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# Total Joint Replacements and Prevention of Surgical Site Infections

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# Total Joint Replacements and Prevention of Surgical Site Infections

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## Introduction

With a rise in the aging population, it should come as no surprise that the rate of total joint replacements (TJR) is increasing as well. Total hip and knee replacements are one of the most commonly performed and successful elective surgeries of this time (Weber et al., 2018). Joint replacements can provide patients with relief of debilitating symptoms for most patients and can also provide curative measures of osteoarthritis for others. Undergoing surgery always comes with risks and benefits. Infection rates following TJR continues to be a rising problem. This can be further complicated by increasing the risk for total joint revision, which is not only physically and emotionally challenging for the patient, but it is also cost intensive for both the patient and a public health concern (Weber et al., 2018).

Every aspect of infection control cannot be contained all the time, for every procedure, but is there a way that we can do more? Unfortunately, patients are often rushed through the perioperative phases, leaving room for various gaps in care. Patients often have unrealistic expectations of recovery and misjudge the efforts needed to optimize the function of their new joint. Comorbidities, such as obesity is another leading cause for infection postoperatively in joint arthroplasty, indicating a need for a revision of practice policies and procedures (George et al., 2017). A multidisciplinary approach to prevent postoperative infection for TJR is the best way to attack infection from all angles to ultimately improve patient outcomes.

## Reason for Study

• A new interdisciplinary approach to identify potential and real problems throughout the perioperative process that contributes to an increase in surgical site infections in patients having a total hip or total knee arthroplasty and formulate evidence-based practices to optimize patient outcomes (Mejia, Williams, & Long, 2015).  
• To educate health care providers of the most up to date, evidence-based recommendations to prevent surgical site infections. These recommendations are provided by the Center for Disease Control and Prevention and intended to be incorporated into surgical quality improvement programs to optimize patient safety (Berríos-Torres et al., 2017).

## Presentation of Case

A 65-year-old female patient, with a body mass index (BMI) of 34 is being seen in the office for a preoperative evaluation for a total left knee arthroplasty. Patient reports worsening symptoms over the last twelve months, consisting of eight out of ten pain while ambulating. She reports a lack of desire to participate in daily activities with her husband and grandchildren. Her worsening depression has resulted in a higher than normal caloric intake as a means for coping. She is current taking medications for hypertension, high cholesterol, diabetes, and ibuprofen for pain related to osteoarthritis.

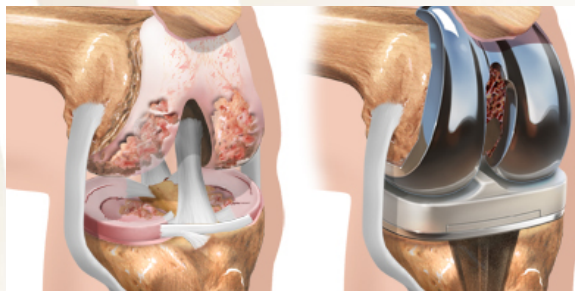
The patient is approved for surgery; however, the surgeon recommends making adjustments to her diet to lose weight. The risks and benefits of surgery are explained to the patient and the informed consent is signed. Surgery is scheduled three weeks out.

Beginning at midnight the night prior to surgery, the patient begins following the preoperative guidelines then arrive two hours before her scheduled surgery to be prepped for surgery. Surgery goes as planned with no complications. The patient spends one night as an inpatient and discharged home the following day. Outpatient rehab is to start immediately.

Week three following surgery, the patient begins to complain of an increase in pain, redness, and swelling at the incision site. She schedules an appointment with the surgeon and she prescribes an oral antibiotic. With no relief of symptoms, the patient is scheduled for a surgical revision of the knee the following week.

## Signs & Symptoms

- Increased pain or stiffness in previously well-functioning joint (The American Academy of Orthopaedic Surgeons, n.d.).
- Swelling (The American Academy of Orthopaedic Surgeons, n.d.).
- Wound drainage (The American Academy of Orthopaedic Surgeons, n.d.).
- Fever, chills, and night sweats (The American Academy of Orthopaedic Surgeons, n.d.).
- Fatigue (The American Academy of Orthopaedic Surgeons, n.d.).
- Warmth and redness around the wound (The American Academy of Orthopaedic Surgeons, n.d.).
- Fast heart rate, nausea, vomiting, and diarrhea could indicate worsening infection (The American Academy of Orthopaedic Surgeons, n.d.).



