Single stage revision TKA for infection

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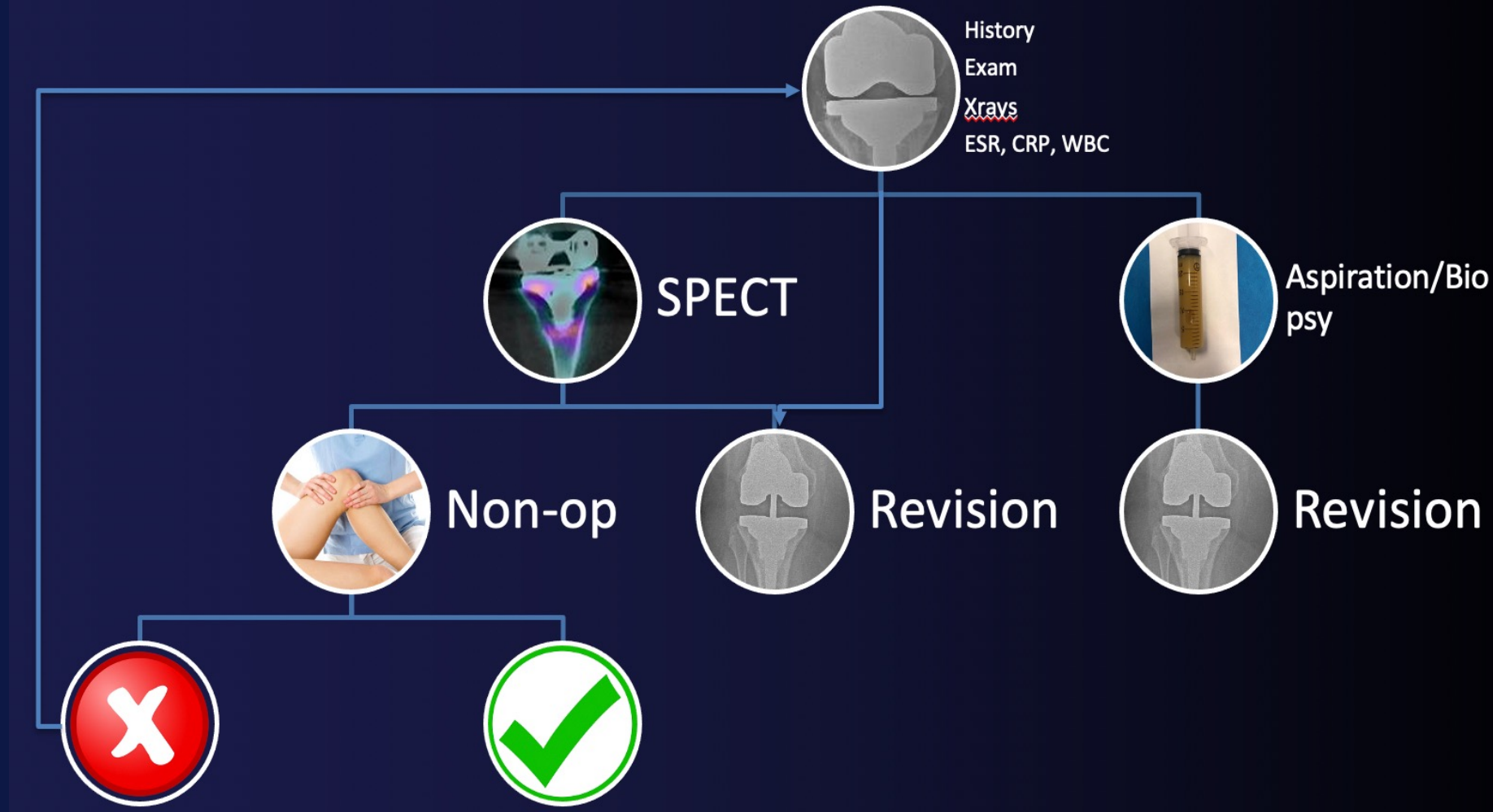
Overview

- Infection following arthroplasty is a devastating diagnosis
- Goals of treatment are 2-fold:
  - Eradicate infection
  - Restore function
- Both must be achieved for success

Overview

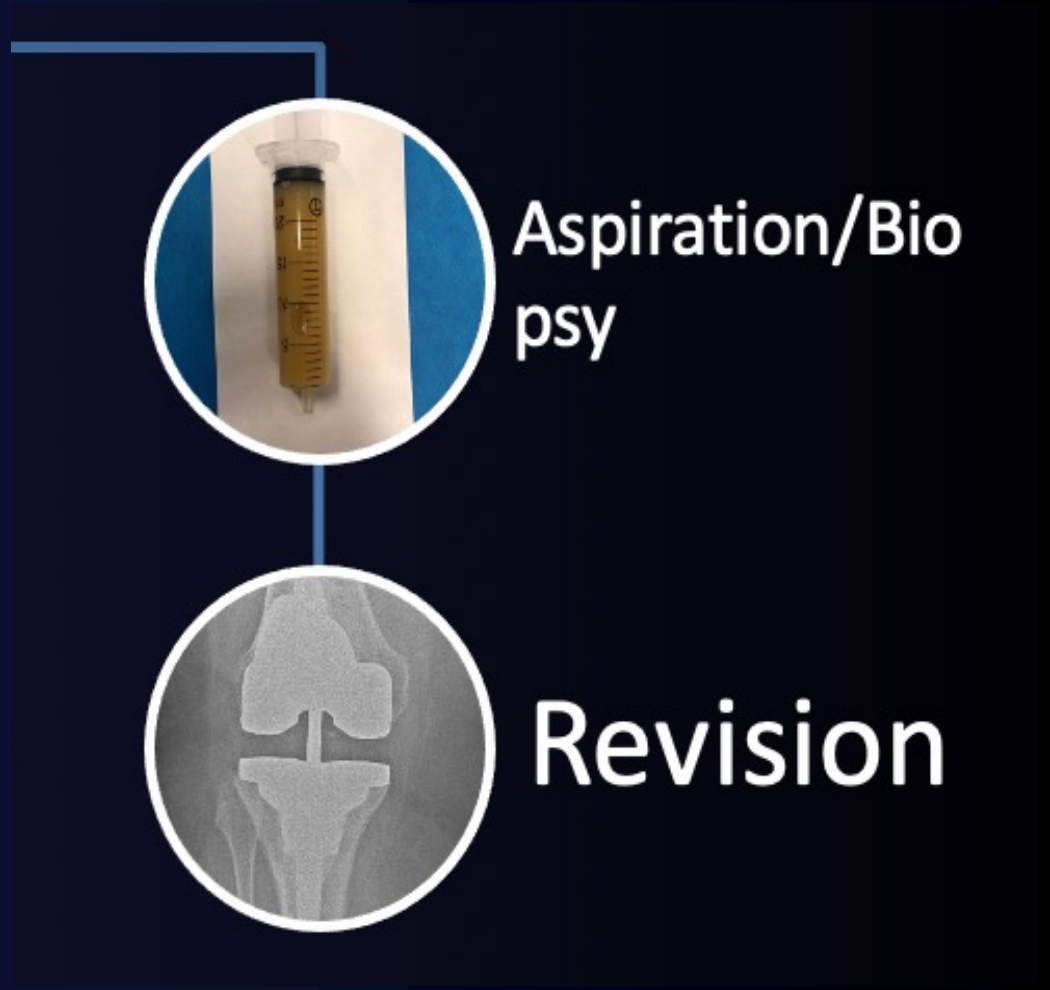
- Is 2 stage revision the only option?
- Is 1 stage revision a viable option?
- How do we choose the best option for each patient?

