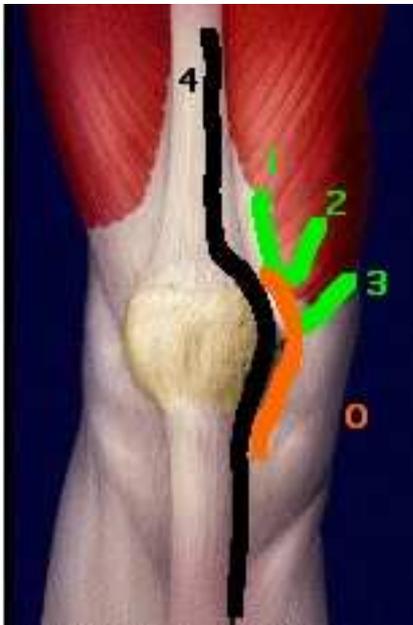


## **MINI INVASIVE SURGERY in KNEE ARTHROPLASTY**

Is it mandatory to make a large exposure to perform perfectly a knee prosthesis ? Recently Mini invasive surgery ( MIS ) in knee arthroplasties is becoming popular as it should provide less intraoperative blood loss, less post-operative pain, better early motion, and a shorter hospital stay, with similar implant accuracy to standard incision.

Surgeons are opposing arguments in the affirmative and opposition. To lighten this debate, we could summarise some of these regarding with:

- visual exposure
- instruments' size
- extensor mechanism préservation
- benefits to what kind of patient
- consequences on management



**0 = minimum arthrotomy**

### **MINI INVASIVE APPROACHES**

**1 = trans tendinous**

**2 = mid vastus**

**3 = subvastus**

### **STANDARD APPROACH**

**4 = standard approach**

## **IN THE AFFIRMATIVE**

### **-visual exposure**

Most of the time, knee prosthesis doesn't require a long standard approach everting the patella and cutting extensor mechanism on a long distance. On the opposite, MIS is not operating through a keyhole. Length of the skin incision is not the most important even if it is the main thing that the patient will see postoperatively. But when it is possible to do it with a small incision why not to do it?

The key to perform the surgery properly is by positioning the knee in the correct amount of flexion or extension to visualize a specific portion of the knee.: that is what professor LASKIN from NY calls "the window positioning technique".

To visualize the anterior femur, the knee is extended to about 45° of flexion. To visualize the tibial plateau, the knee is flexed to 90°. The knee is not hyperflexed

except for the period required to insert the cement and the permanent tibial component.

This is capital for not stretching the soft tissues.

We agree that It could be technically demanding at the beginning of training of the surgeon.

Tremendous demonstration of accuracy is for UKA that doesn't need the same incision than for a TKA as learnt in the past.

10 cm maximum allow a perfect exposure and dramatically shortened the post-operative cares, pain, and time to return to normal activities. Timing of the operation is the same in trained hands, with no more complications than with a standard approach.

### **-instruments**

It is possible to do MIS with regular instruments but it is tough. The danger is to stretch the soft tissue inducing pain and possibility of necrosis.

MIS is facilitated by appropriate instruments adapted to small incision as proposed now by the suppliers. With these new instruments the operation is as easy as with standard approach.

More than this, the modifications of the instrumentation has made us some progress in technical precision and accuracy; this is dramatically demonstrative in the MIS UKA technique.

### **-extensor mechanism preservation**

-preserving the extensor mechanism will facilitate early extension recovery, and active motion

-preserving the patella pouch you will prevent adhesences and facilitate flexion. Consequently, rehabilitation will be facilitated and the hospital stay reduced.

-cutting less tissue lessens pain and blood loss.

The midvastus approach, initially described by Engh, is a modification of the medial parapatellar approach and provides a good exposure to the knee joint. The fibers of the vastus medialis are split obliquely along 2-3 cm, thus disrupting less of the extensor mechanism compared with the parapatellar approach. Many authors published a better outcome in the early postoperative period when compared with the parapatellar approach.

### **-what kind of patient**

The ideal patient had at least 110 °of flexion, a body mass index less than 35.

Patella baja, prior open surgery, morbid obesity, and a heavily muscled leg made this type of exposure very difficult, and may increase operative impairments and complications.

### **-complete and perfect management**

There was no increased prevalence of malpositioning of the components in the limited incision group published up to now.

All the different operating steps before positioning and anchoring the components of the implant devices are perfectly done completely ( removal of osteophytes, capsular and ligaments release, patellar release etc.)

