

## ABSTRACT

**INTRODUCTION:** Recovery after free flap reconstruction in patients with osteoradionecrosis (ORN) can be challenging due to poor wound healing in irradiated tissue. The purpose of this study is to identify surgical site infection (SSI), hardware exposure, and flap failure rates in patients with ORN that underwent an osteocutaneous free flap.

**METHODS:** A retrospective review was performed on patients that underwent an osteocutaneous free flap for osteoradionecrosis between June 2014 and June 2022 at our institution. A total of 34 patients were included in the study. SSI was defined using the CDC criteria which includes purulent drainage, organisms identified from aseptically obtained species, spontaneous wound dehiscence with fever or localized pain or tenderness, or an abscess within 30 days post-op.

**RESULTS:** 82% of patients were treated preoperatively with HBO therapy and 68% with the PENTOCLO protocol. All patients had an osteocutaneous free flap (fibula, scapula, or radial forearm) and 56% received at least 6 weeks of post-operative IV antibiotics. One flap failure occurred. Within 30 days post-op, 21% of patients had an SSI in the head and neck region, 3% had an SSI at the flap donor site, 3% had pneumonia, and 3% developed C. diff infection after post-operative antibiotic prophylaxis. Six patients developed hardware exposure. In comparison to the literature, a similar study with 30 patients showed an SSI rate of 33% and six cases of hardware exposure post-operatively.

**CONCLUSION:** In patients with ORN undergoing an osteocutaneous free flap, SSI rates in the study cohort are lower than in the current literature.

## BACKGROUND

- Microvascular free flaps remain the gold standard in head and neck reconstruction with a success rate in the literature of about 95%.
- Exposure to clean-contaminated fields during head and neck free flap surgeries can result in a high rate of surgical site infections (SSI).
- Prophylactic antibiotics reduce the rate of SSIs after head and neck free flap surgery with ampicillin sulbactam shown to be the most effective choice for prophylaxis.
- Despite the use of antibiotic prophylaxis, rates of SSI remain high.
- The literature is unclear on rates of SSI or hardware exposure in patients with osteoradionecrosis (ORN) undergoing head and neck reconstruction with an osteocutaneous free flap.
- Surgery is complicated in this patient population due to factors such as scarring and decreased tissue vascularity due to radiotherapy.
- The purpose of this project is to analyze infection rates and outcomes in patients with ORN undergoing reconstruction with an osteocutaneous free flap.

## RESULTS

Table 1: Infection rates and outcomes

Variable	Prevalence in Study Cohort (n = 34)	Percentage
<b>Surgical Site Infection (SSI) within 30 days</b>		
SSI in the Head and Neck	7	20.6
SSI at the Flap Donor Site	1	2.9
<b>Distant Infection</b>		
Pneumonia	1	2.9
UTI	0	0.0
<b>Complications from Antibiotics</b>		
C. Diff	1	2.9
<b>Post-Operative Hardware Exposure</b>		
Within 6 months	3	8.8
Within 6-12 months	1	2.9
Greater than 12 months	2	5.9
<b>Flap Failure</b>	1	2.9
<b>Length of Hospital Stay (Days)</b>	10.8 (5.9)	---

Note: Standard deviation displayed in parentheses.