Algorithm


History
Exam
Xrays
ESR, CRP, WBC
SPECT
Aspiration/Biopsy
Non-op
Revision
Revision

Algorithm

- Infection has been diagnosed
- We have options…

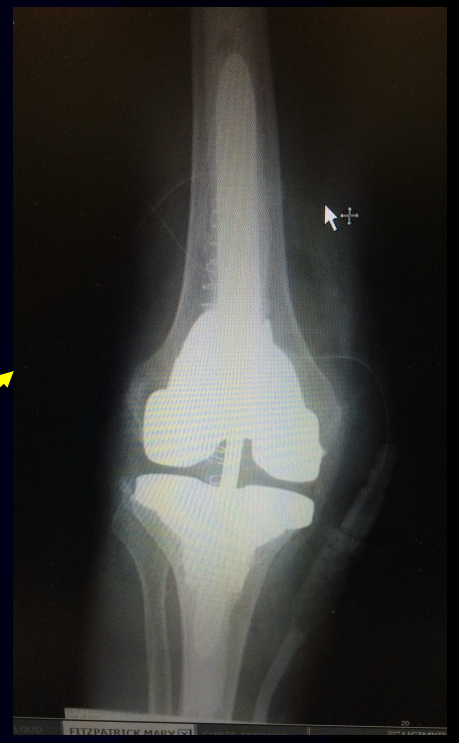


How to choose…

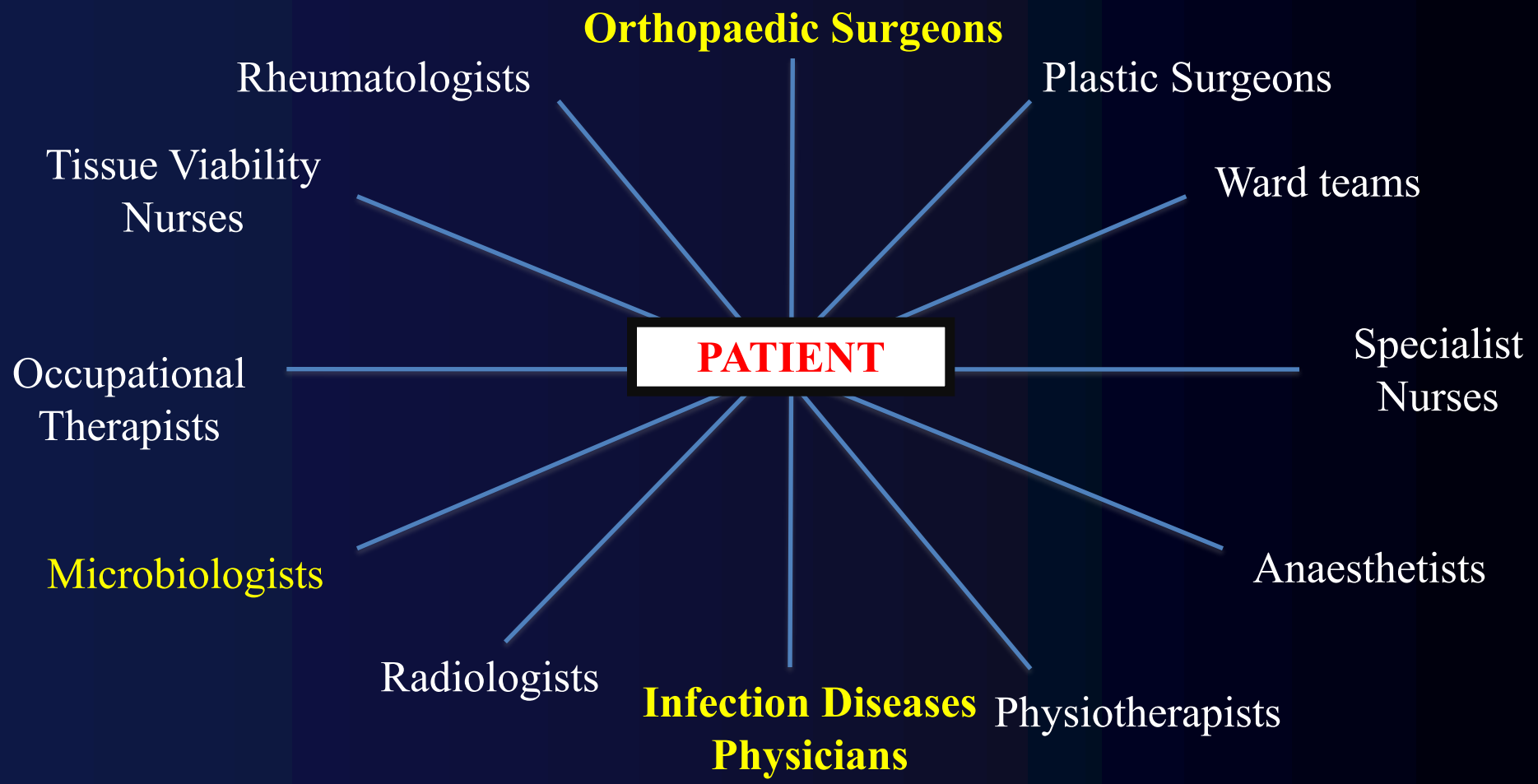
CHRONIC

ACUTE

CHRONIC



Multidisciplinary team



2 stage revision

- 1st stage:
  - Debridement
  - Cultures
  - Implant removal
  - Spacer
  - IV ABs
  - Wait…. (6-12 weeks)

- 2nd stage:
  - Debridement
  - Cultures
  - Spacer removal
  - Definitive implant
  - IV ABs (short duration)

2 stage revision

- 1st stage:
  - Debridement (surgical, mechanical, chemical)
  - Cultures
  - Implant removal
  - Spacer - ABs
  - IV ABs
  - Wait…. (6-12 weeks)

- 2nd stage:
  - Debridement
  - Cultures
  - Spacer removal
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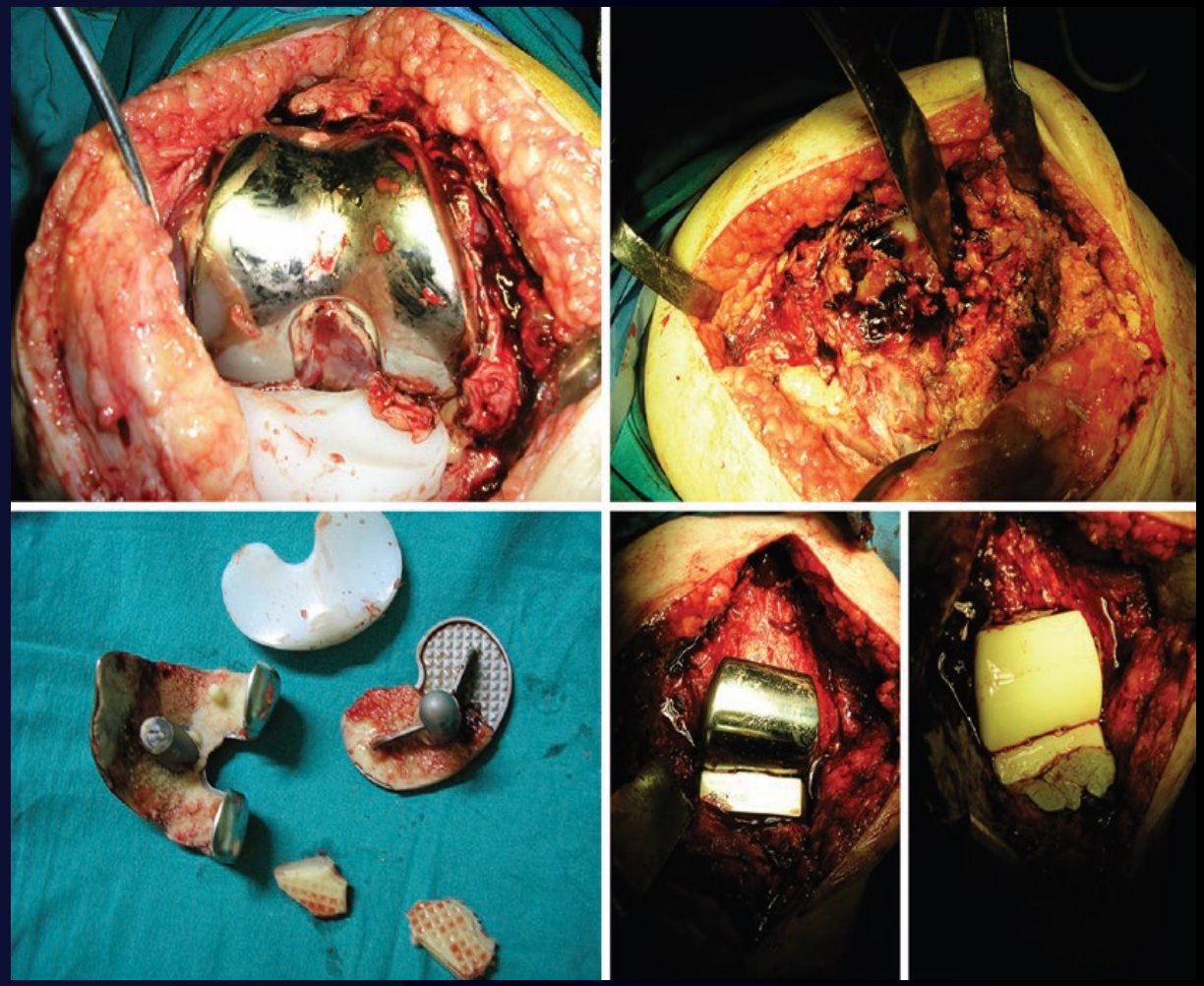

