

## **RISKS AND COMPLICATIONS OF ORTHOPEDIC JOINT PROSTHESIS SURGERY**

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**Abstract:** INTRODUCTION: Joint prosthetic surgeries are a significant advancement in orthopedic medicine, offering a solution for patients suffering from chronic pain and loss of mobility due to debilitating joint conditions. Prosthetics, designed to replace “diseased” joints, represent an effective approach to restoring function, alleviating discomfort and improving quality of life. However, for such procedures there are risks and complications that we must always report. METHODOLOGY: This is a literature review, of a narrative type, which aims to describe the risks and complications of orthopedic prosthetic surgeries, from a theoretical point of view, through materials that have already been published on the topic in question, through analysis and interpretation of literature. The inclusion criteria were: articles in Portuguese and English; published between 2018 and 2024 and which addressed the themes proposed for this research, review-type studies made available in full. The exclusion criteria were: duplicate articles, available in abstract form, which did not directly address the proposal studied and which did not meet the other inclusion criteria. RESULT AND DISCUSSION: With the advancement of medicine, joint prostheses were an achievement of orthopedic medicine, providing pain relief and restoration of mobility for countless patients. However, as with any medical procedure, there are complications and risks associated with these medical devices that must be understood and considered comprehensively. CONCLUSION: Joint prostheses are therefore a remarkable achievement in orthopedic medicine, offering pain relief and restoration of mobility for patients with debilitating joint conditions. The success of prosthetics depends not only on the doctor, but on a multidisciplinary team, from patient preparation and the surgical center to rehabilitation.

**Keywords:** “Orthopedic prostheses”, “surgeries”, “risks”, “complications”.

## INTRODUCTION

Orthopedic surgeries are a significant milestone in orthopedic medicine, offering a valuable solution for patients suffering from chronic pain and loss of mobility due to debilitating joint conditions. Designed to replace damaged or compromised joints, they represent an effective approach to restore function, alleviate discomfort and improve quality of life. Its effectiveness is notable, providing patients with the opportunity to resume daily activities, from walking and climbing stairs to participating in sports and enjoying an active life. However, for this positive transformation to occur, it is essential to understand not only the indications and benefits of joint prostheses, but also the challenges and complications that may arise along the way (RIBEIRO et al., 2013). This article explores in depth the world of joint prostheses, addressing their indications, and the associated risks and complications.

This article consists of a narrative review, which aims to discuss the complications and risks of joint prostheses, through considerations about them and their recovery and rehabilitation, with the aim of expanding the knowledge of students and professionals in the field on the subject. in question.

## METHODOLOGY

This is a literature review, of a narrative type, which aims to describe the risks and complications of orthopedic prosthetic surgeries, from a theoretical point of view, through materials that have already been published on the topic in question, through analysis and interpretation of literature. The inclusion criteria were: articles in Portuguese and English; published between 2018 and 2024 and which addressed the themes proposed

for this research, review-type studies made available in full.

The exclusion criteria were: duplicate articles, available in abstract form, which did not directly address the proposal studied and which did not meet the other inclusion criteria.

The review was carried out from October 2023 to February 2024, through searches in the databases Virtual Health Library (VHL), Latin American and Caribbean Literature in Health Sciences (LILACS), National Institutes of Health's Library of Medicine (PubMed) and Scientific Electronic Library Online (SciELO). The following descriptors were used: "Orthopedic prostheses", "surgery", "risks", "complications" in order to find articles relevant to the subject covered. After the selection criteria, 5 articles remained that were subjected to thorough reading for data collection. The results were presented in a descriptive way, divided into thematic categories addressing: describing the subtitles or points that were mentioned in the discussion.

## DISCUSSION

The use of joint prostheses is a notable achievement in orthopedic medicine, providing pain relief and restoration of mobility for countless patients. However, as with any medical procedure, there are complications and risks associated with these medical devices that must be comprehensively understood and considered.

These medical devices are designed to alleviate pain, restore functionality and improve patients' quality of life (IOSHITAKE et al., 2016). Indications for joint prostheses vary widely, covering conditions such as osteoarthritis, rheumatoid arthritis, traumatic injuries and necrosis avascular.

When joints are affected by these conditions, the use of joint prostheses may

be the best approach to restoring mobility and relieving pain (WILSON; KELLEY; THORNHILL, 1990).

