Plate Exposure after Reconstruction by Plate and Anterolateral Thigh Flap in Head and Neck Cancer Patients with composite mandibular Defects

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Introduction

- Malignant tumor affecting the mandibular gingiva or bone

- Reconstruction of segmental defects

1. Non-vascularized autologous bone grafts
2. Vascularised osteocutaneous flap transfer
3. Combined double-flap transfer
4. Reconstruction plate with soft tissue transfer

Wei FC, Celik N, Yang WG, Chen IH. Plast Reconstr Surg 112: 37e42, 2003
Wei FC, Santamaria E, Chang YM, Chen HC. J Craniofac Surg 1997 Nov: 8: 512–521
Heller, K.S., S. Dubner, and A. Keller. Ame J of surg, 1995. **170**(5): p. 517-520.

Introduction

- Vascularized osteocutaneous flap
  1. Fibula
  2. Scapula
  3. Iliac crest

- Reconstruction plate with soft tissue transfer for advanced cases

- Plate exposure rate : 8% - 92%

Okura, M., et al. Oral Oncology, 2005. **41**(8): p. 791-798
Coletti, D.P., R. Ord, X. Liu, J of Oral and Maxi Surg, 2009. **38**(9): p. 960-963
Boyd JB, M.R., Davidson J, et al.,. Plast Reconstr Surg, 1995. **95**(6): p. 1018–28.

Introduction

- Fasciocutaneous or musculocutaneous free flaps for plate coverage

- The contour of the mandible can be adjusted easily

- Reconstruction plate exposure

1. Radiation therapy
2. Infection,
3. The type and size of the mandibular defects
4. The type of plate

Introduction

- The aim of this study
1. The plate exposure rate
2. The plate exposure timing
3. The factors influence on plate exposure

- Retrospective study

Patients and Methods

Patients and Methods

- Retrospective review study
- Database: Division of reconstructive microsurgery, CGMH-Linkou medical center, Taiwan.
- From Jan 2006 to Jun 2011
- 1,452 patients underwent microsurgical reconstruction after head and neck cancer ablation.

Patients and Methods

- Inclusion criteria:

ALT flap coverage with reconstruction plate for mandibular defect after segmental mandibulectomy (*n*= 141)

- Exclusion criteria:

Incomplete records (*n*= 7)

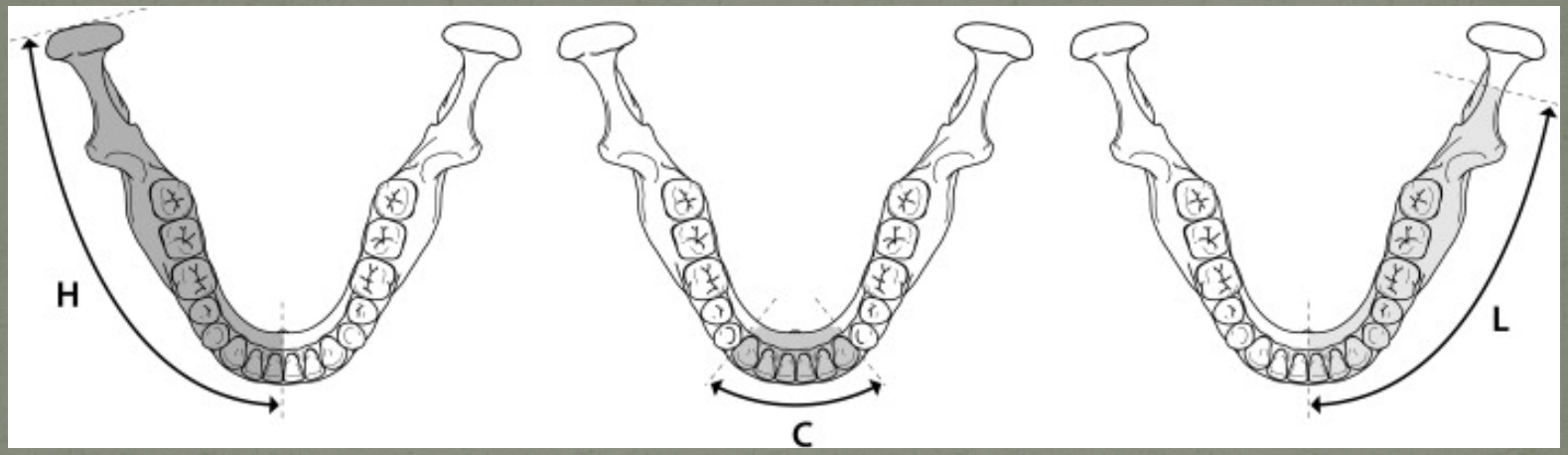
Follow-up less than 6 months (*n*= 4)

