

DISC REPLACEMENT SURGERY

Disc replacement surgery is a procedure that I offer for axial back pain. After suitable investigations which include MRI scan, CT scan, lumbar discography and bone scans if you are in the appropriate age group and have the appropriate symptoms disc replacement surgery may be offered to you. This involves making a cut in your abdomen, working down gently between the abdomen and all the major blood vessels and nerves and the front of your abdomen. Access is gained to the disc space by mobilizing the large blood vessels that run in front of them and then a formal discectomy is done where the disc that is causing the pain is removed. Dissection is carried out to the posterior longitudinal ligament which at times is taken down and little bony spurs are removed. Also care is made to identify no pressure is placed on the nerve roots by bits of bone or disc protrusion. After this a disc replacement is inserted which is a combination of a chrome cobalt device inserted into the top of the lower vertebrae and the bottom of the upper vertebrae with a high grade plastic spacer like the plastic used in hip replacement placed between them.

The advantages of disc replacement surgery are that motion is subsequently maintained at the level rather than the more traditional fusion treatment where motion is prevented. Also as height is restored to the disc which has previously been degenerate the facet joints posteriorly are reduced and this is thought to help reduce the incidence of osteoarthritis developing in these. The other great advantage of maintaining the movement of this level is that the adjacent segment which is put under extra stress during the fusion operation is not as adversely affected with disc replacement surgery.

Disc replacement operations of this type were first done in 1984. Subsequent disc replacement that I use has been around since 1987 and there are good follow up studies from twelve years on which show that results are very good. The main aim of surgery is to help relieve or reduce pain and get a patient back to their life that they had prior to the development of back pain. A thorough rehabilitation program which is also outlined on this web site is important however I do not recommend getting back to strenuous physical activity or playing contact sports. It may be that if your job was one of heavy manual labour you may have to consider retraining.

In summary disc replacement reconstructs the lumbar segment in the manner that preserves stability and restores near normal physiological motion. This enables the prosthesis to assume a large share of the functional lumbar spine which is otherwise difficult to simulate. The success of the treatment does not depend on implant alone but other important factors long term. Long term results are influenced by limiting the procedure to proper indications in the correct patient. Surgical approach is very important and does have some complications which are outlined in the complications section. There have been more than

5,000 implantations in over 30 countries worldwide of the prostheses that I use and greater than ten year results have revealed very positive studies.

Surgical Approach

I use a mid line incision for most of my disc replacements or a transverse incision at the top of your underpants line. The skin is incised and the muscles of the anterior abdominal wall are identified. These muscles are split longitudinally and access is then gained to the retroperitoneal space. Some times it is not possible to mobilize the stomach contents and we have to go through the stomach moving the bowel out of the way. Usually however it is possible to gain access to this space which leads nicely to the anterior part of the spine. Once access to the retroperitoneal space has been obtained care is taken to avoid damaging the ureter or any of the other structures. At the L5/S1 disc space the medial sacral vessel is carefully identified and divided. The common internal iliac veins and arteries are then retracted out of the way and the discectomy is performed.

To gain access to higher disc levels the main vessels are swept away to the right, the ilio-lumbar vein is identified and debrided and all the contributory vessels that are identified are carefully tied off so they do not bleed. The vessels are then swept away from the front of the spine and access is granted to the higher disc levels. When the endplates or bottom and top of the vertebrae have been identified a high speed bur may be needed to be used to shape the top of the vertebrae so the implant fits more exactly and as I previously mentioned the ligament at the back of the spine may be taken down so that any possible problems with pressure on nerves or the spinal cord can be avoided.

Complications

Complications of the disc replacement can be grouped into broad categories. The first one is complications in relation to the approach, complications in relation to the prosthesis, complications related to the anaesthesia.

As with any surgery the complication rate is related to your surgeon's experience and the previous complication groups I have discussed can also be grouped into immediate and long term.