There are several types of joint prostheses, each designed to replace a specific joint in the body. The most common types include: hip, knee, shoulder, elbow and ankle prostheses. Each is adapted to the individual needs of each patient and the characteristics of the joint to be replaced. They are manufactured from a variety of materials such as metals (titanium, cobalt chromium), ultra-high molecular weight polyethylene (UHMWPE) and ceramics. The choice of materials depends on the characteristics of the joint and the specific needs of the patient. The implementation procedure follows a rigorous and systematic process. First, the patient undergoes a complete medical evaluation, including imaging tests, to determine the need for the prosthesis. Surgery involves removing the damaged joint and replacing it with a prosthesis. Post-surgical recovery is essential and includes physiotherapy to restore joint mobility and function (MOREIRA, 2014).

The main predisposing factors for this complication cited in the literature are: advanced age, malnutrition, obesity, diabetes mellitus, advanced-stage HIV infection, presence of a distant infectious focus and history of arthroscopy or infection in previous arthroplasty. Patients with rheumatoid or psoriatic arthritis also have a higher risk of postoperative infection, estimated to be three to eight times higher than in other patients. Prolonged surgical time (more than 150 minutes), blood transfusion and bilateral arthroplasty in the same surgical time are other factors related to a greater occurrence of infection. Any factor that delays the healing of the surgical wound, such as ischemic necrosis, hematoma, cellulitis or wound abscess, increases the risk of infection, since the deep tissues adjacent to the prosthesis are devoid

of local defense barriers (Zimmerli W. 2006). It is important to highlight that the presence of the joint prosthesis leads to an impairment of the function of local granulocytes, which accumulate around the implant and are partially degranulated, with a decrease in the production of superoxide dismutase and impairment of the defense capacity against bacteria, particularly against *Staphylococcus aureus*. Thus, the presence of the implant reduces the size of the bacterial inoculum necessary for infection to occur by more than 100,000 times (Frommelt L. 2006).

Among the most common complications, infection stands out, which can occur in the surgical area or even within the artificial joint itself. Treating an infection often requires removal of the prosthesis, which can be a complex and challenging process (WILSON; KELLEY; THORNHILL, 1990). Furthermore, joint prostheses can become loose or mispositioned over time, resulting in pain, instability and impairment of joint function. The wear of prosthesis materials is also a concern, as it can release particles that cause chronic inflammation in the joint (SMITH et al., 2001). Another potential complication is loosening of the fixation of the prosthetic components, which may require surgical revisions to correct the problem. Joint instability is another concern and can occur due to problems with ligaments or supporting structures, resulting in the feeling that the joint is “leaving out of place.” Additionally, some people may develop allergic reactions to the materials used in dentures, such as metals, causing pain and swelling. In addition to specific complications, joint prosthesis implantation surgery also carries inherent surgical risks, such as bleeding, infection, anesthetic reactions and cardiovascular complications. Furthermore, joint prostheses have a limited useful life, generally ranging from 10 to 20 years, after

which they may need to be replaced in a revision procedure (RIBEIRO et al., 2013). Other risks include activity restrictions after surgery and psychosocial complications, as the emotional and psychological adaptation to the prosthesis and any complications can be challenging for some patients (LIMA; OLIVEIRA, 2010). Therefore, it is crucial that patients and healthcare professionals be fully aware of the complications and risks when considering implantation of a joint prosthesis. The decision to proceed with surgery must be based on a careful assessment of the potential benefits against the known risks. Regular medical monitoring and adherence to rehabilitation guidelines are essential to monitor and manage any complications that may arise, thus ensuring positive results and improving patients’ quality of life.

Recovery and rehabilitation after surgery to implant a joint prosthesis play an important role in the process of restoring the patient’s functionality and well-being. This phase is extremely important to ensure that the patient can fully benefit from the prosthesis and regain their quality of life. In the initial phase of recovery, immediately after surgery, most patients remain in the hospital for a variable period of time, depending on the type of prosthesis and the complexity of the surgery. During this time, the medical team monitors the patient’s recovery and manages pain. Physiotherapy is started within the first 24 hours after surgery. Physiotherapists help the patient perform passive exercises to prevent joint stiffness and improve blood circulation. With the aid of crutches, walkers or other assistive devices, the patient is encouraged to begin moving immediately after surgery, as tolerated, to prevent complications such as deep vein thrombosis (BARBOSA; FARIA; ALMEIDA NETO, 2005).

Joint prostheses can be infected through three distinct routes: direct implantation,



hematogenous and reactivation of latent infection. The penetration of microorganisms into the wound during surgery can occur from endogenous and exogenous sources. Examples include the patient's skin microbiota, members of the surgical team; the environment; and even contaminated implants (Zimmerli W. 2009).

