



Total Joint Replacement Therapy: Enhanced recovery after surgery (ERAS) protocols-Roles of Orthopedic Physicians and Nursing Interventions

¹- Abdulhadi Eid Salem Alalwani,²- Abdullah Eid S Alalwani,³-Hamood Tunaydhid Awad Aljohani,⁴- Abdullah Hamad Sleem Al-Arawi,⁵- Yaser Abdualhadi Hamed Al Hazmi,⁶- Mohammed Marzouq Alsamiri,⁷- Raeed Saleh Alrashidi,⁸- Majed Hamad Alsaleemi,⁹- Mutaz Fahad Rabah Alahmadi,¹⁰- Mohammed Faisal Al-Ibeedan,¹¹- Nahla Saad Al-Zahrani

1. Ksa, Ministry Of Health, King Fahd Hospital
2. Ksa, Ministry Of Health, King Fahd Hospital
3. Ksa, Ministry Of Health, King Salman Bin Abdulaziz Medical City
4. Ksa, Ministry Of Health, King Salman Bin Abdulaziz Medical City
5. Ksa, Ministry Of Health, King Fahd Hospital
6. Ksa, Ministry Of Health, King Fahd Hospital
7. Ksa, Ministry Of Health, King Fahd Hospital
8. Ksa, Ministry Of Health, King Fahd Hospital
9. Ksa, Ministry Of Health, King Fahd Hospital
10. Ksa, Ministry Of Health, King Fahd Hospital
11. Ksa, Ministry Of Health, King Fahd Hospital

Abstract:

Background: Total Joint Replacement (TJR) surgeries are increasingly common procedures aimed at treating joint-related disorders, with enhanced recovery after surgery (ERAS) protocols playing a key role in improving patient outcomes. ERAS focuses on a holistic approach to perioperative care, addressing nutrition, pain management, and early mobilization.

Aim: This article aims to explore the role of ERAS protocols in total joint replacement surgeries, with a specific focus on the roles of orthopedic physicians and nursing interventions in improving recovery and reducing complications.

Methods: The review synthesizes existing evidence on the application of ERAS protocols in TJR surgeries, analyzing their impact on patient recovery, complications, and hospital stay.

Results: Implementation of ERAS protocols in TJR surgery has led to reduced transfusion and mortality rates, shorter hospital stays, and lower complication rates. However, it has not significantly affected 30-day readmission rates. Key components of ERAS include preoperative education, optimization of patient health, minimized opioid use, and early mobilization.

Conclusion: The successful implementation of ERAS protocols in TJR surgeries requires a coordinated effort between orthopedic physicians and nurses. Nurses, in particular, play a central role in preoperative education, postoperative care, and rehabilitation, which are crucial for enhancing recovery.

Keywords: Total Joint Replacement, ERAS, nursing interventions, recovery, orthopedic surgery.

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Introduction:

The Enhanced Recovery After Surgery (ERAS) protocols represent a holistic therapeutic framework designed to prioritize patient well-being throughout the surgical journey. This approach encompasses multiple facets, including adequate nutritional support, efficient pain management, optimal fluid management and hydration, and the encouragement of early postoperative mobilization [1]. Initially conceptualized by Kehlet, the primary goal of ERAS was to accelerate postoperative recovery [1]. Currently, ERAS protocols include a broad spectrum of perioperative interventions aimed at facilitating the healing process post-surgery. The overarching aim of these protocols is to improve patient health outcomes while concurrently reducing healthcare costs through a shorter hospital length of stay (LOS) and lower postoperative mortality rates [1]. The introduction of ERAS theory has prompted a paradigm shift within contemporary protocols, with an increased focus on the perioperative therapeutic practices employed by both surgeons and anesthesiologists. Furthermore, there is an amplified emphasis on preoperative patient education, collaborative interdisciplinary practices, and enhancing patient satisfaction and clinical outcomes. This editorial explores the application of ERAS protocols within the specific context of total joint replacement (TJR) surgery.

