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CONSENSUS

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Formal consensus on fast-track hip and knee arthroplasty: ESSKA/EKA, EHS and APAS recommendations for optimised recovery pathways in joint replacement surgeries

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Abstract

Purpose: This international formal consensus aims to establish a unified, evidence-based approach to perioperative care by promoting the adoption of fast-track surgery or enhanced recovery after surgery (ERAS) protocols, informing healthcare professionals and administrators about optimal perioperative management of arthroplasty and facilitating broader implementation.

Methods: A multidisciplinary panel of 106 experts contributed across a Steering Group ($n = 22$), a Rating Group ($n = 35$) and a Peer Review group ($n = 49$). The Steering Group developed 37 questions and corresponding statements based on the literature review and expert opinion. Statements were graded from A (high-level evidence) to D (expert opinion). An independent Rating Group evaluated each statement on a 1–9 Likert scale across two rounds using the Formal Consensus methodology. Statements were iteratively revised and finalised through consensus and joint discussion. The final document was assessed by an international Peer Review Group to ensure transnational applicability.

For affiliations refer to page 15.

Abbreviations: APAS, Asia-Pacific Arthroplasty Society; EBM, evidence-based medicine; EHS, European Hip Society; EKA, European Knee Associates; ERAS, enhanced recovery after surgery; ERP/ERPs, enhanced recovery pathway(s); ESSKA, European Society for Sports Traumatology, Knee Surgery and Arthroscopy; HAS, Haute Autorité de Santé; LMWH, low molecular weight heparin; LOS, length of stay; NICE, National Institute for Health and Care Excellence; NOACs, non–vitamin K oral anticoagulants; SD, standard deviation; THA, total hip arthroplasty; TKA, total knee arthroplasty; USA, United States of America; VTE, venous thromboembolism.

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Results: Out of 37 questions, a total of 63 statements were developed. Following a set of general statements outlining the principles and overall goals of fast-track total knee arthroplasty (TKA) and total hip arthroplasty (THA), the recommendations addressed and optimised the three key phases of perioperative care: preoperative, intraoperative and postoperative management. Of the 63 statements, 39 were graded A or B and 24 as C or D. Mean agreement scores ranged from 7.7 to 8.9. Overall, 56 statements were considered appropriate with strong agreement and 7 with relative agreement. The Peer Review Group supported the overall statements, providing feedback to clarify specific recommendations and to highlight regional differences in implementation, which were incorporated into the final document.

Conclusions: This consensus endorses the adoption of structured fast-track or enhanced recovery programs as a patient-centred approach to perioperative care in total hip and knee arthroplasty. The aim is to improve the quality of care by reducing morbidity, optimising pain management, shortening hospital stay and enhancing patient satisfaction. While not intended to replace clinical judgement, it provides a pragmatic framework to guide decision-making, promote consistency and facilitate safe early mobilisation and discharge.

Level of Evidence: Level I.

KEYWORDS

enhanced recovery after surgery, fast-track surgery, formal consensus, perioperative care, total hip arthroplasty, total knee arthroplasty

INTRODUCTION

Total knee arthroplasty (TKA) and total hip arthroplasty (THA) were traditionally linked to intraoperative blood loss, severe postoperative pain, considerable physiological and psychological effects and reduced postoperative physical activity, resulting in delayed functional recovery, longer hospital stays and increased in-hospital care and rehabilitation costs [5, 26]. The past 25 years have witnessed the development of 'fast-track surgery', or 'enhanced recovery after surgery' (ERAS) programs designed to enhance postoperative recovery, reduce morbidity and shorten the length of hospital stays (LOS) without compromising safety [14]. Fast-track surgery has transformed perioperative care via a shift to a patient-centred, evidence-based strategy that better aligns with pathophysiological processes. This shift offers numerous benefits not only for patients but also for surgeons and healthcare systems. Fast-track arthroplasty has reduced surgical stress, shortened hospital stays and minimised perioperative complications while enhancing patient recovery, boosting early functional activity and increasing satisfaction [7, 23]. Compared with conventional perioperative care, ERAS pathways have similar or improved postoperative outcome scores [10].

Despite accumulating evidence supporting the multiple benefits of enhanced recovery pathways (ERPs) in patients undergoing TKA and THA, their implementation remains challenging in many orthopaedic units worldwide. Resistance to change, insufficient awareness and education contribute to surgeons' hesitancy in altering established care practices, thus highlighting the need for improved education and dissemination of the benefits, safety and effectiveness of fast-track TKA and THA [23].

The European Knee Associates (EKA), the Knee Arthroplasty and Degenerative Section of the European Society for Sports Traumatology, Knee Surgery and Arthroscopy (ESSKA), established a focus group, 'Optimisation in the Perioperative Management of TKA', to foster collaborative research, advance knowledge in perioperative management, promote professional standards and enhance patient care. This focus group has published exclusive articles [23] and a comprehensive book [15]. Considering the similarity and universality in the perioperative management of TKA and THA in most cases, global collaboration was the logical next step. Consequently, the ESSKA/EKA focus group liaised with experts from the European Hip Society (EHS), Asia-Pacific Arthroplasty Society (APAS), while also including individual independent experts from the United States of America (USA) for a pan-European and international collaboration, aiming to create a standardised language and uniform clinical standards for perioperative care in TKA and THA, incorporating the fast-track surgery philosophy.

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Continual, up-to-date evidence-based refinement of fast-track pathways for TKA and THA is essential for enhanced efficacy. Robust education and heightened awareness are pivotal in fostering global acceptance of fast-track surgery, ultimately contributing to improved patient care and recovery post-TKA and THA and consequently enhancing the quality and safety of patient outcomes while ensuring sustainable healthcare practices. Therefore, this international collaboration is primarily aimed at [5] establishing a unified approach to perioperative care by adopting fast-track surgery or ERAS protocols, acknowledging the increasing prevalence of osteoarthritis and the demand for joint replacement surgeries, and [26] informing healthcare professionals and administrators about the optimal management of perioperative factors and challenges in arthroplasty, based on current evidence and endorsed by global scientific associations. It seeks to facilitate the broader adoption and reinforce the implementation of fast-track arthroplasty, emphasising its uniquity and advantages.

METHODS

The consensus process followed the ESSKA Formal consensus methodology described by ESSKA organs [3, 4] and derived from HAS [2].

The consensus development was coordinated by a single Chairperson, selected based on his position as the Head of the ESSKA/EKA 'Optimisation in the Perioperative Management of TKA' focus group and primary project initiator. All the process was conducted under the supervision of a project manager. The Steering Group comprised twenty-two experts divided into nine subgroups. The panel was multidisciplinary, including orthopaedic surgeons, anesthesiologists and physical therapists, with official representation from ESSKA/EKA, EHS and APAS leadership. The ESSKA/EKA focus group members proposed the initial series of relevant questions. This baseline list was compiled and evaluated following a preliminary survey conducted within this core group to capture the practical expectations of daily practitioners, resulting in the finalisation of the 37 chosen questions. Subsequently, these 37 chosen questions were categorised into nine distinct question subgroups and distributed among the broader international Steering Group. Literature reviews were then conducted across PubMed, Embase and the Cochrane Library using specific keywords tailored to each question, with emphasis on the latest evidence. Following the completion of the literature reviews and the generation of structured summaries detailing the best available evidence for each question, the Steering Group formulated the respective statements or recommendations based on the existing literature and the collective expert opinion.

