Manipulation of the Knee

Dr Keith Holt

This is a procedure that is carried out under general anaesthetic, usually 8 - 10 weeks after knee replacement, with the idea of breaking down scar and adhesions, and improving knee flexion. It is a reasonably common procedure, being necessary in perhaps 1 in 5 cases of knee replacement. It is done as an overnight procedure so that a CPM machine can be used to maintain range. Once home, it is thought useful to hire a machine to use at night, so that range is not lost. Surprisingly, it is usually not painful, and it makes the knee feel freer and more normal.

Why is my knee stiff?

Knee replacement is a big procedure, requiring a large incision which goes through the quadriceps tendon and down the medial side of the patella. This incision creates raw tendon edges that want to heal to all the surrounding tissues, including the lower femur beneath it. What keeps this from happening is early motion. If the wound is moving through a large range, it cannot get glued down to the underlying bone.

If range is not obtained early, for whatever reason, then it is more likely that this gluing down of the tendon will occur. It will also be worse when there has been a moderate amount of bleeding and bruising, not only because this restricts motion, but also because it inflames the tissues and makes them more likely to adhere to each other. For this reason, patients on anti-coagulation, particularly warfaren and the like, are more likely to have this problem. Indeed, we know that these patients, even if they do not obviously bleed excessively, are more likely to end up with a stiff knee.

Conflicting Factors

Early on after knee replacement, the main aim of post operative therapy is to regain as much range as possible. Ideally, this means exceeding 90º before leaving hospital, and maintaining that range at home. At home however, there is a tendency to do more walking and exercise than in hospital, all of which makes the knee more swollen, thereby decreasing range of motion. It is often hard to balance those exercises with the simple bending that is required to maintain range, and the philosophy that 'more is better' should be replaced by the concept of 'rest' with an intermittent bending program.

Rest is very important in the first couple of months, and it is essential to allow the swelling to go down. As the swelling reduces, bending will get easier: and the easiest way of doing this is by sitting on a hard chair or table, and letting the leg hang down. The leg can then be pushed back with the other leg, or moved back and forth on a skateboard, to improve motion.

When motion is not able to be maintained, it is necessary to have a therapist help with this. If pushed too hard however, this can be counter productive. Hence, it is important to have a good physiotherapist look after you.

If motion is coming back easily, then it does not need extra therapy. Indeed, the travel to and from physiotherapy sessions may cause more swelling, which then outweighs the benefits of the treatment. These factors need to be balanced out when considering extra therapy in the early post-operative period.

Who needs manipulation?

Whilst some people regain range easily, others take more time. By 6 weeks post surgery, most should have 90º of bend or more. In the second 6 weeks however, many will show significant improvement in their range. Hence, 6 weeks is too early to be certain that a manipulation will be required, even if it is thought to be likely.

By 3 months, the scar can be so well formed and strong, that it is hard to break down. Hence, in most people, the manipulation should be done a bit earlier than that. This is particularly so in the younger, bigger males who will scar the most. On the other hand, if done too early, particularly when the knee is still very swollen, it may aggravate rather than help. For this reason, the ideal time is usually between 8 and 10 weeks post replacement. It is however, very individual, and many factors come into play in determining the best time to do this.

What is done?

Under general anaesthetic, the knee is bent past the block that has prevented it from bending up until then. Often there is a 'popping' sound, or a sudden feel of giving, that accompanies this; which is then followed by more motion being easily gained. Sometimes it is necessary to manipulate the leg straight as well, but this is both uncommon and usually less successful.

In order to keep the pain and swelling down, intravenous cortisone is usually given, just before the manipulation. This makes a big difference to this, and is the reason why this procedure is generally not sore. To help this out, a further weeks worth of oral cortisone is usually prescribed as well. Because of this, most will then notice that their swelling goes down in that period.

What happens afterwards?

After manipulation, patients are encouraged to stay in hospital

so that a CPM (constant passive motion) machine can be used to keep the knee moving through that first night. We also encourage patients to hire one of these machines, for use at night, for a week. Generally a week is long enough but occasionally 10 - 14 days is helpful.

The machine does not need to be used in the day time because, by sitting down on a chair and swinging the leg, just as in the early post-operative period, range can be maintained. At night time though, if not moved, there is a tendency for the knee to stiffen up. Hence, in the first week, keeping the knee moving for some period during the night, is important. The leg does not need to be on the machine all night, but rather, it can go on it every hour or two for an hour or so. The machine also does not need to be turned up to maximum bend where it might aggravate the situation. As long as it is getting past where the knee was before manipulation, then the edges of the scar tissue that have been pulled apart, will not touch each other, and will not rejoin. Usually, this means that about 105° is necessary, taking care to make sure that the knee is actually going through that range, and that it is not slipping in the machine.

Pain medication

Generally no increase in pain medication will be required in the post manipulation period. Indeed, pain medication requirements often go down because the manipulation makes the knee feel better. The cortisone, which is a very strong anti-inflammatory agent, also helps this recovery.

Success

Whilst not everybody is helped by manipulation, the vast majority are. Even if it is not successful however, it rarely makes the situation worse. As well as this, it is often important to know, that everything possible has been done to maximise the range of motion of the knee in the early weeks.

What if I don't do this or it fails?

The next step after manipulation is to consider an arthroscopic removal of scar. This is usually not done until at least 9 months after replacement surgery, both for fear of aggravating the swelling, and making the scar formation worse. Timing is thus very important in achieving success with this and, if done too early, it can make things worse. On the other hand, whilst there is no limit on how long it can be left, the results do seem to be better if it is done between 9 and 15 months post replacement. This is when the scar has matured and softened, the swelling has reduced, and the chances of aggravating the knee is less. Whilst it can be left longer than this, the results tend not to be as good as when it is done in the above mentioned time frame.

The biggest problem with arthroscopic removal of scar and adhesions, is the possibility of introducing an infection into the knee. For this reason, all those who come to this will be given peri-operative antibiotics for the procedure: and usually, an antibiotic such as vancomycin, which will kill most of the troublesome skin organisms, will be used. Despite this however, there is still a small risk that must be balanced up against the potential benefits.

Arthroscopic removal of scar is useful for treating stiff knees that remain restricted 9 or so months down the line. It is also quite good at removing scar in a knee that seems to bend well but aches when flexed. This is usually caused by tethering scar that has formed between the quadriceps tendon and the underlying bone, and is quite easily removed. Whilst this may not increase the range of motion of the knee, it can be a very rewarding procedure from a functional point of view. In most people, it removes the ache and feeling of tightness with knee flexion, and it makes it feel more normal.

Review

Generally a review is organised for about 2 weeks after manipulation. If this has not been done, please ring Dr Holt's secretary to arrange such.

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