Timing of Type 1 Open Distal Radius Fracture Fixation Does Not Affect Early Complication Rates

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INTRODUCTION:
There is limited published evidence regarding the optimal management of Type I open fractures of the distal radius. The purpose of this study was to compare short-term complication rates among open fractures of the distal radius, with attention to the timing of management of Type I fractures. Our hypothesis was that there would not be a temporal association between treatment and infection for Type I open distal radius fractures.

METHODS:
A retrospective review of all open distal radius fractures at a single level 1 trauma center over a ten-year period was performed. Patients were grouped based on Gustilo-Anderson open fracture classification. The primary outcome measure was superficial and deep infection rates in all patients with minimum six-month follow-up. A subgroup analysis was performed for Gustilo Anderson Type I injuries with three-month follow-up based on time to surgery.
RESULTS:
71 patients with open distal radius fractures were included for analysis with average follow-up of 16.7 months. There was a higher rate of deep infection (30%) and average number of revision surgeries (3.0) in the Type III cohort compared to both Type II (4% & 0.6) and Type I (0% & 0.39) cohorts. A subgroup analysis of 63 Type I fractures with minimum three-month follow-up revealed zero infections, with no difference in other complications or number of revision surgery among patients definitively managed within 24 hours, 24-72 hours, and greater than 72 hours. Two patients were managed nonoperatively, without complication.
DISCUSSION AND CONCLUSION:
Type I open DRFs differ from higher grade DRFs with regards to demographics and injury characteristics, along with infection, complication, and reoperation rates. With no infections in the type I DRF cohort and no difference in complication rates based on time to debridement, our data suggests that it is safe to manage type I open distal radius fractures similarly to closed injuries regarding surgical timing.

Table 1: Demographic Data for each Gustilo Anderson Group. PVD = Peripheral Vascular Disease; CAD = Coronary Artery Disease; IVDA = Intravenous Drug Abuse; ASA = American Society of Anesthesiologists Score

Demographics	Gustilo I	Gustilo II	Gustilo III	P value
N	36	25	10	
Age	55.7 +/- 14.4	50.5 +/- 16.3	45.7 +/- 13.4	0.131
Sex				0.019*
Male	11 (30.6%)	10 (40%)	8 (80%)	
Female	25 (69.4%)	15 (60%)	2 (20%)	
BMI	29.2 +/- 6.8	29.3 +/- 7.1	29.4 +/- 6.8	0.996
Comorbidities				
Diabetes	5 (13.9%)	3 (12%)	0 (0%)	0.465
PVD	1 (2.8%)	1 (4.0%)	0 (0%)	0.811
CAD	3 (8.3%)	1 (4%)	0 (0%)	0.544
Smoking (current)	8 (22.2%)	11 (44%)	3 (30%)	0.194
Alcohol (current)	7 (19.4%)	5 (20%)	4 (40%)	0.361
IVDA	2 (5.6%)	5 (20%)	0 (0%)	0.094
ASA	2.44 +/- 0.77	2.56 +/- 0.82	2.2 +/- 0.79	0.481

Table 2: Complications and Revision Surgery data for each Gustilo Anderson Cohort

Complications	Gustilo I	Gustilo II	Gustilo III	P value
N	36	25	10	
Superficial infection	0	1	0	0.393
Deep infection	0	1	3	0.001*
Malunion	1	1	1	0.602
Non-union	4	4	4	0.097
Hardware failure	2	2	0	0.651
Tendon Rupture	1	0	1	0.812
Symptomatic implants	7	7	2	0.718
Stiffness	15	10	7	0.230
Average Number of Revision Surgeries	0.39 +/- 0.61	0.6 +/- 0.87	3.0 +/- 1.4	<0.001*

Table 3: Complications and Revision Surgery data for each Gustilo Anderson Type I Subgroup

Complications	Early I&D (<24hrs)	Intermediate I&D (24-72 hrs)	Delayed I&D (>72 hrs)	P value
N	42	17	4	
Superficial infection	0	0	0	
Deep infection	0	0	0	
Malunion	1	0	0	0.776
Hardware failure	2	1	0	0.884
Symptomatic implants	6	2	0	0.708
Tendon rupture	0	1	0	0.780
Stiffness	13	6	3	0.210
Average Number of Revision Surgeries	0.31 +/- 0.58	0.18 +/- 0.39	0 +/- 0	0.258