- A total of 130 patients were enrolled in the study

Patients and Methods

- Items of Analysis
- Gender, age, operation time, ASA status, pre-op hemoglobin level, pre-op albumin level, underlying disease, BMI, tumor type, tumor stage, soft tissue defect, bony defect, location of bony defect, plate type, type of reconstruction flap, flap size, blood loss, blood transfusion, ischemia time, post-op wound infection, re-open, pre-op radiation therapy, post-op radiation therapy, chemotherapy, and oral feeding

Jewer's Classification



- 8 permutations- C, L, H, LC, HC, LCL, HCL, HH
- Modifications- include soft tissue defect

  T: tongue, M: mucosa, S: external skin

Statistical Analysis

- Performed with SAS software version 9.1 (SAS Institute Inc., Cary, NC, USA).
- Chi-square test, Fisher's exact test, and Wilcoxon test were used for analysis where appropriate.
- Logistic regression models were used to define the risk factors.
- Significance: $p < 0.05$

Results

General Results

- Plate exposure rate : 37.8% (49/130)
- Post-op infection : 43.1% (56/130)
- Mean F/U period: 2.41 yrs (range, 0.5-5.41 yrs)
- Post-op feeding :
  1. Oral feeding : 66.7% (86/129)
  2. Tube feeding : 33.3% (43/ 129)

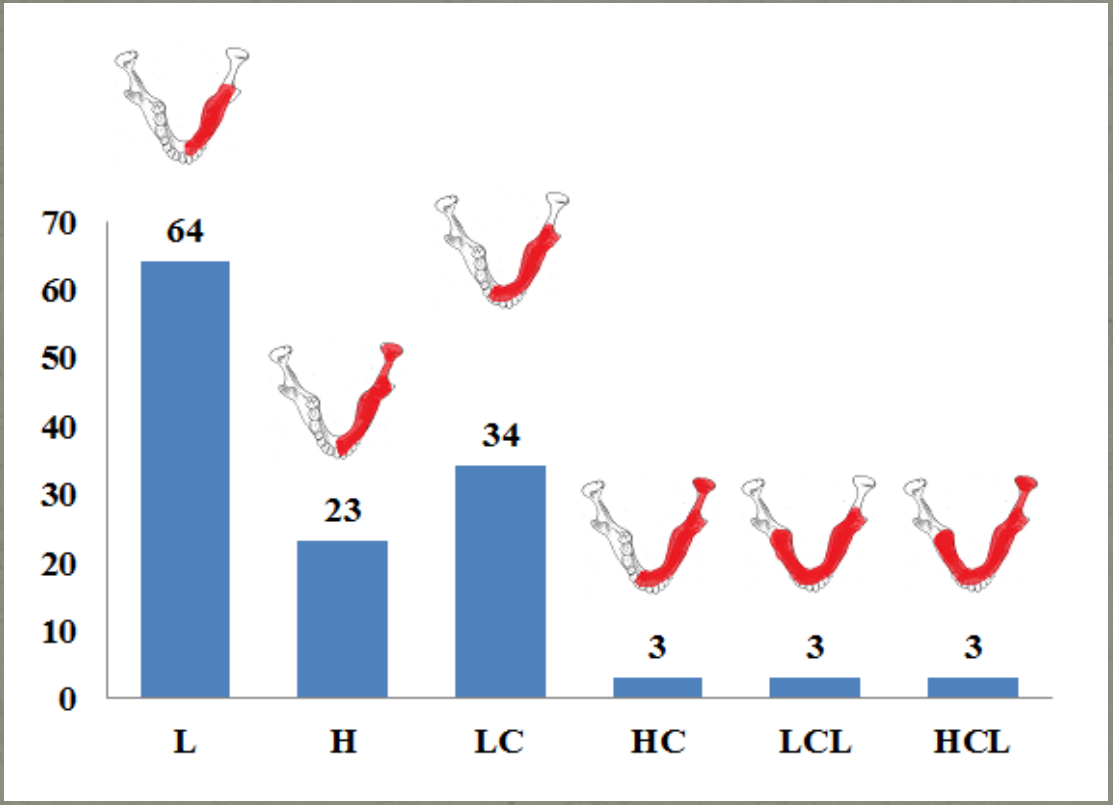
Demographic Table

	Non-exposure, n (%)	Exposure, n (%)	*p* value
Sex			
Male	74 (91.4)	49 (100)	0.086
Female	7 (8.6)	0	
Age (yrs)	56.7 ± 13.6	55.3 ± 10.0	0.704
BMI	23.3 ± 4.4	23.0 ± 4.0	0.64
ASA			
I / II	39	22	0.858
III	42	27	
T status			
T2/ T3	9	4	0.862
T4a	59	37	
T4b	13	8	
N status			
N(-)	29	18	1.000
N(+)	52	31	
Overall stage			
II/ III	3	2	1.000
IVa/ IVb	78	47	
Pre-existing disease			
DM	16 (19.7)	8 (16.3)	0.798
Liver cirrhosis	2	1	1.000
Pulmonary disease	3	2	0.932
Heart disease	1	0	1.000
Hypertension	20	15	0.211