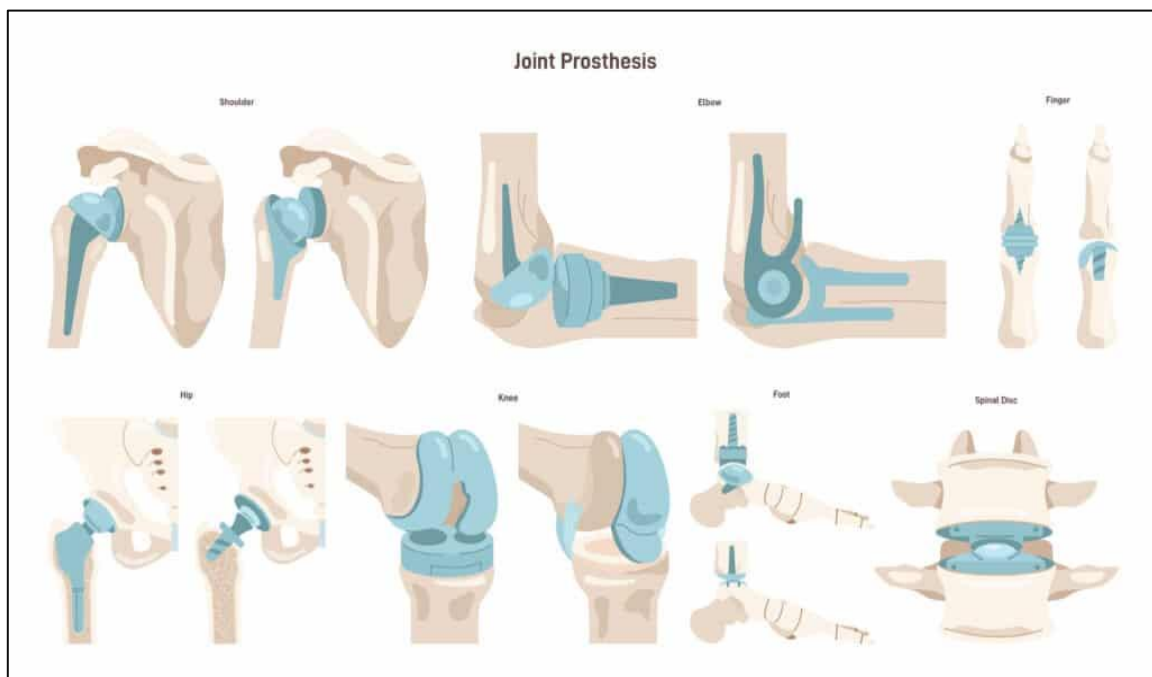


Figure 1: Total Joint Replacement Surgery.

ERAS Protocols in TJR Surgery:

The primary objective of ERAS is to establish a standardized approach for perioperative management to optimize clinical outcomes. In recent years, this methodology has gained considerable traction, particularly within the field of orthopedic surgery. The implementation of ERAS protocols in TJR has resulted in more efficient and improved recovery processes. Previous studies [2, 3] have suggested that the adoption of ERAS protocols significantly reduces transfusion and mortality rates, lowers the incidence of complications, and shortens LOS following TJR. Notably, these improvements have not been associated with any significant impact on 30-day readmission rates [4]. Although ERAS standards exhibit some variability across different specialties, there is consensus that these protocols can be categorized into three main phases: preoperative, intraoperative, and postoperative [4]. It is essential to conduct a thorough review of existing evidence and regularly assess the proposed components of each phase [5].

Preadmission Phases

Information, Education, and Expectation Counseling:

Providing patients with preoperative information ensures they acquire essential knowledge and support in a timely manner. Guidelines strongly recommend comprehensive preoperative training and counseling for patients [4]. Research indicates that preoperative education not only reduces anxiety but also offers benefits in pain management, functional recovery, and the reduction of adverse events [6]. The integration of patient education and counseling is a central feature of ERAS protocols. Given the limited data and compelling evidence supporting its efficacy, it is advisable to provide education on perioperative exercise, rehabilitation, and expected hospital stay duration. The ultimate goal is to reduce patient anxiety and facilitate a smooth transition throughout the discharge process.

Preoperative Phases

Optimization:

According to current guidelines, specific measures must be adhered to in order to achieve optimal outcomes. These include cessation of smoking for at least four weeks, discontinuation of alcohol consumption, early removal of urinary catheters, and addressing preoperative anemia [4]. The prevalence of preoperative risk factors, such as smoking, alcohol use, anemia, and low physical activity, remains high in orthopedic surgery. These risk factors can lead to a range of complications, including impaired wound healing, myocardial infarction, cardiac arrest, pneumonia, urinary tract infections, sepsis, acute renal failure, and mortality [7–9]. While the available evidence is limited, preoperative optimization appears to mitigate postoperative complications and expedite patient discharge.

Fasting:

Patients are recommended to consume only clear fluids up to two hours prior to anesthesia and avoid solid food for six hours before the procedure [4]. Preoperative fasting is implemented to reduce the risk of aspiration during anesthesia. However, extended fasting periods may induce catabolic responses and provoke physiological stress reactions, such as insulin resistance, elevated blood glucose, and muscle tissue breakdown [10]. Studies suggest that reducing fasting durations can lead to improved postoperative recovery, reduced insulin resistance, and lessened stress responses. Updated fasting guidelines have been proposed for various surgical procedures [11]. While data on fasting in TJR is limited, it is crucial to follow established standards and adjust fasting protocols based on the specific timing of the surgery.

Oral Analgesia:

The use of oral analgesics during the perioperative phase is a cornerstone of ERAS protocols. The guidelines advocate for routine administration of paracetamol, non-steroidal anti-inflammatory drugs (NSAIDs), and oxycodone. ERAS protocols emphasize minimizing opioid usage postoperatively to reduce associated risks. However, opioids remain effective for managing moderate-to-severe acute and chronic pain following surgery [12]. Despite the limited available data, there is ongoing recognition of the benefits of perioperative oral analgesia.

Surgical Phases

Standard Anesthetic Protocol:

The establishment of a standardized anesthetic protocol is a pivotal component within the context of Total Joint Replacement (TJR) as part of Enhanced Recovery After Surgery (ERAS) protocols. The specific methods employed may exhibit variability, with spinal anesthesia being the preferred approach in clinical settings [4, 13, 14]. While existing research presents conflicting outcomes [13–16], it is generally advised to prioritize neuraxial anesthesia as the first-line option for patients undergoing knee or hip arthroplasties.