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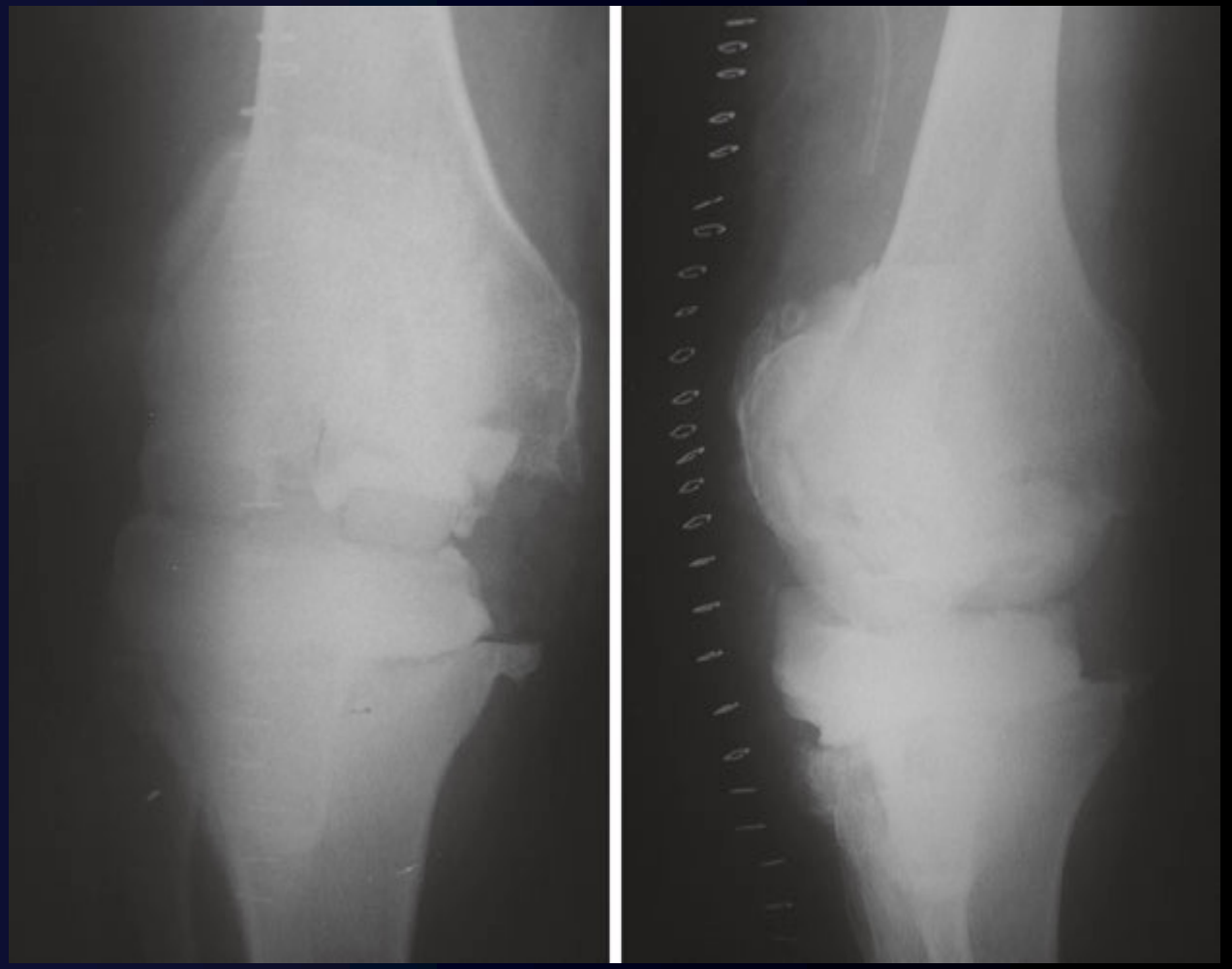

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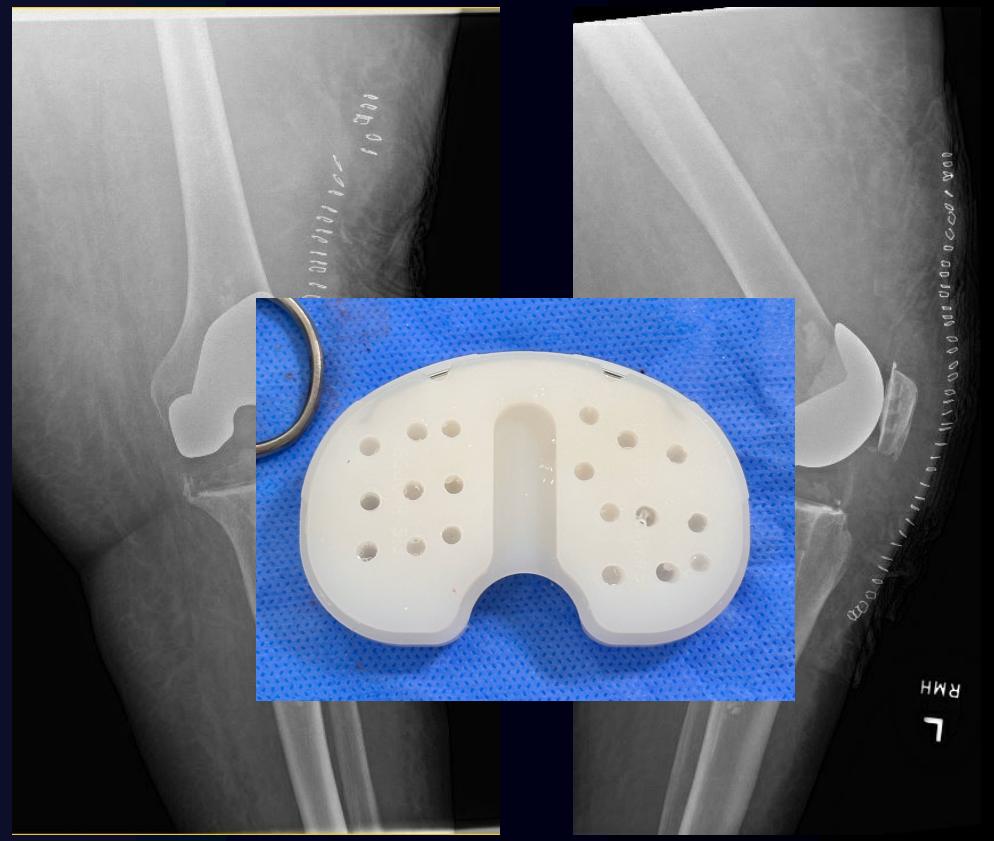

