



Aesthetic and Psychosocial Outcomes after Microvascular Reconstruction for Head and Neck Cancer: A Long-term Cross-sectional Analysis

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Introduction

Background: Due to fear of recurrence, disability, and aesthetic deficits, many patients with head and neck cancer (HNC) may suffer from depressive symptoms.¹ Although ablative surgery is critical for disease control, it often impairs nearby structures that are crucial for self-expression and social interaction.² This is particularly true among patients that require microvascular free tissue transfer (MFTT), which is generally reserved for advanced malignancies and significant defects. The extensive facial disfiguration that often occurs with MFTT makes these patient particularly vulnerable to poor aesthetic outcomes. Recent work suggests that osteocutaneous reconstruction and adjuvant therapy are associated with poor aesthetic outcomes in this population³, but risk factors for poor long-term aesthetic outcomes have not been described. Identifying patients at high risk for long-term aesthetic impairments may allow for interventions to reduce psychosocial dysfunction.

Objective: The primary objective of this study was to identify risk factors for poor aesthetic and psychosocial outcomes among HNC survivors more than one year after MFTT.

Methods

Design: This was a cross-sectional, web-based survey study.

Setting: This study was performed at a single, academic tertiary care center.

Participants: We screened all HNC patients that were between 1 and 6 years from tumor ablation with MFTT at out institution between January 1st, 2015, and December 31st, 2019. Out of 552 unique patients undergoing MFTT, 158 were deceased, 108 had benign, pre-malignant, or other non-cancerous defects, 53 did not have a valid email address, 4 had undergone recent treatment, and 1 was a pediatric patient. After excluding these patients, 228 were included in the study of which 124 competed surveys (response rate: 54.4%).

Survey instruments: We used four scales from the FACE-Q Aesthetic module: Satisfaction with Facial Appearance (SFA), Appearance-Related Psychosocial Distress (ARPD), Psychological Function (PF), and Social Function (SF). The SFA scale addresses topics such as facial symmetry and appearance in photographs. The ARPD, PF and SF scales which investigate how facial appearance influences stress, self-confidence, and making friends, among other related topics. Each scale contains 8 to 10 Likert-style questions which are summed, then subject to Rasch transformation for a final survey score of 0 to 100. Higher SFA, PF, and SF scores indicate superior satisfaction or functioning. Higher ARPD scores indicate greater levels of distress.

Analysis: Univariable and multivariable linear regression were used to test for associations between survey scores and risk factors, including number of years from surgery, age, gender, anxiety or depression history, disease subsite, disease stage, flap type, tube feeding requirements, related hospital readmission, postoperative adjuvant therapy, and disease recurrence. Significance was set at $p < 0.05$. All statistical analyses were performed via Stata version 15 (Stata-Corp LLC, College Station, TX).

Results

Table 1: Patient characteristics (below). The median survey follow-up time was 34.4 months after MFTT. Most respondents were men with a median age of 63. The majority had stage III or IV cancer of the oral cavity or and were reconstructed with anterolateral thigh or fibula flaps. Non-responders had no significant differences in characteristics ($p > 0.05$ for all comparisons, data not shown).

Patient characteristics, N = 124	
Survey follow-up time, months, median (IQR)	34.4 (22.6 – 48.8)
Age, years, median (IQR)	63 (54 – 72)
Female gender	45 (36.3%)
Anxiety or depression history	34 (27.4%)
Subsite	
Aerodigestive	90 (72.6%)
Superficial / cutaneous	34 (27.4%)
Overall stage, AJCC 8 th Ed.	
Early, I-II	29 (23.4%)
Advanced, III-IV	95 (76.6%)
Flap type	
Soft tissue only	51 (41.1%)
Osteocutaneous	40 (32.3%)
Tube feeds ≥ 1 month	43 (34.7%)
Related hospital readmission	69 (55.7%)
Postoperative adjuvant therapy	
None	34 (27.4%)
Adjuvant radiation alone	57 (46.0%)
Adjuvant chemoradiation	33 (26.6%)
Postoperative recurrent disease	31 (25.0%)

Figure 1: Correlation of facial appearance with psychosocial outcomes (below). This is a linear prediction plot demonstrating the relationship between SFA scores and the appearance-related psychosocial function scales: ARPD, PF, and SF. Overall, this suggests that patient’s satisfaction with their facial appearance predicts their psychosocial functioning. After adjusting for follow-up time, age, sex, anxiety or depression history, disease stage, osteocutaneous flaps, prolonged tube feeding, hospital readmission, adjuvant therapy, and recurrent disease via multivariable linear regression models, each 1-point increase in SFA remained predictive of lower ARPD, higher PF, and higher SF.

