

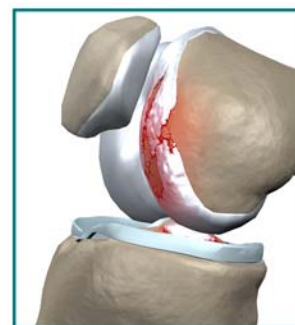
Minimally Invasive Partial Knee Replacements

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Arthritis is a leading cause of disability in the United States. In 2003, arthritis affected 70 million people, a number that is expected to climb as the baby boom generation gets older, which is almost 33% of the population. [Source: Center For Disease Control, 2003.] There is more than one million hospitalizations each year related to arthritis conditions. [Source: National Center for Health.] Arthritis conditions usually do not cause death, but affects our quality of life.

The number of total joint replacements performed annually has been steadily increasing. Over 500,000 total knee replacements are performed each year. This number is steadily increasing due to the aging baby boomer population as well as the increase of obesity in our country. Partial knee replacements are usually about 10-15% of the total number of total knees.

Unicompartmental knee replacements (UKA) gained popularity in the early 1970's. The attraction at that time was the minimal bone sacrifice and potential ease for future revision to a total knee replacement if necessary. However, the combination of poor prosthetic design, instrumentation and inadequate patient selection resulted in unacceptably high failure rates. Subsequently, this was nearly abandoned in the United States by the late 1980's.



**Unicompartmental
Knee Replacement**



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Dr. Repecci was responsible for reintroducing UKA in the United States in the 1990's. He developed a minimally invasive technique for UKA. There was an appeal to orthopedic surgeons who were aware of the potential benefits of reduced tissue trauma and minimally invasive surgery.

Subsequently, UKA enjoyed a resurgence in popularity due to the combination of studies that reported survivorship that rivals total knee replacement. Also, minimally invasive surgical techniques have been developed to facilitate implantation with decreased disruption of the soft tissue envelope. Therefore, the benefits of the minimally invasive technique included shorter incisions, less discomfort, overnight hospital stay, and a more rapid return of range of motion and function.



Signature Patient-Specific Knee

The outcomes of a UKA are highly dependent upon patient selection criteria and the thorough understanding of the appropriate indications, which is critical to both short and long-term successes. The ideal candidate for a unicompartmental knee replacement has non-inflammatory arthritis that has failed non-operative treatment with symptoms confined to the medial (inside) or lateral (outside) joint line and the evidence of isolated arthritis on x-rays. Optimum results have been reported in a non-



Deuce Knee

obese patient without patellofemoral symptoms (kneecap) who have functioning cruciate ligaments and a range of motion greater than 90 degrees. A minimal bowed deformity (less than 10 degrees) and a flexion contracture (lack of straightening out the knee of less than 10 degrees) are additional prerequisites for optimal results. These partial knee replacements can be used on the medial or lateral aspects of the knee, depending on location of arthritis.

The single most important factor in selecting UKA is patient's pain pattern, which means localization of the pain to one portion of the knee. A patient with a more diffuse pain, such as that pain associated with stair climbing, pain at rest or pain related to the front of

the knee as well as one of the sides of the knee, is not a good candidate for a partial knee replacement, but is a better candidate for a total knee replacement. The partial knee replacement relies on the normal ligament mechanics of the knee to help with the stability of the knee. These knee replacements can be fixed bearing or mobile bearing implants. The implant selection is left up to the orthopedic surgeon's decision as to which is the best component for the individual. It is our feeling that the greatest advantage of a partial knee replacement is that it retains the cruciate ligaments as well as the opposite normal compartment and the patella. This results in more normal knee function. This also helps us to explain why patients who have had a partial knee replacement feel "more normal" than those who have undergone a total knee replacement. Total knee replacement results are excellent, however, there is usually some associated clicking or clunking that may occur. However, pain relief is the goal of replacement surgery and does approach 95-98% success.

