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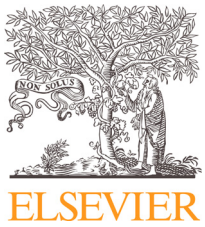

Surgical and patient-reported outcomes after total knee arthroplasty requiring soft tissue flap reconstruction – A 12-year experience from high-volume arthroplasty hospital

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Gastrocnemius

Summary *Background:* This study investigates the outcomes of complex knee joint reconstructions performed by an orthoplastic surgery team at a tertiary referral hospital.
Methods: Retrospective review of all the total knee arthroplasty (TKA)/revision TKA (rTKA) procedures with soft tissue flap reconstruction performed between 2008 and 2019 was conducted. Patients were stratified into two groups according to the urgency of surgery: scheduled non-complicated (SNC) and emergent complicated (EC). The whole study cohort was also categorized into non-infected and infected groups.
Results: Of 20,184 TKAs operated, 58 patients required flap reconstruction (SNC group $n = 27$; EC group $n = 31$). The most common reconstruction was medial gastrocnemius flap (74%). Mean follow-up time was 31.9 months. Functional knee joint salvage was achieved in 96.3% the SNC group and in 80.6% the EC group patients ($p = 0.07$). Transfemoral amputation rates were 3.7%

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in the SNC group vs. 6.5% in the EC group ($p = 0.36$). Oxford Knee Score was 34.5 vs. 25.5 ($p = 0.21$), and range of motion was 100^0 vs. 93^0 ($p = 0.37$) in the SNC and EC groups, respectively. Superior functional knee joint salvage rates were achieved in the non-infected group compared to the infected group (97.1% vs. 75.0%, $p = 0.004$). However, the transfemoral amputation rate was nearly three-fold in the infected group (8.3% vs. 2.9%, $p = 0.36$). Estimated five-year survival with functional knee joint was higher in the non-infected group ($p = 0.03$).
Conclusions: Both the SNC and EC groups had similar acceptable limb salvage rates, and functional and PROM outcomes. Infection reduces the probability of a functional knee joint after TKA and flap reconstruction.

Introduction

Total knee arthroplasty (TKA) is one the fastest growing orthopedic surgery procedures.[1,2] Following TKA, the majority of the patients recover uneventfully, and the overall 10-year revision rate is between 6.2% and 12%.[3,4] Due to the increase in the volume of primary TKA procedures and an aging population, it is not surprising that the total number of revision TKA (rTKA) has also increased over the years.[5] The main indications for rTKA are aseptic loosening, mechanical failure, periprosthetic fracture or infection, chronic pain, and compromise of the surrounding soft tissues.[4] However, repetitive surgeries reduce the viability and mobility of the soft tissues surrounding the knee joint, and thereby increase the risk of wound healing problems, infection, hardware exposure, and in worst case scenarios might lead to knee joint fusion or transfemoral amputation.[6]

Soft tissue flap reconstruction together with TKA/rTKA is indicated when soft tissues around the knee joint are resected with a tumor or considered to be at risk due to previous trauma or surgery. In addition, flap reconstruction might be required in complicated TKA cases with hardware exposure or soft tissue defect secondarily to surgical attempts to eradicate periprosthetic joint infection (PJI). As the main goal of these complex reconstructions is to restore anatomical and functional integrity of the knee joint, the underlying circumstances play a key role in treatment planning, execution, and outcomes, thus requires further insights. There are no treatment guidelines for these challenging situations, but there are, however, a few treatment algorithms based on the experiences of single tertiary care centers.[7-11]

The primary aim of this study was to assess the functional knee joint salvage rate after TKA/rTKA requiring either concomitant flap reconstruction or flap reconstruction following post-operative wound complication with multidisciplinary team (MDT) approach in a high-volume arthroplasty hospital. Secondary aims were to assess short-term and long-term complications and report the functional and patient-reported outcome measures (PROM).

Materials and methods

This retrospective chart review included all patients who underwent TKA/rTKA and simultaneous soft tissue flap reconstruction or flap reconstruction for post-operative complication between 2008 and 2019 at Coxa Hospital for Joint Replacement, Tampere, Finland. The protocol for this study was approved by the Institutional Ethics Review Board, and informed consent for the use of medical records and photography was also obtained.

The MDT approach was used in all reconstructions. The MDT consisted of an experienced revision arthroplasty surgeon and a plastic surgeon who were especially dedicated for lower extremity reconstruction. An infection specialist was included in the discussion and treatment planning stages of all complicated cases. Moreover, sarcoma patients were formally evaluated by the sarcoma MDT. All surgeries were planned and accomplished together with all required specialists. Patients with true soft tissue defect (tumor patients) and patients with soft tissues deemed at risk were operated in one stage operation with arthroplasty surgeon and plastic surgeon. Early wound dehiscence and acute infection cases were operated in one stage with debridement, liner exchange, and flap reconstruction. Patients with chronic periprosthetic infection were treated in two stages (Figure 1).