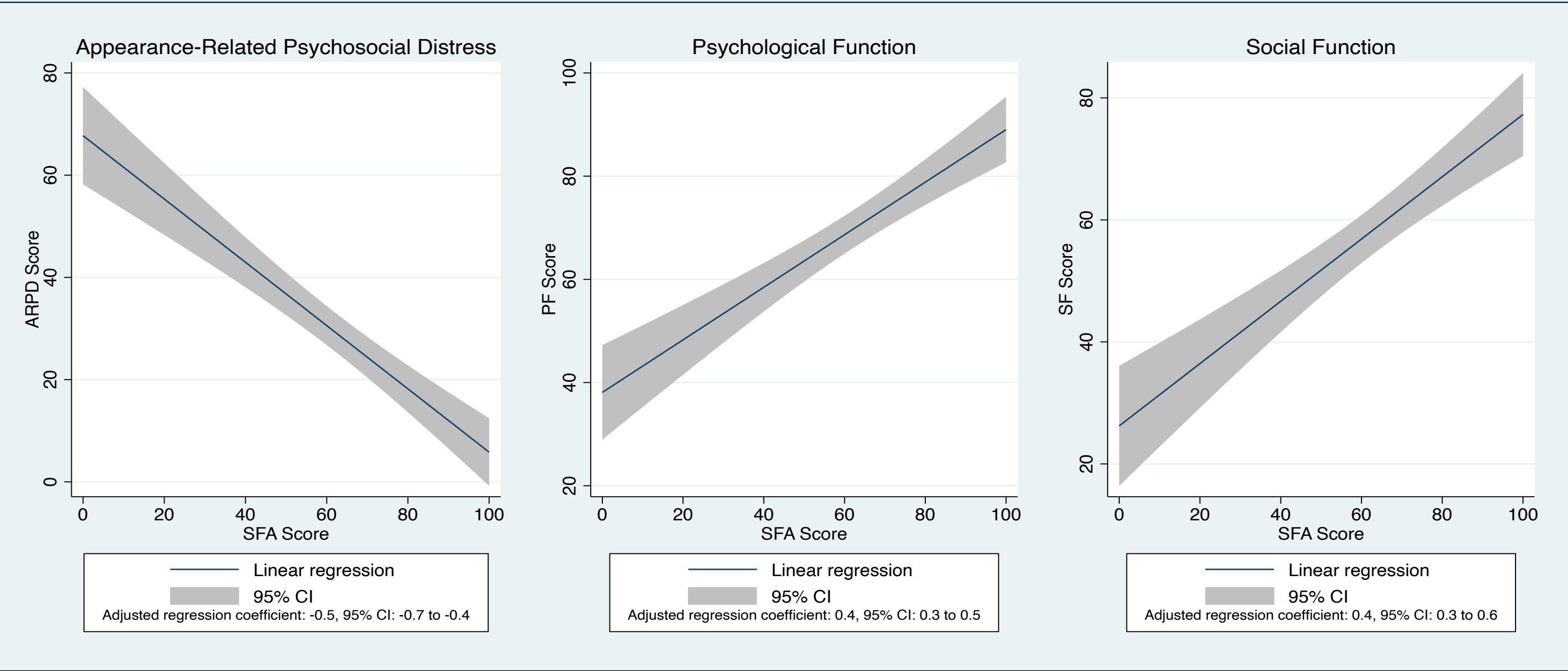


Table 2: Risk factors for impaired aesthetic and psychosocial survey scores (below). Several factors were associated with significantly worse FACE-Q survey scores, indicating impaired aesthetic and psychosocial outcomes. Notably, survey follow-up time did not significantly influence survey scores, suggesting that aesthetic outcomes are unlikely to change beyond one year from MFTT. Impaired SFA was independently associated with osteocutaneous flaps and adjuvant (chemo)radiation. ARPD was independently associated with a history of anxiety or depression and osteocutaneous. PF was associated with, a history of anxiety or depression, osteocutaneous flaps, tube feeding ≥ 1 month, and any recurrent or persistent disease. SF was only associated with a history of anxiety or depression.