For each statement, the following grading system was used:

Grade A: high scientific level
Grade B: scientific presumption
Grade C: low scientific level
Grade D: expert opinion

An independent Rating Group, comprising a panel of 35 experienced clinicians, subsequently reviewed the formulated statements. The rating phase comprised two rounds, during which the panel evaluated and ranked each response on a Likert scale (from 1 ['totally inappropriate'] to 9 ['totally appropriate']) and provided their comments. After the first rating round, the appropriateness and agreement for each statement were assessed based on the assigned scores and the Formal Consensus Methodology guidelines. Considering the scores and comments, the Steering Group revised the statements that did not achieve strong agreement in the first round, and a second rating round was conducted for the adjusted statements. Subsequently, a joint meeting of the Steering and Rating Groups was organised to refine the statements that did not achieve strong agreement in the second round, resolve any other contentious issues and validate and finalise the text.

Each statement was assigned an agreement score (in the form of a median, range and mean ± standard deviation [SD]) that reflects a consensus among the raters on a particular statement.

A statement was considered 'appropriate' when the median rating was ≥7, corresponding to strong agreement (ratings 7–9) or relative agreement (ratings 5–9). Conversely, a statement was classified as 'uncertain' when the median fell between 4 and 6.5, indicating indecision, or in any other case that did not meet the criteria for agreement or disagreement. Finally, a statement was deemed 'inappropriate' if the median was ≤3.5 [2].

The finalised statements were circulated to a Peer Review Group, comprising 49 experts from 31 countries, to assess its transnational applicability and acceptance and all provided structured feedback. Postreceipt of the peer-review feedback, clarifying statements and contextual additions were included to address geographic variability in selected topics and to explain differences in the implementation of certain elements of the fast-track pathway. To ensure broad geographic representation, a multidisciplinary panel of experts, including orthopaedic surgeons, physical therapists and anaesthesiologists from Europe, North America, South America, Asia-Pacific, Africa and the Middle East, participated across all three consensus groups. Finally, the document underwent professional English-language editing.

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RESULTS

The full consensus document, including the references used, is available as Supporting Information S1: File S1.

Out of 37 questions, a total of 63 statements were developed, as some questions required more than one separate statements for proper consideration (Table 1). In terms of grade of recommendation, 21 statements were rated as Grade A, 18 as Grade B, 22 as Grade C and 2 as Grade D. None of the proposed statements were considered inappropriate by the rating group, and therefore, none of the question/answer sets were deleted. The mean agreement scores for each question/statement ranged from 7.7 to 8.9. Among the 63 statements, 10 achieved strong agreement after the first round and 46 after the second round, while 7 statements remained with relative agreement. Forty-nine experts from 31 countries participated in the peer-review phase and overall supported the statements. Their comments primarily focused on clarifying certain recommendations and highlighting regional differences in the implementation of selected elements of the fast-track pathway, which were addressed in the final version of the document.

DISCUSSION

The most important messages of this formal consensus project across the preoperative, intraoperative and postoperative phases are summarised in Figure 1.

Although published scientific evidence offers a solid foundation grounded in scientific research [21], the intricacies of individual patient needs, variations in surgical techniques and evolving clinical practices require the inclusion of expert opinions in cases where a clear conclusion is elusive [4]. The pursuit of addressing the evolving landscape in perioperative care for TKA and THA involves fostering global collaboration among experts while acknowledging the importance of integrating the available literature with expert opinions to establish a comprehensive and nuanced approach. This integration may be realised through a Formal Consensus Statement, which, beyond a rigid set of guidelines, is a dynamic and adaptable framework that considers real-world evidence and patient care complexities.

The scope of this Formal Consensus is to offer carefully formulated recommendations that integrate both evidence-based practices and the extensive collective expertise, rather than provide an 'à la carte menu of options'. This approach recognises the uniquity of each patient, and the need to personalise patient care. With a mission to optimise patient outcomes, reduce complications and enhance recovery while promoting a global acceptance of the fast-track surgery concept, the overarching goal of this Formal Consensus is to support healthcare professionals and institutions in improving the quality and safety of patient outcomes, ensuring sustainable healthcare practices in TKA and THA worldwide.

The present consensus document was structured into four thematic sections covering the perioperative pathway of fast-track arthroplasty. Following a set of general statements outlining the principles and overall goals of fast-track TKA and THA, the recommendations were organised according to the three key phases of perioperative care: preoperative, intraoperative and postoperative management. The preoperative section focuses on patient optimisation and preparation, including patient education, risk-factor identification and modification, anaemia management, optimisation of comorbidities, strategies for preoperative pain control and the role of rehabilitation. The intraoperative section addressed key elements of surgical and anaesthetic management that may influence early recovery, such as antibiotic prophylaxis, anaesthesia and analgesia strategies, blood-loss management, surgical techniques and other perioperative measures aimed at reducing surgical stress and facilitating early mobilisation. Finally, the postoperative section focused on strategies to support rapid functional recovery and safe discharge, including multimodal pain management, prevention of common postoperative complications, early mobilisation and rehabilitation, discharge planning and postdischarge follow-up.

The implementation of ERPs has significantly shortened the LOS post-TKA and THA, often to <72 h. In the USA, discharge within 24 h has become the norm. With further optimisation, a ≤1-day LOS may become feasible in several countries. The key components enabling this shift include careful preoperative patient selection, structured education and adherence to ERPs. The consensus emphasises that fast-track arthroplasty is a patient-centred process primarily aimed at improving the quality of patient care, which is typically associated with a shortened LOS. However, barriers to early discharge, such as cultural expectations, patient reluctance, limitations in social support and reimbursement models that mandate a minimum LOS, remain in some healthcare settings. In certain systems, prolonged hospitalisation remains a prerequisite for transfer to rehabilitation or step-down facilities.

Guidelines typically suggest thromboprophylaxis for 14 days post-TKA and for 28 days post-THA [19]. Recent investigations and registry-based studies suggest that low-risk patients undergoing fast-track TKA and THA, particularly when supplemented by early mobilisation and shortened hospitalisation, may safely receive a less extended pharmacological prophylaxis [11, 17, 18, 20, 24]. Although LMWH is the gold standard for thromboprophylaxis, effective alternatives

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TABLE 1 Summary of questions and statements, including grade of recommendation, mean rating score and level of agreement from the Rating Group.

