



Mini-Plate Versus Reconstruction Bar Osseous Fixation for Oncologic Reconstruction with Free Fibula Flaps: A Single Center Experience

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Purpose

- To examine complication rates between mini- plate (MP) and reconstruction bar (RB) fixation of free fibula flaps (FFF) in the setting of segmental mandibular defects
- We hypothesized a lack of inherent rigid fixation with MPs would lead to higher rates of hardware exposure

Methods

- Retrospective review of all patients who underwent FFF reconstruction after mandibulectomy from 2015-2021
- Primary outcomes of interest: perioperative flap-related complications/infections as well as long-term osteoradionecrosis and hardware failure/exposure
- Patients were stratified into two groups: short-term (<90 days) and long-term (>90 days) recipient site complications (in relation to date of surgery)

Results

- 96 patients met inclusion criteria (RB=63, MP=33)
- Patients were similar with respect to age, diabetes, CAD/PVD, smoking status, and operative characteristics
- The mean follow-up period was 17.24 months
- Adjuvant radiation was administered to 60.6% and 54% of patients in the MP and RB cohorts, respectively.
- Previous head and neck surgery was performed in 22 RB and 10 MP patients
- In patients whose first complication occurred after 90 days, MPs had significantly higher rates of hardware exposure (p=0.046)