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## Underlying Pathophysiology

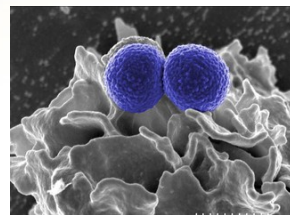
Each of the following present ways in which microorganisms can be introduced into the sterile working environment. There is not a single entity identified as the culprit, but each factor presents and increase in the likelihood of acquiring a surgical site infection following a total joint replacement.

- Using an anterior approach as opposed to other styles in morbidly obese patients. This is related to the overlying pannus atop of the incision site (Purcell, Parks, Gargiulo, & Hamilton, 2016).
- Improper use or timing of parenteral antimicrobial prophylaxis (Berríos-Torres et al., 2017)
- Comorbidities including diabetes, congestive heart disease, and coagulopathy are associated with a higher risk of surgical site infection following total joint replacements (Edmiston Jr. et al., 2019).
- Obesity, possibly related to increased antibiotic resistance and preexisting comorbidities (George et al., 2017)
- Higher American Society of Anesthesiologists (ASA) class (Ferguson et al., 2019).
- Relaxed sterile environment of the operating room (Mejia, Williams, & Long, 2015).
- Unhealthy lifestyle can create a medium for bacterial invasion.
- Even if all proper precautions are taken, simply making an incision through the skin potentiates the risk of infection.
- Antibiotic-impregnated versus nonantibiotic-impregnated bone cement in conjunction with intravenous antibiotics as a surgical site infection prophylaxis (Zhang et al., 2019).
- Infection markers such as neutrophil CD64 are useful in detecting infections in certain populations such as dialysis patients (Doi et al., 2016).

## Significance of Pathophysiology

Surgical site infections for total joint replacements impact many different entities through the ripple effect it creates. For the patient undergoing surgery, the stress factor for the surgery alone is huge. Most patients are aware that this is a major elective surgery with many risks, including infection. If an infection is acquired, the patient suffers an increase in pain and a decrease in quality of life, and potentially may require a joint revision. The revision exacerbates the patient's symptoms, both mentally and physically, increased the time and resources used in the operating room, and increases the patient's risks for undergoing anesthesia.

From a broader viewpoint, socioeconomically, revisions represent the financial burden of a 76% increase in cost when compared to primary hip and knee replacements (Weber et al., 2018). Nationally, antibiotic resistant bacteria have the potential to affect us all and continues to be a major health care concern.



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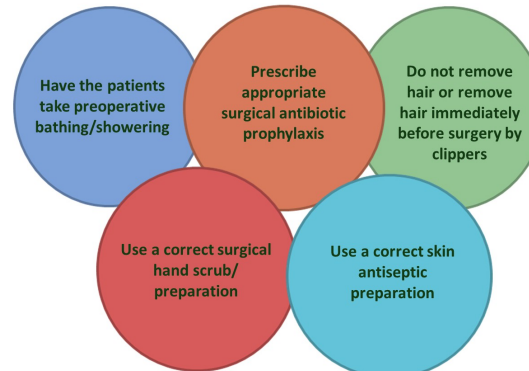


## Implication for Nursing

- Preoperative education on ways to optimize the patient's outcome such as improved diet and increased exercise if possible.
- Commitment to postoperative outpatient rehabilitation.
- Interdisciplinary approach (Mejia, Williams, & Long, 2015).
- Proper cleaning of equipment and decreased traffic and conversations in the operating room (Mejia, Williams, & Long, 2015).
- Decreasing the use of immediate-use steam sterilization (Mejia, Williams, & Long, 2015).
- Proper hand hygiene and gloving (Mejia, Williams, & Long, 2015).
- Nursing leadership to reduce the rate of nursing turnover rate (Mejia, Williams, & Long, 2015).
- Educating the patient on wound care and ensuring the patient has all needed resources for a successful recovery.
- Assessment of preoperative elevated inflammatory marker C-reactive protein and erythrocyte sedimentation rate may lead to earlier recognition of postoperative infections (Khamis, AlSaif, AlQaseer, & Husain, 2019).
- Education on signs of symptoms of infection and when to call the doctor.
- Be a patient advocate and speak up if processes and procedures are not followed adequately, putting the patient at risk.

## Conclusion

Surgical site infections following total joint replacement surgery, can both directly and indirectly affect patients, healthcare organizations, and communities. Humans are cohabitants with destructive microorganisms but with the use of education and technology we can further control ways in which harmful bacteria remain out of the areas where they can live, multiply, and take over the human body. Much progress has been made over the last few decades, but there remains to be a significant problem with perioperative infection control. Working together from a multidisciplinary approach, can help further reduce total joint replacement infection rates and improve patient outcomes and reduce the financial burden within the healthcare system.



Copyright: Global Alliance for Infections in Surgery, n.d.

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