

British Journal of Anaesthesia, 126 (2): 348–349 (2021)

doi: [10.1016/j.bja.2020.09.038](https://doi.org/10.1016/j.bja.2020.09.038)

Advance Access Publication Date: 24 October 2020

© 2020 British Journal of Anaesthesia. Published by Elsevier Ltd. All rights reserved.

Fast-track hip and knee arthroplasty...how fast?

Thomas W. Wainwright¹, Stavros G. Memtsoudis^{2,3,4} and Henrik Kehlet^{5,6,*}

¹Orthopaedic Research Institute, Bournemouth University, Bournemouth, UK, ²Department of Anaesthesiology, Critical Care, and Pain Management, Hospital for Special Surgery, New York, NY, USA, ³Department of Healthcare Policy and Research, Weill Cornell Medical College, New York, NY, USA, ⁴Department of Anaesthesiology, Perioperative Medicine and Intensive Care Medicine, Paracelsus Medical University, Salzburg, Austria, ⁵Section of Surgical Pathophysiology, Rigshospitalet, Copenhagen University, Copenhagen, Denmark and ⁶Lundbeck Foundation Centre for Fast-track Hip and Knee Replacement, Copenhagen, Denmark

*Corresponding author. E-mail: henrik.kehlet@regionh.dk

Keywords: arthroplasty; enhanced recovery; fast-track surgery; hip replacement; knee replacement; outpatient

Fast-track (or enhanced recovery after surgery [ERAS]) programmes for total hip arthroplasty and total knee arthroplasty have evolved over the past 20 yr.¹ Their development has been driven by the questions, ‘Can the operation be done as an outpatient procedure?’ and if not, ‘Why is the patient in the hospital?’ based upon an analysis and modification of undesirable pathophysiological responses that delay recovery.² The data confirm that fast-track approaches can improve clinical and economic outcomes; however, their implementation has not been universal.^{2,3}

Although length of hospital stay (LOS) has been reduced over the past 10 yr within the English NHS, the national mean LOS remains 4–5 days and rates of outpatient arthroplasty continue to be low (data from Hospital Episode Statistics at <https://digital.nhs.uk/data-and-information/data-tools-and-services/data-services/hospital-episode-statistics>). In contrast, in Denmark⁴ and the USA,⁵ mean LOS has been reduced to about 2 days for both total hip arthroplasty and total knee arthroplasty, and outpatient arthroplasty is now well established in selected patients in many international centres.⁶ Importantly, the definition of outpatient surgery within these settings should not include an overnight stay, which is in contrast to other reports using a less than 23 h stay,⁶ thereby adding some confusion when interpreting the data.

The concept of outpatient arthroplasty is not new. Studies demonstrating its feasibility in selected patients were first published more than 10 yr ago. More recently, preliminary observations support that such an approach is feasible in ~15% of unselected patient cohorts within a socialised healthcare system, and with no apparent increase in complications or re-admissions.⁷ Outpatient arthroplasty is therefore an attractive concept in the context of policy changes advocating value-based care models, particularly given the additional capacity and economic benefits it offers, although the economic benefit may be variable and depend on local factors.⁶

However, recent data from population-based observational studies from the USA and Canada based on the American

College of Surgeons National Surgical Quality Improvement Program (NSQIP) database have shown that outpatient total hip arthroplasty and total knee arthroplasty were associated with higher odds of major and minor complications^{5,8} compared with patients discharged after a one-night hospital stay⁵ or a 1–2 day stay.⁸ The USA study⁵ is the first very large comprehensive evaluation of population based data and includes a propensity matched analysis accounting for comorbidities amongst 226 481 total knee arthroplasty and 140 557 total hip arthroplasty patients, with a focus on the safety of outpatient arthroplasty. A smaller ($n=4391$) US private insurance database study also showed a higher risk of perioperative surgical and medical complications compared with standard inpatient total knee arthroplasty.⁹ Although these studies may have several limitations, including residual confounding, the findings nevertheless are an important reminder that outpatient surgery may not equate to optimised care for every patient, and that ERAS protocols should be based on the concept of ‘first better – then faster’.² Consequently, there is a need for improved prediction methods for safe outpatient procedures.¹⁰ Within an optimised ERAS programme, selected high-risk patients may benefit from a planned longer stay in hospital as the best means of accelerating recovery and reducing complications, re-admissions, and morbidity.² Consequently, it may be prudent to keep some patients with specific comorbidities in hospital overnight even though they meet conventional discharge criteria. This is especially the case given that the benefits of discharging a patient home in the evening instead of the next morning are still to be determined from a safety vs economic perspective.⁶ Although apparently safe in several selected settings, we need more generalisable data, including complete post-discharge issues such as emergency department and general practitioner visits and use of skilled nursing or other facilities, home nursing care etc.