The following data were collected from the institutional electronic medical records and surgical database: patient demographics, comorbidities, surgical procedures, microbiological studies, complications, and functional and PROM. The primary endpoint of the study was functional knee joint salvage defined as arthroplasty retention and functional knee joint at the last follow-up. This also included patients with suppressive antibiotic therapy. The secondary endpoint measures were transfemoral amputation, knee joint fusion, recurrent and persistent infection rates, and functional and PROM. Complications were classified according to the Clavien-Dindo classification.[12] Complications and surgical procedures were collected from the day of the flap surgery until the end of the follow-up period. Functional outcomes were assessed as range of motion and knee extension lag, and the Oxford Knee Score (OKS) was used as a PROM tool. The surgical results, functional outcomes, and PROMs are reported at the last follow-up date.

For statistical analysis, the patients were categorized into two groups, according to the urgency of the surgical intervention needed, and a further five subgroups indicating the necessity of flap reconstruction . Patients who underwent planned non-emergent surgery were classified as scheduled non-complicated (SNC). Patients who needed emergent surgery for treatment of TKA or rTKA complications were classified as emergent complicated (EC). In addition, the whole study cohort was categorized into infected

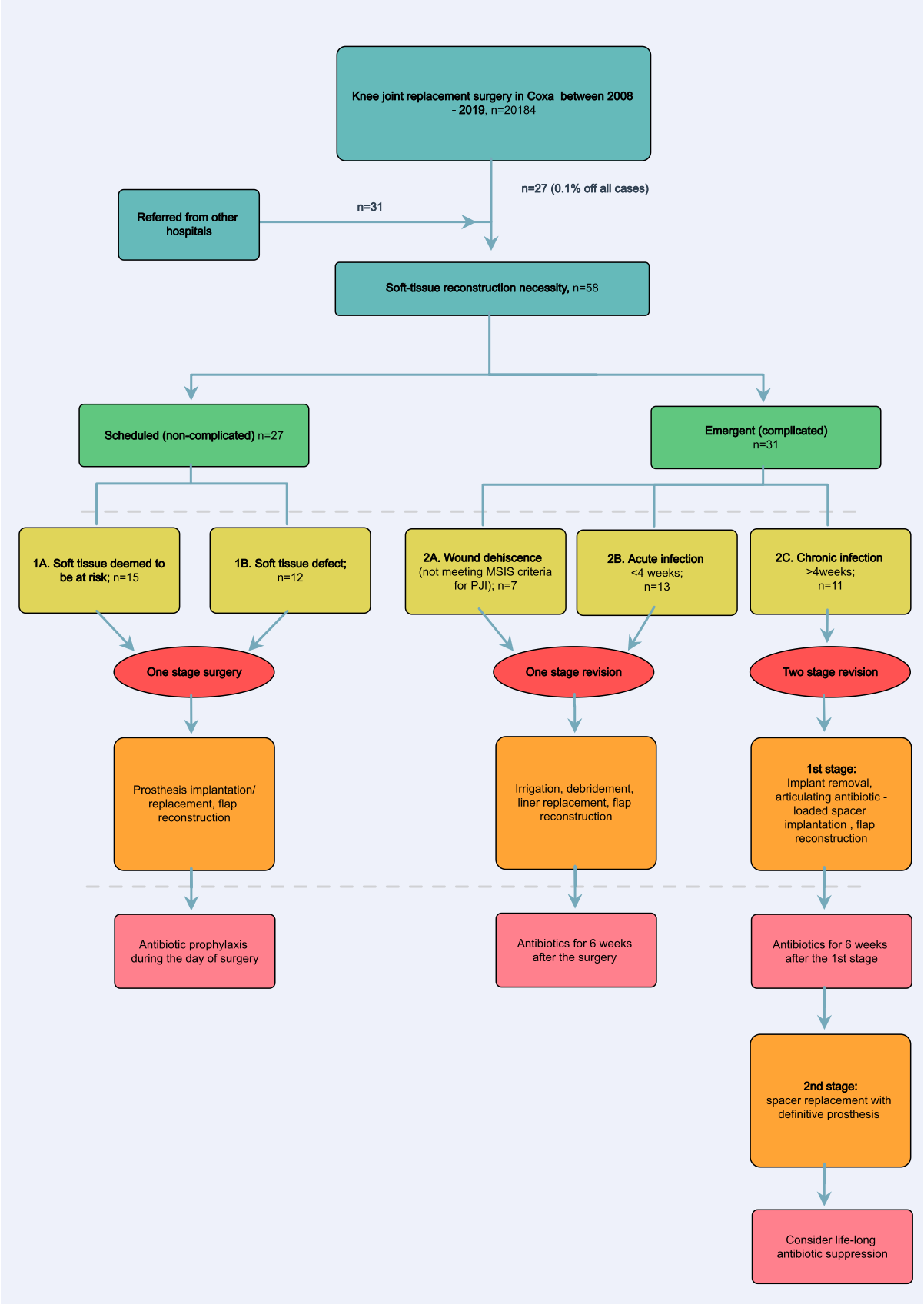

Figure 1 Flowchart describing institutional treatment protocol and patient grouping.

Table 1 Characteristics of the study population and groups.

