 1. Female Sexual Function Index (FSFI)

Patient	Sexual Desire	Sexual Arousal	Lubrication	Orgasm	Satisfaction	Pain	Total
1	4	5	6	4	4	5	28
2	NA	NA	NA	NA	NA	NA	NA
3	4	4	6	5	3	5	27
4	4	5	6	4	4	6	29
5	5	4	6	4	4	5	28
Average	4.25	4.5	6	4.25	3.75	5.25	28
Max Score	5	6	6	6	5	6	34

Figure 1



Transverse colon orientation before inseting into the pelvis. Black arrow: distal segment for neovagina reconstruction.

28. Robot Assisted Penile Inversion Vaginoplasty: A Novel Technique

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Purpose: Gender confirmation surgery is an essential component in the management of gender identity dysphoria. However, short vaginal length, vaginal stenosis, or complications in the perineal dissection are significant limitations of current techniques in male-to-female (MtF) surgery. Here we describe our technique for the robot assisted penile inversion vaginoplasty that addresses these needs.

Methods: The patient is positioned in lithotomy position. The penis is degloved through a circumcision incision. The neurovascular bundle, urethra and corpora cavernosa are dissected out. A six cm bulbar perineal incision is made and the dissection is carried to the bulbar urethra. The dissected urethra, neurovascular bundle, glans and corpora are delivered through this incision. The bilateral corpora are transected at their most proximal limit and oversewn. The penile skin is inverted and gently retracted to allow a two cm incision above the neovagina for the neoclitoris. Immediately below this, an incision for the neomeatus is made. The urethra is brought through this incision and sutured to the skin. The remaining urethral tissue is used as an inlay onto the incised dorsal epithelial surface of the penile skin.

The robotic portion utilizes 4 port incisions: periumbilical Gelport with two pre-placed robotic trocars, right and left lateral ports, and an assistant port in the upper right abdomen. The dissection is from the posterior prostate, staying above Denonviller's fascia to reach the endopelvic fascia. Under direct vision, the endopelvics are opened sharply from below and opened to a width of two fingerbreadths. The neovagina is passed into robotic field and pexed to the anterior reflection of the posterior peritoneum. The peritoneal reflection is then closed.

The neoclitoris is fashioned from the glans penis and approximated. Labia majora and minora are fashioned with local skin flaps. A foley catheter and vaginal stent are left indwelling.

Results: We have performed this technique on 4 patients to date. The index case required an average of 6.5 hours of surgical time with an average estimated blood loss of 100 mL. The vaginal length was greater than 15 cm in all cases. The patients were all discharged home on post-operative day three, with no complications. The patients endorse sensation at the neoclitoris and anterior neovagina, and find the vaginal depth satisfactory.

Conclusions: Our novel method for robot assisted penile inversion vaginoplasty is an important step in optimizing outcomes for our patients. This technique achieves maximal vaginal length in a safe and reproducible manner.

29. Urethral Complications after Female to Male Gender Reassignment: Common Causes, Consequences and Considerations for Salvage Reconstruction

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Purpose: The high frequency at which urethral complications occur after adult female to male gender reassignment surgery (including phalloplasty or metoidioplasty) is well-documented. We aim to examine and understand the basis for these complications in to improve outcomes of salvage reconstruction.

Methods: Consecutive patients who presented to our institutions from August 2013 to October 2015 for salvage reconstruction after urethral complications of adult female-to-male (FtM) gender-reassignment surgery were identified and reviewed.

Results: Twenty patients were included in the study. The average age at presentation was 33.2 years (18-54). The median time of presentation from gender confirming surgery was 4 months (1-13). Phalloplasty (17) predominated over metoidioplasty (7) as the initial reconstruction (4 patients underwent both repairs). The most common subjective complaint was urinary retention in 12/20 patients (60%). Eleven patients presented with suprapubic catheter, 4 with urethral self-calibration and 3 with perineal urethrostomy.

The most common preoperative findings were neourethral stricture in 16/20 patients (80%), cutaneous fistulization at various points along the neourethra (10/20 patients), and anastomotic leak from the native urethral opening to a pelvic cavity (10/20 patients).