Before more widespread recommendations for outpatient arthroplasty, there are several practical caveats that need to be

considered. Firstly, the value of a change to outpatient practice should only be investigated in the context of an existing optimised fast-track programme, that is it should not be a justification for units without an existing properly implemented fast-track programme. Secondly, it may be more difficult to implement in some settings, such as hospital vs ambulatory surgery centres (ASC). However, preliminary data suggest an outpatient programme can be performed successfully in both settings.¹¹

In addition to these contextual factors, the most important challenge for future improvement within the outpatient ERAS setting is better understanding and control of undesirable perioperative pathophysiological responses such as pain relief, control of inflammatory responses and orthostatic intolerance, optimal blood management, and prevention of cognitive dysfunction.¹² Future optimisation and reduction of these post-surgical sequelae therefore represent a prerequisite for further development and increased use of outpatient total hip arthroplasty and total knee arthroplasty. There is a need to be able to identify patients at risk of complication or re-admission preoperatively and before discharge. Of special importance will be the need to identify ways to predict high pain and inflammatory responders¹² so that related pathophysiology can be modified to facilitate optimal post-discharge rehabilitation strategies.²

Nevertheless, for high-performing total hip arthroplasty and total knee arthroplasty ERAS centres, outpatient surgery is a natural evolution, and the results have led to widespread enthusiasm for the approach across healthcare systems, industry, and media. However, for some patients it may remain better to prolong their hospital stay modestly. This may apply especially to sites without an already established successful fast-track protocol, where outpatient arthroplasty may not be possible or lead to increased re-admissions and morbidities. In addition, the outpatient approach should not be based upon increased use of post-discharge care facilities with secondary cost and safety challenges.

To summarise, there is a delicate balance between implementation of established evidence for total hip arthroplasty and total knee arthroplasty ERAS care and moving too fast to more widespread implementation of the promising outpatient approach given the fact that more patients with comorbidities or need for revision surgery are being seen. We should be mindful to 'walk before we run' and remember that the ERAS concept is based on reduction of undesirable pathophysiological responses to surgery in order to enhance recovery, meaning 'first better, then faster'.

British Journal of Anaesthesia, 126 (2): 349–352 (2021)

doi: [10.1016/j.bja.2020.10.014](https://doi.org/10.1016/j.bja.2020.10.014)

Advance Access Publication Date: 10 November 2020

© 2020 British Journal of Anaesthesia. Published by Elsevier Ltd. All rights reserved.

Could anaesthetic technique be blocking successful outcomes in arteriovenous fistula surgery?

Alan J. R. Macfarlane^{1,2,*}, Mark D. Neuman³ and Emma Aitken⁴

¹Glasgow Royal Infirmary, Glasgow, UK, ²University of Glasgow, UK, ³University of Pennsylvania, Philadelphia, PA, USA and ⁴Queen Elizabeth University Hospital, Glasgow, UK

Declarations of interest

The authors declare that they have no conflicts of interest.

References

1. Kehlet H. Fast-track hip and knee arthroplasty. *Lancet* 2013; **381**: 1600–2
2. Wainwright TW, Kehlet H. Fast-track hip and knee arthroplasty — have we reached the goal? *Acta Orthop* 2019; **90**: 3–5
3. Memtsoudis SG, Fiasconaro M, Soffin EM, et al. Enhanced recovery after surgery components and perioperative outcomes: a nationwide observational study. *Br J Anaesth* 2020; **124**: 638–47
4. Petersen PB, Jorgensen CC, Kehlet H. Temporal trends in length of stay and readmissions after fast-track hip and knee arthroplasty. *Dan Med J* 2019; **66**: A5553
5. Liu J, Elkassabany N, Poeran J, et al. Association between same day discharge total knee and total hip arthroplasty and risks of cardiac/pulmonary complications and readmission: a population-based observational study. *BMJ Open* 2019; **9**, e031260
6. Vehmeijer SBW, Husted H, Kehlet H. Outpatient total hip and knee arthroplasty. *Acta Orthop* 2018; **89**: 141–4
7. Gromov K, Jorgensen CC, Petersen PB, et al. Complications and readmissions following outpatient total hip and knee arthroplasty: a prospective 2-center study with matched controls. *Acta Orthop* 2019; **90**: 281–5
8. Nowak LL, Schemitsch EH. Same-day and delayed hospital discharge are associated with worse outcomes following total knee arthroplasty. *Bone Joint J* 2019; **101-b**: 70–6
9. Arshi A, Leong NL, D'Oro A, et al. Outpatient total knee arthroplasty is associated with higher risk of perioperative complications. *J Bone Joint Surg Am* 2017; **99**: 1978–86
10. Johnson DJ, Castle JP, Hartwell MJ, D'Heurle AM, Manning DW. Risk factors for greater than 24-hour length of stay after primary total knee arthroplasty. *J Arthroplasty* 2020; **35**: 633–7
11. Sershon RA, McDonald 3rd JF, Ho H, Goyal N, Hamilton WG. Outpatient total hip arthroplasty performed at an ambulatory surgery center vs hospital outpatient setting: complications, revisions, and readmissions. *J Arthroplasty* 2019; **34**: 2861–5
12. Kehlet H. Enhanced postoperative recovery: good from afar, but far from good? *Anaesthesia* 2020; **75**(Suppl 1): e54–61