

TALLINNA TERVISHOIU KÕRGGKOO



Õenduse õppetool

Õe õppekava

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**PERIOPERATIIVSE ÕENDUSE ROLL ENDOPROTEESI INFEKTSIOONIDE
ENNETAMISEL PUUSA- JA PÕLVELIIGESE ARTROPLASTIKA LÄBINUD
EAKATEL PATSIENTIDEL**

Lõputöö

Tallinn 2026

Olen koostanud lõputöö iseseisvalt. Kõik töö koostamisel kasutatud teiste autorite töödest, kirjandusallikatest ja mujalt pärinevad andmed on viidatud. Luban Tallinna Tervishoiu Kõrgkoolil avalikustada oma lõputöö PDF-versiooni raamatukoguprogrammis.

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KOKKUVÕTE

Laura-Liisa Lehtla (2026). Tallinna Tervishoiu Kõrgkool, õenduse õppetool. Perioperatiivse õenduse roll endoproteesi infektsioonide ennetamisel puusa- ja põlveliigese artroplastika läbinud eakatel patsientidel. Lõputöös on 21 lehekülge ja 27 kirjandusallikat.

Uurimustöö eesmärgiks oli kirjeldada perioperatiivse õenduse rolli endoproteesi infektsioonide ennetamisel puusa- ja põlveliigese artroplastika läbinud eakatel patsientidel. Uurimismeetodina on kasutatud teoreetilist kirjanduse ülevaadet, mille käigus uuriti teemakohaseid artikleid ja ravijuhiseid.

Uuringu tulemused näitasid, et eakatel patsientidel, kellele tehakse puusa- või põlveliigese artroplastikat, on suurenenud risk endoproteesi infektsiooni tekkeks kaasuvate haiguste, vanusega seotud tegurite, aeglasema paranemisprotsessi ja vähenenud immuunsuse tõttu. Seetõttu on infektsioonide ennetamine kogu perioperatiivse perioodi vältel hädavajalik. Ülevaade tõi välja perioperatiivse õenduse kui võtmeteguri infektsioonide ennetamisel kogu kirurgilise protsessi vältel.

Selle uuringu tulemused näitasid, et infektsioonide ennetamise protsess algab juba operatsiooni eelses faasis patsiendi seisundi hindamise ja riskitegurite tuvastamise kaudu. Need tulemused näitasid samuti, et perioperatiivsetel õdedel on väga oluline ja mitmekülgne roll infektsioonide ennetamise tagamisel. Õendustegevused hõlmavad patsiendihooldust, patsiendi õpetamist ja tehnilisi oskusi. Lisaks tuvastati kliiniliste juhiste järgimine ja järjepidev infektsioonikontroll oluliste teguritena tüsistuste vähendamisel ja kirurgiliste tulemuste parandamisel.

Kokkuvõttes mängib perioperatiivne õendus olulist rolli endoproteesi infektsioonide ennetamisel eakatel artroplastika läbinud patsientidel ning toetab ohutumalt postoperatiivset taastumist, kus parima kirurgilise tulemuse saavutamise nõuab tõendus põhine lähenemist.

Võtmesõnad: perioperatiivne õendus, endoproteesi infektsioon, eakas patsient, artroplastika, infektsioonide ennetamine.

SUMMARY

Laura-Liisa Lehtla (2026). Tallinn Health University of Applied Sciences, Department of Nursing. The role of perioperative nursing in preventing prosthetic joint infection in elderly patients undergoing hip and knee arthroplasty. The thesis consists of 21 pages and 27 references.

This study aimed to describe the role of perioperative nursing in preventing joint infections in elderly patients undergoing hip and knee arthroplasty. A theoretical literature review was used as the research method, during which relevant scientific articles and clinical guidelines were analyzed.

The findings of the study showed that elderly patients who are undergoing hip or knee arthroplasty have an increased risk of prosthetic joint infection due to comorbidities, age-related factors, a slower healing process and reduced immune response. Therefore, infection prevention throughout the entire perioperative period is essential. The review identified perioperative nursing as a key factor in infection prevention throughout the entire surgical process.

The findings of this study indicated that the process of infection prevention begins already in the preoperative phase through assessing the patient's condition and identifying risk factors. These results also showed that perioperative nurses have a highly important and multifaceted role in ensuring infection prevention. Nursing activities include patient care, patient education and technical skills. In addition, adherence to clinical guidelines and consistent infection control were identified as essential factors in reducing complications and surgical outcomes.