Intraoperatively, the pelvic cavity was identified as vaginal remnant in 11 of 20 patients (55%) despite history of vaginectomy in all patients. Pathologic evaluation of the cavity tissue confirmed vaginal epithelium in 7 patients, while the remaining four had no pathology specimen recorded. Neourethral stricture was identified in 16/20 patients (78%), 7 of which were pan-urethral. The remaining 9 patients had anastomotic strictures, of which 6 had additional concurrent meatal stenosis. Sixteen of the 20 patients (80%) had at least two of the following: neourethral stricture, remnant vagina, urethrocutaneous fistula, or meatal stenosis.

Conclusions: The majority of patients with urethral complications after adult FtM gender confirming surgery will have multiple concurrent pathologies. Distal obstruction by a neourethral stricture may predispose to fistulization proximal to the anastomosis causing urethrocutaneous fistula and dilation of previously obliterated vaginal cavity. These findings are important in understanding of the complex nature of the urinary complications after FtM gender reassignment, and for planning salvage reconstruction in these patients.

30. Mandible Reconstruction by the Assistant of Stereolithographic Three-dimensional Printing Model Technique

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Introduction

Three-dimensional (3D) bio-model is a technique based on the computed tomography (CT) which involved in some reconstructive surgeries in recent years. In this article, we presented a case of odontogenic keratocyst (OKC) over mandible which need to be resected and reconstructed via the help of this technique.

Case Report

A 18-year-old female suffered from odontogenic keratocyst (OKC) between left mandible ramus and angle. The 3D stereolithography method used for pre-operative designed and bio-models were designed and printed out before the operation. The first model of lesion site was used to evaluate the excision margin. The contralateral site mirrored to lesion site and the second guide was printed for bending of the reconstructive plate to fit the shape of the mandible. After tumor excision, the defect was reconstructed immediately with left free fibula osteoseptocutaneous flap successfully. After 18 months follow-up, the patient showed satisfied aesthetic result, proper occlusion and chewing function.

Discussion

It is not easy to get good cosmetic and functional result in mandible reconstruction. The 3D bio-model can assist the surgeon to evaluate the size and design the osteotomies tailor to the defect, shaping the titanium plate to fit the mandible, and shorten the operative time. By this easy and economic method the good results can be expected.

Figures and Legends



Figure 1. preoperative panorex showed radiolucent mass over left mandible.

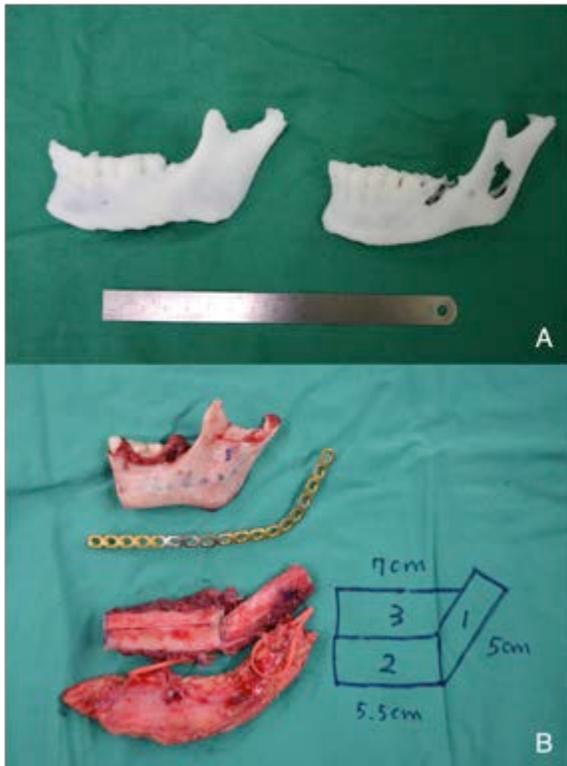


Figure 2. (A) The three-dimensional (3D) stereolithography technique was used for pre-operative design. The contralateral mandible is mirrored to the lesion side and the second model was printed out for the shaping of reconstructive plate.

