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Resident training in head and neck flap reconstruction in U.S. academic otolaryngology programmes

Mahesh H. Bhaya, M.D., Gady Har-El, M.D., F.A.C.S.

Abstract

The main objective of this study was to assess resident training in head and neck flap reconstruction, and to determine the confidence of graduating residents in performing these flaps independently. Questionnaires were distributed to otolaryngology residents graduating in 1997. Respondents recorded the number of pedicled and free flap procedures they performed, or assisted with, and indicated flaps they felt confident about performing independently.

Pectoralis major myocutaneous (PMMC) (n = 560, mean 6.59) and radial forearm (RF) (66, 0.78) were the most common pedicled and free flaps performed. There was a significant difference ($p = 0.0002$, Mann-Whitney U test) between median confidence for pedicled (44.5 per cent) and free flaps (two per cent). Ten of the 17 flaps showed a significant Pearson correlation ($p<0.05$) between number of procedures performed and confidence in performing them independently. Of the pedicled flaps, latissimus dorsi (LD) showed good correlation (r = 0.67), PMMC showed low correlation (r = 0.19) and other pedicled flaps fair correlation. Of the free flaps, LD (r = 0.64) and fibula (r = 0.50) showed good correlation and rectus abdominis and RF fair correlation. There was a fair inverse correlation (r = −0.29) between numbers of pedicled and free flaps performed.

Higher correlation in flaps uncommonly performed reflects greater operative training necessary to achieve the confidence for performing these flaps independently. As respondents perfomed greater numbers of free flaps, the number of pedicled flaps decreased. It might thus be important to train residents in all aspects of pedicled flaps. Most respondents were of the opinion that additional training in free flaps was necessary for those planning a career in head and neck reconstructive surgery.

Key words: Surgical Flaps; Head and Neck Neoplasms; Physicians, Junior; Training Support

Introduction

Head and neck surgery involves ablation of cancer and the functional and aesthetic reconstruction of resected areas. Otolaryngologists are very often involved in both aspects of this debilitating and disfiguring disease. Training of residents in reconstructive aspects of head and neck surgery is an important aspect of their residency training.[1]

The reconstructive surgeon must have the capability to perform a wide variety of techniques. It is generally accepted that the simplest and most reliable technique should be the initial procedure of choice. If this fails to accomplish the reconstructive goals a more sophisticated technique should be used.

Pedicled myocutaneous flaps are reliable, provide the necessary soft-tissue bulk and skin coverage and are technically easier to learn and perform. Over the past three decades, they have provided an excellent tool for the advancement of head and neck reconstruction. However, they do have their limitations. Optimal results are difficult to obtain by using these flaps for reconstruction of the anterior mandibular and floor of mouth defects, total pharyngectomy defects and large defects involving the anterior cranial fossa and orbit. In addition, most pedicled flaps do not provide bone for jaw reconstruction.

When pedicled flaps cannot accomplish their reconstructive goals, free flaps are usually used. Free flaps are effective in poorly vascularized post-radiotherapy sites, have the flexibility of orientation often unavailable to myocutaneous pedicled flaps and often provide bone for mandible reconstruction.[2] But they require the expertise and experience that usually comes with specialized training. Also, the procedures are long and if failure occurs it is usually total.[3,4]

This study was undertaken to evaluate the utilization, teaching and training of reconstructive flaps of the head and neck in academic otolaryngology programmes. It would also determine the confidence with which graduating residents would perform these flaps independently as practising otolaryngologists.

From the Department of Otolaryngology, State University of New York Health Science Center at Brooklyn, NY, USA.
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TABLE Ia
PEDICLED FLAPS

	Flaps performed	Flaps participated	Flaps performed per respondent	Flaps participated per respondent
Latissimus dorsi	14	44	0.2	0.5
Pectoralis major	560	951	6.6	11.2
Forehead	182	306	2.1	3.6
Deltopectoral	88	138	1.0	1.6
Trapezius	13	43	0.2	0.5
Temporalis muscle	101	155	1.2	1.8

TABLE Ib
FREE FLAPS

	Flaps performed	Flaps participated	Flaps performed per respondent	Flaps participated per respondent
Radial forearm	66	296	0.8	3.5
Rectus abdominis	21	104	0.3	1.2
Free fibula	39	202	0.5	2.4

Materials and methods

Questionnaires were designed to evaluate the objectives of the study. The questionnaires did not ask for the identity of the respondent. The questionnaires were distributed to otolaryngology residents who graduated in 1997, through their individual training programmes. The questionnaires categorized the flaps into six pedicled and 11 free flaps. Respondents were asked to record the number of procedures they performed or assisted with and to check the flaps they felt most comfortable and confident about performing independently. Additional comments or suggestions were invited.

Results

Eighty-five questionnaires were returned completed by the respondents. Considering approximately 250 residents graduate every year from otolaryngology programmes throughout the country, this constituted a 34 per cent response rate.

Respondents participated (performed/assisted) in 1637 pedicled an 870 free flap procedures. The pectoralis major myocutaneous (PMMC) (n = 560, mean 6.59 per respondent), forehead (182, 2.14), temporalis muscle (101, 1.19) and deltopectoral (88, 1.04) were the most common pedicled flaps. The radial forearm (RF) (66, 0.78), rectus abdominis (RA) (21, 0.25) and fibula (39, 0.46) were the most common free flaps. The latissimus dorsi (LD) (11, 0.13) and trapezius (11, 0.13) pedicled flaps were not commonly performed (Tables Ia and Ib).