Questions	Statements	Grade of recommendation agreement median (range)
What is the typical LOS after fast-track THA and TKA? Is there a hard cut-off for LOS, from admission to discharge, for it to be considered 'fast-track'?	Patient discharge typically occurs 48–72 h after fast-track THA and TKA, and in many healthcare systems, within 24 h. Outpatient arthroplasty, with same-day discharge (SDD), is gaining acceptance, particularly in North America, where it is rapidly becoming the standard. However, certain systems impose a minimum hospital stay owing to reimbursement policies. No strict cut-off exists for fast-track LOS. The local healthcare setting, the patient's medical history and social support, and postoperative pathways can all influence the actual LOS. Patient selection should be followed by patient- and setting-customised protocols, with an overarching goal of enhancing recovery, improving outcomes and shortening the LOS without compromising patient safety, thus ensuring that each patient receives an optimal quality of care.	Grade C, Strong agreement, 9 (7–9)
Should a fast-track THA and TKA protocol aim for same-day admission, surgery and discharge? Is it safe in terms of adverse events and readmission rates?	The growing trend towards outpatient arthroplasty notwithstanding, SDD is not mandatory for THA and TKA patients. Fast-track protocols are primarily aimed at improving the quality of patient care, which is typically associated with a shortened LOS. Not all patients are eligible for SDD. Clear criteria should guide patient selection, ensuring that the hospital team, clinical infrastructure and postdischarge environment are appropriately prepared. When these conditions are met, moderate evidence supports that SDD is safe. A patient-centred decision should be made when the safety of SDD is in doubt. It should ensure patients for whom SDD is safe can benefit from a decreased risk of postoperative adverse events without an increased risk of readmission.	Grade C, Strong agreement, 9 (8–9)
Is it necessary to evaluate process quality in fast-track THA and TKA? What are the usable measures?	Clinical and nonclinical outcomes should be evaluated when applying fast-track THA and TKA protocols. Clinical outcomes include range of motion (ROM) and functional tests, LOS, readmissions, complications and patient-reported outcome measures (PROMs) such as pain and satisfaction, should be evaluated. Nonclinical outcomes include health economics. Objective functional performance and physical activity tests may be used to measure early functional recovery. Emerging technologies, including wearables and smartphone applications, may be used to objectively monitor recovery. Ensuring compliance with the fast-track protocols is critical for limiting between-study heterogeneity.	Grade C, Strong agreement, 9 (8–9)
How do preoperative educational and expectation management programs affect outcomes after fast-track THA and TKA?	Preoperative patient education and expectation management programs have significant benefits, including improved patient satisfaction, postoperative pain and anxiety and shortened LOS. However, evidence regarding their impact on other PROMs, especially those related to functional recovery and return-to-work, are currently lacking.	Grade C, Strong agreement, 9 (7–9)
What are the risk factors that should be managed before elective fast-track THA and TKA, and by which means?	Preoperative screening and patient optimisation are essential for minimising complications and maximising patient success post-THA and TKA. Modifiable risk factors that should be optimised for all patients include obesity, anaemia, diabetes, tobacco use/smoking, excessive alcohol consumption and malnutrition. Other comorbidities that should be assessed and (where possible) optimised include cardiovascular, pulmonary, hepatic, renal and cerebrovascular diseases, as well as hypertension and frailty. The ideal strategies and parameters for optimising risk factors are outlined below. These are recommendations to improve outcomes and complication rates rather than strict contraindications for surgery. *Absolute modifiable risk factors* *BMI*: For patients with obesity, a goal of a BMI < 40 kg/m^2 is recommended. This target may reduce the risk of periprosthetic joint infection (PJI), increased pain, opioid use (for THA) and 90-day mortality (for TKA). However, even patients with a BMI > 40 kg/m^2 may benefit from surgery after careful individual risk assessment.	Grade B, Strong agreement, 9 (7–9) BMI: Grade B, Strong agreement, 9 (7–9) Anaemia: Grade A, Strong agreement, 9 (8–9) Diabetes: Grade A, Strong agreement, 9 (8–9) Smoking: Grade B, Strong agreement, 9 (7–9) Alcohol:

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TABLE 1 (Continued)

Questions	Statements	Grade of recommendation agreement median (range)
	Weight loss is advised for patients with a BMI of 26–39 kg/m^2; however, it is not mandatory. Notably, some studies have associated this range with a lower mortality rate in THA/TKA than a BMI < 25 kg/m^2. *Anaemia*: For patients with anaemia, a Hb goal of ≥13 g/dL (8.1 mmol/L) in males and ≥12 g/dL (7.5 mmol/L) in females is recommended before elective THA/TKA, when achievable, to potentially reduce the risk of transfusions (THA/TKA), postoperative falls (THA/TKA), PJI (THA) and 90-day mortality (TKA). *Diabetes*: For patients with diabetes, a goal of HbA1c ≤ 7.5% (58 mmol/mol) is recommended before elective THA/TKA, owing to the increased risk of PJI, surgical complications, surgical site infections (SSIs), readmission and 90-day mortality (THA/TKA). *Smoking*: To reduce the risk of PJI in THA and 90-day mortality in TKA, smoking should be ceased at least 4 weeks before elective THA/TKA. However, it is acknowledged that adherence to this recommendation may be challenging. *Alcohol*: For patients with excessive alcohol consumption, although the difficulty in screening and enforcing this recommendation is recognised, excessive alcohol consumption should be ceased before elective THA/TKA. However, complete abstinence from alcohol is not required, as moderate consumption may be acceptable. This recommendation is based on the potentially increased risk of PJI and postoperative falls associated with alcohol abuse (THA/TKA). *Malnutrition*: For patients with malnutrition, a goal of albumin >3.5 g/dL, serum transferrin >200 mg/dL, vitamin D2 > 30 ng/mL (75 nmol/L) and total lymphocyte count >1500 cells/mm^3 is recommended, along with consideration of a high-protein diet or essential amino acid supplements. This recommendation is based on the potentially increased risk of PJI, falls, transfusions, VTE and/or complications necessitating revision (THA/TKA). Referrals to a nutrition team or dietitian may be considered for patients with malnutrition. Consensus of superiority regarding nutritional clinical assessment tools is elusive; however, the Mini Nutritional Assessment is a validated measure. *Decolonisation*: Based on the current literature with strong evidence, skin and nose staphylococcal decolonisation is recommended pre-THA and TKA as it reduces the risk of staphylococcal PJI, including methicillin-resistant staphylococcus aureus (MRSA) and methicillin-resistant staphylococcus epidermidis (MRSE). *Relatively modifiable risk factors* For patients with congestive heart failure/heart disease; lung, liver or kidney diseases; stroke/cerebrovascular disease; and/or frailty, medical optimisation is recommended before elective THA and TKA and/or assessment with a frailty index. In patients with stroke/cerebrovascular disease, preoperative optimisation does not require additional anticoagulation. In the case of frailty, preoperative exercise therapy is recommended as part of a multimodal approach to improve resilience and reduce perioperative risks.	Grade B, Strong agreement, 8 (7-9) Malnutrition: Grade C, Relative agreement, 8 (6-9) Decolonisation: Grade A, Strong agreement, 9 (7-9) Grade: Congestive heart failure/heart disease, A; lung disease, A; liver disease, A; kidney disease, A; cerebrovascular disease, A; and frailty, B. Strong agreement, 9 (7-9)
Does preoperative platelet level influence blood loss control and complication rates in patients undergoing fast-track THA and TKA?	Thrombocytopenia increases the risk of bleeding, the need for blood transfusion, and consequently, the rate of surgical and medical complications. A platelet count of ≥100,000/μL is recommended to reduce the risk of these adverse events.	Grade C, Strong agreement, 9 (7–9)
For which patients undergoing fast-track THA and TKA should routine thrombophilia screening be performed?	A thrombophilic state increases DVT incidence in TJA. However, DVT incidence is low with thromboprophylaxis and early mobilisation. Therefore, routine thrombophilia screening is not recommended for all patients undergoing THA and TKA. However, younger age (no specific threshold), recurrent VTE or patients with a family history of thrombolytic disorders require thrombophilia screening.	Grade C, Strong agreement, 9 (7–9)
Does oral iron supplementation improve Hb status	Iron supplementation is recommended for patients with Hb <13 g/dL (8.1 mmol/L) or serum ferritin levels <100 μg/L, provided other underlying causes have been excluded. Considering the ambiguity in current research on the superiority of oral	Grade B, Strong agreement, 9 (7–9)

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TABLE 1 (Continued)