In conclusion, perioperative nursing plays a significant role in preventing prosthetic joint infections in elderly arthroplasty patients and supports safer postoperative recovery, where the best surgical outcome requires an evidence-based approach.

Keywords: perioperative nursing, prosthetic joint infection, elderly patient, arthroplasty, infection prevention.

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INTRODUCTION

The most commonly performed surgical procedures in modern healthcare are hip and knee arthroplasty, particularly in the elderly population. Arthroplasty is a surgical procedure in which a damaged joint is replaced and it is effective in reducing pain and improving mobility, but it may come with complications. One of the most serious complications is periprosthetic joint infection (PJI), which involves the prosthesis and adjacent tissues (Tande & Patel, 2014). The primary mechanism contributing in attracting PJI is the formation of biofilm. Biofilm is a structure consisting of microorganisms that create a protective matrix on the surface of the implant. With the protective matrix over the implant, bacteria can survive and it will be resistant to antibiotic treatment and also to the body's own immune system responses. Because of the protective matrix of biofilm it is hard to treat the infection and it often leads to surgical intervention (Aslam & Darouiche, 2012).

Patient's health and quality of life all depend on the success of the operation and infection prevention. Prosthetic joint infection can often lead to prolonged treatment, pain, reduced physical mobility and recovery. Many patients that experience PJI have the need for revision surgery or even total removal of the prosthesis (Izakovicova et al., 2019). Revision surgeries create a burden on the healthcare system. These surgeries are much more complex and expensive. Treatments are extensive and patients often require repeated hospital visits (Davidson et al., 2019).

It can lead to prolonged hospital stays, revision surgeries and decreased quality of life. Recent studies show, that prosthetic joint infections remain a serious clinical challenge despite the advances in infection prevention strategies (Xiong et al., 2025).

Even though there are different ways for infection to spread, the most common way is contamination during surgery, where microorganisms are introduced despite the use of sterile techniques. They can also be introduced through hematogenous spread, where microorganisms can reach the joint through bloodstream from other infections sites on the body. Although prosthetic joint infections are not so common, it is possible for infections to happen soon after surgery or even years later. It can be determined whether the infection occurred during surgery or postoperatively. If the infection is found weeks after the surgery then it is most commonly associated with intraoperative contamination. If the infection is delayed then it is associated

with less virulent bacteria. Infections that are late and develop years later are associated with hematogenous spread from other infections on the body (Vaishya et al., 2018).

From a perioperative nursing perspective, infection prevention is the essence of perioperative care. Perioperative nurses are directly involved in all stages of the surgical process and responsible for executing evidence-based practices and techniques to prevent the risk of infection. These include the patient assessment, maintenance of aseptic practices and monitoring. Studies show, that surgical site infections are among the most common healthcare associated infections, but they are largely preventable through proper nursing interventions (Jeronimo & Afonso, 2025).

Nevertheless, despite the availability of guidelines and evidence-based recommendations, inconsistencies still remain in clinical practice. Research has shown that not only does the effectiveness of infection prevention rely on protocols but also on the knowledge of perioperative nurses who must have the clinical decision-making skills. It means, that there is still a need to understand the specific role of perioperative nursing in preventing prosthetic joint infections.

Research problem: Prosthetic joint infection (PJI) remains one of the most serious complications following hip and knee arthroplasty, particularly among elderly patients and it may lead to reduced quality of life, prolonged hospitalization and increased healthcare costs (Yilmaz et al., 2024). Evidence-based perioperative nursing practices, which include infection prevention measures, adherence to aseptic techniques and implementation of clinical guidelines play an important role in improving patient outcomes and reducing surgical site infections (Spruce, 2020).

Aim of the thesis: The aim of this thesis is to describe the role of perioperative nursing in preventing prosthetic joint infections in elderly patients undergoing hip and knee arthroplasty.

Research tasks:

1. To describe the risk factors associated with prosthetic joint infections among elderly patients undergoing hip and knee arthroplasty.
2. To describe perioperative nursing interventions related to infection prevention.

Key concepts:

Perioperative nursing: Perioperative nursing refers to nursing care provided before, during and after the operation. It focuses on patient safety, aseptic techniques and prevention of complications. This includes patient preparation, intraoperative support and postoperative monitoring (World Health Organization, 2016).

Prosthetic joint infection (PJI): Prosthetic joint infection is defined as an infection that involves a joint prosthesis and surrounding tissues, that is typically caused by microorganisms that attach to implant surfaces and form biofilms (Izakovicova et al., 2019).

Elderly patient: An elderly patient is defined as a person aged 65 years or older (Ministry of Social Affairs, 2018-2022).

