

Total Knee Replacement

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I. INTRODUCTION

The total knee replacement surgery, also called knee arthroplasty, was first performed in 1968. Currently it is now one of the most frequently performed and successful surgeries in the United States. Annually 600,000 patients receive the surgery with a 90% success rate afterwards. The knee joint is made up of three bones, the lower end of the femur (thigh bone), the upper end of the tibia (shin bone), and the patella (knee cap). Covering these three bones where they meet is the articular cartilage which protects the bones and allows them to move easily and without friction. Additionally located in the knee are the menisci which are found in the joint between the femur and tibia, along with large ligaments that help to provide stability to the bones. When one of the components of the knee is compromised and the pain restricts the patient from performing regular every day activities, a knee replacement may be necessary.

II. CAUSES

A knee replacement may be helpful when a patient can no longer comfortably perform activities of daily living. There are several circumstances that would require a knee arthroplasty to be performed on a patient. The first is arthritis. The most common form is osteoarthritis, which is wear and tear due from old age and use of the knee. The cartilage that cushions the bones wears away causing the bones to rub against each other when typical leg movements are performed. This friction from the bones grinding against each other causes knee pain. Another form of arthritis is rheumatoid or inflammatory. This is when the synovial membrane that surrounds the knee joint becomes inflamed or thickens, this can eventually lead to cartilage loss, and pain. Lastly, a serious injury from physical activity to the knee could require a knee replacement. Fractures to knee bones or tears to the major ligaments cause further damage to the articular cartilage leading to pain and limited function.

III. PROCEDURE

In a total knee replacement, the surgeon makes an eight to twelve inch incision across the front of the knee. Next the damaged part of the joint (cartilage or bone) is removed and a man-made artificial prosthesis comprised of metal and plastic is inserted after the surfaces of the knee have been shaped to properly fit the artificial joint. It is attached to the thigh bone, shin, and knee cap. The injured surfaces at the end of femur and tibia are removed along with small amounts of bone. Metal components are placed to mimic the surface of the joint and can either be press fitted or cemented with methylmethacrylate. The undersurface of the kneecap is cut and replaced with a plastic (ultra high density polyethylene), and lastly a spacer is inserted between the metal components

to ensure a smooth gliding surface. The total process takes about 2 hours.

IV. SURGERY PROGRESSION

Recent progression has included improvements in materials used for replacement artificial joints that allow for more natural movement of the leg. No longer is cobalt chrome metal used but now titanium alloys have replaced these replacement parts. Plastic inserts have been redesigned and improved to last longer and allow for more support of the knee. These man made inserts now have rotating parts to allow for more natural leg movement and deter the breakdown of plastics. These artificial parts can now be designed to only replace an exact part of the knee where injury has occurred (partial knee replacement rather than a total knee replacement). These vast improvements recently have allowed knee replacements to last upward of 20 years and more. A few years ago they were only expected to last about half the time. Additionally new developments have been made with minimal invasive cuts. These smaller incisions, means less cutting into deep tissues which allows for quicker recovery from the procedure and less pain. Some hospitals even now use computers to assist with the surgery, which makes for a more precise implant position and alignment. These strides in the surgical procedure make the whole process a lot quicker and much less painful for the patient.

REFERENCES

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