Questions	Statements	Grade of recommendation agreement median (range)
before fast-track THA and TKA in patients with anaemia as long as other causes are screened?	versus intravenous (IV) iron administration, oral iron supplementation is a more economical option. Nevertheless, IV administration may be considered for issues such as bowel malabsorption and iron intolerance, or when a rapid Hb increase is required. Oral iron supplementation typically requires 4–12 weeks to achieve a haematologic response. The duration of preoperative iron supplementation should be individualised based on patient needs and guided by regular monitoring of Hb and serum ferritin levels.	
Is preoperative EPO recommended to improve anaemia in patients undergoing fast-track THA and TKA as long as other causes are screened?	Preoperative EPO increases Hb levels and reduces postoperative transfusion rates. Despite the beneficial effects, concerns about thrombotic risk remain contentious. Therefore, routine use of EPO is not recommended for patients with preoperative anaemia undergoing THA and TKA, considering cost issues and limited evidence for its routine benefit. Nevertheless, EPO may be considered selectively in well-defined cases, after identification of the underlying cause of anaemia and in agreement with the multidisciplinary team.	Grade B, Relative agreement, 9 (5–9)
Does preoperative autologous donation have a role in preventing postoperative anaemia in patients undergoing fast-track THA and TKA, as long as other causes are screened?	Preoperative autologous donation (PAD) may help minimise postoperative allogenic blood transfusion. The autologous blood is stored and reinfused intraoperatively, if needed. With fast-track optimisation, the need for blood transfusion for THA and TKA is seldom. Considering the possibility of transfusion reactions and cost-effectiveness, routine PAD is not recommended in fast-track THA and TKA.	Grade C, Strong agreement, 9 (8–9)
Should anticoagulants and antiplatelets be ceased before fast-track THA and TKA as part of the patient blood management protocol?	Antiplatelets (except aspirin) and anticoagulants should be ceased preoperatively, if medically acceptable, to lower the risk of excessive blood loss, haematomas and transfusion. Evidence suggests that low-dose aspirin can often be safely continued without significantly increasing the risk of bleeding. However, in patients receiving aspirin for primary prevention or without a clear medical indication, temporary cessation may be appropriate. Novel oral anticoagulants (NOACs) must be paused before THA and TKA because of the high risk of bleeding. The surgery should be performed when the plasma levels of the agents are at their lowest, usually >48–72 h (depending on the specific agent and kidney function) after the last dose, without bridging with a low-molecular-weight heparin (LMWH) except in high thrombotic risk circumstances. For neuraxial anaesthesia, the risk of an epidural haematoma should be considered. Cessation of apixaban and rivaroxaban is recommended 72 h preoperatively, and dabigatran 72–120 h preoperatively, depending on creatinine clearance. Postoperative recommencement of anticoagulants should be case-based, considering the medication type, medical necessity and bleeding risk. Notably, NOACs should be resumed provided adequate haemostasis has been achieved at intermediate bleeding risk 24 h postoperatively and at high bleeding risk 48–72 h postoperatively. In the interim, until NOACs can be safely recommenced, prophylactic administration of LMWH is recommended. The individual risk of the patient should prevail in all decisions.	Grade B, Strong agreement, 9 (8–9)
How should preoperative opioid usage be addressed in patients undergoing fast-track THA and TKA?	Preoperative opioid usage is associated with suboptimal pain management, higher opioid dependence, lower patient-reported outcomes and a higher risk of postoperative complications post-THA and TKA. Opioids should be discontinued preoperatively whenever feasible or minimised to the lowest tolerable level. Opioid decrementation should be gradual, individualised and medically supervised to prevent withdrawal symptoms or pain exacerbation.	Grade C, Strong agreement, 9 (7–9)
Are there any acceptable and effective preoperative means that may contribute to	St. 1: Administering preemptive multimodal analgesics, ideally before the onset of pain, prevents the establishment of central sensitisation, leading to reduced postoperative pain.	St. 1: Grade A, Strong agreement, 9 (8–9) St. 2: Grade C, Relative agreement, 8 (6–9)

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TABLE 1 (Continued)

Questions	Statements	Grade of recommendation agreement median (range)
perioperative pain management?	St. 2: Addressing preoperative anxiety and depression through enhanced perioperative support can affect postoperative pain perception, contributing to pain management. St. 3: Ensuring adequate preoperative hydration and optimising nutritional status can enhance postoperative recovery and reduce pain and complications.	St. 3: Grade C, Strong agreement, 9 (7–9)
Which physical therapist instructions and treatment options are recommended before fast-track THA and TKA?	St. 1: Patients undergoing preoperative physical therapy for fast-track THA or TKA should follow a personalised intervention, considering that most have already received conservative treatments. Core goals include procedure-specific muscle strengthening, improving ROM, managing pain and providing patient education to ensure a realistic understanding of the recovery process. Although weight management is typically handled by dietitians or other specialists, physical therapy offer support by encouraging safe physical activity. St. 2: The evidence on the effect of preoperative physical therapy on postoperative pain, function and LOS is inconclusive. Considering cost-effectiveness, a semi-supervised preoperative preparation approach that combines independent exercises with professional guidance and education is advised. This should involve practicing using crutches, including managing stairs.	St. 1: Grade B, Strong agreement, 9 (7–9) St. 2: Grade C, Strong agreement, 8 (7–9)
What are the current recommendations about antibiotic prophylaxis in fast-track THA and TKA?	As affirmed by high-quality studies, a single dose of 2 g cefazolin should always be administered 30–60 min preincision. It is a potent measure to significantly reduce the risk of PJI (if a type 1 allergy is not reported). Most of the supporting evidence refers to cefazolin; however, similar first- or second-generation cephalosporin-based prophylaxis regimens may be appropriate as well. The administration of antibiotic prophylaxis in the 24-h postoperative setting lacks substantial supportive evidence. It should not be prolonged for >24 h in patients without PJI risk factors.	Grade A, Strong agreement, 9 (8–9)
Is the routine use of urinary catheters during THA and TKA recommended? What is the acceptable bladder volume in postoperative urinary retention (POUR) before a catheterisation is recommended?	Routine use of urinary catheters is not recommended in patients undergoing THA and TKA. Avoidance of an indwelling urinary catheter reduces the risk of urinary tract infections, without increasing the incidence of POUR, which is mainly due to iatrogenic and patient-related factors. Postoperative intermittent catheterisation should be reserved for symptomatic patients and guided by ultrasound-guided bladder volume assessment. Implementation of a monitored catheterisation threshold of 800 mL, rather than 500 mL, reduces the need for postoperative catheterisation without increasing urological complications.	Grade B, Strong agreement, 9 (7–9)
Should spinal or general anaesthesia be used in fast-track THA and TKA?	Spinal and general anaesthesia can be used for fast-track arthroplasty. Each has advantages and disadvantages; hence, the choice depends on evaluation, patient preference, co-morbidities and logistical factors. The shift towards fast-track surgery has led to a substantial decrease in major medical complications. Based on recent extensive nonrandomised epidemiological database cohort studies, short-acting spinal anaesthesia is recommended as the first choice.	Grade B, Strong agreement, 9 (7–9)
What are the known pros and cons of nonsteroidal anti-inflammatory drugs (NSAIDs), acetaminophen, pregabalin and dexamethasone used in a multimodal approach for fast-track THA and TKA?	St. 1: Multimodal analgesic approaches involve the simultaneous use of multiple medications with different mechanisms of action to provide adequate pain relief while minimising the risk of side effects associated with any single medication. A multimodal pain management protocol results in reduced reliance on narcotics, improved pain ratings and satisfaction levels, and facilitates rapid recovery during the early postoperative period in THA and TKA. St. 2: In fast-track surgery protocols, opioid-sparing pain therapy is recommended. The side effects of opioids, such as impaired sleep quality, dizziness, fall risk, apnoea, nausea, constipation and postoperative delirium, hinder patient rehabilitation. St. 3: Nonsteroidal anti-inflammatory drugs are effective in reducing postoperative pain, heterotopic ossifications and opioid consumption. The side effects of NSAIDs include gastrointestinal irritation and potentially increased risk of bleeding. As a part of multimodal treatment, NSAIDs are recommended as first-line postoperative	St. 1: Grade A, Strong agreement, 9 (8–9) St. 2: Grade A, Strong agreement, 9 (8–9) St. 3: Grade A, Strong agreement, 9 (8–9) St. 4: Grade A, Strong agreement, 9 (8–9) St. 5: Grade A, Strong agreement, 9 (7–9) St. 6: Grade A, Strong agreement, 9 (7–9) St. 7:

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TABLE 1 (Continued)