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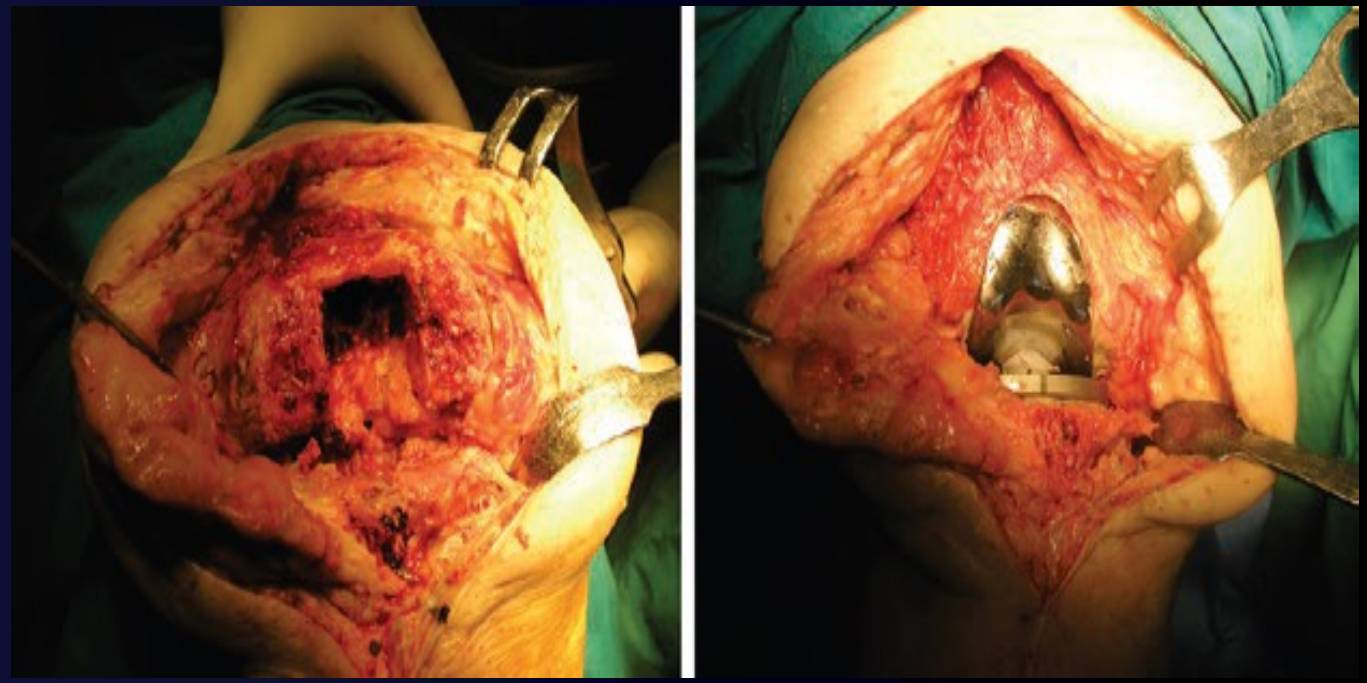

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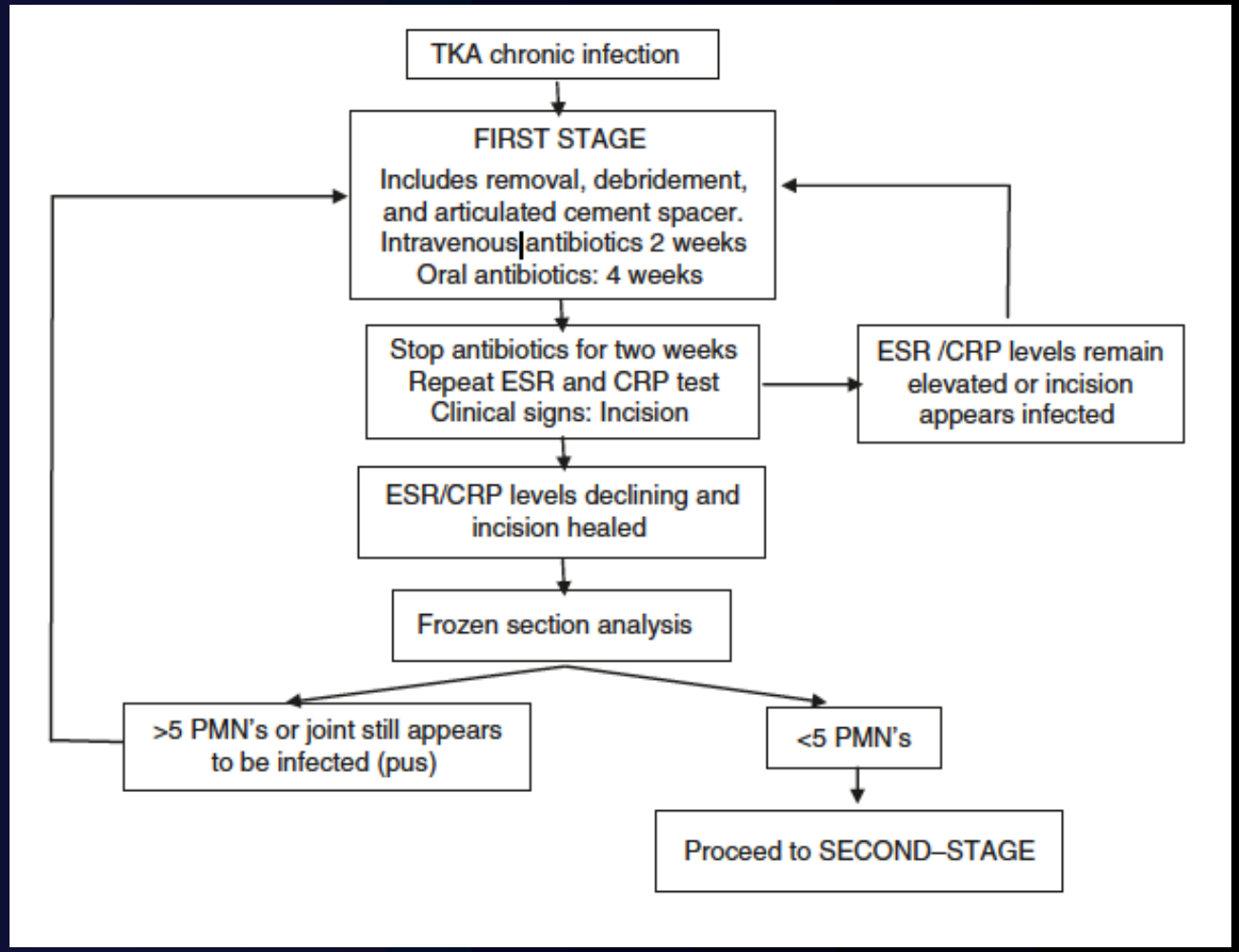
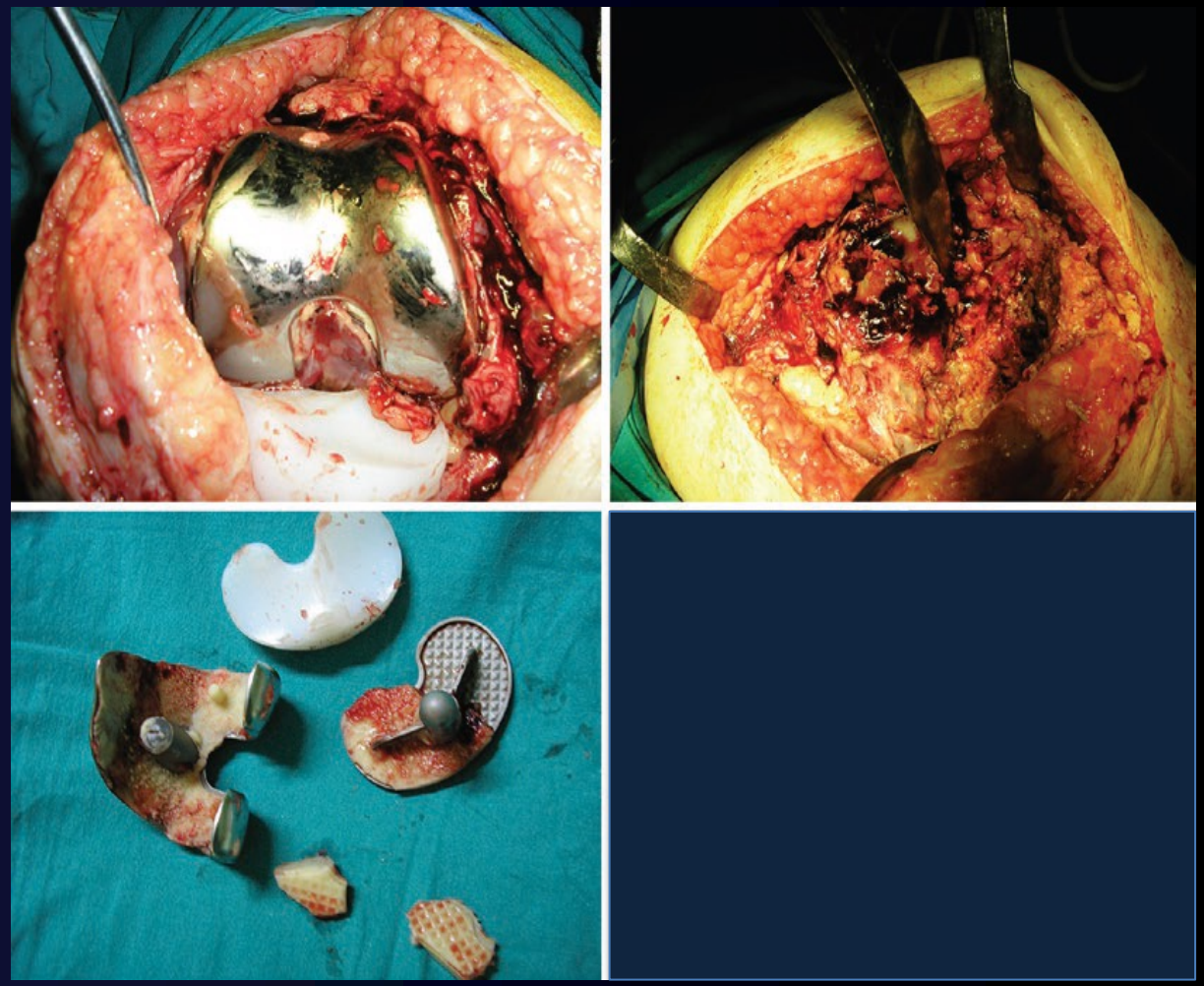