Arthroplasty: Arthroplasty is a surgical procedure where damaged joints are replaced with an artificial implant to relieve pain and increase mobility (Min et al., 2019).

Infection prevention: Infection prevention refers to evidence-based practices that are aimed at reducing the risk of infections (World Health Organization, 2016).

1. METHODOLOGY

This thesis is a theoretical literature-based study aimed at describing the role of perioperative nursing in preventing prosthetic joint infections in elderly patients undergoing hip and knee arthroplasty. A literature review method was used to collect and analyze scientific evidence. This viewpoint allows the integration of existing knowledge and supports the use of evidence-based nursing practice (Snyder, 2019).

The data was collected from electronic scientific databases PubMed, CINAHL, Science Direct, WHO and IRIS. These databases were selected due to their relevance to healthcare and nursing research. The combination of keywords used in the research was: *perioperative nursing*, *prosthetic joint infection*, *infection prevention*, *elderly patients* and *arthroplasty*. Boolean operators were used to improve keyword combinations. A total of 37 sources were reviewed, of which 27 sources were included in the study. Among the 27 evidence-based articles, 9 were nursing-related articles that focused on infection prevention in nursing.

Inclusion criteria were established to ensure the relevance of the articles. The main focus was on the peer-reviewed scientific articles published between 2016-2026, that were written in English and full text was available. However a small number of articles that were published between 2012-2015 are also included. It is justified by their scientific value and relevance to the topic. One of these articles was particularly important because of its foundational knowledge on prosthetic joint infections that included definitions, pathologies and risk factors. Based on the methodological recommendations, the use of older sources may be used when they constitute the key literature in the field (Snyder, 2019).

The selected articles were chosen based on their relevance, scientific quality and their utility to the research. The analysis focused on key themes related to prosthetic joint infections, perioperative nursing interventions and infection prevention.

2. PROSTHETIC JOINT INFECTIONS IN KNEE AND HIP ARTHROPLASTY

2.1. Risk factors for prosthetic joint infections in elderly patients

The risk of infection is often higher in elderly populations compared to other age groups. Older age-related physiological changes and slower tissue regeneration are factors that further increase the probability of infection. There are many different factors that determine the risk of prosthetic joint infection. These factors can be divided into patient-related and perioperative factors. Prevention and planning are key factors in successful perioperative care. Understanding these factors is essential because many of them can be modified during the preoperative period through nursing interventions (Ayoade et al., 2023).

Patient-related factors play the biggest role in the possible development of infection. Patients who have conditions such as diabetes, malnutrition and obesity are commonly associated with weakened wound healing and decreased immune responses. Moreover, older age itself is considered a significant risk factor (Li et al., 2026). Chronic diseases furthermore increase the risk of infection such as cardiovascular diseases and immunosuppressive conditions. Due to these risks, the patient's circulation and ability to fight infection are affected and postoperative care is more complicated. In addition, lifestyle factors such as smoking have shown a negative effect on tissue oxygenation and wound healing. These factors highlight the importance of preoperative assessment during which nurses play a key role in patient advocacy, identifying risks, and preparing them for surgery (Ayoade et al., 2023).

Other risk factors that have been identified with prosthetic joint infection are corticosteroid use and underlying conditions such as rheumatoid arthritis, cirrhosis, neoplasm and immunosuppression (Splicher-Moffarah et al., 2022). Comorbidities can considerably increase the risk of infection following joint replacement surgery. Physiological changes can reduce the body's ability to heal itself and prevent infection. Multiple comorbidities in elderly patients are common. Collaboration and careful assessment can help reduce the risks (Izakovicova et al., 2019).

Surgery-related factors are also strongly associated with PJI. The longer the surgery, the greater the risk of contamination. An open surgical field exposed for longer than needed is a potential contamination risk. Additionally, non-sterile techniques and breaks in aseptic practice can allow microorganisms to enter the surgical wound which increases the risk for infections. Antibiotic prophylaxis is an extremely important factor in infection prevention. If not administered at the right time before the incision, then the antibiotic effectiveness is reduced (Liu et al., 2018).

Intraoperative factors like the operating room environment, the use of medical devices, and amount of surgical personnel in the operating room can influence the risk of infection. In every arthroplasty, it is important to minimize the airborne microorganisms. That is why it is essential in arthroplasty to reduce the frequent door openings, unnecessary people in rooms and to make sure the quality of air quality in the operating room meets standards and humidity is within the permitted range (Qvistgaard et al., 2019).