	Group		All $n = 58$	p-value
	Scheduled non-complicated (SNC) $n = 27$	Emergent complicated (EC) $n = 31$		
Age at the time of flap operation M(CI)	60.3 (52.4 to 68.3)	70.9 (67.3 to 74.6)	66.2 (61.7 to 70.5)	* 0.06
Gender n(%); female/male	15(55.6)/12(44.4)	19 (61.3)/12 (38.7)	34 (58.6)/24 (41.4)	**0.66
Hospital stay, days M(CI)	14.9 (9.9 to 19.9)	15.1 (10.5 to 19.7)	15.6 (11.6 to 20.3)	*0.97
Number of surgeries before flap reconstruction M(CI)	1.3 (0.8 to 1.9)	2.8 (2.3 to 3.4)	2.1 (1.7 to 2.5)	*<0.01
Charlson Comorbidity Index (CCI) (CI)	2.5 (1.6 to 3.4)	1.0 (0.6 to 1.5)	1.7 (1.3 to 2.2)	*0.01
Surgery length, min, Median (IQR)	254.5 (185.5 to 320)	146.5 (110.5 to 227)	208.5 (125.5 to 291)	*0.02
Follow-up, months M (CI)	33.8 (18.9 to 48.6)	30.3 (20.8 to 39.8)	31.9 (23.6 to 40.3)	*0.74

Footnote: M - Mean, CI - 95%, Confidence interval for Mean, IQR - interquartile range, n - sample size, *p - Mann-Whitney U test, **p - chi-square test.

and non-infected groups at the time of flap reconstruction on the basis of Musculoskeletal Infection Society (MSIS) criteria for PJI.[13]

A Kaplan-Meier survival curve was constructed to assess estimated survival with functional knee joint (transfemoral amputation and knee joint fusion were considered as an event), and log-rank test was used to determine statistical significance. Mann-Whitney U test and chi-square test were used to test the statistical significance for continuous and categorical variables, respectively. A p-value of <0.05 was considered statistically significant. All statistical analyses were performed using SPSS Statistics 24.0 (IBM, Armonk, NY, USA).

Results

A total of 20,184 TKA and rTKA procedures were performed during the 12-year study period. However, 58 (0.3%) (SNC group $n = 27$; EC group $n = 31$) patients underwent TKA or rTKA accompanied by soft tissue flap reconstruction. Then, 27 patients (0.1%) were primarily operated in our institution and eventually required flap reconstruction. The remaining 31 patients were referred from other hospitals to our unit with an existing TKA complication or with soft tissues that were considered to be at risk prior to TKA. The detailed demographics and characteristics of the patients and study groups are presented in Table 1.

Soft tissue reconstructions

Medial gastrocnemius flap was the most commonly used flap in both study groups, 19/27 (70.4%) in the SNC group and 24/31 (77.4%) in the EC group. In the SNC group, five patients (18.5%) required initial free flap reconstruction, whereas none of patients in the EC group underwent free flap reconstruction as the primary reconstruction method (Figure 2a-F). Three patients who underwent free latissimus dorsi flap reconstruction also required simultaneous medial gastrocnemius flap. Moreover, additional flap reconstructions were indicated in two (6.5%) patients in the EC group with recurrent PJI, resulting in secondary soft tissue defects after thorough debridement and implant replacements. A summary of the flap reconstructions is presented in Table 2.

Functional knee joint outcomes in the snc and ec groups

In the entire cohort, the functional knee joint salvage rate was 87.9%. A total of four patients (6.9%) eventually underwent knee joint fusion, and three (5.2%) underwent transfemoral amputation. In the EC and SNC groups, functional knee joint salvage rates were 80.6% and 96.3%, respectively ($p = 0.07$). Eight patients (25.8%) in the EC group had recurrent infection after TKA and flap reconstruction, requiring further surgical management. In addition, two patients (6.5%) with uncontrolled infection from the EC group underwent transfemoral amputation, and one patient (3.7%) with chronic limb ischemia from the SNC group underwent amputation six weeks after rTKA and flap reconstruction due to insufficient blood circulation and infectious complications ($p = 0.61$). After failed attempts to eradicate PJI, four patients (12.9%) in the EC group ended up with knee joint fusion, and two other patients (6.5%) continued with permanent antibiotic suppression (Table 3).

Functional knee joint outcomes in the non-infected and infected groups

A total of 24 patients met the MSIS criteria for PJI at the time of flap reconstruction, and the remaining 34 patients were categorized as infection-free. The mean follow-

