

Keeping our patients safe

Preventing infection begins long before you come into the OR.



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Bringing relief from pain and a return to mobility, total joint replacement (TJR) provides a dramatic improvement in quality of life for people with end-stage osteoarthritis of the knee, hip or shoulder. Like all surgeries, however, it does come with some risk of complications. In a TJR, we are removing a structural portion of the body and replacing it with synthetic materials—usually metals and plastic—materials that are very unforgiving when it comes to infection. The prime focus of our efforts to keep you safe is minimizing the risk of infection.



Opened to patients in Spring of 2013, the 6th floor at Columbia Memorial Hospital provides a modern, serene environment for recovery after elective surgery .

To accomplish this, we strive to control and optimize all the known risk factors that we can. These can be broadly categorized as surgery-related risks and patient-related risks. Reducing surgery-related risk factors for infection starts with our protocols for maintaining a sterile operating room. To keep the patient from being contaminated, we wear triple surgical gloves and “space suits”; we follow special procedures for draping the surgical site so the patient’s skin is not touched until the wound is complete; operating rooms are pressurized using highly filtered air; and the number of personnel in the operating room is limited. Since studies show that longer surgery times increase the risk of infection, our consistent orthopaedic surgical teams work methodically and swiftly to reduce exposure time during surgery.

These and similar measures go a long way towards keeping patients safe. However, because TJR is usually an elective surgery, we’re actually able to begin the process of preventing infection long before a patient comes into the OR.

A strong body of medical evidence has identified

a number of patient-centered factors that greatly increase the risk of infection in TJR and other surgeries. These factors include uncontrolled diabetes, obesity, smoking, unresolved dental problems and colonization with methicillin-resistant *Staphylococcus aureus* (MRSA).

Before TJR, we do an in-depth assessment of our patients’ general health to uncover any chronic illnesses, comorbidities and life-style behaviors that are likely to impact the outcome of their surgery. When appropriate, we ask patients to consult their cardiologists, pulmonologists and other specialists that will help them to optimize their health before scheduled surgery. Our aim is to collaborate with our patients and their physicians to control as many of the variables that could lead to complications as possible.

There is no aspect of orthopaedic surgery that is not improved by smoking cessation, blood sugar control and, in obese patients, weight loss. The impact of these preventable risks on infection

rate is cumulative. For example, with uncontrolled diabetes a patient's risk may double; in the obese, having a Body Mass Index (BMI) of 40 or above may raise the infection rate by a factor of seven. For a patient with uncontrolled diabetes *and* obesity, the risk of infection may be ten times higher. Clearly, for the surgeon and the patient, it is unwise to proceed to surgery without attempting to limit these risks.

Diabetes Control

There is strong evidence that having diabetes increases a patient's risk for complications after total joint replacement, predominantly as a result of infection and impaired healing. The evidence also shows that maintaining tight glycemic control before and after surgery dramatically reduces the incidence of such complications.

As part of the preoperative workup, we measure hemoglobin A1C, the relatively long-term marker of glucose control. Optimally, we'd like to see that number as close to "normal" as possible, or at least below 7, which is considered to be well-controlled diabetes. If a patient's A1C is too high, we cannot proceed to the joint replacement without interventions to bring the diabetic index within an acceptable range. We work with the patient's primary care physician and endocrinologist to develop a treatment regimen that will keep the surgery safe.

Not only does good glycemic control reduce surgical complications, it can dramatically improve a person's long-term health profile. We have patients that tell us they're thankful that we've helped them understand the tangible benefit of tight diabetic management and they often maintain improved glycemic control even after their operation is complete. This has health benefits far beyond minimizing surgical risks.

Smoking Cessation

Among the many good reasons to give up smoking is the fact that it triples the risk of infection in TJR. We consider smoking cessation to be an extremely important part of getting ready for surgery and provide our patients with resources that can help them accomplish this. The goal is to cease smoking at least 30 days before the surgery—which gives various body functions a chance to return to normal—and to continue not smoking during the post-surgical healing period and beyond.