Local Anesthetics for Infiltration Analgesia and Motor-Sparing Nerve Blocks:

Local Infiltration Analgesia (LIA) constitutes a cornerstone in perioperative pain management. It is important to note that nerve blocks are not universally recognized as an essential element of ERAS protocols [4]. LIA offers a significant advantage over nerve blocks due to its lack of motor inhibition, thus facilitating early mobilization [4]. However, it is critical to assess the potential effects of nerve blocks on

motor function, tailoring their application based on individual patient conditions and comorbidities. The 2019 and 2020 PROSPECT guidelines from the European Society of Regional Anaesthesia & Pain Therapy (ESRA) recommended specific pain management strategies for hip and knee replacement surgeries. The fascia iliaca (FI) and adductor canal nerve blocks have been identified as the optimal peripheral nerve blocks for managing postoperative pain in patients undergoing total hip and total knee replacement surgeries, respectively [17]. There has also been a notable increase in the clinical application of advanced ultrasound-guided nerve blocks [18, 19]. Modern motor-sparing peripheral nerve blocks, such as the pericapsular nerve block (PENG) [20], supra-inguinal fascia iliaca nerve block (s-FIC) [21], and sub-sartorial nerve blocks like the adductor canal nerve block, have proven to be highly effective in preserving quadriceps motor function. These techniques have demonstrated superior benefits in terms of surgical recovery compared to traditional methods such as lumbar plexus, femoral, and FI nerve blocks.

Prevention of Perioperative Blood Loss:

In accordance with established standards, the administration of tranexamic acid (TXA) is recommended to mitigate perioperative blood loss and minimize the need for postoperative allogenic blood transfusions [4]. Total knee and total hip arthroplasties are notably associated with significant blood loss, which can contribute to elevated rates of surgical infections, delayed recovery, prolonged hospitalization, and increased morbidity and mortality rates [22]. Although the precise dosage of TXA remains uncertain [23–28], a substantial body of evidence supports its efficacy in Total Joint Arthroplasty (TJA), highlighting it as a recommended practice.

Maintaining Normothermia:

Maintaining normothermia throughout both the preoperative and postoperative phases is crucial. This involves employing pre-warming protocols and actively warming patients during surgery to ensure normal body temperature regulation [4]. Perioperative hypothermia is widely recognized as a significant risk factor for the development of postoperative complications, particularly in the elderly population. This condition can disrupt coagulation and platelet function, increase cardiac morbidity, elevate the risk of surgical site infections, and contribute to the development of pressure ulcers [29–37]. Various intraoperative techniques have been utilized to maintain normothermia, including air warming systems, air-free warming devices, reflective blankets, and the warming of intravenous fluids. These methods have been shown to reduce the duration of spontaneous breathing, the time taken for eye opening, the recovery of consciousness, and the process of extubation. Additionally, their use has been linked to a reduction in the incidence of shivering and postoperative cognitive dysfunction following surgery [29–37]. Despite limited empirical evidence, it is beneficial for patients undergoing TJR to maintain normothermia using diverse strategies throughout the surgical process.

Antimicrobial Prophylaxis and Skin Preparation:

Guidelines recommend the use of systemic antibacterial prophylaxis for patients undergoing Total Joint Replacement (TJR) [4]. While infection following hip and knee replacement surgeries is relatively rare, it remains a significant concern, making the implementation of antibiotic prophylaxis essential in minimizing infection rates. However, there is currently a lack of universally accepted guidelines and consensus regarding the specific use of antibiotic and antiseptic prophylaxis in TJR. The use of an antimicrobial prophylaxis regimen is a standard practice in modern orthopedic surgery, aimed at addressing common bacteria associated with infections. The protocols used in this study included the administration of cefazolin, cefuroxime, or vancomycin, either as monotherapy or combined with gentamicin [38–40]. Thus, to minimize postoperative infection risk, it is advised that patients undergoing TJR receive systemic antimicrobial prophylaxis. Ensuring adequate skin preparation is equally critical.

Perioperative Surgical Factors

Surgical Approach and Technique:

The choice of surgical procedure can significantly impact surgical outcomes, complications, and recovery processes. Minimally invasive surgery has been recognized for its potential advantages, including reduced stress and pain [4]. However, the guidelines did not emphasize or officially endorse any specific surgical technique due to the lack of conclusive evidence [4]. Overall, the use of a minimally invasive approach with a limited incision has the potential to deliver superior results when integrated into an ERAS protocol.

Drainage:

The avoidance of routine use of surgical drains in hip and knee replacement procedures is widely supported [4]. The application of suction drains in orthopedic surgery is considered a reasonable and effective method for reducing postoperative wound hematomas. However, previous studies have suggested that drains may not be necessary for patients undergoing total joint arthroplasty [41, 42]. With regard to urinary drainage, a clinical study has indicated that catheterization may not be required in total knee arthroplasty when spinal epidural anesthesia is employed without drainage [43]. Although the available evidence is relatively limited, it is recommended to minimize the use of common drainage methods and discontinue them promptly once they are no longer necessary.

Perioperative Fluid Management:

Maintaining fluid balance is a crucial aspect of ERAS protocols, particularly for patients recovering from TJR. Fluid management strategies that follow either restricted or balanced approaches are recommended, while liberal fluid protocols are discouraged [4]. Goal-directed fluid management strategies are widely advocated in the literature [43–47], although further research is required to better understand the precise impact of these methods.