(B) Left fibula osteoseptocutaneous (OSC) flap was split into three structs, double barrel, supported by reconstructive plate and fixed with microplates in between.



Figure 3. Post-operative panorex (after plate removal).

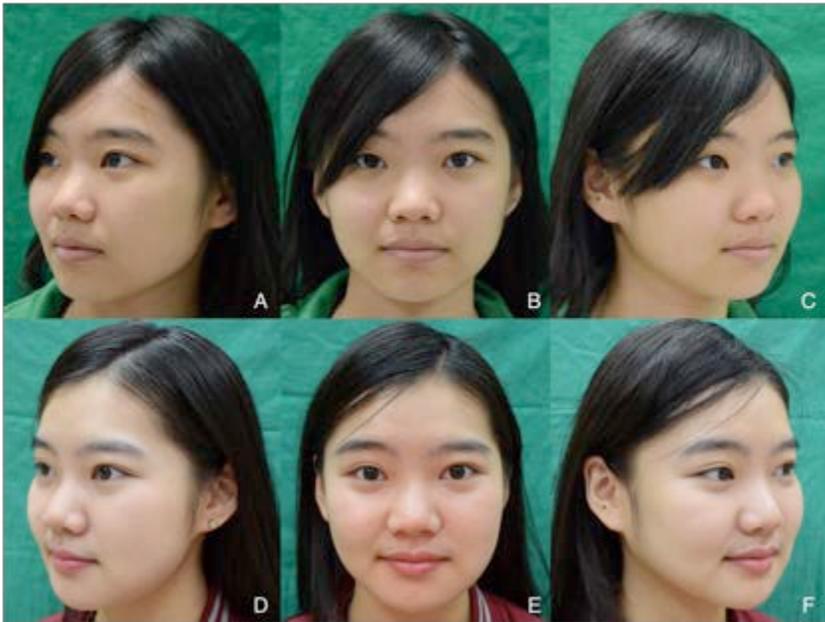


Figure 4. (A,B,C) preoperative photos. (D,E,F) post-operative 18 months photos.

31. Simultaneous Reconstruction of the Lower Lip During Functioning Free Muscle Transplantation for Smile Reanimation in Facial Paralysis: Objective and Subjective Evaluation Comparing Different Surgical Methods

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Introduction: Functioning free muscle transplantation (FFMT) is currently the golden standard for smile reanimation, focusing more on the effects on the upper lip, rather than the lower lip. This study aims to compare the different lower lip reconstructive methods associated with FFMT for facial paralysis.

Methods: Patients were retrospectively collected for this study from the year 2006 to 2015 and divided into 3 groups. The method of lower lip repair for group 1 was suturing a free plantaris tendon graft onto the FFMT and then passing the graft through the entire lower lip in a loop fashion (Figure 1). In group 2, the proximal gracilis aponeurosis was lengthened and then repaired to the lower lip. The lower lip was not repaired in group 3 patients. The subjective evaluations were performed by three independent reviewers assessing photos and videos, with emphasis on the discrepancy of the vermilion exposure between the two halves, midline deviation and horizontal tilt (Figure 2) of the lower lip. Objectively, the preoperative and postoperative volume dimension and movement excursion of the lower lip were measured using Photoshop (Adobe, California, USA) and compared between the two halves (Figure 3). Statistical analysis of the final results was performed by using chi-square and one-way ANOVA tests.

Results: A total of 53 patients were included in this study. Subjectively, groups 1 and 2 showed significant improvement in vermilion exposure dynamically and midline deviation statically (Figure 4). Both these groups also had a significantly higher overall score statically and dynamically than group 3. Group 2 also had the least discrepancy in vermilion exposure postoperatively within the three groups. Objectively, the discrepancy of the lower lip volume between the paralyzed and healthy halves all decreased after surgery in the 3 groups, with no significant difference (Figure 5). However, groups 1 and 2 both showed significantly larger increase in postoperative volume of the paralyzed side.

