GREG MALHAM
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ARTIFICIAL DISC REPLACEMENT - CERCICAL & LUMBAR

INTRODUCTION:

The discs in your spine act as shock absorbers, positioned between the blocks of bone in your spine called vertebra. A disc is made of an outer wall of oblique fibres called the Annulus Fibrosus and an inner gel containing protein and water called the Nucleus Pulposus. The discs are flexible, allowing the spine to bend forward *(flexion)*, backwards *(extension)*, sideways *(lateral flexion)* and rotate.

DEFINITION:

An Artificial Disc is a device that can be implanted into the spine, replacing the damaged disc to permit normal load bearing and motion of the spine.

The Artificial Disc is also called a disc replacement, disc prosthesis or arthroplasty device. With total disc replacement, most of the disc tissue is removed and the artificial disc is inserted into the disc space between the vertebrae.

Artificial Discs have two cobalt-chromium metal plates; one is attached to the vertebra above the disc being replaced and the other to the vertebra below. Between the two plates is a central core, either of metal or plastic *(called polyethylene)* permitting motion in the ball and socket principal. The devices allow motion by smooth curved surfaces gliding across each other.

Artificial discs have been used in Europe since the late 1980's and are approved by the FDA in the USA. The devices were used in Australia from the mid 1990's until 2006 when the TGA approval was withdrawn on cervical artificial discs only, because of the cost *(approximately AUD $9,000 each).* Since 2006 cervical artificial discs have not been funded for public or privately insured patients. Funding continues for lumbar artificial discs. Cervical and lumbar artificial discs are available for self- funded patients or approved Workcover patients.

INDICATIONS:

A **Cervical Artificial Disc Replacement** can be used to treat pain arising from a damaged disc, which is compressing the spinal cord or nerve roots which has not responded to non-operative care such as medication, injections, rest and physiotherapy.

A **Lumbar Artificial Disc Replacement** is used in symptomatic disc degeneration with discogenic pain without significant facet joint disease.

Prior to the development of Artificial Discs, the only surgical option was fusion, where adjacent vertebral bodies were fused together, using interbody cages and bone after the damaged disc was removed.

The goal of Artificial Disc replacement is to:
• Maintain motion, not restore motion at the affected disc level;
• Reduce the loading and stress on the adjacent disc levels.

Artificial Disc replacement is usually performed in patients under 55 years of age.
Certain conditions prevent a patient from receiving an artificial disc. These include marked loss of disc space height, thin bones *(osteoporosis)*, slip of one vertebra across another *(called spondylolisthesis)*, vertebral body fracture, spine tumour or infection, significant wear and tear arthritis in the small facet joints at the back of your spine, or allergies to the materials in the artificial disc device. In addition, significant surgery to the front *(anterior)* of your neck or abdomen, previous radiotherapy or morbid obesity may prevent access to insert the artificial disc device into your neck or lumbar spine.

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POTENTIAL ADVANTAGES OF ARTIFICIAL DISC REPLACEMENT VERSUS FUSION:

After removal of the painful disc and relief of spinal cord or nerve root compression, the Artificial Disc allows motion at the operated level.

In contrast to fusion, where the vertebrae above and below the damaged disc are fused together, the Artificial Disc may reduce the wear and tear risks to discs above and below the operated level.

The Artificial Disc may permit a more rapid return to activities than fusion surgery.

The patient is encouraged to return to gradual progression and normal motion early in the post-operative period.

SUCCESS OF ARTIFICIAL DISC REPLACEMENT:

The **Cervical Artificial Disc Replacement** improves arm pain, numbness and weakness in 80 - 90% of patients. No change in symptoms occurs in 10%.

The **Lumbar Artificial Disc Replacement** improves low back pain in 70 - 80% and lower limb pain in 80% of patients. No change in symptoms occurs in 10 - 20%.

RISKS OF ARTIFICIAL DISC REPLACEMENT:

Cervical Artificial Disc Replacement
The total risk of cervical artificial disc replacement is approximately 2%.

Specific risks are infection, bleeding, hoarse voice *(dysphonia)*, problems with swallowing *(dysphagia)*, Horner's syndrome *(small pupil and drooping eyelid),* nerve root damage *(causing pain, numbness and weakness in the arms)*, damage to the spinal cord, causing weakness of arms and legs *(quadriparesis)* or paralysis *(quadriplegia)*, failure of the fusion or movement of the cage.

General risks associated with any surgical procedure are heart attack, pneumonia, blood clots in the legs, (DVT), which can travel to the lungs (pulmonary embolus), stroke, drug reaction, general anaesthesia and death.

Lumbar Artificial Disc Replacement
The total risk of lumbar artificial disc replacement is 3 - 5%. Specific risks are bowel injury, ureter damage, bleeding from large retroperitoneal iliac arteries or veins, emboli (blood clots) to lower limbs and retrograde ejaculation in males.

General risks associated with any surgical procedure are heart attack, pneumonia, blood clots in the legs, *(DVT),* which can travel to the lungs *(pulmonary embolus)*, stroke, drug reaction, general anaesthesia and death.

BEFORE SURGERY:

Tell Mr Malham about any medical conditions or previous operations. If you have a medical condition such as diabetes, heart problems, high blood pressure or asthma, Mr Malham may arrange for a specialist physician to see you for a pre-operative assessment and medical care following the neurosurgery.

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BEFORE SURGERY:

Inform Mr Malham of medication that you are taking and/or have allergies to medications.
Patient must stop using the following, 10 days pre-operatively:
- Aspirin
- Plavix
- Isocover
- Asasantin

Patient must stop using blood thinning medication *(such as Warfarin)*, 3-5 days pre-operatively.

SINGLE AND TWO LEVEL DISC INJURIES

Single level cervical and lumbar disc injury - One level Artificial Disc Replacement is appropriate. Single level cervical and lumbar adjacent segment disease above a previous fusion level - one level Artificial Disc Replacement is appropriate.

Two level cervical disc injuries - Two level Artificial Disc Replacement is appropriate.
Two level lumbar disc injuries at L4/5 and L5/S1 - perform "Hybrid" surgery with L5/S1 Anterior Lumbar Interbody Fusion *(to provide stable base)* and then L4/5 Artificial Disc Replacement *(to maintain motion above and reduce risk of adjacent segment disease)*.

CHOICE OF ARTIFICIAL DISC PROSTHESIS:

Mr Malham is credentialed to use the Prestige, Prodisc-C, Mobi-C, Synergy, Maverick and M6 Lumbar prostheses. He has lectured, taught courses and attends regular national & international conferences on Artificial Disc Replacements. Mr Malham's preferred prostheses since 2004 is the Prestige and Synergy in the cervical or neck and Maverick with M6 in the lumbar region. This choice is based on the safety, stability (resistance to sheer forces) and results provided by these devices. All devices are TGA approved in Australia and FDA approved in the U.S.A. Mr Malham has no financial arrangement or benefit from using these prostheses.

AFTER SURGERY:

No cervical collar or lumbar brace is needed post-operatively. Sensible normal activity is advised.

Avoid bending, twisting, heavy lifting and activities above shoulder height in the first 4 weeks following surgery.

Patients can sit for meals 20 - 30 minutes.

Car travel is permitted as a passenger for short distances. Driving can be resumed 4 weeks post operatively, after assessment by Mr Malham.

Walk 4 equal small walks per day and undertake a home exercise programme, provided to you by the physiotherapist whilst in hospital.

Outpatient physiotherapy can be resumed after your 4 week post-operative review by Mr Malham.