The surgeon will have to make a decision between a unicompartmental knee replacement, a total knee replacement or what is called a high tibial osteotomy for the treatment of isolated medial compartment arthritis in the younger patient. Typically the partial knee replacements are utilized in younger individuals who, again, have isolated arthritis to the inside or outside of the knee. The results of UKA reported by Dr. Berger reveal a 10-year survivorship of 98% and a 15-year survivorship of 96% using a standard open approach. These patients average 68 years of age at the time of surgery. In patients under 60 years of age, Dr. Swenkoski found 11-year survivorship of 92%. One can also look at this and say that there is an approximately 10 out of 100 patients that will need a revision at a 10-15 year follow-up.

In conclusion, partial knee replacement has had a resurgence in popularity due to a combination of long-term studies, better implants and minimally invasive surgical techniques to facilitate minimal disruption of the soft tissue envelope. The benefits include smaller incisions, less discomfort, overnight too can be done through a minimally invasive incision and patients can usually go home the next day.

hospital stay and a more rapid return of range of motion and functions. Unfortunately, not everyone is a candidate for a partial knee replacement and this is a decision that would need to be made based on your exam, x-rays and consultation with your physician.

PATELLOFEMORAL REPLACEMENTS (KNEECAP REPLACEMENTS)

Recently there has been a refinement in the technique and the recent technology of patellofemoral replacements (kneecap), which is a new and exciting area of orthopedics. A small percentage of patients present with kneecap symptoms or difficulty going up and down stairs, and the x-rays reveal that there is isolated kneecap arthritis. This also could be related to a malalignment or kneecap tracking problem or a previous surgery to the knee that has resulted in isolated kneecap arthritis. Several implant manufacturers have made significant advancements in their implants as well as the minimally invasive surgical technique and alignment jigs needed to perform this operation successfully. Therefore, we are also able to help out patients who have isolated patellofemoral arthritis. This

DEUCE KNEE REPLACEMENT

There are two other evolving minimally invasive knee surgery techniques. This relates to the application of a Deuce knee replacement, which is the ability to resurface the kneecap as well as the medial compartment of the knee. These are the two areas of the knee that are most commonly affected by arthritis. Therefore, these can be replaced while still retaining the cruciate ligaments. This also can achieve a well-balanced knee while still not sacrificing the cruciate ligaments. This design of replacing the two frequently worn out compartments is a relatively new design. It is early in terms of our standard long term total knee outcome studies. But none the less it may prove beneficial to many people, and seems to be demonstrating excellent results.

PATIENT SPECIFIC KNEE REPLACEMENTS

Finally, the most recent exciting current technological breakthrough is the utilization of preoperative MRI's which are custom and patient-specific allowing us three dimensional preoperative planning. This results in simplified surgery without the use of intramedullary guides, which will essentially decrease pain and shorten the operative time, which will hopefully result in better patient outcomes. Through the utilization of preoperative custom-made molds (which allows the femur and tibia positioning guides to uniquely fit into each individual knee), we are able to apply patient-specific technology, which will allow simple, fast and accurate surgical techniques. The patient-specific technique is innovative and it differs from conventional instrumented technique by reducing the number of surgical steps and instruments needed for each intervention. This technique will decrease the use of a tourniquet and decrease the time under anesthesia.



This is a new developing technique and it will still need to undergo long-term studies to ultimately determine whether or not it can alter or fine tune the excellent results that we now achieve with knee replacements. There are risks associated with any surgery, but the risks of infection, blood clot or wound healing problems tends to be more on the negligible side while allowing us to obtain 95-98% excellent patient satisfaction scores and outcomes from our current techniques. Partial knee replacement is a technique that can be utilized in approximately 10-15% of patients with knee arthritis. Partial knee replacements often may be the only knee replacement one needs in their lifetime or it allows us to bridge the gap between young individuals who have had isolated knee arthritis until such a time that they are old enough and better candidates for total knee replacement.



Patellofemoral Replacement