Operative Variables

	Non-exposure	Exposure	*p* value
Hb (g/dL)	13.0 ± 1.9	13.4 ± 2.1	0.241
Alb (g/dL)	3.4 ± 0.8	3.6 ± 0.8	0.196
Operation time (min)	638.4 ± 169.3	695.3 ± 170.9	0.066
Blood loss (mL)	393.1 ± 288.9	462.2 ± 275.5	0.044

Location of Mandibular Defect



No significant association with plate exposure

Flap-related Variables

	Non-exposure	Exposure	*p* value
Flap type			
ALT-MC, *n* (%)	40 (49.4)	10 (20.4)	0.002
ALT-FC, *n* (%)	19 (23.5)	24 (49)	
ALT-Chimeric, *n* (%)	22 (27.2)	15 (30.6)	
Mucosa defect (cm2)	89.0 ± 44.9	85.5 ± 35.5	0.903
Skin defect (cm2)	51.4 ± 60.3	60.8 ± 51.4	0.141
Bone defect (cm)	8.4 ± 2.6	8.4 ± 2.4	0.800
Flap size(cm2)	197.8 ± 82.0	206.9 ± 61.5	0.319
Ischemic time (min)	114.4 ± 41.8	117.1 ± 45.4	0.909

Peri-operative Variables

	Non-exposure, *n* (%)	Exposure, *n* (%)	*p* value
Previous op			
yes	24	17	0.684
no	57	32	
Pre-op R/T			
yes	26	19	0.558
no	55	30	
Post-op R/T			
yes	55	42	0.040
no	26	7	
Intra op BT			
yes	46	31	0.587
no	35	18	
Re-exploration			
yes	4	5	0.430
no	77	44	
Post-op wound infection			
yes	36	21	1.000
no	45	28	
Post-op debridement			
yes	13	5	0.498
no	68	44	

Multivariate Analysis of Risks

Factor	Adjusted OR (95% CI)	*p* value
Blood loss (> = 325 vs. < 325 ml)	2.378 (1.132-- 4.997)	0.022
Post- op R/T (yes vs. no)	2.836 (1.123-- 7.161)	0.024

- OR odds ratio, 95% CI confidence interval
- Logistic regression analyses were adjusted by age, sex, overall stage, and ischemic time

Timing of plate exposure

- Time from op day to plate exposure day:
  Median: 9.1 months (Range, 6- 30.1 months).

Discussion

Discussion

- Reconstruction plates for mandibular defect

- The complication rate : 24% - 95%

1. Plate fracture
2. Screw loosening
3. Plate exposure
4. Wound infection
5. Malocclusion

D. P. Coletti, R. Ord, X. Liu; Int. J. Oral Maxillofac. Surg. 2009; 38: 960–963
Tobias, Oliver, Bernd; J. Cranio-Maxillo-Facial Surg. 2010; 38, 350-354

Discussion

- Post-op infection
1. Relatively higher (43.1%) when compared to reported rate (11% - 47%)
2. No impact on plate exposure

- Post-op feeding
1. Persistent infection status
2. Deformity w/ or w/o R/T
3. Recurrence
4. Disease progression

Discussion

- Exposure : the most common plate-related complication

- Plate exposure rate: 37.8% vs. 46.15% (Prof. Wei in 2003)

- Three factors associated with plate exposure

1. Intra-operative blood loss
2. Type of flap reconstruction
3. Post-operative radiation therapy

Wei FC, Celik N, Yang WG, Chen IH; Plast Reconstr Surg 112: 37e42, 2003
Nicholson, Roy E. Schuller, David E; Arch Otolaryngol Head Neck Surg.1997;123:217-222

Discussion

- Okura, et al. in 2005: (100 cases)

The pre-operative radiation therapy had 3.46 times plate exposure rate.

- Coletti, et al. in 2009: (110 cases)

Plate exposure is closely associated with radiation therapy

- Ettl, et al in 2012: (344 cases)

Significant correlation between neoadiuvant RCT and plate loss

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Discussion

- Well explain with patients about the increased possibility of plate exposure after radiation therapy
- Decreasing intra-operative blood loss is also decreasing the plate exposure rate

Conclusion

Conclusion

- Adequate hemostasis to decrease blood loss
- Myocutaneous flap coverage will be the first choice for reconstruction plate
- Well inform to the patient that high possibility of plate exposure after post-operative radiation therapy

Thanks for your attention