The patients who had the MIS demonstrated significantly better clinical outcomes with respect to the length of hospital stay, need for inpatient rehabilitation after discharge, narcotic usage at two and six weeks postoperatively, and the need for assistive devices to walk at two weeks post-operatively.

It has been shown that patients with a limited incision require approximately 50% less analgesics than patients in a standard incision group.

In trained surgical hands, operation is not longer than for a standard approach. a learning curve of 25 to 50 procedures may be required in the hands of a high volume arthroplasty surgeon.

## **IN OPPOSITION**

### **-visual exposure**

In contrast to arthroscopic procedures that actually allow better intraarticular view, one would argue that the smaller incision restricts the visibility of surgeons to do the procedure and may lead to complications, particularly malaligned components, poor cement technique, retained cement fragments, skin damage, infection, soft tissue stretching.

Marketing advantage of the length of the incision has nothing to do with the magnitude of the surgical procedure; the minimally invasive procedures do not make the operation smaller by shortening the incision.

It may increase the trauma to the knee by skin stretching and retracting soft tissues, which often are necessary with MIS.

This should be avoided.; Why to be brutal to the soft tissues beneath the small skin incisions as an adequate procedure would have been just by lengthening the incision and having direct full exposure of the bone segments?

### **-instruments**

Working through a small incision may result in both more pressure on the skin and soft tissues from stronger retraction and more abrasion of the skin edges from reamers, cutting saw, and rasps. These factors may cause more wound complications and infection.

Using regular ancillary material is difficult inside the tighter incision. The risk is to badly perform the cuts or position correctly the jigs.

Smaller instruments are required and they have their own inbuilt errors: the closer together are the pins on a cutting bloc, the lesser is the stability and the greater the cutting angulation will be leading to malpositioning the implants.

### **-extensor mechanism préservation**

In midvastus approach , a potential damage to the neural and vascular structures due to the incision in the vastus medialis muscle could not be excluded.

The interval between the main conjoined quadriceps tendon and the vastus medialis is safe and direct and is virtually aneural and avascular. It also is extensile in a standard approach and can be extended as far proximally as necessary to manage any complications that arise.

in **subvastus** arthrotomy, the soft tissues may be damaged by tension and hematoma. This may lead to an irritation of neuromuscular structures located in the joint capsule, the quadriceps, and patella tendon, and thus leads to a delayed recovery from pain.

It is possible not to evert the patella and preserve the patella pouch in a standard approach the same as in MIS.

### **-what kind of patient**

MIS is not for every patient ; To be safe you should exclude Patella baja, prior open surgery, morbid obesity, and a heavily muscled leg.

### **-complete management**

The average operating time may be longer in the smaller limited incision patients as the surgeon checks more often at each steps in a small operative field.

Soft tissue balancing and osteophytes removal may become difficult because of limited visualisation leading the surgeon omitting these steps.

it may be difficult to place a stemmed tibial component with this limited incision . So, the risk exists in Malaligned components, poor cement technique, retained cement fragments as complications directly related with the MIS approach.

## **AVERAGE POSITION**

Common sense dictates that when a surgeon is able to do the same operation through a small incision why shouldn't it do it ?

Accepting the fact that the goal of each operation is to give the best result as possible to the patient, each surgeon should do the best approach required to limit soft-tissue trauma, to manage perfectly the knee, to correctly implant the devices and to improve the appearance of the scar.

That's what we could call **L I S A** = less incision surgery as Available.

MIS is not a goal in itself and has nothing to do with perfection. There is no definitive adequate length providing the surgical act is perfect. The MIS surgeon's club is not yet settled.

A knee arthroplasty doesn't resume to a small approach as it has been demonstrated that a standard approach combined with the protocols of anesthesia, analgesia; and early rehabilitation used in MIS may lead to the same functional results.

A surgeon hesitant to use minimal incision techniques can obtain similar early results without changing the surgical procedure.

successes of Knee arthroplasties are caused by many factors:

1. patient selection and preoperative preparation
2. minimal tissue trauma from smaller incisions
3. anesthesia protocols
4. pain management protocols
5. early physical therapy protocols

We should add an other factor : the surgeon with his knowledge and practice.

- his ability and confidence in the surgical technique he learnt and uses commonly
- his training in performing these operations
- his up-to-date formation

All may influence the choice of the technique and the final result.

Tremendous demonstration of accuracy is for UKA



**Standard approach**



**versus Less Invasive Surgery in Uni K A**



**Standard approach**

**versus**



**Less Invasive Surgery in T K A**

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