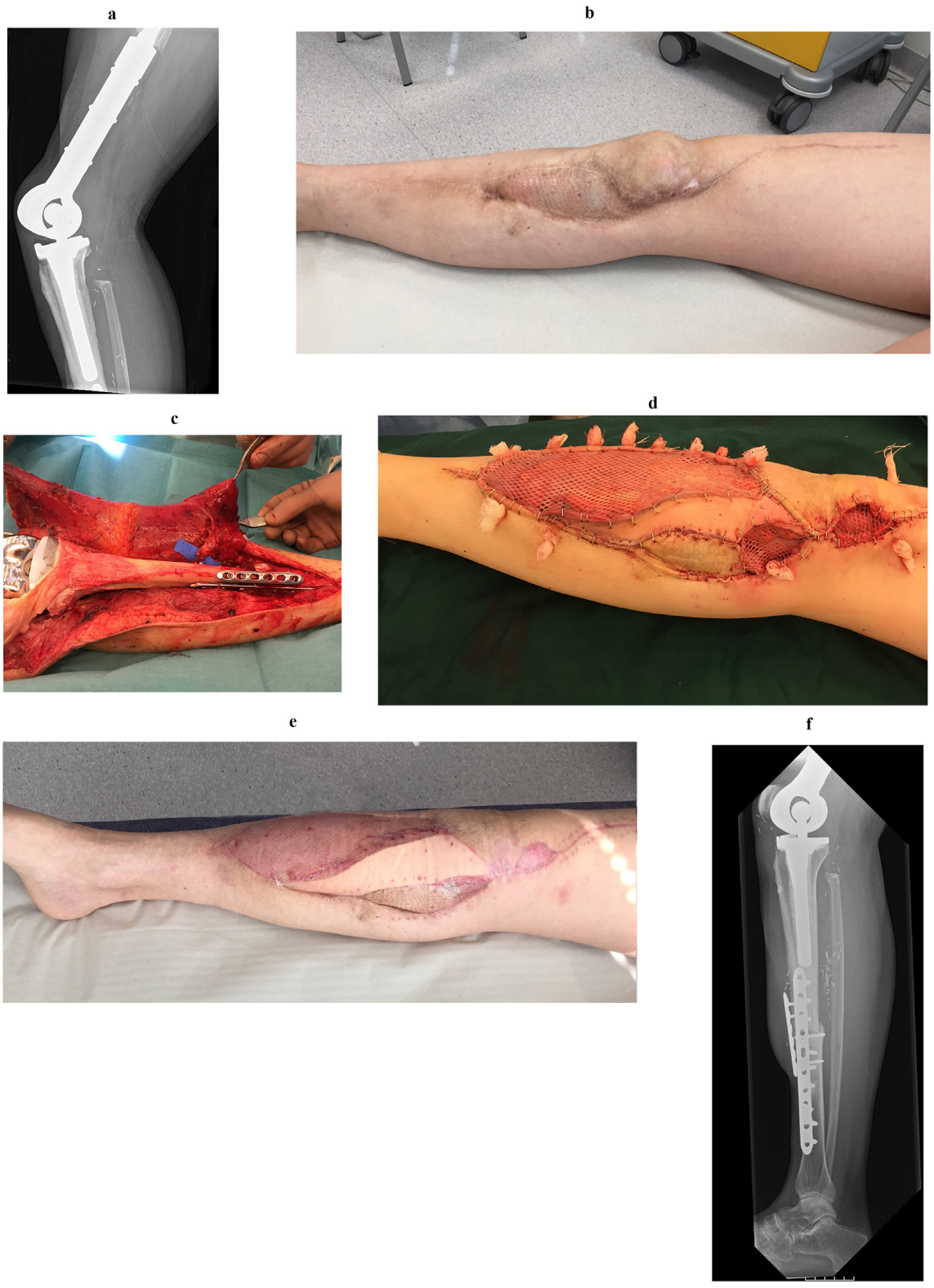

Figure 2 (a) A 40-year-old patient, who had osteosarcoma of the distal femur with proximal tibia skip-metastasis resected 20 years ago. Proximal tibia allograft and distal femur endoprosthesis were used for reconstruction. Patient developed chronic infection after revision surgery that resulted in resorption of allograft patella and loss of active knee extension. (b) Thin skin envelope over resorbed patella and previously used medial gastrocnemius flap and skin graft. (c) Patient underwent one-stage revision with new allograft and endoprosthesis. Endoprosthesis was covered with microvascular latissimus dorsi musculocutaneous flap. (d) Immediate post-operative result. The muscle flap reaches from allograft tibia junction to proximal over the patella. (e) Post-operative result at 6 weeks. (f) Post-operative X-ray at 13 months. Active range of motion is 0 to 60°.

Table 2 Summary of soft tissue reconstructions and prostheses used.

Flap	Group		All $n = 58$
	Scheduled non-complicated (SNC) $n = 27$	Emergent complicated (EC)$n = 31$	
Primary reconstructions			
Medial gastrocnemius	19/27 (70.4%)	24/31 (77.4%)	43/58 (74.1%)
Lateral gastrocnemius	1/27 (3.7%)	2/31 (6.5%)	3/58 (5.2%)
Both gastrocnemius heads	2/27 (7.4%)	5/31 (16.1%)	7/58 (12.1%)
Free latissimus dorsi flap	2/27 (7.4%)	-	2/58 (3.4%)
Free latissimus dorsi flap + medial gastrocnemius	3/27 (11.1%)	-	3/58 (5.2%)
Secondary reconstructions (complicated cases requiring additional flap)			
Lateral gastrocnemius	-	1/2 (50%)	1/2(50%)
Free latissimus dorsi flap	-	1/2 (50%)	1/2 (50%)

Footnote: n – sample size.