1 stage revision

- 1st stage:
  - Debridement
  - Cultures
  - Implant removal
  - ~~Spacer + ABs~~
  - IV ABs
  - ~~Wait…. (6-12 weeks)~~
- 2nd stage:
  - Debridement
  - Cultures
  - Spacer removal
  - Definitive implant
  - IV ABs (short duration)



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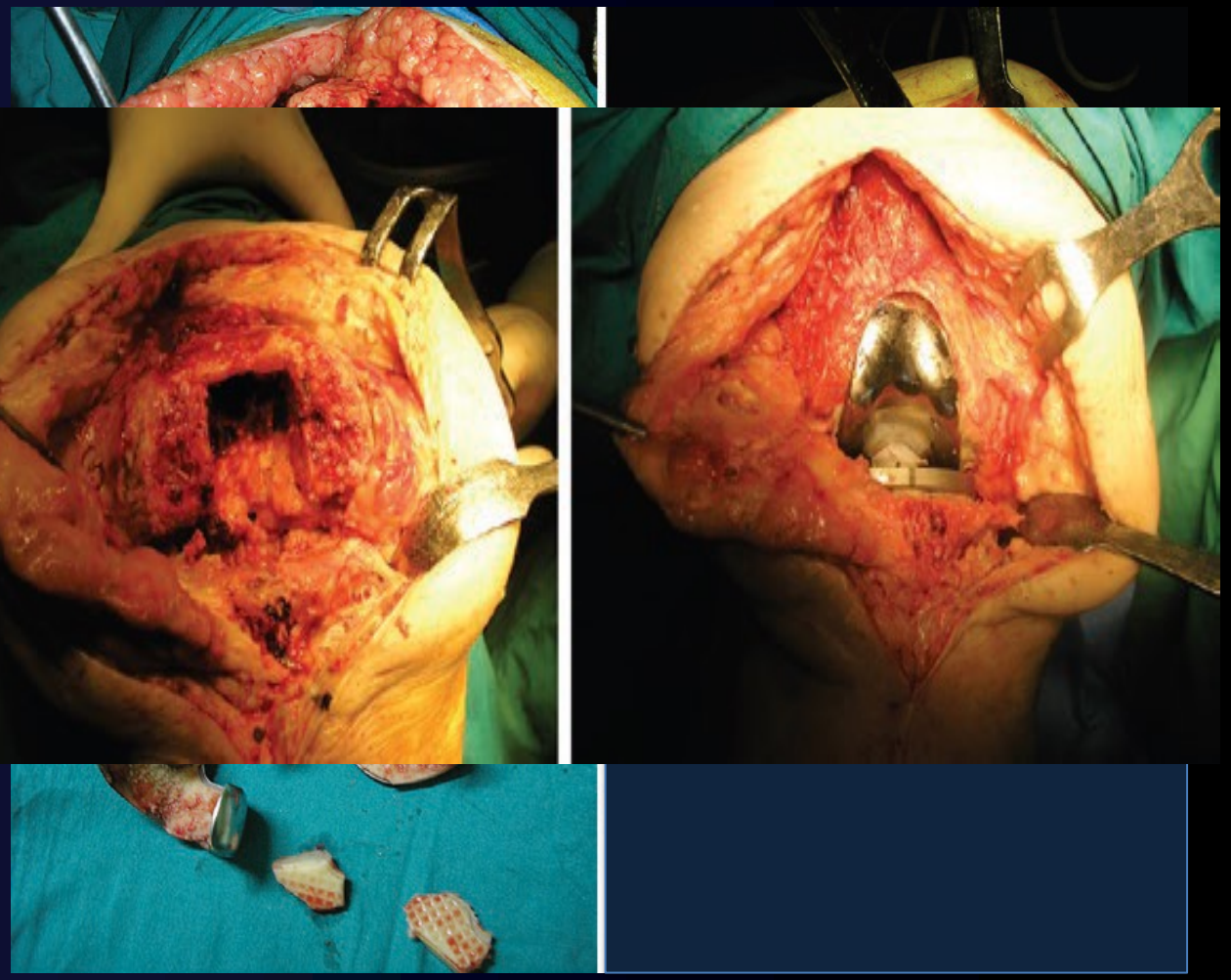
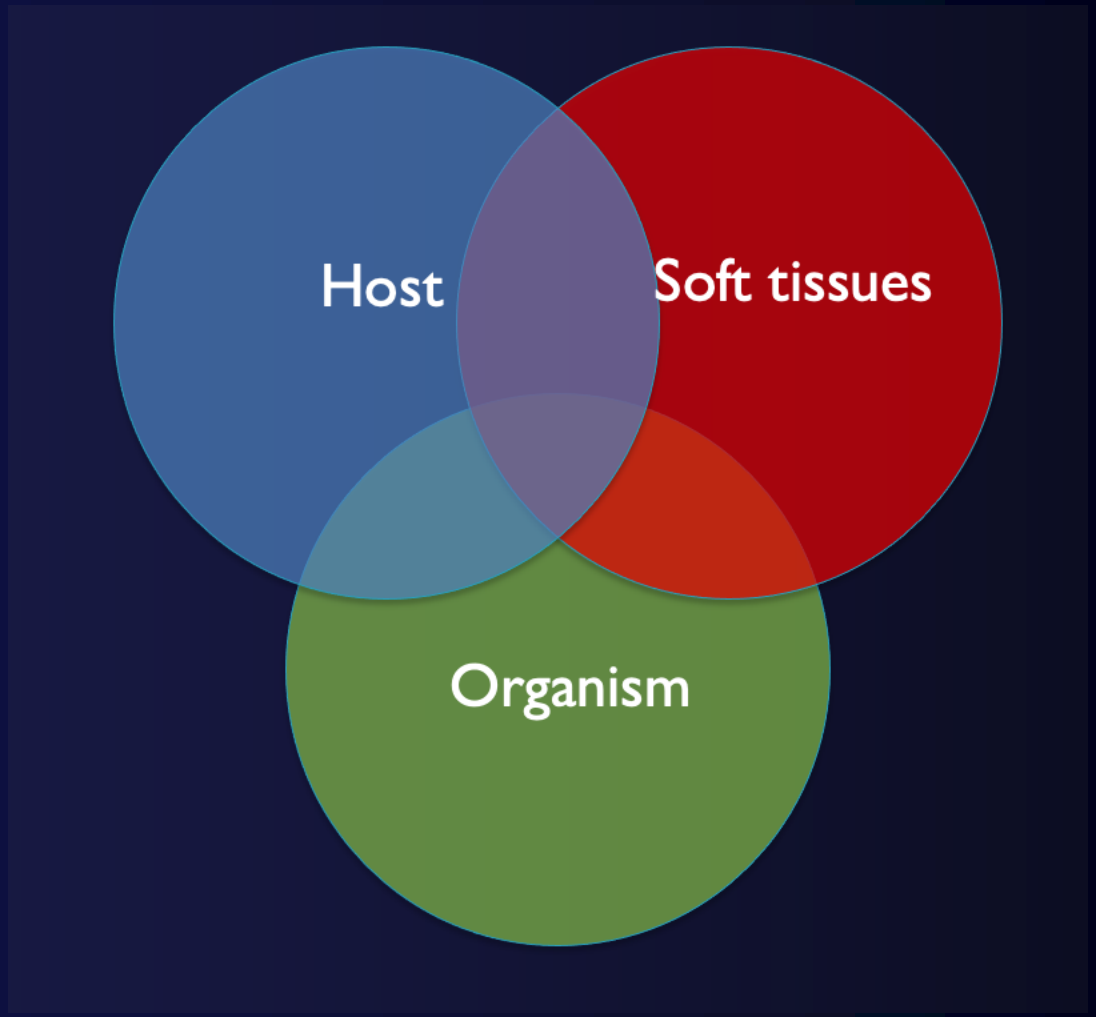
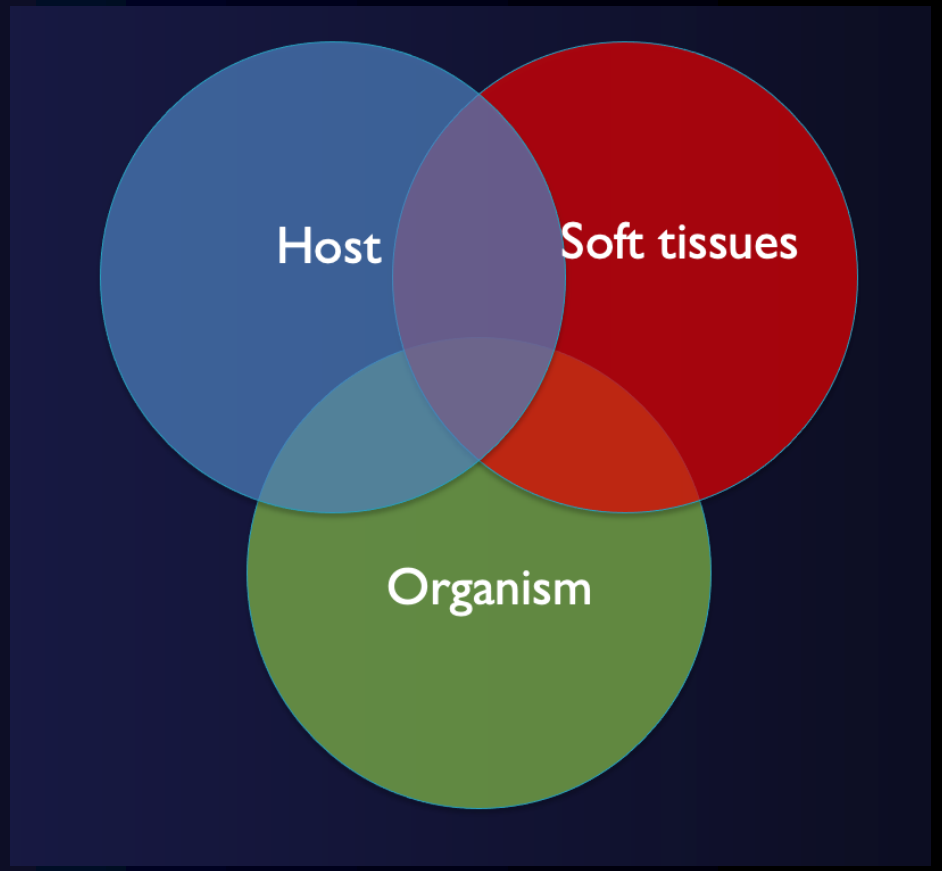


