Outcomes of Muscular Flaps Required in Infected Revision Total Joint Arthroplasty

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Background

- Periprosthetic joint infection (PJI) is a severe complication following total joint arthroplasty (TJA), occurring in 0.5-2% of cases and accounts for 13-17% of primary total hip arthroplasty (THA) revisions and over 30% of revision THA failures.
- When periarticular soft tissue is compromised, muscle flaps may be required to restore durable coverage, obliterate dead space, and enhance vascularity.

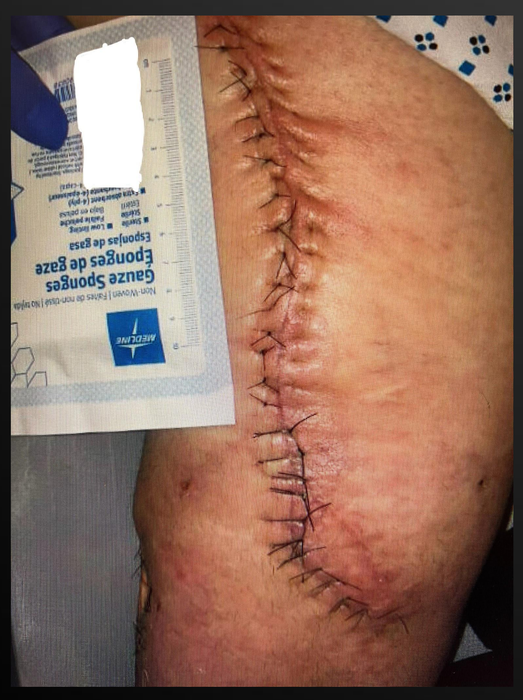

Figure 1: Clinical image demonstrating healing complex closure of revision right total knee with rotational vastus lateralis, medial gastrocnemius, and lateral gastrocnemius muscle flaps.

Methods

- This retrospective study analyzed 140 infected TKA cases between January 2018 and February 2025, performed by three fellowship-trained orthopaedic surgeons in collaboration with two plastic surgeons.
- Patients underwent free, rotational, or combined flap reconstruction.
- Outcomes examined for flap failure, reinfection, and reoperation examined up to 1 year.

Table 1: Demographics and Clinical Characteristics

Variable	Free Flaps (n=36)				Rotational Flaps (n=125)				
Flap Type		Rectus Abdominis (n=12)	Anterolateral Thigh (ALT) (n=13)	Latissimus Dorsi (n=10)		Medial Gastrocnemius (n=97)	Lateral Gastrocnemius (n=21)	Vastus Medialis (n=57)	Vastus Lateralis (n=17)
Gender (%)									
Female		27	54	40		64	81	44	41
Male		73	46	60		36	11	56	59
BMI (kg/m²)		29.84	26.43	32.01		26.28	29.82	29.39	30.86
Age (years)		63	76	67		68	69	62	64
Diabetes (%)		0	54	40		28	20	26	35
CCI (median)		2	4	3		3	4	3	2
Smoking (%)		17	77	30		40	55	58	47
ASA (median)		2	3	3		3	3	3	3
Causal Organism (%)									
Gram-Positive		33.3	15.38	0		23.71	23.81	28.07	11.76
Gram-Negative		33.3	30.77	10		13.40	19.05	15.79	5.88
Fungi		0	0	10		7.22	4.76	3.51	11.76
Culture-Negative		25	38.46	60		45.36	42.86	47.37	64.71
Multiple Organisms		8.3	15.38	20		10.31	9.52	12.28	11.76
Operation Time (min)		281.18	334.58	222.50		220.52	248.28	227.95	294.82
Wound Complication		25	42	40		11	26	23	19
Labs									
CRP (mg/L)		6.98	2.83	5.73		6.61	7.40	6.88	7.25
ESR (mm/hr)		75.90	79.29	48.4		55.72	48.33	49.09	42.45
A1c (%)		5.78	6.05	6.01		5.43	5.56	5.47	5.61

Table 2: Outcomes at 1-Year

Outcome	Model A	Model B
Definition	Effect of flap type (free ± rotational or rotational only)	Individual flap types
Failed Flap	• Female patients had lower odds (p = 0.01)	• Lateral gastrocnemius flaps had an increased risk (p = 0.004) • Female patients had a lower risk (p = 0.014)
Reinfection	• Wound complications, gram-negative infections, and longer operative times had increased risk (p = 0.0017, 0.0017, and 0.011, respectively)	• ALT and vastus medialis flaps had an increased risk (p = 0.044 and 0.023, respectively) • Latissimus dorsi flap had a decreased risk (p = 0.012) • Gram-negative infections, wound complications, and longer operative times were associated with an increased risk (p = 0.012, 0.014, and 0.016, respectively) • Older age was associated with a decreased risk (p = 0.031)
Reoperation	• Wound complications and smokers had an increased risk (p = 0.00001 and 0.048, respectively)	• Wound complications and lateral gastrocnemius flaps had an increased risk (p = 0.00005 and 0.005, respectively) • Female patients and older age had a decreased risk (p = 0.022 and 0.025, respectively)

Results

- The cohort included 140 revision TKAs with a mean age of 66 years, a mean BMI of 30.81, 42% smokers, and 28% with diabetes mellitus. 40% were males and 60% were females.
- Of those, 54 had static spacers, 6 had articulating spacers, and the remaining 80 had final revision components.
- At 1 year, lateral gastrocnemius flaps had an increased risk of flap failure and reoperation, p = 0.0004 and 0.005, respectively.
- The latissimus dorsi flaps had the lowest reinfection rates, p = 0.012. ALT and vastus flaps both had an increased risk of reinfection, p = 0.044 and 0.023, respectively.

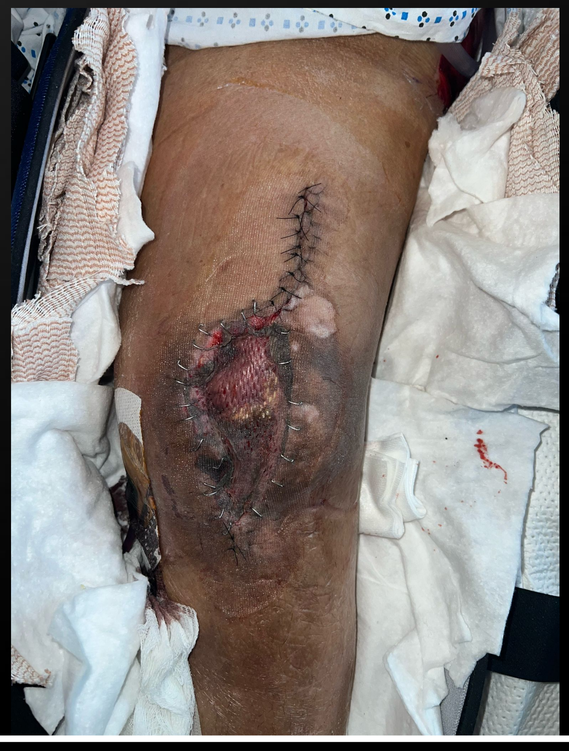

Figure 2: Clinical image demonstrating rotational muscle flap and split thickness skin grafting after two-stage revision total knee

Conclusions

- Lateral gastrocnemius flaps may not be the ideal first flap choice if other flaps are available.
- Latissimus dorsi flaps are a viable option in reconstruction after infected TKA.
- Flaps should be chosen based on location of defect and donor site risks.