After Surgery Phases

Thromboprophylaxis:

Immediate mobilization of patients following surgery, coupled with appropriate thromboprophylaxis, is critical [4]. Patients undergoing orthopedic surgery are at increased risk for venous thromboembolism (VTE), a condition that significantly contributes to perioperative morbidity and mortality [48]. The combination of pharmacological and mechanical prophylaxis is recommended to reduce the risk of VTE in TJR patients.

Nausea and Vomiting:

Multimodal prophylaxis for postoperative nausea and vomiting (PONV) in patients undergoing hip and knee replacement surgeries typically includes dexamethasone and/or 5-hydroxytryptamine receptor 3 (5-HT₃) antagonists [4]. PONV is a common complication following arthroplasty, with potential to negatively impact the discharge process and increase patient discomfort and emotional distress. Risk factors for PONV, as identified in prior studies [49, 50], include bilateral total joint arthroplasty, motion sickness, a history of migraines, lower body mass index, female gender, non-smoking status, and the use of postoperative opioids. Despite limited available evidence, it is advisable to implement multiple strategies to prevent PONV.

Nutritional Care and Intervention:

Malnutrition significantly increases the likelihood of in-hospital mortality, postoperative complications, overall mortality, and reoperation rates in individuals undergoing total hip arthroplasty. Consequently, it is essential to provide comprehensive nutritional therapy to these patients to mitigate elevated postoperative risks [51, 52]. The application of appropriate nutritional interventions following surgery has been shown to improve outcomes.

The Role of Nurses in Joint Replacement Surgery

Joint replacement surgery, particularly total hip and knee replacements is one of the most common and successful orthopedic procedures performed worldwide. It is typically indicated for patients suffering from severe arthritis, traumatic joint injury, or other degenerative joint conditions. The successful outcome of joint replacement surgery depends on various factors, including the skill of the surgical team, the perioperative care provided, and the management of the patient's post-operative recovery. Nurses play a crucial role throughout the perioperative journey, from preoperative assessments to post-surgery rehabilitation. Their role encompasses patient education, pain management, monitoring complications, assisting with mobility, and promoting overall recovery. This essay will examine the multifaceted role of nurses in joint replacement surgery, focusing on the preoperative, intraoperative, and postoperative phases.

Preoperative Phase: Preparation and Education

The preoperative phase is crucial in ensuring that patients are mentally and physically prepared for joint replacement surgery. Nurses are integral members of the preoperative team, playing a vital role in preparing patients for the procedure. This preparation includes both physical assessments and patient education.

Patient Education: One of the primary roles of nurses in the preoperative phase is patient education. Nurses provide information about the surgical procedure, potential risks and benefits, and the expected recovery process. Educating patients on the importance of deep breathing exercises, mobilization, and the management of postoperative pain helps reduce anxiety and enhances recovery outcomes. Patients are also instructed on the use of assistive devices, such as walkers or crutches, which may be necessary after the procedure. Preoperative education is associated with improved patient satisfaction, reduced anxiety, and a smoother recovery process.

Physical Assessment: Nurses conduct a thorough physical assessment before surgery, including evaluating the patient's medical history, comorbid conditions (e.g., hypertension, diabetes), and the overall physical status. This helps identify any potential risks or complications that may affect the surgery or recovery. Additionally, nurses are involved in obtaining laboratory tests, such as blood work and imaging studies, to ensure the patient is fit for surgery.

Psychosocial Support: Patients undergoing joint replacement surgery may experience feelings of fear, uncertainty, or anxiety. Nurses provide emotional and psychosocial support to help alleviate these concerns, ensuring that patients feel comfortable and confident about their decision to undergo surgery. Effective communication and empathy are essential in fostering a trusting nurse-patient relationship during this phase.

Intraoperative Phase: Support and Monitoring

During the intraoperative phase, nurses work in collaboration with the surgical team to ensure the patient's safety, comfort, and well-being. Their responsibilities include assisting with anesthesia administration, monitoring vital signs, and maintaining a sterile environment.

Assisting with Anesthesia: Nurses assist anesthesiologists or nurse anesthetists in preparing patients for anesthesia. This includes verifying the patient's identity, the surgical site, and the appropriate anesthesia method. They also monitor the patient's responses to anesthesia throughout the surgery, ensuring that the patient remains stable and comfortable.

Monitoring Vital Signs: Nurses continuously monitor the patient's vital signs (e.g., heart rate, blood pressure, oxygen saturation) during the surgery to detect any abnormalities or changes in condition. This is crucial in preventing intraoperative complications such as hypotension or hypoxia, which can negatively affect the outcome of the surgery.

Sterility and Instrument Management: Nurses assist in maintaining a sterile environment during surgery to prevent infection. They ensure that all surgical instruments are accounted for and are used in accordance with the surgical procedure. Their attention to detail helps prevent surgical errors and ensures patient safety.

Postoperative Phase: Recovery and Rehabilitation

The postoperative phase is critical to the overall success of joint replacement surgery. Nurses are responsible for managing pain, monitoring complications, and promoting early mobility to ensure optimal recovery outcomes. Their role extends beyond the hospital setting, as nurses are also involved in educating patients on self-care and rehabilitation at home.