How to choose…



How to choose…

- Host grade:
  - Immunocompromise
  - Systemic symptoms
- Soft tissues:
  - (Fistula)
  - Unable to achieve soft tissue coverage
- Organism:
  - Unknown
  - Polymicrobial
  - (Gram neg; fungal)



2 stage not always better

THE BONE & JOINT JOURNAL EST. 1948

■ ARTHROPLASTY

Current actual success rate of the two-stage exchange arthroplasty strategy in chronic hip and knee periprosthetic joint infection

INSIGHTS INTO NON-COMPLETED SECOND-STAGE CASES

P. S. Corona,
M. Vicente,
L. Carrera,
D. Rodríguez-Pardo,
S. Corró

Aims

The success rates of two-stage revision arthroplasty for infection have evolved since their early description. The implementation of internationally accepted outcome criteria led to the readjustment of such rates. However, patients who do not undergo reimplan-

Table II. Comparison between patients who underwent reimplantation and those who did not.

Variable	Reimplanted group (n = 144)	Non-reimplanted group (n = 18)
Joint, n (%)		
Hip	79 (54.9)	14 (77.8)
Knee	65 (45.1)	4 (22.2)

Single stage success

BJO

■ KNEE

Single-stage revision for the infected total knee arthroplasty

THE CARDIFF EXPERIENCE

N. Razii,
J. M. Clutton,
R. Kakar,
R. Morgan-Jones

From Cardiff and Vale Orthopaedic Centre, University Hospital Llandough, Cardiff, UK

Aims

Periprosthetic joint infection (PJI) is a devastating complication following total knee arthroplasty (TKA). Two-stage revision has traditionally been considered the gold standard of treatment for established infection, but increasing evidence is emerging in support of one-stage exchange for selected patients. The objective of this study was to determine the outcomes of single-stage revision TKA for PJI, with mid-term follow-up.

Methods

A total of 84 patients, with a mean age of 68 years (36 to 92), underwent single-stage revision TKA for confirmed PJI at a single institution between 2006 and 2016. In all, 37 patients (44%) were treated for an infected primary TKA, while the majority presented with infected revisions: 31 had undergone one previous revision (36.9%) and 16 had multiple prior revisions (19.1%). Contraindications to single-stage exchange included systemic sepsis, extensive bone or soft-tissue loss, extensor mechanism failure, or if primary wound closure was unlikely to be achievable. Patients were not excluded for culture-negative PJI or the presence of a sinus.