Questions	Statements	Grade of recommendation agreement median (range)
	pain medications, provided the patient has no gastrointestinal ulcers, history of gastric bypass surgery, peripheral arterial disease, coronary heart disease, renal insufficiency or heart failure. The type of NSAID administered, dose and administration duration should be carefully considered, along with patient comorbidities. St. 4: Oral and IV acetaminophen should be used as a nonopioid adjunct for pain management during hospitalisation as a part of multimodal treatment. Oral and IV acetaminophen are safe when appropriately administered to patients undergoing primary TJA. St. 5: Pregabalin-included multi-modal analgesia protocols has been demonstrated to have a moderate beneficial effect on acute postoperative pain and nausea, with a decrease in opioid consumption. However, its routine use can neither be recommended nor opposed owing to the conflicting evidence on its efficacy. The benefits should be weighed against the risk of drowsiness and sedation. St. 6: A single dose of IV dexamethasone preoperatively is beneficial for early postoperative pain relief, nausea and vomiting. It reduces the inflammatory response in TJA and improves the knee ROM in TKA patients. St. 7: The dexamethasone dose ranges from 0.1 to 0.3 mg/kg, with most studies using a single 10–24 mg dose preoperatively. High-dose corticosteroids up to 1 mg/kg provide minimal statistically significant and clinically relevant benefits over the standard dose. Compared with a single preoperative dose, repeated postoperative or multiple doses are associated with minimal benefits. The risk of PJI is not increased for both low- and high-dose dexamethasone regimens. Both patients with and without diabetes can expect a slight to moderate increase in blood glucose levels on postoperative Day 1. A single preoperative dose is recommended. Neither high nor multiple doses of corticosteroids can be recommended, as further studies are needed to clarify their safety and superiority.	Grade C, Strong agreement, 9 (7–9)
What is the current role of peripheral nerve blocks (PNBs) in fast-track THA and TKA? Which PNBs are helpful?	St. 1: In both THA and TKA, PNBs can positively influence pain scores and patient satisfaction. If motor-sparing, the positive effects of PNBs outweigh the risks. The effects are more pronounced for TKA. Nevertheless, satisfactory pain relief can be achieved if other aspects of ERAS, such as local infiltration and multimodal analgesia are warranted. St. 2: The standard use of PNBs for THA is not recommended, as they have a limited effect on pain and functional recovery. St. 3: For TKA, the adductor canal block (ACB) is recommended, as it effectively reduces pain while being motor-sparing.	St. 1: Grade C, Strong agreement, 9 (7–9) St. 2: Grade B, Strong agreement, 9 (7–9) St. 3: Grade A, Strong agreement, 9 (7–9)
Can hypotensive anaesthesia minimise perioperative blood loss in fast-track THA and TKA?	Hypotensive anaesthesia lowers blood pressure through various medications and techniques. This protocol effectively reduces blood loss in THA and TKA and improves the surgical field. The patient's comorbidities and potential risks should be considered before applying hypotensive anaesthesia.	Grade C, Strong agreement, 9 (7–9)
What is the optimal management of tourniquet use in fast-track TKA?	Considering the conflicting literature on the effects of tourniquet use, application variations and alternative blood conservation techniques, routine tourniquet application is not recommended as a standard procedure in fast-track TKA. Nonetheless, the decision should depend on the surgical team. Inflation pressure, duration and timing should be carefully considered. If necessary, tourniquet application should be selective, transitory and use lower inflation pressure to minimise complications. A personalised tourniquet pressure ranging from SBP + 75 mmHg to SBP + 100 mmHg can offer intraoperative support and safely help reduce postoperative pain. Surgeons should exercise caution when using tourniquets in patients at high risk for VTE or ischaemia-related events.	Grade B, Strong agreement, 9 (7–9)
What is the role of alternative or minimally invasive surgical (MIS) approaches and	Although various surgical approaches and minimally invasive or muscle-sparing techniques for THA and TKA are available, except for marginal, unsustainable short-term gains, none have demonstrated objective superiority. Hence, the choice of surgical approach should be based on the surgeon's expertise and suitability for	Grade B, Strong agreement, 9 (7–9)

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TABLE 1 (Continued)

Questions	Statements	Grade of recommendation agreement median (range)
instrumentation in fast-track THA and TKA?	the specific operation. Regardless of the surgical approach, minimising soft tissue trauma remains a key principle of fast-track surgery.	
Is tranexamic acid safe and effective for managing blood loss during THA and TKA?	Tranexamic acid effectively reduces blood loss and transfusion rates post-TJA without increasing the risk of VTE.	Grade A, Strong agreement, 9 (8–9)
What is the optimal tranexamic acid administration route, dosing and timing for THA and TKA?	Topical, oral and IV TXA are equally effective in decreasing blood loss and transfusion rates during TJA. Meticulous surgical preparation and technique, including stringent sterile conditions during drug preparation and application, are key to avoiding contamination risks for topical TXA. Based on moderate evidence, compared with topical or IV TXA alone, the efficacy of combined topical and IV TXA is superior in decreasing blood loss and transfusion rates, without increasing the occurrence of DVT. More studies are needed to clarify the optimal TXA administration route, dosing and time. Dosage adjustments may be necessary for patients with renal impairment or other comorbidities. Combining systemic (1 g IV or 2 g oral TXA) preincision and either 1 g of topical TXA intraoperatively or 1 g IV TXA after wound closure is recommended for THA and TKA.	Grade C, Strong agreement, 9 (7–9)
Is local anaesthesia infiltration (LIA) superior to a peripheral nerve block (PNB) for postoperative pain management in patients undergoing fast-track THA and TKA?	Exclusive use of LIA is recommended over motor-sparing PNBs for post-THA and TKA pain management, considering the comparable postoperative pain scores and opioid consumption, easier administration and a better safety profile. Combined motor-sparing PNBs, such as the adductor canal block and LIA may enhance postoperative analgesia in patients with poor pain control post-TKA.	Grade A, Relative agreement, 9 (6–9)
Does the use of postoperative drains have a place in fast-track THA and TKA?	Routine use of postoperative drains is not recommended in TJA. Evidence indicates no significant clinical advantages or differences in functional outcomes and complication rate between the use and nonuse of drains. In addition, procedures with drains have been associated with greater blood loss, higher transfusion rates and longer LOS than procedures without drains.	Grade A, Strong agreement, 9 (7–9)
What are the recommendations for pharmacological thromboprophylaxis after fast-track THA and TKA?	Pharmacologic thromboprophylaxis is recommended post-TJA, with the selection and duration of thromboprophylaxis agents adhering to local and national guidelines and guided by individual patient risk factors. Current guidelines suggest thromboprophylaxis for 14 days post-TKA and for 28 days post-THA. However, the 2024 European guidelines suggest that carefully selected patients in a fast-track pathway (LOS ≤ 5 days with early mobilisation and meeting functional recovery criteria) may safely receive in-hospital prophylaxis or chemoprophylaxis restricted exclusively to the in-hospital period, using LMWH or a NOAC, without additional anticoagulants postdischarge. Despite the significant drawback of self-administered injections, LMWH is the gold standard for thromboprophylaxis. Effective alternatives such as NOACs are comparable in terms of preventing VTE and bleeding. Aspirin is widely available, affordable and does not require monitoring. Emerging evidence supports low-dose aspirin (75–162 mg/day) as long-term prophylaxis post-TKA or THA in low-risk patients, initiated on the day of surgery and continued for up to 4 weeks postoperatively. Overall, conflicting data notwithstanding, recent guidelines have adopted a more nuanced, risk-adjusted approach. A postdischarge plan comprising a brief in-hospital course of LMWH (enoxaparin 40 mg/day) with the option to switch to low-dose aspirin (75–162 mg/day) for low-risk patients undergoing fast-track TJA is recommended. Prophylaxis should be continued up to Day 14 for TKA or Day 28 for THA. Although evidence specific to outpatient arthroplasty is limited, the same risk-adjusted prophylaxis plan may be followed, albeit adapted: for example, by omitting the in-hospital LMWH dose and initiating low-dose aspirin directly in low-	Grade B, Relative agreement, 8 (5–9)