Table 3 Surgical outcomes in the SNC and EC groups.

Outcome (at the end of follow-up)	Group		All $n = 58$	p
	Scheduled non-complicated (SNC) $n = 27$	Emergent complicated (EC) $n = 31$		
Salvage rates				
Functional knee joint salvage	26/27 (96.3%)	25/31 (80.6%)	51/58 (87.9%)	0.07
Transfemoral amputation	1/27 (3.7%)	2/31 (6.5%)	3/58 (5.2%)	0.61
Knee joint fusion	0/27 (0%)	4/31 (12.9%)	4/58 (6.9%)	0.05
Antibiotic suppression	0/27 (0%)	2/31 (6.5%)	2/58 (3.5%)	0.18

Footnote: n – sample size, p – chi square test.

up time in the infected group was 34.5 (95% CI 31.3–47.1) months and 28.9 (95% CI 18.2–38.4) months in the non-infected group ($p = 0.87$). Functional knee joint salvage rates were 33/34 (97.1%) and 18/24 (75%) in the non-infected and infected groups, respectively ($p = 0.004$). Transfemoral amputation rate was nearly three-fold in the infected group compared to the non-infected group (8.3% vs. 2.9%, $p = 0.36$). Knee joint fusion was more common among patients in the infected group than among patients in the non-infected group: 16.7% vs. 0%, $p = 0.01$. After initial treatment, unplanned reoperations were necessary in 50% patients in the infected group, with recurrent infection being the most common indication for reoperation (33.3%). At the last follow-up, two patients (8.3%) in the infected group with persistent PJI were receiving permanent antibiotic suppression. The most common pathogens causing PJI were *Staphylococcus* spp. (Table 4).

The Kaplan–Meier survival estimator outlined higher survival with functional knee joint in the non-infected group (96% (95%CI 88 to 100% at one-, two- and five-years)) compared to a survival rate in the infected group of 86% (95%CI: 72 to 100%) at one year, 71% (95% CI: 49 to 93%) at two years, and 62% (95%CI 37 to 86%) at five years, $p = 0.03$ (Figure 3).

Table 4 Pathogens causing periprosthetic joint infection.

Pathogen	n (%)
Staphylococcus spp.	13 (54%)
Enterococcus spp.	3 (13%)
Enterobacter spp.	3 (13%)
Streptococcus spp.	2 (8%)
Pseudomonas spp.	2 (8%)
Candida spp.	1 (4%)

Complications

No total flap losses were encountered. However, complications occurred in 11/27 (40.7%) patients in the SNC group and 17/31 (54.8%) patients in the EC group ($p = 0.31$). The most severe surgical complications according to the Clavien-Dindo classification are listed in Table 5. Post-operative complications requiring unplanned reoperations were necessary for nine patients (33.3%) in the SNC group and for 15 patients (48.4%) in the EC group ($p = 0.25$). The most common complications requiring surgical management in both study groups were infection (newly diagnosed or re-

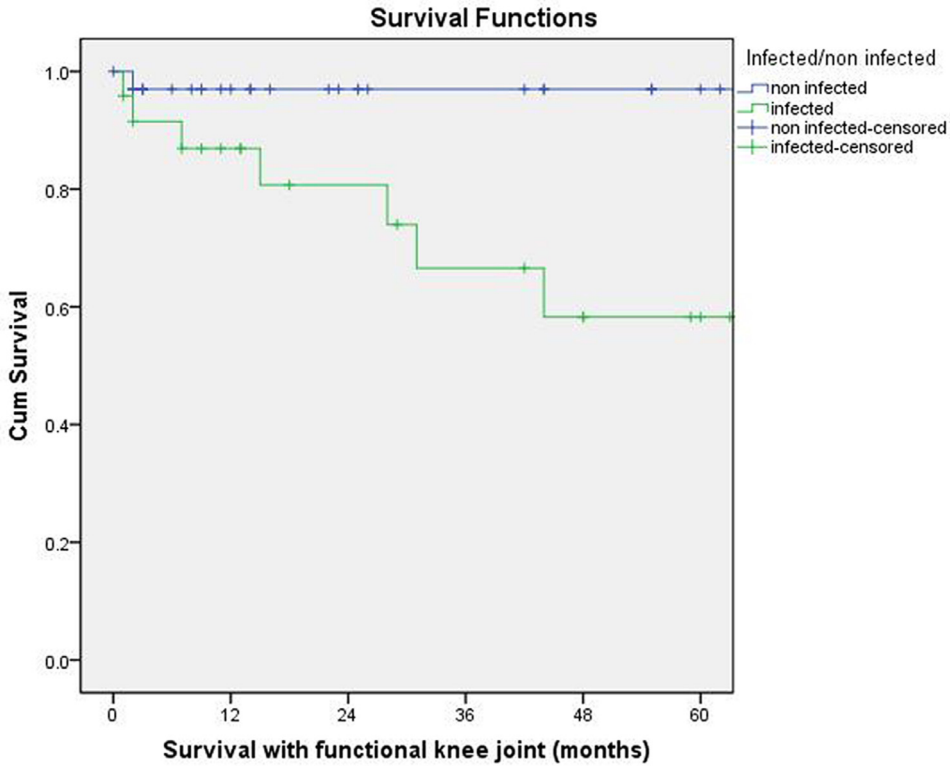

Figure 3 Survival with functional knee joint according to infection.