Perioperative nurses ensure that environmental standards are followed (EORNA, 2020).

3. THE ROLE OF PERIOPERATIVE NURSING IN INFECTION PREVENTION

3.1. Preoperative nursing interventions

Preoperative nursing care plays a significant role in preventing infections. Preoperative protocols, preoperative planning, evaluating patient risk factors and communicating in the operating room are among the many things preoperative nurses are responsible for. A successful outcome for the patient is the ability to effectively identify the potential risks early and contribute to reducing complications. Elderly patients are particularly vulnerable during preoperative, they often require additional monitoring and emotional support (Bashaw et al., 2019).

Identifying patient's medical risk factors for assessment before surgery that may increase the likelihood of infection is essential. This includes medical history, allergies, chronic diseases and any signs of an existing infection. This is accompanied by a physical examination of the patient and the need for catheter placement. Effective patient assessment at this stage mostly depends on nurses documenting and communicating findings to the surgical team. Early findings and interventions allow time for intervention. Complete patient assessment supports the best possible outcome for surgery (Izakovicova et al., 2019).

Proper skin preparation is needed for the upcoming surgery. It is essential to reduce any microbial contamination. Chlorhexidine is used to decrease the number of microorganisms present (Liu et al., 2018).

Patients are also required to undergo antiseptic bathing before the surgery. This is ensured by nurses that the bathing procedure is performed correctly. Effective skin preparation reduces the risk of contamination and plays a key role in infection prevention (World Health Organization, 2016).

Another intervention is patient education. In preoperative care, patients need to understand the significance of how to prepare for surgery, including hygiene, medication management and

postoperative expectations. Educated patients are more likely to follow instructions clearly. Both verbal and written instructions are given to guarantee that the patient understands them. It is most important with elderly patients who often need more support or clarification. Successful patient education contributes to safer surgical outcomes and reduced infection risks (Harington, 2014).

3.2. Intraoperative nursing interventions

One of the most important responsibilities for perioperative nurses is maintaining aseptic techniques during the whole surgery and maintaining the sterile field. Infection control protocols are strictly followed, which includes proper hand hygiene, sterile gloving, and dressing, handling sterile surgical instruments and correct use of surgical drapes and covers to ensure the sterile field is maintained. Any deviation from proper aseptic practice can lead to possible contamination event of the surgical site. Perioperative nurses monitor the sterile field throughout the entire surgery and in the event of a possible contamination, the sterile field is immediately restored with sterile drapes. Nurses also ensure that all personnel included in the operation room follow these guidelines (Qvistgaard et al., 2019).

The sterile field includes all surgical instruments, including the tables that are covered with sterile drapes. The maintenance of sterile surgical field is essential for preventing infection. The sterile field is set up by preoperative nurses who ensure that the sterile field is not compromised. Continuous situational awareness and attention is needed for maintaining sterility. Even a small breach can increase the risk of infection (Qvistgaard et al., 2019).

The operating room environment has a direct impact on infection control. These risk factors are key for successful surgery. Room temperature, air filtration, and the number of people present in the operating room can affect the microbial contamination. Limiting unnecessary actions can help keep a stable environment. Constant door openings are a significant risk for airborne microorganisms. Perioperative nurses try to minimize these factors by coordinating activities.

Measures are taken to ensure that the risk of airborne contamination is reduced and surgical practice is maintained safely (Qvistgaard et al., 2019).

Teamwork and effective communication skills are needed to ensure the intraoperative infection prevention. Nurses are important members of the surgical team, always ensuring adherence to guidelines and any emerging issues handled within protocols. Clear and direct communication is needed to prevent any mistakes and errors. Efficiency is improved by a collaborative approach to maintain a sterile field and controlled surgical environment (Qvistgaard et al., 2019).

Incident reporting is an important part of maintaining patient safety and infection prevention in the operating room. When reporting an incident, it supports learning and improving communication skills within the surgical team and helps healthcare institutions identify areas requiring improvement. Studies are suggesting that a non-punitive reporting culture encourages nurses to report more openly, which can help with patient safety improvement (Juliasih et al., 2023; Oweidat et al., 2023; World Health Organization, 2023).

3.3. Postoperative nursing interventions

Proper wound care is essential in infection prevention. Clean and appropriate dressing is administered by nurses who are monitoring the wound to ensure proper hygiene. It is important to close the wound using sterile technique to prevent contamination. It is extremely important to manage the wound properly in elderly patients, who may have a much slower healing process (Wilson, 2015). Advanced wound dressings such as occlusive dressings and silver-impregnated dressings may help to reduce the wound infection risk. This protects the wound from external contamination in its moist healing environment. Postoperative wound management also includes monitoring and timing of staple or suture removal. Timing is important, because delayed removal can lead to bacterial growth, while premature removal can affect the closing and healing of the wound (World Health Organization, 2016; Berrios-Torres et al., 2017).