Complications related to the approach. The implantation of the artificial disc requires an anterior approach. This as mentioned previously can either be trans peritoneal or retroperitoneal. I prefer the retroperitoneal approach. Trans peritoneal approach increases the risk of abdominal adhesions, ileus and occlusion of the bowel secondary to scar tissue. Also it increases the risk of abdominal hernia. It has also been felt that a transperitoneal approach is associated with a higher incidence of retrograde ejaculation in the male

population than the retroperitoneal approach. This was felt to be due to the bilateral dissection of the sacral fascia and nerve.

The immediate complications of the approach during the exposure it may happen accidentally or may be necessary to open the peritoneum. Usually this will have no further consequences other than a brief post operative ileus where the bowel doesn't work for a day or two. The risk of major vascular injury particular the vena cava and the left iliac crane are greater and exposed in the L4/5 disc than the L5/S1 disc. If the vascular anatomy is particularly abnormal or there is major difficulties with mobilizing the vessels a Vascular Surgeon may be required to help repair the damage. This is also true in the case of revision surgery where previous approaches have been made to the spine. I have never had a major vascular injury in any of the anterior approaches I have performed thus far.

Damage to the major vessels may occur from retractors or if the surgery is extended in duration there is an increased risk of a deep vein thrombosis. Depending on the patient I also consider giving low molecular weight Heparin to try and avoid this risk. This however is not routine and is individualized to each particular patient and their risk factors. During exposure of the L5 disc you may get a sympathectomy effect which includes the sensation of a warmer left leg during the first or second month after surgery. This is minimized by identifying the sympathetic chain and retracting it to the left.

Surgical complications are also a possibility which include loss of sensitivity in women and retrograde ejaculation in men. Again these are less common with a retroperitoneal approach and using monopolar cautery. The best way to avoid this approach is limiting the dissection in the mid line. The left ureter may be damaged during the exposure particularly in revision surgery. If this is the case a Urologist may be useful to help. Compression of the left genitofemoral nerve may occur causing paraesthesia of the left anterior thigh, this is particularly so in the L4/5 disc exposure.

As with any surgical procedure a superficial wound or a deep wound infection has been described. Acute post operative haematoma has also been described and urinary tract infections have also been described. I try and avoid this complication by limiting the use of an indwelling bladder catheter and mobilize my patients quickly post op.

Secondary complications to the approach. Abdominal hernias rarely occur with the retroperitoneal approach but have been described. Late infections have been reported but this is not common in my experience.

Complications related to implant of the procedure. To restore normal disc height one needs to distract the vertebrae before implantation. This in itself may induce complications. There have been episodes of epidural bleeding which has been controlled by direction application of haemostatic sponges and compression.

There have also been cases reported of leaking of the cerebral spinal fluid. Usually sequelae of this are a headache and a prolonged time post operative lying horizontal. Some patients also experience radicular pain after implant of disc replacement. This is usually controlled by anti inflammatory medications however severe sciatica may develop. This is due to irritation of the nerve roots usually at the time of distracting of the disc space. Early post operative subsidence of the disc has been reported, this is best avoided by ensuring that the endplates are prepared properly and that there is a good horizontal apposition of the disc to the bone. Anterior subluxation or dislocation of the implant has only been observed anteriorly and never into the spinal canal. This may be as a result of excessive activity post op and needs to be monitored by on going follow up x-rays. This may require revision of the prosthesis itself. Anterior displacement of the plastic core is possible and most likely to occur at the L5/S1 level.

Long Term Complications

These complications are in general related to the overall positioning of the implant. Subsidence of the implant is possible. Heterotrophic ossification where the disc space becomes ossified and immobile is also a possibility. Usually these do not require any anterior revision surgery. Wear of the implant is also a possibility however neither prosthetic implant fracture nor complete destruction of polyethylene/plastic core with significant loss of disc height or any chemical or bone reactions to polyethylene debris have been described in any study with more than a ten year follow up.

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