Bacteremia, from distant foci, can generate hematogenous contamination of the prosthesis. The primary foci most frequently reported in the world literature are: respiratory, cutaneous, urinary, dental and gastrointestinal tracts. Gram-positive bacteria are predominant in the contamination of joint prostheses, especially *Staphylococcus aureus* and *Staphylococcus epidermidis*. Infections caused by gram-negative bacilli and fungi such as *Candida sp* have been reported more frequently around the world (Del Pozo JL, Patel R. 2009).

In long-term rehabilitation, the patient continues to receive physical therapy, but now focusing on muscle strengthening exercises for the muscles around the joint. This is essential to stabilize the prosthesis and improve function. Range of motion exercises are implemented to restore flexibility to the joint, allowing for more natural movement. Functional training is incorporated to improve specific skills needed for daily activities, such as walking, climbing stairs and lifting objects, helping the patient to regain independence (KISNER, 1998). Psychological support and counseling can be helpful in dealing with emotional challenges associated with fitting the prosthesis, as well as in addressing any concerns or anxieties. Follow-up appointments with the orthopedic surgeon are scheduled to evaluate recovery, check the integrity of the prosthesis, and adjust if necessary. Maintaining an active lifestyle is essential after rehabilitation, as the prosthesis is designed to allow the resumption of normal activities, including playing

sports and participating in an active lifestyle (MOREIRA, 2014). of possible complications, such as infection, loosening of the prosthesis or persistent pain, and report it immediately to the healthcare professional. The duration of rehabilitation may vary depending on individual factors such as age, health status and type of prosthesis. It is essential to follow your healthcare professional's guidance and maintain a constant commitment to physical therapy to ensure a successful recovery.

With patience, dedication and adequate monitoring, many patients are able to resume an active and functional life after the implantation of a joint prosthesis (IOSHITAKE et al., 2016).

## CLINICAL PRESENTATIONS

Infections of joint prostheses present characteristic signs that can be divided into acute manifestations such as intense pain, high fever, toxemia, heat, redness and secretion in the surgical wound or chronic manifestations, namely, progressive pain, formation of cutaneous fistulas, with drainage of secretion purulent, in most cases without fever. The clinical presentation depends on the virulence of the etiological agent involved, the nature of the infected tissue and the route of infection acquisition. Several classifications have been proposed to define the moment at which contamination occurs and thereby establish the likely etiological agent involved and the best therapeutic strategy (Frommelt L. 2006).

Laboratory tests such as white blood cell count, erythrocyte sedimentation rate, alpha 1 acid glycoprotein and C-reactive protein can also be carried out to help with the diagnosis (Del Pozo JL, Patel R. 2009).

On radiography, they may be similar to those found in mechanical losses, not contributing to the diagnosis of infection. Ultrasonography can be useful in locating

deeper collections and guiding diagnostic puncture. Scintigraphic methods are considered more specific in the differential diagnosis, especially when using leukocyte or immunoglobulin techniques labeled with radioisotopes.

The definitive diagnosis of the infection must be carried out through the isolation in culture of the microorganism obtained from the puncture of the joint fluid, secretion from the surgical wound and materials collected during surgical debridement (Del Pozo JL, Patel R. 2009).

For patients who are going to undergo the surgical procedure, it is of great importance to have a good Pre-operative assessment, also in the prevention of postoperative infections, aiming to identify and treat recent foci of infection, as well as stabilize comorbidities and reduce, when possible, the use of immunosuppressive drugs. In addition, the following are recommended: hospitalization close to the surgery; cleaning, sterilization and very rigorous handling of all surgical materials to be used; maintenance of clean conditions, adequate air conditioning of the operating room; restricted trichotomy and also close to surgery using depilatory creams and not sharp devices; mechanical cleaning of the area to be operated with antiseptic solutions such as chlorhexidine; creation of a special surgical environment with differentiated attire and optional use of laminar flow; Adequate antibiotic prophylaxis, started from zero to 60 minutes before anesthetic induction and maintained for 24 hours; body temperature and glycemic control throughout the perioperative period; shortest surgical time possible with appropriate technique; careful dressings performed with aseptic technique; early mobilization of the patient in the postoperative period (Mangram AJ et al 1999).

## FINAL CONSIDERATIONS

As we have seen, joint prostheses are a remarkable achievement in orthopedic medicine, offering pain relief and restoration of mobility for patients with debilitating joint conditions. However, the success of these medical devices depends on understanding the indications, appropriately choosing types and materials, performing a precise surgical procedure, effective rehabilitation, and carefully managing associated risks and complications. With an informed approach and a commitment to rehabilitation, many patients can enjoy a significant improvement in quality of life and functionality after implantation of a joint prosthesis.

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