Flaps were categorized as **low** confidence when 0–25 per cent of respondents expressed confidence in performing them independently, **fair** (26–50 per cent), **good** (51–75 per cent) and **excellent** (greater than 75 per cent). The median confidence for pedicled flaps (n = 6) was 44.5 per cent (range 8–79 per cent). This was significantly higher ($p = 0.0002$, Mann-Whitney U test) than the median confidence of two per cent (range 0–10 per cent) for the free flap group (n = 11) (Table II).

An interesting finding of this study was that there was a fair inverse correlation ($r = -0.29$) between the numbers of pedicled flaps and the number of free flaps performed.

TABLE II
FLAPS VS CONFIDENCE

Flap	Mean No. of flaps performed	No. surgeons confident	% Confident
Pedicled			
Pectoralis	6.59	67	79
Deltopectoral	1.04	40	47
Trapezius	0.15	10	12
Temporalis	1.19	36	42
Latissimus dorsi	0.16	7	8
Forehead	2.14	42	49
Free			
Rectus abdominis	0.25	6	7
Radial	0.78	8	10
Latissimus dorsi	0.09	2	2
Lateral arm	0.01	0	0
Lateral thigh	0.09	0	0
Scapular	0.06	2	2
Iliac crest	0.2	1	1
Fibula	0.46	3	4
Temporoparietal	0.04	3	4
Jejunum	0.04	0	0
Temporoparietal	0.04	3	4
Jejunum	0.04	0	0
Omentum	0	0	0

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TABLE III
CORRELATION COEFFICIENTS – FLAPS AS SURGEON, ASSISTANT AND PARTICIPANT

Flap	Flaps as Surgeon	CC	Flaps as assistant	CC	Flaps as Participant	CC
Pectoralis	560	0.189^{ns}	391	0.116^{ns}	951	0.184^{ns}
Forehead	182	0.491*	124	0.332*	124	0.456*
Deltopectoral	88	0.486*	50	0.342*	138	0.466*
Trapezius	13	0.345*	30	0.117^{ns}	43	0.277**
Temporalis	101	0.430*	54	0.314*	155	0.473*
Latissimus	14	0.665*	30	0.369*	44	0.515*
Radial forearm	66	0.381*	230	0.248**	296	0.434**
Rectus	21	0.489**	83	0.415*	104	0.520*
Free fibula	39	0.501*	163	0.117^{ns}	202	0.329*
Latissimus	8	0.637*	37	0.066^{ns}	45	0.319*

*Correlation is significant at the 0.01 level (2-tailed).
**Correlation is significant at the 0.05 level (2-tailed).
ns = not significant.

Respondents expressed low confidence in the trapezius (12 per cent) and LD flaps (eight per cent). The pedicled deltopectoral, forehead and the temporalis flaps were categorized in the fair confidence level. The pedicled pectoralis major myocutaneous flap was the flap which most respondents felt confident performing. Respondents expressed low confidence in performing all free flap procedures.

Ten of the 15 flaps showed a significant correlation ($p<0.05$, Pearson correlation) between the number of individual flap procedures performed as a surgeon and confidence in performing them independently. Of the pedicled flaps, the LD showed good correlation (r = 0.67) whereas the PMMC showed low levels of correlation (r = 0.19). The other pedicled flaps showed fair correlation. Of the free flaps, LD (r = 0.64) and fibula (r = 0.50) showed good correlation and RA and RF showed fair level of correlation.

The correlation coefficient between confidence and procedures performed as surgeon was higher than those assisted in by the respondents (Table III).

Discussion

Larger numbers of respondents were confident of performing pedicled flaps as compared to free flaps. Flaps less commonly performed, such as the pedicled LD and most free flaps had a higher correlation between confidence and numbers of individual flap procedures performed. This paradox may reflect the greater operative training and experience required for achieving the confidence necessary in performing these flaps independently. Also, the presence of head and neck fellows in many US programmes may have a significant influence on resident training in head and neck flap reconstruction.

As respondents performed greater numbers of free flap procedures, the number of pedicled flaps performed by them decreased. Free flaps require advanced training and special expertise to develop the skills necessary for performing them independently. Most residents were of the opinion that free flap training was more suitable for post-residency advanced training. It might thus be important to comprehensively train residents in all aspects of pedicled flap reconstructive procedures reserving the technically more demanding free flap procedures for those planning a career in reconstructive surgery. Adequate training in pedicled local and regional flaps would thus contribute immensely to the reconstructive capabilities of practising otolaryngologists. There was greater confidence in procedures performed by the respondent as opposed to those assisted in by respondents. A study by Adamson *et al.*[5] demonstrated a need for greater training in reconstructive and cosmetic surgery at the residency level. The best means of educating residents in facial plastic and reconstructive surgery is through increased operative experience with training courses being the second most popular choice.[5,6]

Conclusion

Greater operative training is necessary to achieve confidence for performing reconstructive flap procedures independently. It might also be important to train residents in all aspects of pedicled flaps, and additional training in free flaps was recommended for those planning a career in head and neck reconstructive surgery.

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Address for correspondence:
Mahesh Bhaya, M.D.,
Department of Otolaryngology.
SUNY Health Science Center at Brooklyn,
450 Clarkson Avenue, Box 126,
Brooklyn, NY 11201, USA.

Fax: (718) 270-3924

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