Conclusions: Both the plantaris tendon graft and the proximal aponeurosis groups showed the most improvement in the postoperative dynamic appearance and increase in volume of the paralyzed side, with group 2 having the least discrepancy in the vermilion exposure. However, group 3 also showed less discrepancy in the volume between the two halves, indicating that not reconstructing the lower lip may still have an impact on the final lower lip outcome.

Figure 1

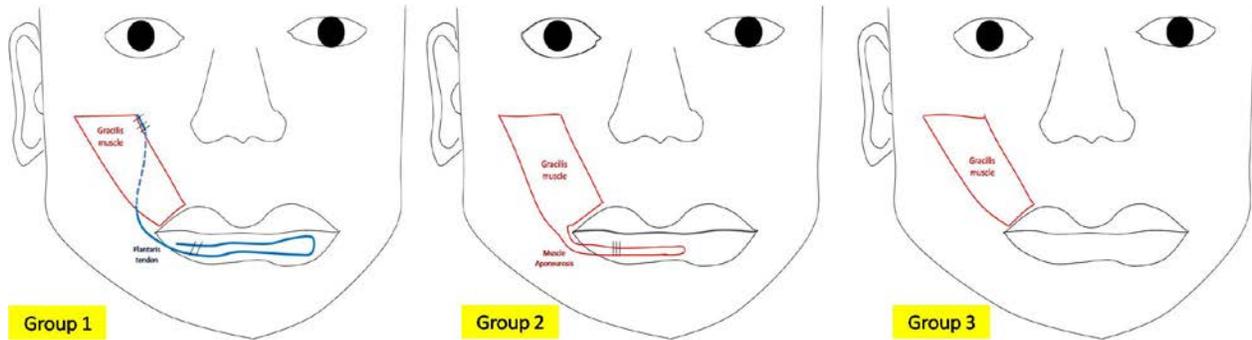


Figure 2

SYMMETRY	Volume and Bulk (Vermillion exposure)	Midline deviation (Vertical)	Horizontal tilt (Horizontal)
1	Complete mismatch	Deviated beyond lateral side of contralateral nostril	Tilt > 2x lip height
2	Severe discrepancy	Deviated within lateral half of contralateral nostril	Tilt > 1x lip height
3	Moderate discrepancy	Deviated within medial half of contralateral nostril	Tilt less than 1x lip height
4	Mild discrepancy	Mild deviation, within the width of the columella strut	Minor tilt
5	Perfect (near) symmetry	Perfect (near) symmetry	Perfect symmetry