Pain Management: Effective pain control is one of the primary goals in the postoperative care of joint replacement patients. Nurses assess the patient's pain level using standardized pain scales and administer appropriate analgesics as prescribed. Nurses also monitor for side effects of pain medications, such as nausea or constipation, and take necessary steps to mitigate these effects. Non-pharmacological pain management techniques, such as relaxation exercises and guided imagery, are also utilized to complement medication.

Monitoring for Complications: Nurses play a key role in identifying and managing potential postoperative complications, including infection, deep vein thrombosis (DVT), pulmonary embolism (PE), and joint dislocation. They monitor the surgical site for signs of infection (e.g., redness, swelling, warmth) and assess for any unusual symptoms, such as fever or increased pain, which could indicate an infection. Early detection of complications allows for timely intervention and improves patient outcomes.

Promoting Mobility and Rehabilitation: Early mobilization is a critical aspect of recovery following joint replacement surgery. Nurses assist patients with post-surgical exercises, including simple movements such as ankle pumps and knee bending, to promote circulation and prevent complications such as DVT. They work closely with physical therapists to ensure that patients begin rehabilitation early to restore joint function and improve mobility. Nurses provide guidance on the use of assistive devices, such as crutches or walkers, to ensure that patients can safely move and perform daily activities.

Patient Education and Discharge Planning: Nurses educate patients and their families about postoperative care, including wound care, pain management, and the use of medications. They emphasize the importance of attending follow-up appointments, adhering to rehabilitation plans, and avoiding activities that could jeopardize the healing process. Additionally, nurses provide information on lifestyle changes, such as weight management and physical activity, which can help prevent complications and improve long-term outcomes.

Psychosocial Support: Recovery from joint replacement surgery can be emotionally challenging, particularly for elderly patients. Nurses continue to provide psychosocial support, addressing patients' concerns about recovery and assisting with any emotional or psychological challenges they may face. Their compassionate care and encouragement are essential for enhancing patient morale and promoting a positive outlook on recovery. The role of nurses in joint replacement surgery is multifaceted and extends across all stages of the surgical process. From preoperative education and preparation to postoperative rehabilitation and recovery, nurses play a central role in ensuring the safety, comfort, and overall well-being of patients undergoing total joint replacement procedures. Their responsibilities include patient education, pain management, complication prevention, and rehabilitation support, all of which contribute to a successful outcome. By providing compassionate care and collaborating with the multidisciplinary healthcare team, nurses are integral to improving patient outcomes and enhancing the quality of life for individuals undergoing joint replacement surgery.

Conclusion:

Total joint replacement (TJR) surgery is a highly effective solution for individuals with severe joint degeneration, particularly in the hip and knee. The adoption of Enhanced Recovery After Surgery (ERAS) protocols in TJR has led to significant improvements in clinical outcomes, including reduced postoperative complications, shorter hospital stays, and improved recovery rates. Central to the success of ERAS protocols is a coordinated and multidisciplinary approach that involves both orthopedic physicians and nurses. Nurses have a pivotal role in the preoperative, intraoperative, and postoperative phases of TJR. Preoperatively, they are instrumental in patient education, helping to alleviate anxiety and set realistic

expectations for the surgical process. This education includes information about pain management, postoperative care, and rehabilitation, which prepares patients for what to expect, thereby enhancing their overall recovery experience. Nurses also assist in optimizing patient health by ensuring that risk factors such as smoking, alcohol use, and preoperative anemia are addressed in line with ERAS recommendations. During the surgical phase, while the focus is primarily on anesthesiologists and surgeons, nurses contribute by monitoring the patient's status and assisting in pain management, ensuring that protocols for anesthetic administration, such as spinal anesthesia or local infiltration analgesia, are followed. Postoperatively, nurses have a crucial role in managing complications, including managing pain, monitoring for signs of infection, and assisting with early mobilization to reduce the risk of venous thromboembolism and improve functional outcomes. Furthermore, the integration of nutritional interventions as part of the ERAS protocols cannot be overstated. Nurses help to assess and address the nutritional needs of patients, particularly since malnutrition can lead to poor outcomes, including increased mortality and complications. In conclusion, the effectiveness of ERAS protocols in TJR surgeries hinges on the active involvement of nurses throughout the perioperative journey. Their education, clinical interventions, and supportive care significantly enhance patient recovery, reduce complications, and improve overall outcomes, underscoring the critical role of nursing in successful joint replacement surgery.

References:

1. Kehlet H (1997) Multimodal approach to control postoperative pathophysiology and rehabilitation. *Br J Anaesth* 78, 606–617.
2. Zhu S, Qian W, Jiang C, Ye C, Chen X (2017) Enhanced recovery after surgery for hip and knee arthroplasty: a systematic review and meta-analysis. *Postgrad Med J* 93, 736–742.
3. Deng QF, Gu HY, Peng WY, Zhang Q, Huang ZD, Zhang C, Yu YX (2018) Impact of enhanced recovery after surgery on postoperative recovery after joint arthroplasty: results from a systematic review and meta-analysis. *Postgrad Med J* 94, 678–693.
4. Wainwright TW, Gill M, McDonald DA, Middleton RG, Reed M, Sahota O, Yates P, Ljungqvist O (2020) Consensus statement for perioperative care in total hip replacement and total knee replacement surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations. *Acta Orthop* 91, 3–19.
5. Kehlet H, Memtsoudis SG (2020) ERAS guidelines for hip and knee replacement – need for reanalysis of evidence and recommendations? *Acta Orthop* 91, 243–245.
6. McDonald S, Page M.J., Beringer K., Wasiak J., Sprowson A. (2014) Preoperative education for hip or knee replacement. *Cochrane Database Syst Rev* 2014, CD003526.
7. Debbi EM, Rajae SS, Spitzer AI, Paiement GD (2019) Smoking and total hip arthroplasty: increased inpatient complications, costs, and length of stay. *J Arthroplasty* 34, 1736–1739.
8. Akhavan S, Nguyen LC, Chan V, Saleh J, Bozic KJ (2017) Impact of smoking cessation counseling prior to total joint arthroplasty. *Orthopedics* 40, e323–e328.
9. Agrawal S, Ingrande J, Said ET, Gabriel RA (2021) The association of preoperative smoking with postoperative outcomes in patients undergoing total hip arthroplasty. *J Arthroplasty* 36 (3), 1029–1034.
10. Findlay JM, Gillies RS, Millo J, Sgromo B, Marshall RE, Maynard ND (2014) Enhanced recovery for esophagectomy: a systematic review and evidence-based guidelines. *Ann Surg* 259, 413–431.
11. Ljungqvist O, Scott M, Fearon KC (2017) Enhanced recovery after surgery: a review. *JAMA Surg* 152, 292–298.
12. Buvaendran A, Kroin JS, Tuman KJ, Lubenow TR, Elmofty D, Moric M, Rosenberg AG (2003) Effects of perioperative administration of a selective cyclooxygenase 2 inhibitor on pain management and recovery of function after knee replacement: a randomized controlled trial. *JAMA* 290, 2411–2418.
13. Pu X, Sun JM (2019) General anesthesia vs. spinal anesthesia for patients undergoing total-hip arthroplasty: a meta-analysis. *Medicine* 98 (16), e14925.

14. 14.Liu P, Wu Y, Liang Z, Deng Y, Meng Q (2019) Comparing the efficacy of pain managements after total hip arthroplasty: a network meta-analysis. *J Cell Biochem* 120, 4342–4354.
15. 15.Zorrilla-Vaca A, Grant MC, Mathur V, Li J, Wu CL (2016) The impact of neuraxial versus general anesthesia on the incidence of postoperative surgical site infections following knee or hip arthroplasty: a meta-analysis. *Reg Anesth Pain Med* 41, 555–563.
16. 16.Johnson RL, Kopp SL, Burkle CM, Duncan CM, Jacob AK, Erwin PJ, Murad MH, Mantilla CB (2016) Neuraxial vs general anaesthesia for total hip and total knee arthroplasty: a systematic review of comparative-effectiveness research. *Br J Anaesth* 116, 163–176.
17. 17.ESRA. Prospect. Available at <https://esraeurope.org/front-page/prospect/> (accessed 2023).
18. 18.Morrison RS, Dickman E, Hwang U, Akhtar S, Ferguson T, Huang J, Jeng CL, Nelson BP, Rosenblatt MA, Silverstein JH, Strayer RJ, Torrillo TM, Todd KH (2016) Regional nerve blocks improve pain and functional outcomes in hip fracture: a randomized controlled trial. *J Am Geriatr Soc* 64, 2433–2439.
19. 19.Boselli E, Hopkins P, Lamperti M, Estèbe JP, Fuzier R, Biasucci DG, Disma N, Pittiruti M, Traškaitė V, Macas A, Breschan C, Vailati D, Subert M (2021) European Society of Anaesthesiology and Intensive Care Guidelines on peri-operative use of ultrasound for regional anaesthesia (PERSEUS regional anaesthesia): peripheral nerves blocks and neuraxial anaesthesia. *Eur J Anaesthesiol* 38, 219–250.
20. 20.Girón-Arango L, Peng PWH, Chin KJ, Brull R, Perlas A (2018) Pericapsular Nerve Group (PENG) block for hip fracture. *Reg Anesth Pain Med* 43, 859–863.
21. 21.Hebbard P, Ivanusic J, Sha S (2011) Ultrasound-guided supra-inguinal fascia iliaca block: a cadaveric evaluation of a novel approach. *Anaesthesia* 66, 300–305.
22. 22.Levine BR, Haughom B, Strong B, Hellman M, Frank RM (2014) Blood management strategies for total knee arthroplasty. *J Am Acad Orthop Surg* 22, 361–371.
23. 23.Gao FQ, Li ZJ, Zhang K, Huang D, Liu ZJ (2011) Risk factors for lower limb swelling after primary total knee arthroplasty. *Chin Med J (Engl)* 124, 3896–3899.
24. 24.Poeran J, Chan JJ, Zubizarreta N, Mazumdar M, Galatz LM, Moucha CS (2021) Safety of tranexamic acid in hip and knee arthroplasty in high-risk patients. *Anesthesiology* 135, 57–68.
25. 25.Taeuber I, Weibel S, Herrmann E, Neef V, Schlesinger T, Kranke P, Messroghli L, Zacharowski K, Choorapoikayil S, Meybohm P (2021) Association of intravenous tranexamic acid with thromboembolic events and mortality. *JAMA Surg* 156, e210884.
26. 26.Li H, Bai L, Li Y, Fang Z (2018) Oral tranexamic acid reduces blood loss in total-knee arthroplasty: a meta-analysis. *Medicine (Baltimore)* 97, e12924.
27. 27.Zhao-Yu C, Yan G, Wei C, Yuejv L, Ying-Ze Z (2014) Reduced blood loss after intra-articular tranexamic acid injection during total knee arthroplasty: a meta-analysis of the literature. *Knee Surg Sports Traumatol Arthrosc* 22, 3181–3190
28. 28.Fillingham YA, Ramkumar DB, Jevsevar DS, Yates AJ, Shores P, Mullen K, Bini SA, Clarke HD, Schemitsch E, Johnson RL, Memtsoudis SG, Sayeed SA, Sah AP, Della Valle CJ (2018) The efficacy of tranexamic acid in total knee arthroplasty: a network meta-analysis. *J Arthroplasty* 33, 3090–3098.e1.
29. 29.Yi J, Liang H, Song R, Xia H, Huang Y (2018) Maintaining intraoperative normothermia reduces blood loss in patients undergoing major operations: a pilot randomized controlled clinical trial. *BMC Anesthesiol* 18, 126.
30. 30.Casati A, Fanelli G, Ricci A, Musto P, Cedrati V, Altimari G, Baroncini S, Pattono R, Montanini S, Torri G (1999) Shortening the discharging time after total hip replacement under combined spinal/epidural anesthesia by actively warming the patient during surgery. *Minerva Anesthesiol* 65 (7–8), 507–514.
31. 31.de Brito PovedaV, Clark AM, Galvão CM (2013) A systematic review on the effectiveness of prewarming to prevent perioperative hypothermia. *J Clin Nurs* 22, 906–918.
32. 32.Xu H, Xu G, Ren C, Liu L, Wei L (2019) Effect of forced-air warming system in prevention of postoperative hypothermia in elderly patients: a prospective controlled trial. *Medicine* 98 (22), e15895.