When we create a surgical wound in the course of TJR, we count on neovascularization, the growth of new blood vessels, to contribute to healing. In general, that function is not performed very well in the smoking population. Nicotine constricts blood vessels, reducing blood flow to the wound by as much as 25 percent, limiting the delivery of healing



nutrients and infection fighting white blood cells. Along with the poorer outcomes of smokers, some studies report that they experience more post-surgical pain.

Obesity Reduction

Obesity is increasingly discussed in the orthopaedic literature as an independent risk factor for complications in total joint replacement, especially in the area of infection. It is not difficult to understand why that's the case.

The relative poor blood supply of adipose tissue retards healing. The increased depth to which we need to make our incisions means there is more space for blood and fluids to accumulate after surgery, space where infections can develop. And, generally, operations on obese individuals are more difficult, they take longer and require extra firm retraction to expose the joint. The accumulation of these factors is related to increased risk of infection. If a patient is both diabetic and morbidly obese, the risks multiply.

What we do is try to bring people's weight down. If they were long-term patients, we would have worked at this in the course of their treatment for arthritis: losing weight makes the knee and the hip much less painful. One pound of weight loss takes 3-5 pounds off the joint reaction force in the knee and the hips, so that can make them less symptomatic. If the time comes that we need to have a joint replacement done, bringing the weight down makes the surgery less dangerous. And longer term, the prosthesis, which is just a metal and plastic device, a bearing like any other bearing, is subjected to the load applied. Any bearing has a given life span, based on the load

By completely covering operating room personnel from head to toe, and exhausting filtered air to the floor, we decrease chances of contamination during surgery.

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and the number of cycles. The number of cycles is related to how active the person is, but the load is due to body weight. So bringing the load down by decreasing the weight pays dividends, in terms of decreasing surgical risks, and by decreasing the rate of loosening and bearing wear.

We’ve found that when a patient’s weight gets up above a BMI of 40, many ultimately need help for weight reduction. We work in conjunction with a local bariatric program. This multi-disciplinary program involves dietitians, counseling, support groups, and sometimes surgical procedures. We’ve had many success stories in which people have dramatically dropped their weight. Sometimes, weight loss alone can make them feel so much better that we can delay or even prevent surgery. But if a total joint replacement is eventually needed, the loss of weight allows us to do it much more safely and with a better chance of long-term success.

Dental Health Evaluation

Pre-operative screening and treatment for dental problems plays an important role in the reduction

of post-operative infections. A growing body of data shows that the systemic spread of periodontal bacteria through the blood stream is a significant cause of infection in joint replacement.

People with periodontal disease—a group that includes approximately 75 percent of adults in the U.S.—often experience no symptoms until the condition is advanced. The bacterial infection can lurk invisibly on the inside surface of the gums, close to the root of the tooth. Yet, visible or not, these bacteria can spread to every tissue in the body, including that surrounding the prosthetic joint. Periodontal bacteria have also been associated with heart attack, high blood pressure, and other conditions that make it a risk for those undergoing surgery.

This is why we send our patients to the dentist for pre-surgical evaluation. If there is an immediate need for dental work in order to clear up periodontal infection, we feel it’s wise to delay surgery until after that has been completed.

Patients who have had TJR should take extra effort to maintain good dental health and we recommend prophylactic antibiotics before any subsequent dental work.

Keeping bacteria out of the OR

The majority of infections affecting total joint replacement are caused by methicillin-resistant *Staphylococcus aureus* (MRSA), a notorious infection in all hospitals throughout the nation. In our community, about 20 percent of the population is colonized by MRSA. So we use a simple nasal swab test to identify those patients who have the bacteria. These patients are given specific antibiotics effective against MRSA before and during surgery.

The reason we screen patients and don’t just use the MRSA-effective antibiotics for everyone is that we worry about creating resistance to that crucial drug in the community as a whole, wasting its power in cases where it isn’t actually necessary.

Keeping MRSA out of the operating room and the hospital, along with all our other preventive measures and health interventions, gives us the ability to provide our patients with the best of outcomes in the safest of settings.