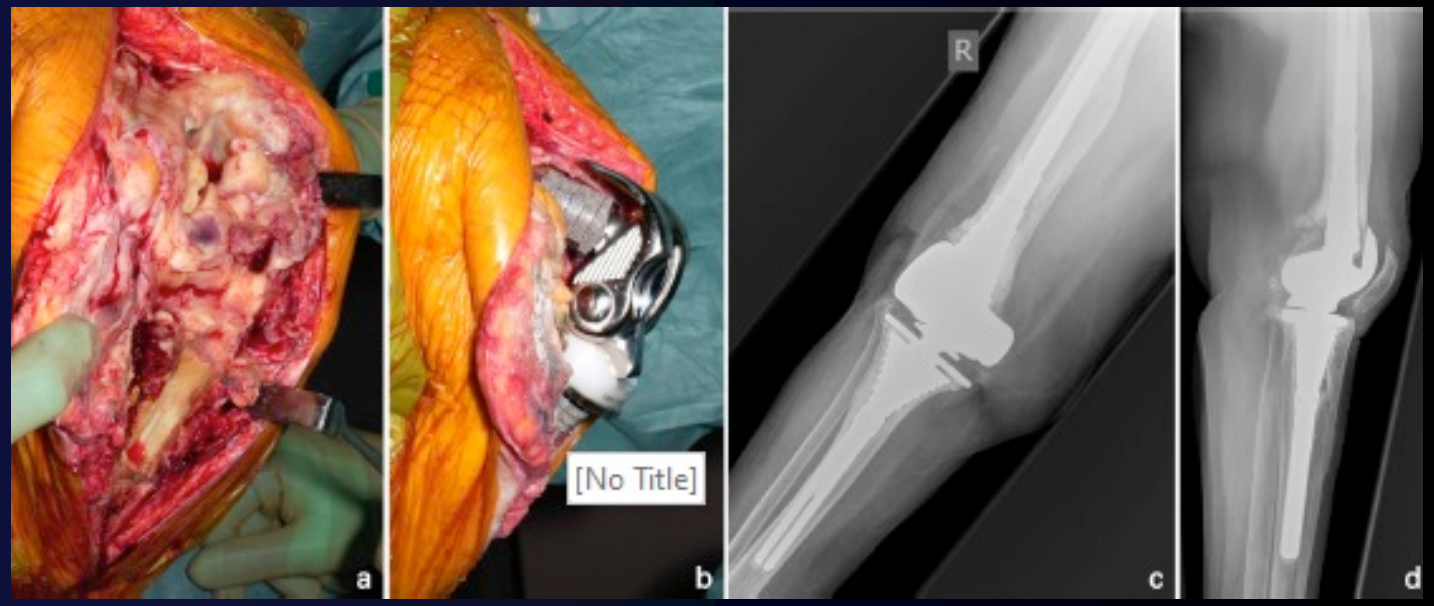
Results

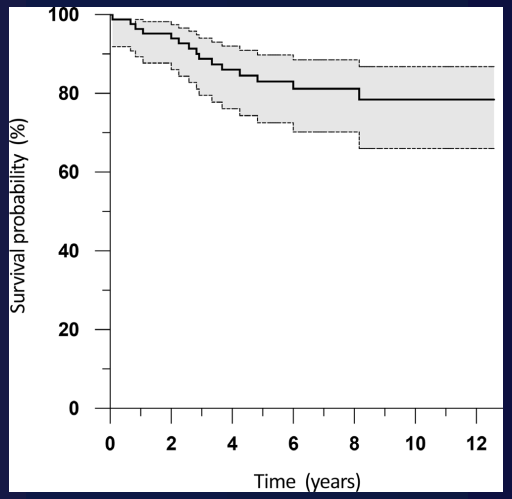
Overall, 76 patients (90.5%) were infection-free at a mean follow-up of seven years, with eight reinfections (9.5%). Culture-negative PJI was not associated with a higher reinfection rate ($p = 0.343$). However, there was a significantly higher rate of recurrence in patients with polymicrobial infections ($p = 0.003$). The mean Oxford Knee Score (OKS) improved from 18.7 (SD 8.7) preoperatively to 33.8 (SD 9.7) at six months postoperatively ($p < 0.001$). The Kaplan-Meier implant survival rate for all causes of reoperation, including reinfection and aseptic failure, was 95.2% at one year (95% confidence interval (CI) 87.7 to 98.2), 83.5% at five years (95% CI 73.2 to 90.3), and 78.9% at 12 years (95% CI 66.8 to 87.2).

Conclusion

One-stage exchange, using a strict debridement protocol and multidisciplinary input, is an effective treatment option for the infected TKA. This is the largest single-surgeon series of consecutive cases reported to date, with broad inclusion criteria.

Cite this article: *Bone Jt Open* 2021;2-5:305–313.





Take home message

- Single-stage revision is an effective treatment option for the infected total knee arthroplasty (TKA) and can be performed with uncemented or hybrid component fixation.
- A strict debridement protocol is paramount for patients undergoing single-stage revision TKA for periprosthetic joint infection (PJI) and each case should receive multidisciplinary input.
- Culture-negative PJI was not associated with increased recurrence of infection following one-stage exchange, but polymicrobial infections demonstrated significantly worse outcomes.

Single stage success

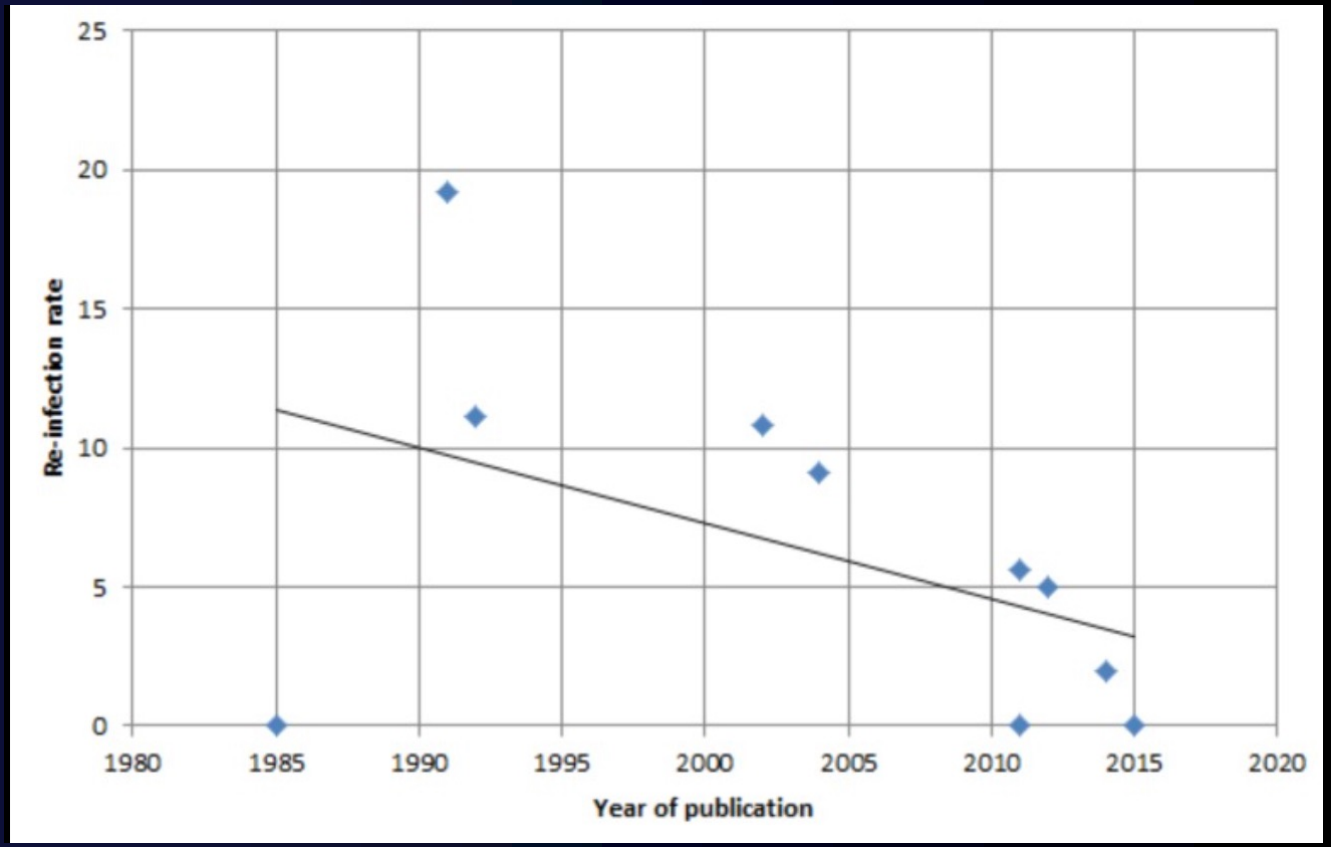
504 *The Open Orthopaedics Journal*, 2015, *9*, (Suppl 2: M9) 504-510

Open Access

Single Stage Knee Arthroplasty Revision Surgery: A Systematic Review of the Literature

E. Chew[*,1], W.S. Khan[2], S. Agarwal[2] and R. Morgan-Jones[2]

- Re-infection rates 0-20%
- We are getting better!



Single stage success

The Journal of Arthroplasty 36 (2021) 298–304

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

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Christian Klemt, PhD, Venkatsaiakhil Tirumala, MSc, Ruben Oganesyan, MD, Liang Xiong, MD, Janna van den Kieboom, MD, Young-Min Kwon, PhD, MD *

Department of Orthopaedic Surgery, Massachusetts General Hospital, Harvard Medical School

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Table 5
Comparison of PROM Scores Between the Propensity Score–Matched Study Cohorts.

PROM Score	1-Stage (N = 44)	2-Stage (N = 88)	*P* Value	Delta	MCID
Preoperative					
KOOS-PS	47.9 ± 14.1	45.6 ± 13.9	0.42	2.3	10
Physical SF 10A	37.5 ± 6.3	35.5 ± 6.7	0.70	2.0	4-6
PROMIS SF Physical	38.8 ± 7.3	36.5 ± 7.0	0.34	2.3	3-5
PROMIS SF Mental	44.1 ± 10.7	43.5 ± 8.7	0.95	0.6	3-5
Postoperative					
KOOS-PS	62.2 ± 8.3	51.9 ± 6.3	**<0.01**	**13.3**	10
Physical SF 10A	42.8 ± 7.8	38.1 ± 7.7	**<0.01**	**4.7**	4-6
PROMIS SF Physical	44.8 ± 8.9	41.0 ± 7.6	**0.01**	**3.8**	3-5
PROMIS SF Mental	50.5 ± 9.4	47.1 ± 7.8	**0.02**	**3.4**	3-5

Bold values indicate statistically significant values.
PROM, patient-reported outcome measure; MCID, minimal clinically important difference; KOOS-PS, Knee disability and Osteoarthritis Outcome Score physical function; Physical SF 10A, physical function short form 10A; PROMIS, Patient-Reported Outcomes Measurement Information System.

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No difference in re-infection or complication rate

Comparison of Complication and Readmission Rates Between the Propensity Score–Matched Study Cohorts.