Characteristic	Multivariable adjusted regression coefficients (95% CI)			
	Satisfaction with Facial Appearance	Appearance-Related Psychosocial Distress	Psychological function	Social Function
Increasing years from surgery	+1.1 (-2.2 to 4.5)	+2.8 (-0.4 to 6.0)	-0.7 (-3.6 to 2.2)	-0.9 (-4.2 to 2.2)
Age ≥ 65	+5.81 (-3.7 to 15.4)	-7.8 (-16.9 to 1.4)	+0.7 (-7.6 to 8.9)	+7.3 (-1.9 to 16.4)
Female gender	-8.9 (-18.7 to 0.9)	+8.6 (-0.8 to 17.9)	-10.5 (-18.9 to -2.1)*	-3.1 (-12.4 to 6.3)
Anxiety or depression history	-5.5 (-16.1 to 5.1)	+11.1 (1.0 to 21.2)*	-13.2 (-22.3 to -4.1)*	-15.9 (-26.0 to -5.7)*
Osteocutaneous free flap	-10.6 (-20.4 to -0.8)*	+12.5 (3.1 to 21.9)*	-10.4 (-18.8 to -1.9)*	-8.8 (-18.2 to 0.6)
Advanced stage (III or IV) disease	-1.7 (-13.0 to 9.6)	+4.5 (-6.3 to 15.3)	-4.9 (-14.6 to 4.8)	-4.6 (-15.5 to 6.2)
Tube feeds ≥ 1 month	-5.4 (-14.9 to 4.1)	+7.5 (-1.6 to 16.6)	-11.2 (-19.4 to -3.1)*	-9.1 (-18.2 to 0.1)
Related hospital readmission	-8.7 (-18.1 to 0.7)	+6.2 (-2.8 to 15.2)	-3.6 (-11.7 to 4.5)	-4.2 (-13.3 to 4.8)
Adjuvant (chemo)radiation	-6.9 (-13.8 to -0.1)*	+6.6 (0 to 13.2)	-4.9 (-10.8 to 1.0)	-2.2 (-8.8 to 4.4)
Recurrent or persistent disease	-7.5 (-17.1 to 2.1)	+12.3 (3.1 to 21.4)	-9.8 (-18.0 to -1.6)*	-6.0 (-15.2 to 3.2)

Discussion

Summary: In 124 patients at a median of nearly 3 years after MFTT, both osteocutaneous reconstruction and adjuvant therapy resulted in worse patient-reported satisfaction with their facial appearance. Appearance-related psychosocial functioning was significantly worse with a history of anxiety or depression, female gender, osteocutaneous flaps, prolonged tube feeding, recurrent disease, and poor satisfaction with facial appearance.

Discussion: Patient-perceived aesthetic outcomes are correlated with psychosocial function after head and neck reconstruction^{3,4}. These results demonstrate that HNC patients who undergo MFTT have generally poor long-term satisfaction with facial appearance. In comparison, the aesthetic survey scores three years after MFTT in this study were far worse than those previously reported 10 months after local flap reconstruction⁵. Importantly, this study reveals the demographic, disease, treatment and complication-related risk factors that exacerbate this risk. Osteocutaneous flaps and adjuvant radiation were independently associated with impaired aesthetic satisfaction several years after MFTT. Our data is also consistent with previous reports finding women and those with prior mood disorders at an increased risk of impaired psychosocial functioning.^{4,6,7} Surgeons should strive to recognize these high-risk patients. Early implementation of referrals for psychosocial support and/or consideration of aesthetic revision surgeries may help minimize this risk of associated psychosocial deficits in this population.

Limitations of this study include a low response rate and sample size that may reduce the generalizability of the results. Furthermore, the minimal clinically significant difference for these scales is unknown.

Conclusion

HNC patients undergoing osteocutaneous reconstruction and adjuvant radiation are at an increased risk of impaired aesthetic outcomes more than one year after MFTT. These impairments do not appear to improve with time. Female patients with a history of anxiety or depression, prolonged postoperative tube feeding requirements, and any recurrent disease are more vulnerable to psychosocial impairments. It is imperative to identify these patients and implement risk mitigation strategies. Aesthetic outcomes should be a priority for reconstructive surgeons in attempt to preserve psychosocial functioning after MFTT in HNC patients.

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