Early signs of infection are monitored by nurses. Symptoms such as swelling, pus leaking, redness, increased pain while during movement or at rest, even a fever can indicate the presence of infection. If symptoms are discovered early, then timely interventions can be made to reduce the risk of complications (Izakovicova et al., 2019).

Patient education continues after the surgery. For complications to be prevented, patients must be taught proper wound care, maintain proper hygiene and recognize signs of infection. All this helps ensure safe recovery. Guidance and support are provided by the nurses to improve patient compliance and understanding their role in postoperative (Harrington, 2014).

4. DISCUSSION

The research shows the importance of perioperative nurses in preventing PJI. Prosthetic joint infection still remains one of the most complicated issues with knee and hip arthroplasty. The outcome of the surgery that was contaminated via perioperative risk factors affects the patient while simultaneously burdening the healthcare system (Tande & Patel, 2014). Based on the reviewed literature, nursing interventions in perioperative care play an important role in reducing infection risks throughout the whole surgical process.

This thesis focused on the importance of perioperative nursing in infection prevention. The importance of preoperative patient assessment is highlighted by many studies. Before surgery, it allows the early identification and assessment of risk factors to improve the patient's condition. The risk of infection is influenced by many factors such as patient-related factors and perioperative ones (Allegranzi et al., 2016). These findings indicate that perioperative nurses have to recognize preventable risk factors and improve patient readiness before the surgery. Patient education, monitoring and team collaboration are the key factors.

According to Allegranzi et al., (2016) reducing infection risk, correct patient assessment and enhancement of health status play an important role. These findings emphasize that early identification of risk factors allows better interventions for better surgical outcomes.

The World Health Organization highlights the importance of maintaining proper aseptic techniques and controlling the operating room environment. Intraoperative factors play a critical role in preventing PJI. Compliance with infection prevention protocols greatly reduces the risk of contamination. Based on the literature reviewed, it can be concluded that perioperative nurses play a critical role in maintaining standards in surgical settings.

Additionally, postoperative care remains an important part in infection prevention. Early detection of infection symptoms and proper wound care can reduce the complications and improve recovery (Berrios-Torres et al., 2017). This indicates that postoperative nursing interventions are essential in preventing the progression of prosthetic joint infection and enabling early treatment.

Elderly patients are identified as the most vulnerable group. It is important to understand how to initiate best surgical practices for the elderly. The elderly are most vulnerable because of their age-related physiological changes (Splicher-Moffarah et al., 2022). Therefore, these patients require more intensive perioperative care, monitoring to prevent the infection and support recovery.

Based on the articles found, it can be said that perioperative nursing has an important and versatile role in preventing prosthetic joint infections in elderly arthroplasty patients. Successful infection prevention needs a systematic and evidence-based approach, where perioperative nurses contribute by assessing patients, maintaining aseptic practices and effective postoperative care.

CONCLUSIONS

The results of this thesis showed, that one of the most serious complications following hip and knee arthroplasty is prosthetic joint infection. Prosthetic joint infections can have a negative impact on patients' recovery and quality of life. It was found that prosthetic joint infection was affected by many risk factors including old age, perioperative practices and comorbidities.

The findings of this thesis showed that patient assessment and early identification of risk factors are essential for infection prevention. Infection prevention starts during the preoperative stage. It is highly critical that the right aseptic techniques and keeping sterility are maintained during the intraoperative period to prevent prosthetic joint infections. During the postoperative care, maintaining wound cleanliness and monitoring any early infection risk symptoms are critical.

Elderly patients were identified as the higher risk group, who required more individualized care and attention throughout the whole perioperative stage. Additionally, effective pain management is essential in recovery. Insufficient pain relief may delay mobilization, prolong hospitalization and detrimentally affect the outcome.

Based on the reviewed literature, evidence-based perioperative nursing practices are needed in reducing prosthetic joint infections that comply with clinical guidelines. In the Estonian healthcare context, the continuing education of perioperative nurses, multidisciplinary collaborations and infection prevention protocols may contribute to improving patient safety and surgical outcomes.

To summarize, perioperative nursing plays an important role in preventing prosthetic joint infections. Therefore, an effective team-based approach is needed for effective infection prevention.

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