Table 5 The most severe surgical complications according to the Clavien-Dindo classification.

Complication grade	Group		All $n = 58$	p
	Scheduled non-complicated (SNC) $n = 27$	Emergent complicated (EC) $n = 31$		
Grade I	0 (0%)	0 (0%)	0 (0%)	0.39
Grade II	2 (7.4%)	1 (3.2%)	3 (5.2%)	
Grade IIIA	1 (3.7%)	0 (0%)	1 (1.7%)	
Grade IIIB	7 (25.9%)	15 (48.4%)	22 (37.9%)	
Grade IVA	1 (3.7%)	1 (3.2%)	2 (3.5%)	
Grade IVB	0 (0%)	0 (0%)	0 (0%)	
Grade V	0 (0%)	0 (0%)	0 (0%)	

Footnote: n – sample size, p – chi square test.

current) and delayed wound healing. Wound dehiscence or skin graft failure requiring further surgical management occurred in seven patients (SNC group $n = 3$ (11.1%); EC group $n = 4$ (12.9%)) (Table 6). Secondary unplanned reoperations, mainly due to recurrent infection or wound healing problems, were indicated in nine (29.2%) patients in the EC group, whereas none of the patients in the SNC group required secondary unplanned reoperation ($p<0.001$).

Functional and patient-reported outcomes in snc and ec groups

OKS evaluations were available for 31 patients (SNC $n = 14$; EC $n = 17$), and knee joint functional measurements for 41 patients (SNC $n = 23$; EC $n = 18$). OKS evaluations of the patients in the SNC group with a median score of 34.5 (IQR 26–44) were graded as "good", whereas in the EC group, the median OKS evaluation was 25.5 (IQR 15–36), which is graded as "moderate".[14] The difference between the groups was not, however, statistically significant ($p = 0.2$), (Figure 4a). Median range of motion was 100^0 (IQR 83^0-118^0) and 93^0 (IQR 66^0-121^0) in the SNC and EC groups, respectively ($p = 0.4$) (Figure 4b). Only two patients had clinically significant active extension lag of 25^0 and 45^0 (both in the SNC group), both patients underwent extensor mechanism reconstruction during the initial reconstruction. All other patients had either full active extension or non-significant lag of less than ten degrees.