33. 33.McGovern PD, Albrecht M, Belani KG, Nachtsheim C, Partington PF, Carluke I, Reed MR (2011) Forced-air warming and ultra-clean ventilation do not mix: an investigation of theatre ventilation, patient warming and joint replacement infection in orthopaedics. *J Bone Joint Surg Br* 93 (11), 1537–1544
34. 34.Kümin M, Deery J, Turney S, Price C, Vinayakam P, Smith A, Filippa A, Wilkinson-Guy L, Moore F, O'Sullivan M, Dunbar M, Gaylard J, Newman J, Harper CM, Minney D, Parkin C, Mew L, Pearce O, Third K, Shirley H, Reed M, Jefferies L, Hewitt-Gray J, Scarborough C, Lambert D, Jones CI, Bremner S, Fatz D, Perry N, Costa M, Scarborough M (2019) Reducing Implant Infection in Orthopaedics (RIliO): results of a pilot study comparing the influence of forced air and resistive fabric warming technologies on postoperative infections following orthopaedic implant surgery. *J Hosp Infect* 103, 412–419.
35. 35.Tjoakarfa C, David V, Ko A, Hau R (2017) Reflective blankets are as effective as forced air warmers in maintaining patient normothermia during hip and knee arthroplasty surgery. *J Arthroplasty* 32 (2), 624–627.
36. 36.Liu S, Pan Y, Zhao Q, Feng W, Han H, Pan Z, Sun Q (2019) The effectiveness of air-free warming systems on perioperative hypothermia in total hip and knee arthroplasty: a systematic review and meta-analysis. *Medicine (Baltimore)* 98, e15630.
37. 37.Ma H, Lai B, Dong S, Li X, Cui Y, Sun Q, Liu W, Jiang W, Xu F, Lv H, Han H, Pan Z (2017) Warming infusion improves perioperative outcomes of elderly patients who underwent bilateral hip replacement. *Medicine* 96 (13), e6490.
38. 38.Ryan S.P., Kildow B.J., Tan T.L., Parvizi J., Bolognesi M.P., Seyler T.M., American Association of Hip and Knee Surgeons Research Committee (2019) Is there a difference in infection risk between single and multiple doses of prophylactic antibiotics? A meta-analysis. *Clin Orthop Relat Res* 477, 1577–1590.
39. 39.Siddiqi A, Forte SA, Docter S, Bryant D, Sheth NP, Chen AF (2019) Perioperative antibiotic prophylaxis in total joint arthroplasty: a systematic review and meta-analysis. *J Bone Joint Surg Am* 101, 828–842.
40. 40.Rivera A, Sánchez A, Luque S, Mur I, Puig L, Crusi X, González JC, Sorlí L, González A, Horcajada JP, Navarro F, Benito N (2020) Intraoperative bacterial contamination and activity of different antimicrobial prophylaxis regimens in primary knee and hip replacement. *Antibiotics (Basel)* 10, 18.
41. 41.Kosins AM, Scholz T, Cetinkaya M, Evans GRD (2013) Evidence-based value of subcutaneous surgical wound drainage: the largest systematic review and meta-analysis. *Plast Reconstr Surg* 132, 443–450.
42. 42.Zhang Q, Liu L, Sun W, Gao F, Zhang Q, Cheng L, Li Z (2018) Are closed suction drains necessary for primary total knee arthroplasty? A systematic review and meta-analysis. *Medicine (Baltimore)* 97, e11290.
43. 43.Noailles T, Brulefert K, Chalopin A, Longis PM, Gouin F (2016) What are the risk factors for post-operative infection after hip hemiarthroplasty? Systematic review of literature. *Int Orthop* 40, 1843–1848.
44. 44.Holte K, Kristensen BB, Valentiner L, Foss NB, Husted H, Kehlet H (2007) Liberal versus restrictive fluid management in knee arthroplasty: a randomized, double-blind study. *Anesth Analg* 105, 465–474.
45. 45.Lawrie CM, Ong AC, Hernandez VH, Rosas S, Post ZD, Orozco FR (2017) Incidence and risk factors for postoperative urinary retention in total hip arthroplasty performed under spinal anesthesia. *J Arthroplasty* 32, 3748–3751.
46. 46.Giglio MT, Marucci M, Testini M, Brienza N (2009) Goal-directed haemodynamic therapy and gastrointestinal complications in major surgery: a meta-analysis of randomized controlled trials. In: *Database of Abstracts of Reviews of Effects (DARE): Quality-assessed Reviews [Internet]. Centre for Reviews and Dissemination; (UK:).*