Figure 3



Figure 4

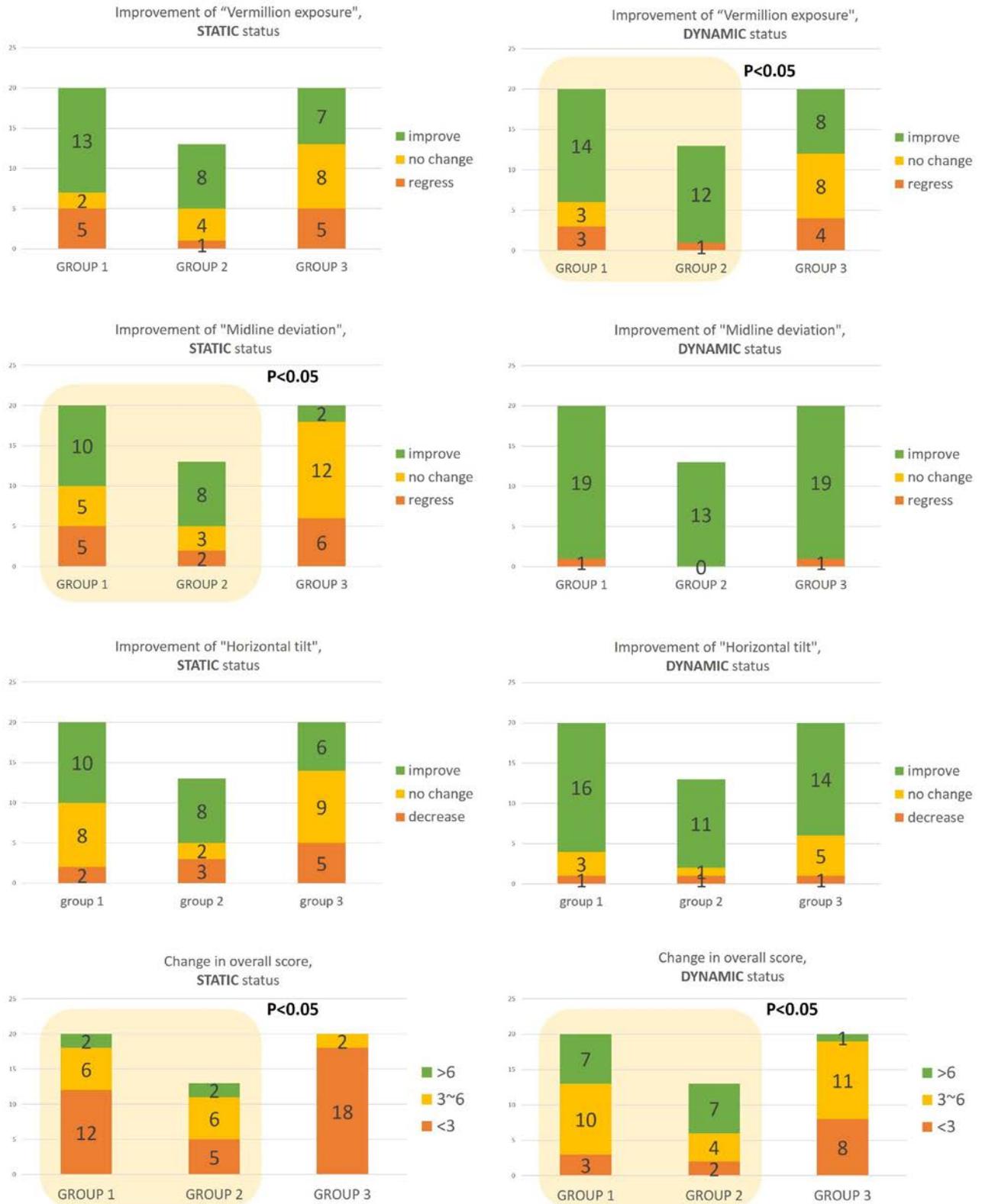
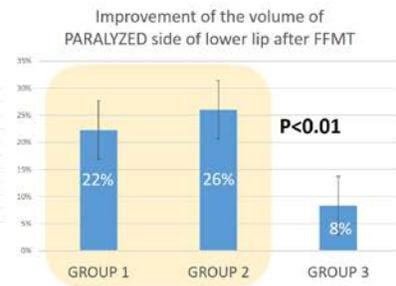
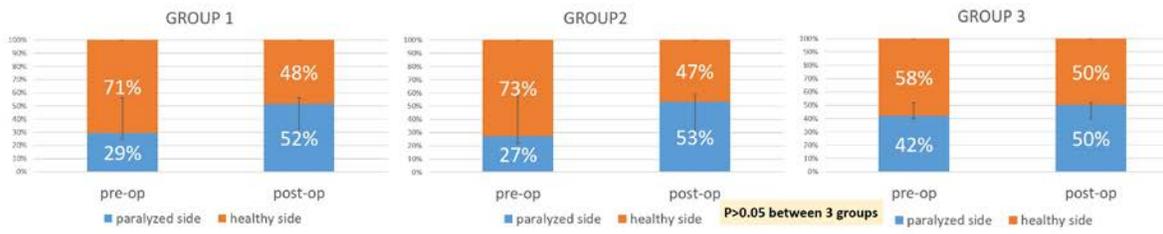


Figure 5

Distribution of the volume of paralyzed and healthy side of the lower lip



32. The Preferred Reconstruction of a 2/3 Upper Lip Defect: 239 Microsurgeons' Decision

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Introduction

The best reconstructive strategy for defects spanning two-thirds of the length of the upper lip is still in debate, as local or free flaps are both applicable. The purpose of this study was to analyze the decisions made by international microsurgeons when facing this clinical scenario.