Complications	1-Stage (N = 44)	2-Stage (N = 88)	*P* Value
Complication rates			
Reinfection rate (%)	25.0	27.2	.78
90-d Mortality rate (%)	0.0	1.1	.81
1-y Amputation rate (%)	2.2	1.1	.61
Re-revision rate (%)	6.8	7.9	.82
First-stage length of stay (d)	6.5 ± 4.4	6.7 ± 4.8	.88
30-d Readmission rate (%)	18.2	20.4	.75
60-d Readmission rate (%)	20.4	22.7	.77
90-d Readmission rate (%)	22.7	25.0	.77

Single stage success

- Reduction in economic costs to healthcare system
- Portuguese study found $16k + reduction per patient single vs 2

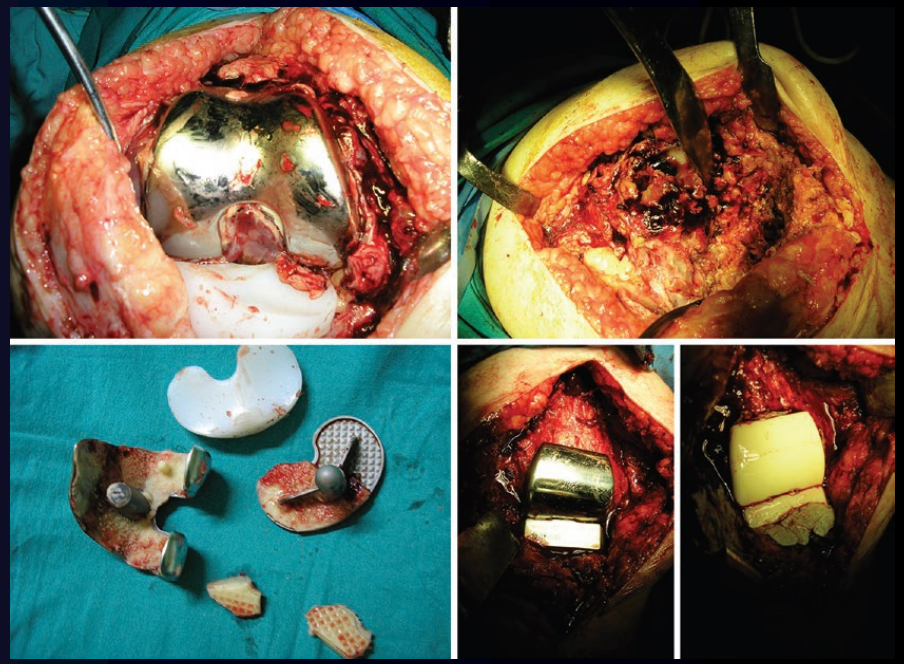
Article

Experiences during Switching from Two-Stage to One-Stage Revision Arthroplasty for Chronic Total Knee Arthroplasty Infection

Guillem Navarro [1,2], Luis Lozano [2,3], Sergi Sastre [2,3], Rosa Bori [2], Jordi Bosch [4] and Guillem Bori [2,3,5,*]

Conclusion

- Single and 2 stage revision for infection have similar success rates
- Single stage revision is a viable option in a large proportion of PJI
- Requires meticulous debridement
- Reduced morbidity, reduced costs



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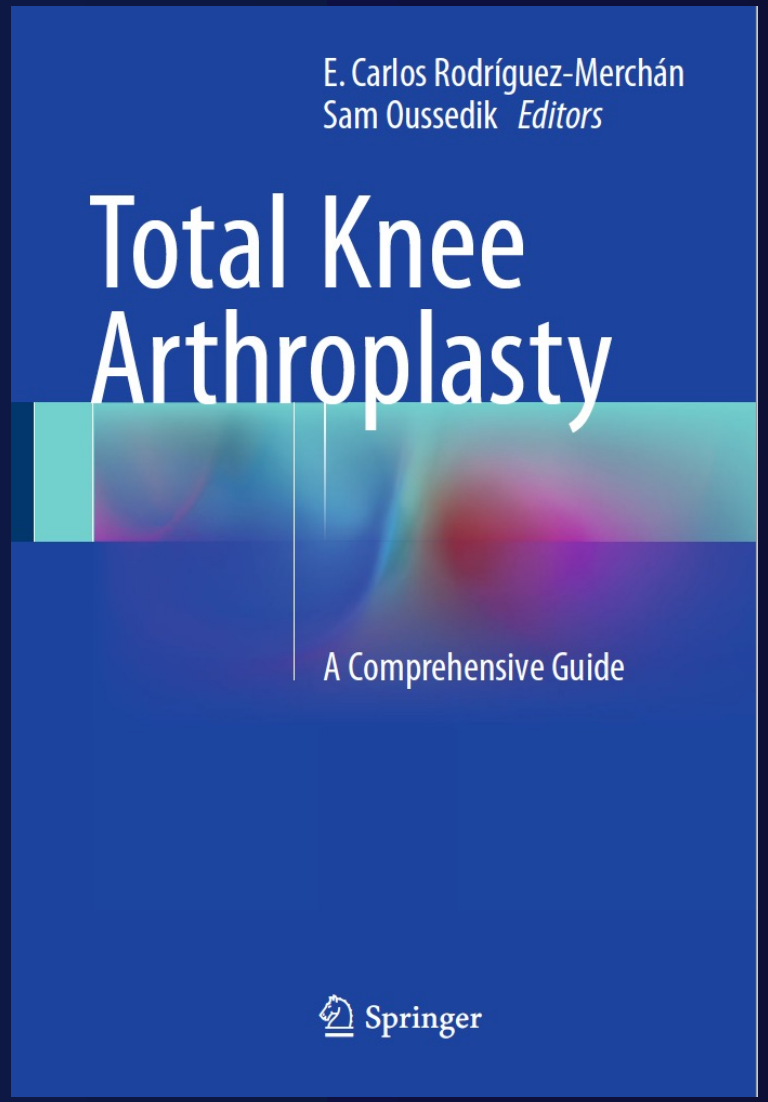
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A Comprehensive Guide
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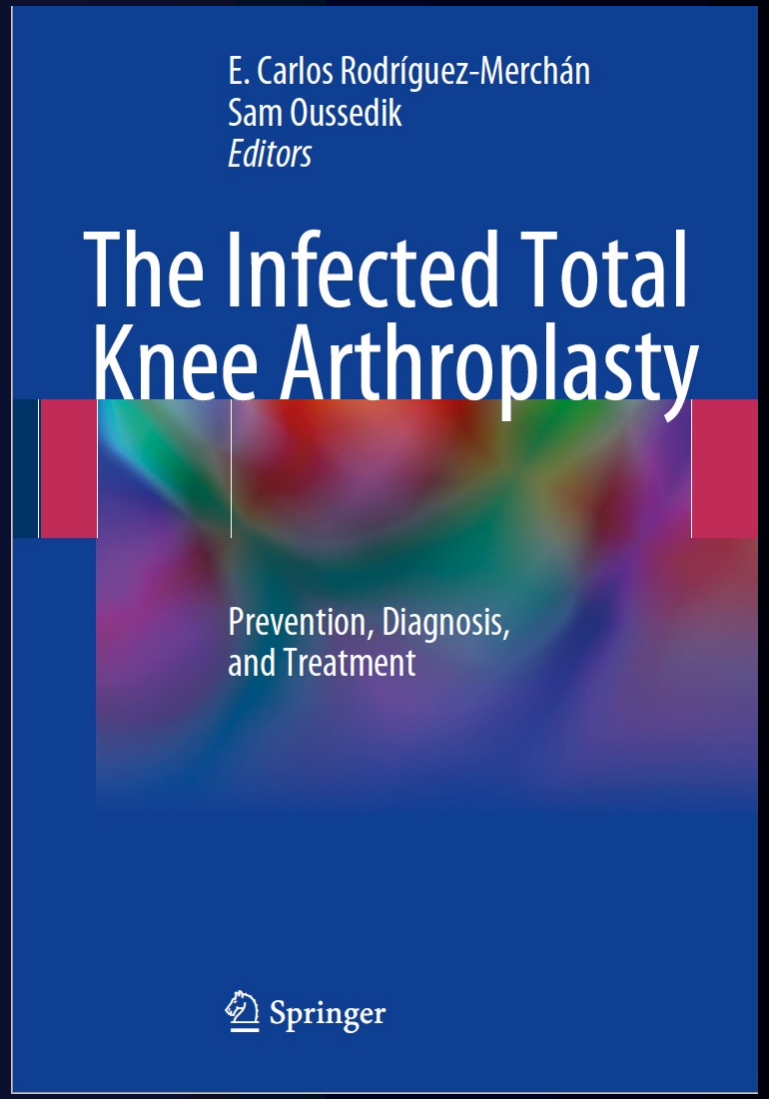
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