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TABLE 1 (Continued)

Questions	Statements	Grade of recommendation agreement median (range)
	risk patients. This plan aligns with the 2024 updated European Society of Anaesthesiologists (ESA) guidelines, which recommend aspirin monotherapy postdischarge for patients undergoing fast-track THA and TKA. In patients with additional VTE risk factors, the plan should be customised according to risk stratification, ensuring that thromboprophylaxis decisions reflect a comprehensive assessment of individual bleeding risk and consideration of other patient-specific factors. This optimised recommendation balances effectiveness, safety and practicality while considering patient-specific factors. Adherence to local guidelines should be a key component of clinical decision-making.	
Is any nonpharmacological thromboprophylaxis effective for fast-track THA and TKA?	Nonpharmacological thromboprophylaxis is not recommended as a stand-alone treatment; rather, it is suggested as a possible adjunctive measure to pharmacological thromboprophylaxis. Early mobilisation is crucial in reducing the risk of VTE post-TJA. Moderate evidence supports the use of intermittent pneumatic compression devices (IPCDs), although the cost must be considered. Graduated compression stockings (GCSs) may be effective as well, but the evidence is limited.	Grade B, Relative agreement, 9 (6–9)
What is the best strategy to prevent and treat postoperative nausea and vomiting (PONV) in fast-track THA and TKA?	St. 1: Postoperative nausea/vomiting is distressing for patients, hinder mobilisation and prolong in-hospital stay. Patient factors, anaesthetics and postoperative orthostatic tolerance can influence PONV incidence and intensity. To reduce the baseline risk of PONV, minimising opioid use via multimodal analgesia and judicious use of regional anaesthesia, is recommended and propofol, rather than volatile anaesthetics, advised. St. 2: Prophylaxis is recommended for patients with any risk factor for PONV. Neurokinin, serotonin, dopamine antagonists and corticosteroids are effective drug classes. Corticosteroids are recommended as the first choice: they are effective as prophylaxis and reduce pain and orthostatic intolerance (high-quality evidence). Should PONV occur despite prophylaxis, drugs from unused classes are more effective than repeat dosing.	St. 1: Grade B, Strong agreement, 9 (8–9) St. 2: Grade B, Strong agreement, 9 (7–9)
Are there any effective nonpharmacological methods for postoperative analgesia in fast-track THA and TKA?	St. 1: Postoperative programs that focus on active strengthening exercises, which have been demonstrated to reduce pain in patients undergoing THA and TKA, are recommended. St. 2: Literature on the effect of cryotherapy post-THA pain remains inconclusive. However, considering the observed minor benefits in TKA patients, cryotherapy can be a viable post-TKA analgesia option.	St. 1: Grade A, Strong agreement, 9 (7–9) St. 2: Grade C, Strong agreement, 9 (7–9)
What is the optimal rehabilitation strategy in the early postoperative phase after fast-track THA and TKA?	St. 1: Walking on the day of surgery is recommended after THA and TKA as it enhances early patient functionality without increasing the risk of complications or negatively impacting any outcomes. Therefore, early patient mobilisation is essential and may shorten the LOS. St. 2: Fasttrack rehabilitation optimises the patient's condition predischarge. Progressive resistance training can be safely used for early patient mobilisation. Based on moderate evidence, immediate full-weight bearing after uncemented THA is recommended, at the discretion of the surgeon. St. 3: Immediate full-weight bearing after cemented THA and cemented and uncemented TKA, possibly using walking aids according to patient preference and at the health professional's discretion, is recommended. St. 4: Active ROM exercises are more effective than passive ROM exercises in improving ROM and other outcomes. Therefore, active ROM exercises should be encouraged, and passive ROM exercises, especially those performed with continuous passive motion devices, should be avoided.	St. 1: Grade A, Strong agreement, 9 (8–9) St. 2: Grade B, Strong agreement, 9 (8–9) St. 3: Grade D, Strong agreement, 9 (8–9) St. 4: Grade A, Strong agreement, 9 (8–9)
What are the recommended techniques for preventing and managing postoperative wound	Preventive strategies include medical optimisation of patient-specific risk factors such as high BMI, hypoalbuminemia, smoking, anaemia, diabetes, renal or hepatic impairment and MRSA colonisation. Intraoperative strategies should aim to minimise surgical risks by limiting operating time and tourniquet use, ensuring meticulous haemostasis, handling soft tissues carefully and using electrocautery,	Grade C, Relative agreement, 8 (6–9)

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TABLE 1 (Continued)

Questions	Statements	Grade of recommendation agreement median (range)
drainage and the corresponding infection risk in patients undergoing fast-track THA and TKA?	tranexamic acid, secure multilayer wound closure and absorbent compress dressings. Management of postoperative drainage involves temporary anticoagulant withholding and meticulous wound monitoring. Incisional negative pressure wound therapy (iNPWT) may be selectively applied in high-risk patients, such as those with obesity. If wound drainage (leakage) persists or infection is suspected, joint aspiration and cultures are recommended to guide further management, and a low threshold adopted for debridement, antibiotics and implant retention (DAIR) in cases of potential PJI. High-quality evidence defining a universal timeline for these interventions is currently lacking; therefore, an individualised approach is recommended.	
What are the requirements for same-day discharge in fast-track THA and TKA? Is next-day discharge an alternative?	The labour-intensive process, SDD requires comprehensive preoperative optimisation, careful patient selection, detailed planning and vigilant postoperative monitoring. When these elements are appropriately implemented, SDD can be successfully achieved in a high proportion of cases (reported failure rates, 0.5%–7%). However, the prevalence and feasibility of SDD vary across countries and healthcare settings. The prerequisites for outpatient TJA include comprehensive preoperative education for both the patients and their caregivers, effective postoperative pain management, blood pressure control, successful gait and/or stair training, PONV and POUR management and adequate social support for at least the first night postdischarge. When medical or social factors preclude SDD, next-day discharge is an acceptable approach to avoid the risks of prolonged LOS while facilitating a safe return-to-home.	Grade C, Strong agreement, 9 (7–9)
What type of postdischarge planning is required to facilitate fast-track THA and TKA?	Effective postdischarge planning for fast-track THA and TKA requires comprehensive preoperative education for patients and caregivers, adequate social support and a restorative home environment. Home discharge is preferred for patients who can ambulate safely, provided the environment is conducive and sufficient support is available. Discharge to a skilled nursing facility should be reserved for patients unable to ambulate safely, those lacking home support, or those with cultural or logistical barriers to home care. Timely and accessible communication with the surgical team postdischarge is essential to optimise recovery and minimise complication risk.	Grade C, Strong agreement, 9 (8–9)
What is the optimal postdischarge rehabilitation approach in fast-track THA and TKA?	St. 1: Continuing the rehabilitation process postdischarge optimises functional outcomes and patient quality of life. Rehabilitation protocols after fast-track THA and TKA are based on general assumptions for postoperative procedures following conventional arthroplasty procedures. The primary objectives typically include pain management, oedema control, muscle strengthening and general functional recovery. Consensus on the optimal combination of postoperative rehabilitation interventions, including the type, setting, frequency, intensity and duration is elusive. The regimen should be personalised. St. 2: Patient education and expectation management are recommended as a basic component of postoperative rehabilitation.	St. 1: Grade A, Strong agreement, 9 (7–9) St. 2: Grade D, Strong agreement, 9 (8–9)
Is a fully supervised approach mandatory in postdischarge rehabilitation after fast-track THA and TKA?	Apart from an in-person, fully supervised exercise-based approach, a semi-supervised approach, such as home visits by physiotherapists combined with a daily exercise regimen for the patient to follow independently, constitutes a verified postdischarge strategy to improve ROM, walking ability, muscle strength and PROMs, including pain. Better patient adherence to the exercise program and execution results in a better outcome for muscle strength. In home-based rehabilitation, this may be effectively supported by remote monitoring (telerehabilitation).	Grade A, Strong agreement, 9 (7–9)
What is the best follow-up strategy after fast-track THA and TKA?	St. 1: The first follow-up with the surgeon is usually between 2 and 6 weeks postoperatively. Specifically, TKA patients may benefit from a second follow-up with the surgeon or a knowledgeable physiotherapist, without radiographs, at 3 months for closer monitoring. Emerging evidence suggests that the need for	St. 1: Grade C, Strong agreement, 9 (7–9) St. 2: Grade C, Strong agreement, 8 (7–9)