Materials and Methods

A case involving a defect that extended across two-thirds of the length of the upper lip following squamous cell carcinoma excision was presented via an online questionnaire. Responses regarding treatment options were collected from international microsurgeons and a total of 239 microsurgeons replied. The data was recorded and then further studied by geographic area and microsurgeons' level of experience (greater or less than 5 years as a staff surgeon). All of the collected data was analyzed by SPSS.

Results

A total of 69 (28.3%) of microsurgeons chose a free flap as their method of reconstruction, while 170 (69.7%) chose a local flap as their first priority for reconstruction in the given case. Amongst those who indicated a preference to use a free flap, the most common responses were radial forearm (68.1%), medial sural artery perforator (11.5%), and anterolateral thigh flap (5.8%). For those surgeons who selected a local flap as their first option, the most common responses were Abbe (41.2%), Karapandzic (13.5%), and bilateral cheek advancement (11.8%). The microsurgeons in Middle/South America and Asia-Pacific showed a strong preference for free flaps as compared to microsurgeons in Europe and North America (42.4 and 50.0% vs. 14.9 and 21.4%, respectively) ($p < 0.01$).

Conclusion

For every defect, microsurgeons need to evaluate the patient thoroughly and provide the best options for reconstruction. The free flap is not mandatory in all cases, and other potential options should be explored where possible. Microsurgeons in Europe and North America chose local flaps more often than other geographical areas, potentially indicating greater experience with these techniques.



Figure 1. 50-year-old male suffered from upper lip squamous cell carcinoma *s/p* excision, defect: 5x3 cm from outside (about 2/3 upper lip), what do you prefer for reconstruction?

33. Free Tissue Transfers for Head and Neck Cancer Patients with End-Stage Renal Disease on Dialysis: Analysis of Outcomes using the Taiwan's National Health Insurance Research Database

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Purpose: The number of patients diagnosed with end-stage renal disease (ESRD) is increasing at around 5% annually. During their life span, some of these patients will require free tissue transfers to reconstruct their body after trauma or cancer resection. In the general population, the success rates of free tissue transfer have been reported between 95 and 99%. However, comorbidities, such as uremia, diabetes mellitus and severe atherosclerotic disease, can increase the level of complexity in these patients.

The aim of our study is to describe the outcomes of ESRD patients under dialysis who underwent free tissue transfer for head and neck reconstruction.

Methods: Based on the Taiwan national health insurance program database, two cohorts were analyzed: ESRD group on dialysis and a non-ESRD control group. Postoperative complications within 90-days and mortality within 30-days of the date of surgery were recorded. For coexisting comorbidities, we determine the presence of diabetes mellitus (DM) and peripheral vascular disease (PVD). For statistical analyses, a 2-tailed *P* value < .05 was considered statistically significant.

Results: Between 1998-2010, 85 cases with ESRD on dialysis and 841 controls without ESRD were analyzed. The majority of patients were aged ≤ 65 years (82.5%) and nearly 92.9% of them were men. The major subdivision of head and neck cancer was neoplasm of other and unspecified parts of the mouth followed by neoplasm of tongue, the gum, hypopharynx and floor of mouth. Compared with the non-ESRD group, patients with ESRD tended to have higher rates of DM and PVD ($p < 0.001$). In addition, the ESRD patients were significantly associated with an increased risk of stroke (adjusted OR=4.28, 95% CI=1.30–14.1) and a significantly increased risk of 30-day mortality (adjusted OR=4.58, 95% CI=1.18–17.8). However, there was no significant difference regarding flap failure among groups (adjusted OR=0.74, 95% CI=0.27-2.05).

Conclusions: Despite greater pre-operative risk factors, renal failure does not appear to effect free flap survival following head and neck reconstruction. However, optimizing patient's medical condition is critical to the success of this reconstructive effort.

34. Paradox of Free Fibula Flap Thrombosis for Mandibular Reconstruction and Vein Size: Bigger May Not Be Better

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Introduction: The principle reconstructive modality for segmental mandibulectomy defects is the osteocutaneous free fibula flap. Preoperative CT angiography has been recommended to assess the quality of arterial inflow to the flap and donor limb. However, the impact of the venous system on flap viability has not been explored.