47. 47.Cecconi M, Fasano N, Langiano N, Divella M, Costa MG, Rhodes A, Della Rocca G (2011) Goal-directed haemodynamic therapy during elective total hip arthroplasty under regional anaesthesia. Crit Care 15, R132.
48. 48.Zhang J, Chen Z, Zheng J, Breusch SJ, Tian J (2015) Risk factors for venous thromboembolism after total hip and total knee arthroplasty: a meta-analysis. Arch Orthop Trauma Surg 135, 759-772.
49. 49.Wang Y, Yang Q, Lin J, Qian W, Jin J, Gao P, Zhang B, Feng B, Weng X (2020) Risk factors of postoperative nausea and vomiting after total hip arthroplasty or total knee arthroplasty: a retrospective study. Ann Transl Med 8, 1088.
50. 50.Hahm TS, Ko JS, Choi SJ, Gwak MS (2010) Comparison of the prophylactic anti-emetic efficacy of ramosetron and ondansetron in patients at high-risk for postoperative nausea and vomiting after total knee replacement. Anaesthesia 65, 500-504.
51. 51.Newman JM, Sodhi N, Khlopas A, Piuze NS, Yakubek GA, Sultan AA, Klika AK, Higuera CA, Mont MA (2020) Malnutrition increases the 30-day complication and re-operation rates in hip fracture patients treated with total hip arthroplasty. Hip Int 30, 635-640.
52. 52.Li S, Zhang J, Zheng H, Wang X, Liu Z, Sun T (2019) Prognostic role of serum albumin, total lymphocyte count, and mini nutritional assessment on outcomes after geriatric hip fracture surgery: a meta-analysis and systematic review. J Arthroplasty 34, 1287-1296.

دور الأطباء العظام والتدخلات الترميمية - (ERAS) العلاج بالاستبدال الكامل للمفاصل: بروتوكولات التعافي المعزز بعد الجراحة

الملخص:

الخلفية: تُعتبر جراحات الاستبدال الكامل للمفصل (TJR) من الإجراءات الشائعة بشكل متزايد، التي تهدف إلى علاج الاضطرابات المتعلقة بالمفاصل، حيث تلعب بروتوكولات التعافي المعزز بعد الجراحة (ERAS) دورًا رئيسيًا في تحسين نتائج المرضى. يركز ERAS على نهج شامل للرعاية المحيطة، ويعالج التغذية، إدارة الألم، والتحفيز المبكر على الحركة.

الهدف: يهدف هذا المقال إلى استكشاف دور بروتوكولات ERAS في جراحات الاستبدال الكامل للمفاصل، مع التركيز بشكل خاص على أدوار الأطباء العظام والتدخلات الترميمية في تحسين التعافي وتقليل المضاعفات.

المنهج: يقوم المراجعة بتلخيص الأدلة الحالية حول تطبيق بروتوكولات ERAS في جراحات الاستبدال الكامل للمفصل، وتحليل تأثيراتها على تعافي المرضى والمضاعفات ومدة البقاء في المستشفى.

النتائج: أدى تطبيق بروتوكولات ERAS في جراحة الاستبدال الكامل للمفصل إلى تقليل معدلات النقل بالدم والوفيات، وتقليل مدة البقاء في المستشفى، وانخفاض معدلات المضاعفات. ومع ذلك، لم تؤثر بشكل كبير على معدلات إعادة القبول في المستشفى خلال 30 يومًا. تشمل المكونات الرئيسية لـ ERAS التعليم قبل الجراحة، وتحسين صحة المرضى، وتقليل استخدام المواد الأفيونية، والتحفيز المبكر على الحركة. الخلاصة: يتطلب تنفيذ بروتوكولات ERAS بنجاح في جراحات الاستبدال الكامل للمفصل جهدًا منسقًا بين الأطباء العظام والممرضين. يلعب الممرضون، بشكل خاص، دورًا مركزيًا في التعليم قبل الجراحة، والرعاية بعد الجراحة، وإعادة التأهيل، وهي أمور حاسمة لتعزيز التعافي. الكلمات المفتاحية: استبدال المفصل الكامل، ERAS، التدخلات الترميمية، التعافي، جراحة العظام.