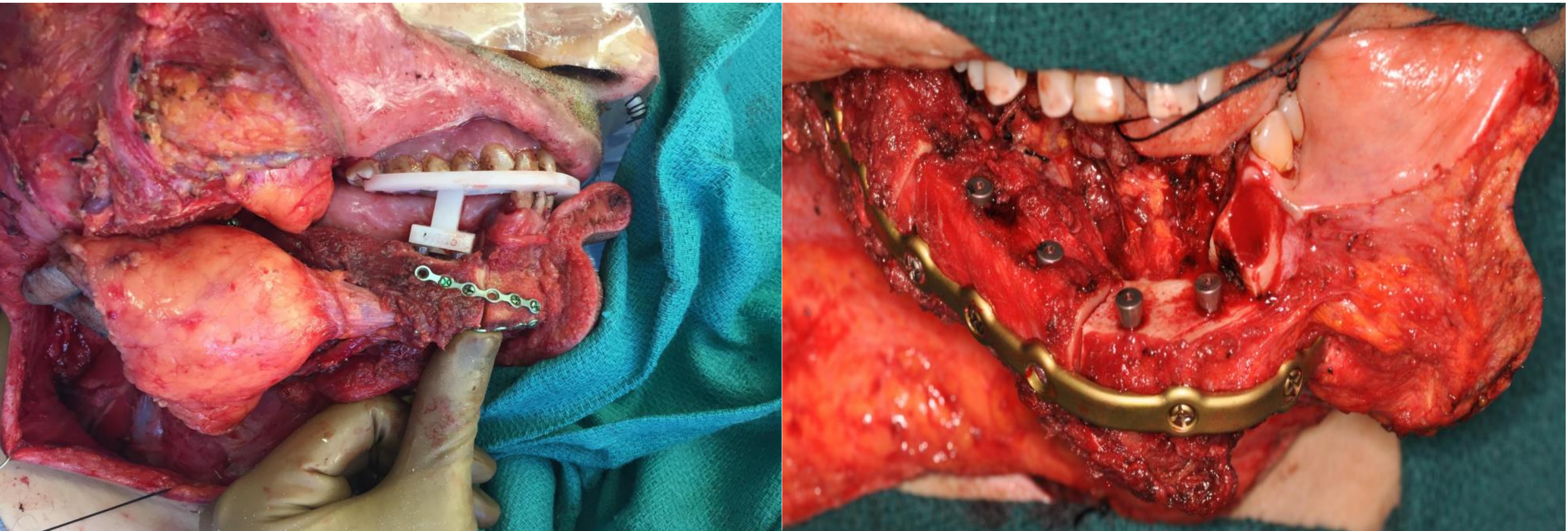
Table 1: Overall Complication Rates

	Total Patients, n (%)	MPs, n (%)	RBs, n (%)	p value
Ever Complication*	54 (56.25)	20 (60.61)	34 (53.97)	0.665
Abscess	27 (50)	7 (35)	20 (58.82)	0.158
Aspiration Pneumonia	2 (3.7)	1 (5)	1 (2.94)	1.0
Chyle Leak	1 (1.85)	0 (0)	1 (2.94)	1.0
Delayed Wound Healing	4 (7.41)	2 (10)	2 (5.88)	0.622
Exposed Hardware	13 (24.07)	7 (35)	6 (17.65)	0.194
Flap Congestion	1 (1.85)	0 (0)	1 (2.94)	1.0
Flap Ischemia	3 (5.56)	2 (10)	1 (2.94)	0.548
Hardware Failure	1 (1.85)	0 (0)	1 (2.94)	1.0
Hematoma	7 (12.96)	1 (5)	6 (17.65)	0.239
Orocutaneous Fistula	12 (22.22)	7 (35)	5 (14.71)	0.101
Osteoradionecrosis	2 (3.7)	1 (5)	1 (2.94)	1.0
Partial Flap Loss	2 (3.7)	1 (5)	1 (2.94)	1.0
Wound Dehiscence	11 (20.37)	7 (35)	4 (11.76)	0.077
Wound Infection	16 (29.63)	9 (45)	7 (20.59)	0.072
*Percentages are out of total patients included in the study, all other percentages are out of those who had recipient site complications; MP: Mini-Plate; RB: Reconstruction Bar				

Table 2: Subgroup Analysis

	Total Patients	MPs	RBs	p value
Total Recipient Site Complications	54	20	34	
Early Complication (<90 days), n(%)	39 (72.2)	15 (75)	24 (70.6)	1.0
Type, n (%)				
Abscess	20 (37)	7 (35)	13 (38.2)	0.77
Chyle Leak	1 (1.9)	0 (0)	1 (2.9)	1.0
Flap Congestion	1 (1.9)	0 (0)	1 (2.9)	1.0
Flap Ischemia	2 (3.7)	1 (5)	1 (2.9)	1.0
Hematoma	3 (5.6)	0 (0)	3 (8.8)	0.29
Orocutaneous Fistula	2 (3.7)	0 (0)	2 (5.9)	0.52
Wound Dehiscence	7 (13)	5 (25)	2 (5.9)	0.09
Wound Infection/Cellulitis	3 (5.6)	2 (10)	1 (2.9)	0.55
Outcome, n (%)				
Inpatient Antibiotics	3 (5.6)	2 (10)	1 (2.9)	0.55
Bedside I&D	12 (22.2)	5 (25)	7 (20.6)	0.74
Conservative Management	11 (20.4)	7 (35)	4 (11.8)	0.08
IR Drainage	2 (3.7)	0 (0)	2 (5.9)	0.52
Return to OR	9 (16.7)	0 (0)	9 (26.5)	0.02
Outpatient Antibiotics	2 (3.7)	1 (5)	1 (2.9)	1.0
Readmission	0 (0)	0 (0)	0 (0)	--
Later Exposed Hardware, n (%)	10 (18.5)	4 (20)	6 (17.6)	1.0
Late Complication (> 90 days), n (%)	15 (27.8)	5 (25)	10 (29.4)	0.55
Type, n (%)				
Abscess	4 (7.4)	0 (0)	4 (11.8)	0.28
Cancer Recurrence	1 (1.9)	0 (0)	1 (2.9)	1.0
Contour Irregularities	2 (3.7)	1 (5)	1 (2.9)	1.0
Exposed Hardware	1 (1.9)	0 (0)	1 (2.9)	1.0
Malunion	1 (1.9)	0 (0)	1 (2.9)	1.0
Wound Dehiscence	1 (1.9)	0 (0)	1 (2.9)	1.0
Wound Infection/Cellulitis	5 (9.3)	4 (20)	1 (2.9)	0.06
Outcome, n (%)				
Inpatient Antibiotics	6 (11.1)	4 (20)	2 (5.9)	0.18
Bedside I&D	2 (3.7)	0 (0)	2 (5.9)	0.52
Conservative Management	1 (1.9)	0 (0)	1 (2.9)	1.0
Fat Grafting	1 (1.9)	1 (5)	0 (0)	0.37
IR Drainage	1 (1.9)	0 (0)	1 (2.9)	1.0
Return to OR	2 (3.7)	0 (0)	2 (5.9)	0.52
Outpatient Antibiotics	1 (1.9)	0 (0)	1 (2.9)	1.0
Readmission	1 (1.9)	0 (0)	1 (2.9)	1.0
Later Exposed Hardware, n (%)	3 (5.6)	3 (15)	0 (0)	0.046
MP: Mini-Plate; RB: Reconstruction Bar; IR: Interventional Radiology; OR: Operating Room; I&D: Incision and Drainage				

Figure 1: Fixation Plates



Left: MP spanning defect between fibula flap and native mandible anteriorly; Right: RB spanning right mandibular defect with intervening FFF. Note presence of dental implants on FFF and native mandible.

Conclusions

- In patients with late complications, MPs have a higher risk of long-term hardware exposure
- Future studies are needed to assess the effects of fixation on patient reported outcomes (PROs) and quality of life measures in this population