Patients and Methods: A retrospective review of all patients undergoing free fibula flap mandible reconstruction was performed at a single tertiary cancer center from 2002 to 2015. Patient demographics, medical comorbidities, smoking history, and neoadjuvant/adjuvant chemoradiation were examined as well as overall complications including operative reexploration and total flap losses.

Results: One hundred and seven patients underwent free fibula flap reconstruction of the mandible. Nine patients underwent multiple free flaps and were excluded. Of the remaining 98 patients, eight patients required operative exploration for microvascular compromise. All patients were found to have venous thrombosis. There were 3 total flaps losses with a salvage rate of 62.5% and overall flap survival of 96.9%. The size of the vena comitantes in the compromised flaps were significantly larger than those of the remaining patients (4.4 mm vs. 3.1 mm, $p < 0.0001$). Although the total operative times were similar between the two groups (585.2 min vs 563.3 min), the ischemia time was significantly shorter in those cases that required operative takeback (76.5 min vs 104.0 min, $p < 0.04$).

Conclusions: Venous thrombosis of free fibula flaps is more common than arterial thrombosis. Venous stasis in larger vena comitantes may be a contributing factor to microvascular compromise particularly because of the low flow within the fibula flap compared to other musculocutaneous or fasciocutaneous free flaps. Anticoagulation and performing a hand-sewn, end-to-side anastomosis instead of using a venous coupler may be beneficial if the veins are larger than 4.0 mm in size.

35. Chimeric Multiple Perforator Fibula Flap (CMPF): Expanding Single Flap Reconstruction and Optimizing Donor Site Morbidity

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Introduction

The free osteocutaneous fibula is the flap of choice for complex composite mandibular and maxillary reconstruction. However, recipient defect size, flap volume, and donor site morbidity pose individual challenges. We present an anatomic study and clinical application of a perforator-preserving free fibula flap with multiple individual skin islands and a lateral hemisoleus. The chimeric multiple perforator free fibula (CMPF) design increases the versatility of the flap, obviates the need for secondary free tissue transfer, and improves donor site morbidity.

Method

Thirty-eight flaps in 17 fresh cadavers were dissected using a perforator preserving technique. A total of 138 cutaneous perforators were isolated, averaging 3.64 perforators per leg. Twenty-six percent were located in the proximal third, with an average length of 6.8 cm. Seventy-eight percent were musculocutaneous perforators. The tibioperoneal trunk gave rise to the proximal peroneal perforator in 15.2% of cases and was not included in the single-pedicle free fibula flap dissection. From April 2011 to May 2016, the CMPF flap was utilized in 117 composite mandibular and maxillary reconstructions. Age ranged from 7 to 74 years. Flap design was based on defect size and isolated cutaneous and muscular perforators.

Results

All patients were reconstructed using the CMPF flap technique. The flap contained multiple skin islands in 87 cases (74.4%) and a single proximal skin island in 25 cases (21.3%). In 101 (86.3%) patients, the proximal perforator was a direct branch of the peroneal artery. It followed a musculocutaneous course in 88% of cases and had an average length of 7.4 cm. In 16 patients (13.7%), the proximal perforator was a direct branch of the tibioperoneal trunk and the flap was subsequently designed distally. The lateral hemisoleus was harvested in 72 cases (61.5%). The proximal leg defect was primarily closed in 86 patients (76.8%) and skin grafted in 26 (23.2%); distal leg donor site was grafted in 80 (87%) cases. There were no proximal donor site dehiscences and all skin grafts healed well. The distal donor site dehiscence rate was 72.8% and required local wound care or regrafting. Nine flaps (7.7%) were lost due to salivary fistula or infection, all of which occurred in complex tertiary cases.

Conclusion

The CMPF flap is based on a single peroneal vascular pedicle and provides independent skin and muscle components for large volume complex head and neck reconstructions. Utilizing the proximal perforator and associated skin island improves donor site morbidity.