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TABLE 1 (Continued)

Questions	Statements	Grade of recommendation agreement median (range)
	follow-up with the surgeon post-TJA may be less than previously assumed. At least one routine follow-up with the surgeon (with radiographs) within the first year and one follow-up (with radiographs) for any TJA between 2 and 10 years postoperatively is recommended, unless any medical issues requiring more frequent follow-ups exist. Virtual follow-ups are as effective as in-person follow-ups and are more cost-effective for additional monitoring without needing radiographs. St. 2: Evidence of the benefits of using Patient Engagement Platforms (PEPs) is accumulating. In addition to increasing patient engagement in the postoperative course, PEPs keep the patients motivated and well-informed patients and provide valuable data exchange, keeping the care team informed about the patient.	

Abbreviations: BMI, body mass index; DAIR, debridement, antibiotics and implant retention; DVT, deep vein thrombosis; EPO, erythropoietin; GCSs, graduated compression stockings; Hb, haemoglobin; iNPWT, incisional negative pressure wound therapy; IPCDs, intermittent pneumatic compression devices; LIA, local Infiltration analgesia; LMWH, low-molecular-weight heparin; MRSA, methicillin-resistant *Staphylococcus aureus*; MRSE, methicillin-resistant *Staphylococcus epidermidis*; NOACs, novel oral anticoagulants; NSAIDs, nonsteroidal anti-inflammatory drugs; PAD: preoperative autologous donation; PEPs, patient engagement platforms; PJI, periprosthetic joint infection; PNBs, peripheral nerve blocks; PONV, postoperative nausea and vomiting; POUR, postoperative urinary retention; PROMs, patient-reported outcome measures; ROM, range of motion; SDD, same-day discharge; SSI, surgical site infections; THA, total hip arthroplasty; TKA, total knee arthroplasty; TXA, tranexamic acid; VTE, venous thromboembolism.

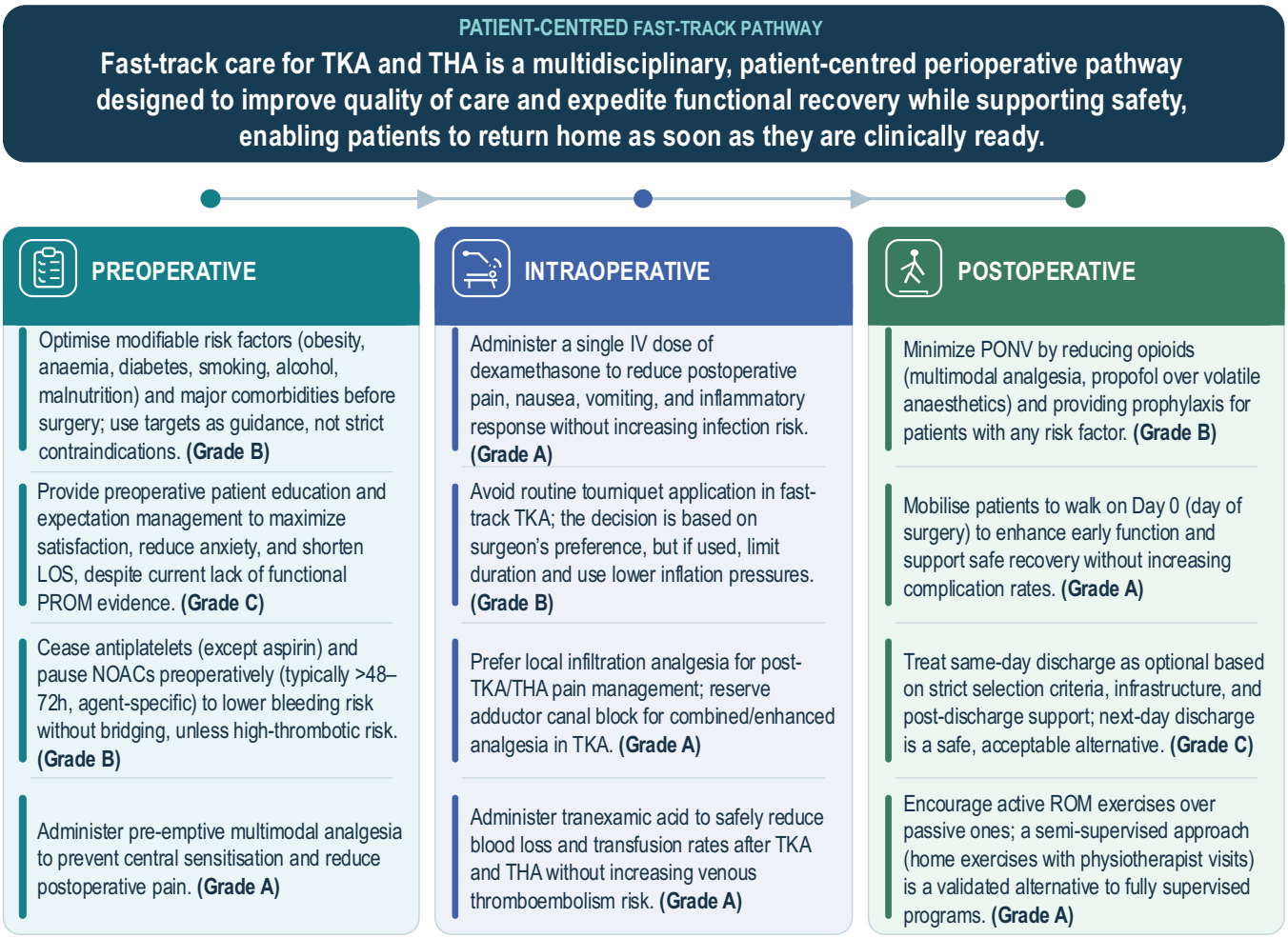

FIGURE 1 Key recommendations of the formal consensus on fast-track total knee and hip arthroplasty.

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such as NOACs are comparable in terms of preventing VTE and bleeding [1, 12, 22]. Aspirin is widely available, affordable and does not require monitoring. Emerging evidence supports low-dose aspirin (75–162 mg/day) as long-term prophylaxis post-TKA or THA in low-risk patients [9, 16, 17, 19]. Although the overall evidence remains conflicting, the Consensus group's robust and up-to-date evidence-based, optimised recommendation balances effectiveness, safety and practicality while carefully considering patient-specific factors. In countries where local guidelines and legal requirements frequently impact the selection and duration of thromboprophylaxis agents, the legal aspect rules decisions.