Figure 1: Infection rates

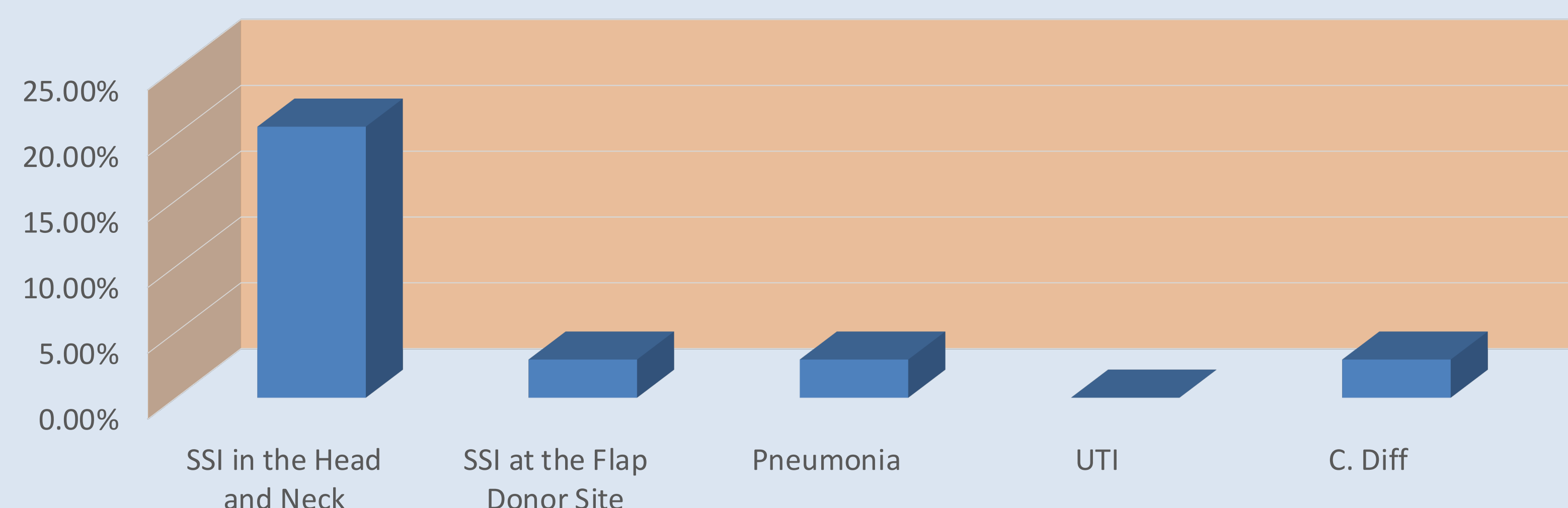


Figure 1 shows the rate of occurrence of different infections in percentages. 20.6% of patients developed an SSI in the head and neck region, 2.9% developed an SSI at the flap donor site, 2.9% developed pneumonia, and 2.9% developed Clostridioides difficile infection. No patients developed a UTI. SSI – Surgical Site Infection, UTI – Urinary Tract Infection.

## METHODS

- Retrospective review of patients who underwent an osteocutaneous free flap within the Department of Otolaryngology-Head and Neck Surgery at our institution between 2014 and 2022.
- CPT code 20969 (free osteocutaneous flap with microvascular anastomosis) used to identify eligible patients.
- Patients with osteoradionecrosis as the primary indication for surgery were included. All other patients were excluded.
- The electronic health record of 232 patients were reviewed based on CPT code 20969. 34 patients met all criteria and were included in the study.
- SSI defined using CDC criteria which includes any of the following within 30 days after surgery:
  - Purulent drainage, organisms identified from aseptically obtained species, spontaneous dehiscence with fever or localized pain or tenderness, or an abscess
  - Diagnosis of SSI by a physician or physician designee

## RESULTS

Table 2: Demographics and comorbidities

Variable	Study Cohort (n = 34)	Percentage
<b>Sex</b>		
Male	24	70.6
Female	10	29.4
<b>Age at Surgery (Years)</b>	66 (9.4)	---
<b>Malnutrition</b>	9	26.4
<b>Smoking History</b>		
Past Smoker	22	64.7
Current Smoker	3	8.8
<b>Charlson Comorbidity Index</b>	2.6 (1.1)	---
<b>Preoperative Plate Exposure</b>	3	8.8

Note: Standard deviation displayed in parentheses.

Table 3: Operative data

Variable	Study Cohort (n = 34)	Percentage
<b>Flap Type</b>		
Fibula	31	91.2
Scapula	2	5.9
Radial Forearm	1	2.9
<b>Estimated Blood Loss (mL)</b>	280.8 (154.2)	---
<b>Blood Transfusion</b>	1	2.9
<b>Intra-Operative Complications</b>	1	2.9
<b>Length of Surgery (mins)</b>	629.0 (147.5)	---

Note: Standard deviation displayed in parentheses.

## CONCLUSIONS

- The literature on infection rates and outcomes after free flap reconstruction in patients with osteoradionecrosis is limited.
- A similar study by Gal et al. had an SSI rate of 33% and 6 cases of hardware exposure post-operatively.
- This compares to an SSI rate of 20.6% in this cohort with 6 patient developing postoperative plate exposure.
- This study is limited by its small sample size and retrospective nature. A prospective study may yield stronger data to support these conclusions.

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