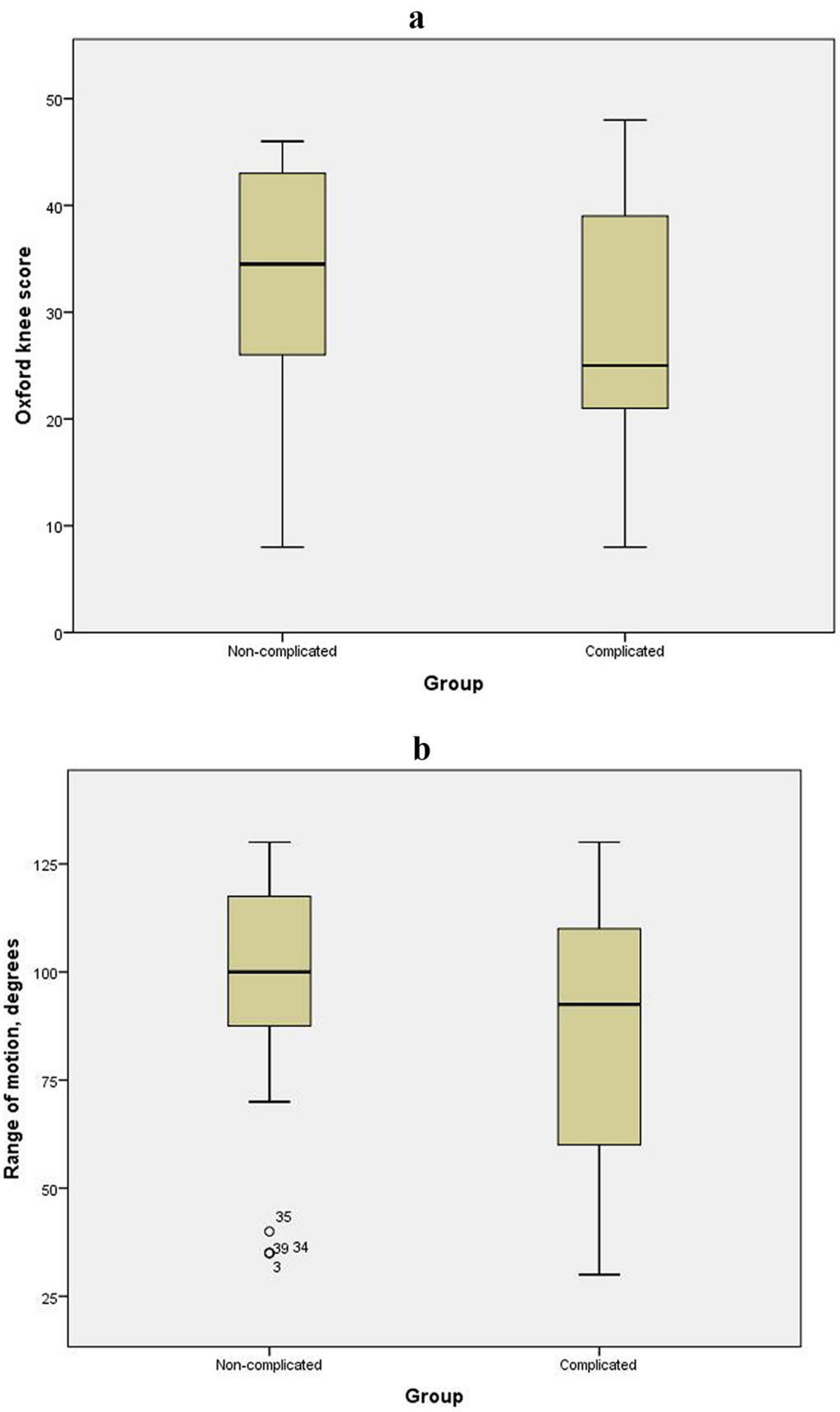

Figure 4 (a) Oxford Knee Score questionnaire evaluations in SNC and EC groups. (b) Evaluation of range of motion in SNC and EC groups

Table 6 Complications and their surgical management.

Complication	Group		All $n = 58$	p
	Scheduled non-complicated (SNC) $n = 27$	Emergent complicated (EC) $n = 31$		
Delayed wound healing	3/27 (11.1%)	4/31 (12.9%)	7/58 (12.1%)	0.73
Mechanical failure	1/27 (3.7%)	1/31 (3.2%)	1/58 (1.7%)	0.70
Infection	5/27 (18.5%) (newly diagnosed)	10/31 (32.2%) (recurrent and newly diagnosed)	15/58 (25.8%)	0.59
Surgical management of complications, procedures performed during first reoperation				
Transfemoral amputation	1/27 (3.7%)	0/31 (0%)	1/58 (1.7%)	-
Knee joint fusion	0/27 (0%)	2/31 (6.5%)	2/58 (3.5%)	
Implant/component replacement	3/27 (11.1%)	4/31 (12.9%)	7/58 (12.1%)	
Debridement, skin grafting	1/27 (3.7%)	1/31 (3.2%)	2/58 (3.5%)	
Debridement, NPWT	0/27 (0%)	3/31 (9.7%)	3/58 (5.2%)	
Hematoma evacuation, wound closure	1/27 (3.7%)	0/31 (0%)	3/58 (1.7%)	
Debridement, drainage, closure	3/27 (11.1%)	2/31 (6.5%)	5/58 (8.6%)	
LD flap + spacer	0/27 (0%)	2/31 (6.5%)	2/58 (3.5%)	
Gastrocnemius flap + implant replacement	0/27 (0%)	1/31 (3.2%)	1/58 (1.7%)	
Surgical management of complications, procedures performed during second reoperation				
Transfemoral amputation	0/27 (0%)	2/31 (6.5%)	2/58 (3.5%)	-
Knee joint fusion	0/27 (0%)	2/31 (6.5%)	2/58 (3.5%)	
Implant component replacement	0/27 (0%)	1/31 (3.2%)	1/58 (1.7%)	
Flap	0/27 (0%)	2/31 (6.5%)	2/58 (3.5%)	
Skin grafting	0/27 (0%)	2/31 (6.5%)	2/58 (3.5%)	

Footnote: n - sample size, p - chi square test, NPWT - negative pressure wound therapy.

Discussion

This 12-year retrospective chart review showed that major wound complications requiring flap reconstruction after TKA/rTKA are extremely rare (0.1%) in a high-volume tertiary joint replacement hospital. Moreover, in cases of complex TKA, a meticulous MDT approach can achieve functional knee joint salvage in 80.6% of cases, with transfemoral amputation rates as low as 6.5%. OKS scores ranged from moderate to good after TKA and flap surgery, and clinically significant extension lag is uncommon (3.4%).

The treatment of TKA complications, however, is associated with less favourable surgical outcomes and requires proper management.[15] In our study, functional knee joint salvage was achieved in 80.6% of patients in the EC group, with four (12.9%) eventually having to have knee joint fusion and only two (6.5%) requiring transfemoral amputation. These results are superior to previously reported results, as functional knee joint salvage was achieved in 54% to 64% of cases and incidence of transfemoral amputation ranged from 16% to 33% after complicated TKA and flap reconstruction.[4,7,8,16] (Supplement 1). This improved rate of functional joint salvage highlights the need for MDT approach for both surgical planning and execution.

