

# Knee Arthroplasty

## I. Introduction

Arthroplasty is defined as a surgical repair of a joint or the fashioning of a movable joint, using the patient's own tissue or an artificial replacement.

In a knee Arthroplasty, the entire knee is taken out through surgery and replaced with an artificial knee. The longest bone, known as the Femur (thigh bone) is attached to the Patella, Meniscal cartilage, Hyaline cartilage, and the Tibia (shinbone).

## II. Causes

Athletes that play sports like football, for example are high risks of knee Arthroplasty for their physical activity in which they are hit near their knees or below it. Another cause of Knee Arthroplasty is arthritis in the knee, commonly known as Osteoarthritis. Osteoarthritis is a form of arthritis that develops over a period of time in the knees. Other causes are simple as elderly men or women having cartilages in their knees that are worn out due to age.

## III. Procedure

The procedure normally takes about two hours. Surgeons cut away damaged bone and cartilage from your thighbone, shinbone and kneecap and replace it with an artificial joint (prosthesis) made of metal alloys, high-grade plastics and polymers. Surgeons make an incision down through the middle of the knee so that they have exposure to the Femur bone, Tibia bone, and the patella. Next, they make a hole through the center of the femur and then they slide a rod down the femur. This allows the surgeons to cut a specific angle relative to the femur usually 5 or 7 degrees. Then they cut 8 or 10 millimeters of the femur bone in order to make the angle correct for the prosthesis to fit

nicely and comfortably. They use antibiotic saline to avoid infection in the knee and throughout the body. They then cut away approximately 2 millimeters of the Tibia so they are able to implant the Tibial prosthesis. It is important that they balance and align the Femur prosthesis to the Tibial prosthesis (base plate) to avoid any pain for the patient when he/she begins to walk normally. They use cement to connect the patella to the Tibial base plate and femoral prosthesis. It is imperative to maintain extension of knee. From time to time the surgeons will extend and bend the knee to ensure that the patient has stability in their knees.

## IV. Post Surgery

Post surgery, the patient usually spends about 3 to 5 days in the hospital. Patients then go home or go to a skilled nursing facility (SNF). SNF is a rehab facility where nurses provide exercises to improve movement in your knee. Also once at home the patient has to take medication for about 3 weeks after surgery; usually antibiotics. Important to keep your knees extended completely and exercise your knee by bending it up to 120 degrees.

## V. Different Types of Knee Replacements

There are three common types of Knee Replacement surgery. The first type of knee replacement is constrained. In a constrained knee replacement the implants are connected to the bone with a hinge-like device for stability and durability in the knee.

The second type of knee replacement is non-constrained. A non-constrained knee replacement does not rely on a hinge-like device. It relies on the bone's ligament and muscles for support.

The last type of knee replacement is Unicondylar. This replacement occurs when

only part of the knee is infected with arthritis or is worn out. The cuts in this particular surgery are less invasive compared to the non-constrained and constrained knee replacement.

## VI. Companies with Patents for Knee Replacements

Three major companies that patent knee replacements are Stryker, Wright Medical Technology, and Smith & Nephew Orthopaedics. The important distinction to make is that the Smith & Nephew Orthopaedics use Oxinium instead of nickel chrome alloys for their prosthesis. The polyethylene in the Oxinium is much stronger and lasts longer than the polyethylene in the nickel chrome alloy prosthesis.

## VII. References:

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