Several guidelines and recommendations have previously addressed perioperative care in total hip and knee arthroplasty, including ERAS protocols and related consensus statements [6, 8, 25]. While these have provided important evidence-based frameworks, variations remain in their implementation and scope across different healthcare settings, and further optimisation of individual components is still required [13]. The present consensus builds upon the existing literature by integrating current evidence with multidisciplinary expert opinion and by addressing the full perioperative pathway within a global context. In contrast to previous recommendations, it emphasises transnational applicability and provides a pragmatic framework that can be adapted to diverse healthcare systems and clinical environments.

The implementation of fast-track arthroplasty pathways is shaped by multiple interrelated factors, including differences in healthcare systems, clinical practice patterns, reimbursement models, local regulations, institutional resources, cultural influences and heterogeneity in national guidelines and medico-legal frameworks. Despite this variability, the high level of agreement across the consensus statements indicates a strong convergence among experts on the core principles of perioperative care. This consistency supports the broad applicability of a standardised, evidence-informed fast-track pathway, while allowing the necessary flexibility to accommodate regional and system-specific differences.

From a clinical perspective, this consensus provides a structured framework to support the implementation of fast-track pathways in daily practice. By outlining key perioperative principles across all phases of care, it facilitates a coordinated, multidisciplinary approach aimed at reducing variability and improving consistency in patient management. Importantly, the recommendations are not intended to be prescriptive but rather to guide clinical decision-making, allowing adaptation to individual patient characteristics and local healthcare settings. As such, this consensus may serve both as a practical reference for clinicians and as a basis for institutions, scientific associations and healthcare systems seeking to develop or refine their fast-track arthroplasty protocols.

Several factors contribute to the robustness of the present consensus. First, the process involved a large, multidisciplinary group of 106 experts with extensive clinical and academic experience in hip and knee arthroplasty. Second, strict adherence to a structured and validated methodology, based on the formal consensus framework, ensured a transparent and reproducible process with iterative refinement of the statements [3, 4, 2]. An additional strength lies in the broad international representation of the participants, encompassing experts from multiple continents and healthcare systems, thereby enhancing the external validity and global relevance of the recommendations. It should be emphasised that the recommendations are not intended as rigid directives but should be interpreted within the context of individual patient characteristics, clinical judgement and local healthcare environments.

This consensus has several limitations. First, as with all consensus-based methodologies, the strength of the recommendations depends on the available evidence and for certain topics, limited or heterogeneous data necessitated reliance on expert opinion. In the current study, this was the case for only 2 out of the 63 recommendation statements, which were ultimately graded as Grade D. However, this reflects the primary aim of a formal consensus: to provide practical guidance in areas where high-level evidence is lacking. Second, the recommendations represent the state of knowledge as established by the consensus process and may evolve as new evidence emerges. Third, although broad international representation was achieved, differences in healthcare systems, resources, and regulatory frameworks may influence the applicability of specific recommendations across settings. Fourth, given the complexity and heterogeneity of patients undergoing TKA and THA, it is not possible to address all clinical scenarios, and the statements should therefore be interpreted within the context of individual patient characteristics and clinical judgement. Finally, as with all consensus projects, the potential risk of selection bias regarding the composition of the expert panels must be acknowledged as a limitation. However, this was mitigated by adhering to the strict, multi-tier organisational framework of the Formal Consensus methodology, ensuring independent drafting, rating and external review cycles.

CONCLUSIONS

This consensus endorses the adoption of structured fast-track or enhanced recovery programs as a patient-centred approach to perioperative care in total hip and knee arthroplasty. These pathways aim to improve the quality of care by reducing morbidity, optimising pain management, shortening hospital stays and enhancing patient satisfaction. While the present consensus is not

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intended to replace clinical judgement, it provides a pragmatic framework that guides decision-making, promotes consistency of care, facilitates safe early mobilisation and discharge and prioritises positive patient experiences throughout the perioperative journey.

Variability in healthcare systems, resources, cultural expectations and medico-legal frameworks presents challenges for implementation, highlighting the need for ongoing research, education and dissemination of best practices. The dissemination of this globally informed consensus should contribute to the broad adoption of fast-track arthroplasty programs, supporting improvements in the quality, safety and patient-centeredness of care worldwide.

AUTHOR CONTRIBUTIONS

All authors contributed substantially to the development of this consensus manuscript. The manuscript was drafted by Trifon Totlis and Remigio Kort and critically revised by Nanne Kort and then by all co-authors. All authors approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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CONFLICT OF INTEREST STATEMENT

Nicolaas Budhiparama: Consultation or Speaker Honorarium: DePuy Synthes (USA), Johnson & Johnson (USA), Zimmer Biomet (USA); Grants/fellowship: ISAKOS—Knee Arthroplasty Travelling Fellowship (USA), ISAKOS—The Paolo Aglietti Award (USA). Christian Carulli: Consultation or Speaker Honorarium: Dompè (IT), Angelini Pharma (IT). Michael Clarius: Consultation or Speaker Honorarium: Zimmer Biomet (USA), Medacta (CH), Aesculap (DE), Becton, Dickinson and Company (USA); Participation in clinical trials: Aesculap (DE), Zimmer Biomet (USA). Bruce Gomberg: Director or employee: Carelon (USA); Owner enterprise: Maine Orthopaedic Review (USA); Consultation or Speaker Honorarium: Maxx Orthopaedic (USA), Personal Remedies (USA). Guenther Daniel: Consultation or Speaker Honorarium: Arthrex (USA). Haddad Fares S.: Royalties: Stryker (USA), Corin (GB), MatOrtho (GB); Consultation or Speaker Honorarium: Stryker (USA), Zimmer Biomet (USA); Participation in clinical trials: multiple National Institute for Health and Care Research (NIHR) and local trials at University College London Hospitals (UCLH); Grants/research supports: multiple grants each year from charities and industry to fund research and support staff. David Liu: Equity interests: Formus Labs Ltd (NZ), ArthroLase Pty Ltd (AU), Naviswiss (CH), Nexus Pacific Private Hospital (AU); Royalties: Zimmer Biomet (USA), Johnson and Johnson Medtech (USA); Consultation or Speaker Honorarium: Zimmer Biomet (USA), Johnson and Johnson Medtech (USA), Formus Labs Ltd (NZ), LifeHealthCare (AU); Participation in clinical trials: Allay Therapeutics (USA); Grants/fellowship: Zimmer Biomet (USA). Luis Machado: Grants/fellowship: Smith and Nephew (GB); Sumon Nandi: Royalties: Springer Publisher (DE); Participation in clinical trials: ProperSAT (USA), PTClearSHoT (USA); Grants/fellowship: IMUKA (NL), Chinese Association of Orthopaedic Surgeons (CN), Arthroplasty Society in Asia (SG); Grants/research supports: AAHKS (USA), AAOS (USA). Daniel Pérez-Prieto: Consultation or Speaker Honorarium: Link (DE), Heraeus (DE), BoneSupport (SE). Eric Smith: Equity Interests: DePuy Synthes (USA), ConforMIS (USA); Royalties: DePuy Synthes (USA), ConforMIS (USA); Consultation or Speaker Honorarium: DePuy Synthes (USA), ConforMIS (USA). Reha Tandogan: Consultation or Speaker Honorarium: Stryker (USA), Smith and Nephew (GB), Menarini Pharma (IT), Abdi İbrahim Pharma (TR). Eleftherios Tsiridis: Consultation or Speaker Honorarium: Zimmer Biomet (USA), DePuy Synthes (USA), Stryker (USA), United (USA); Grants/research supports: Zimmer Biomet (USA). TR: Consultation or Speaker Honorarium: Stryker (USA), Smith and Nephew (GB), Menarini Pharma (IT), Abdi İbrahim Pharma (TR).

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available in Supporting Information S1: File S1 of this article.

ETHICS STATEMENT

The authors have nothing to report.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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