Our institution includes infectious disease specialist in the complex knee joint reconstruction MDT. This is in accordance with the current literature showing superior surgical outcomes in tertiary centers with MDT approach that includes the bone infection unit.[7,9] In our study, early and aggressive surgical treatment was chosen in complicated TKA/rTKA cases followed with well-vascularized muscle flap reconstruction. The advantage of muscle flaps in lower extremity reconstructions was reported by Grimer *et al*. in their study on oncological tibial resections and reconstructions with significantly decreased rates of infection.[17] In a systematic review and meta-analysis, outcomes of reconstructions with fasciocutaneous flaps were superior compared to muscle flaps following complex knee joint reconstructions; however, the meta-analysis was based on small sample size studies (number of patients ranging from one to 24), and the mean follow-up time of the fasciocutaneous flap group was one-fourth of that of the muscle flap group.[18] As observed by Kwiecien *et al*. in their study, short-term results can be misleading and do not guarantee a long-term result.[4]

Soft tissue reconstructions after complicated TKA/rTKA as a limb salvage procedure has been the most thoroughly reported with certain limitations on patient categorization

in terms of infection.[4,7-9,11,15,16,19] In our study, functional knee joint salvage was achieved in 75% of patients in the infected group and in 97.1% of patients in the non-infected group ($p = 0.004$). The transfemoral amputation rate was higher in the infected group compared to the non-infected group, although this did not reach statistical significance. The recurrent infection rate among those patients treated for PJI was 33.3% after initial treatment, and knee joint fusion was statistically significantly more common among patients in the infected group. The findings from our study demonstrate superior results on functional knee joint salvage and recurrent infection rates when compared to previously reported results, as the presence of PJI is associated with high rates of recurrent infections, reaching up to 69.2%, and leads to amputation in up to 33% of cases.[8,16]

Based on the results of this study, functional knee joint and limb salvage rates over 96%, with a low complication rate, can be achieved with MDT approach in patients requiring prophylactic or immediate soft tissue reconstruction on a scheduled basis in a high-volume arthroplasty unit. Complications requiring further surgery occurred in 33.3% of the patients in the SNC group, with infection and wound dehiscence being the most common complications. Moreover, none of the patients in the SNC group underwent knee joint fusion or experienced recurrent infection. Recent studies support prophylactic soft tissue reconstructions before TKA or during rTKA procedures in high-risk patients.[7,15] Casey *et al*. reported the results of prophylactic soft tissue reconstructions before TKA in high-risk patients with an incidence of complications reaching 47.8%. However, all patients underwent successful TKA without wound healing issues or infection.[15] Kwiecen *et al*. reported an 87% functional knee joint salvage rate at one year and 80% at the end of 54.7 $\pm$ 31.3 month's follow-up, with an overall complication rate of 47.1% after rTKA and immediate soft tissue reconstruction [4].

In accordance with the previous literature, our results show that patient-reported outcomes are better in non-complicated cases, as patients in the SNC group had slightly higher OKS evaluations (34.5) than patients in the EC group at the end of the follow-up period (25). This finding was not, however, statistically significant.[4,11,20] Recent studies from Corten *et al*. and McPherson et al. have reported that patients with infected TKA have significantly improved PROM scores after revision arthroplasty and soft tissue reconstruction.[20,21] However, PROM and functional outcomes, following soft tissue reconstructions of TKA defects, are reported in only a few studies using validated outcome scales or range of motion.[18] Our results showed comparable range of motion at the end of the follow-up period of 100^0 and 93^0 between the SNC and EC groups, respectively. Casey *et al*. reported a statistically significant higher range of motion in a prophylactic reconstruction group compared to a salvage group (103.2 $\pm$ 3.1 vs. 87.9 $\pm$ 3.3), although the absolute range of motion was similar to that in our cohort.[15] In their study, Kwiecien *et al*. reported a decreasing range of motion over time in patients with pre-existing soft tissue defects at the time of flap reconstruction.[4]

Since this study was retrospective in nature, it has some limitations. The patient groups were heterogenous according to etiology, comorbidities, age, and surgical technique. The SNC group included patients undergoing oncological resections and reconstructions that might have had an impact on post-operative complications and also on functional outcomes and PROM. Of note, this is one of the very few studies on this topic that evaluates functional and patient-reported outcomes with a validated outcome scale, although we were not able to compare functional and patient-reported outcomes before the reconstruction and over time. Despite the above limitations, this study indicates the importance of the MDT approach and the existence of an institutional protocol in complex knee reconstructions that results in a high rate of functional knee joint and limb salvage. During the 12-year study period, surgical techniques, wound management materials, and practices along with orthopedic implants have evolved, and therefore this might have had an effect on the results of this study.

Conclusions

The results of our study indicate that good functional knee joint salvage rates, functional outcomes and PROM can be achieved in non-complicated and complicated TKA cases requiring soft tissue reconstruction. The presence of PJI adversely affects the salvage rate. We strongly advocate the MDT approach in complicated TKA cases followed by early and aggressive surgical treatment.

Conflict of interest statement

None.

Funding

None.

Ethical approval

The protocol for this study was approved by the Institutional Ethics Review Board and informed consent for the use of medical records and photography was also obtained.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.bjps.2022.06.019.

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