

Mosaicplasty for knee cartilage defects

1 Guidance

1.1 Current evidence suggests that there are no major safety concerns associated with mosaicplasty for knee cartilage defects. There is some evidence of short-term efficacy, but data on long-term efficacy are inadequate. In view of the uncertainties about the efficacy of the procedure, it should not be used without special arrangements for consent and audit or research.

1.2 Clinicians wishing to undertake mosaicplasty for knee cartilage defects should take the following actions.

- Inform the clinical governance leads in their Trusts.
- Ensure that patients understand the uncertainty about the procedure's efficacy and the options for alternative treatments. They should provide them with clear written information. In addition, use of the Institute's *Information for the public* is recommended (available from www.nice.org.uk/IPG162publicinfo).
- Audit and review clinical outcomes of all patients having mosaicplasty for knee cartilage defects. The Institute may review the procedure upon publication of further evidence.

2 The procedure

2.1 Indications

2.1.1 Full thickness cartilage defects of articular surfaces in weight-bearing joints may be limited to the joint surface (chondral) or involve the underlying bone (osteochondral). They cause symptoms which may include pain, catching, locking and

swelling, and may lead to degenerative changes within the joint. These defects usually occur from direct trauma, but may also occur in avascular necrosis, osteochondritis dissecans and a variety of cartilage disorders.

2.1.2 Conventional surgical methods for treating knee cartilage defects include Pridies' operation (drilling the joint cartilage to promote healing), debridement and abrasion arthroplasty, which lead to fibrocartilaginous scar formation within the defects. Newer alternatives are autologous chondrocyte implantation (ACI) and autologous periosteal grafts. ACI involves removing hyaline cartilage from a non-weight-bearing portion of the knee, cultivating the cartilage cells in vitro and implanting them by an open procedure. Autologous periosteal grafts use periosteum containing stem cells from the tibia, turned to face the subchondral bone.

2.2 Outline of the procedure

2.2.1 Mosaicplasty is a technique for creating an osteochondral autograft. Small cylindrical osteochondral plugs are harvested from the periphery of the patellofemoral area, which bears less weight, and inserted into drilled tunnels in the affected weight-bearing part of the knee joint. The procedure is commonly undertaken by open surgery, but it may be carried out arthroscopically when perpendicular access to the harvesting and implantation sites is feasible. The harvesting and implantation process is repeated until about 70% of the defective area is filled, with minimal spacing between plugs.

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This guidance is written in the following context

This guidance represents the view of the Institute which was arrived at after careful consideration of the available evidence. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. This guidance does not, however, override the individual responsibility of healthcare professionals to make appropriate decisions in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

Interventional procedures guidance is for healthcare professionals and people using the NHS in England, Wales and Scotland.

This guidance is endorsed by NHS QIS for implementation by NHSScotland.

2.3 Efficacy

- 2.3.1 The studies used different outcome measures, which makes the assessment of efficacy difficult. In a randomised controlled study that compared mosaicplasty with ACL, there was no significant difference in the number of patients who had an excellent or good clinical outcome at 1 year (69% [29/42] and 88% [51/58], respectively). In the subgroup of patients who had repairs to lesions of the medial femoral condyle, significantly more patients who had ACL had an excellent or good outcome (88% [21/24]) compared with those who had mosaicplasty (72% [21/29]) ($p < 0.032$). Arthroscopic evaluation of grafts at 1 year after the procedure found that 35% (8/23) of mosaicplasty patients had successful grafts that rated grade 1 or 2 according to the International Cartilage Repair Society criteria, compared with 84% (31/37) of ACL patients ($p < 0.01$).
- 2.3.2 In a case series of 831 patients where only 118 procedures involved the patellofemoral joint, the proportion who had an excellent or good outcome based on standard clinical scores at 10 years depended on the site of mosaicplasty and ranged from 79% in patients with patellar mosaicplasty to 92% in patients with femoral condylar mosaicplasty. In a case series, 95% (54/57 patients) had returned to their normal level of sport and work activity at 3 years. In another case series, 86% (45/52) of patients had an increased level of knee function and activity at 2 years' follow-up. For more details, refer to the Sources of evidence.
- 2.3.3 The Specialist Advisors noted that efficacy may be influenced by the size of the area repaired and consequently the amount of donor cartilage required.

2.4 Safety

- 2.4.1 Procedure-related and long-term complications were inadequately reported in the studies. They may have been influenced by the use of concomitant surgery during the mosaicplasty procedures.

- 2.4.2 One case series reported postoperative locking of the knee joint in 10% (5/52) of patients. Haematoma or haemarthrosis affected 2% (1/52) to 4% (36/831) of patients in case series. Wound infection rates were less than 1% (4/831) to 2% (1/52). No serious complications were reported at the harvest site. For more details, refer to the Sources of evidence.
- 2.4.3 The Specialist Advisors reported anecdotal adverse events that included cartilage degeneration adjacent to the mosaicplasty site, femoral condyle fracture and occasional technical problems.

2.5 Other comments

- 2.5.1 It was noted that this procedure is often carried out as one part of a more extensive procedure.

3 Further information

- 3.1 The Institute has issued technology appraisal guidance on cartilage injury – autologous chondrocyte implantation (www.nice.org.uk/TA089).

Andrew Dillon
Chief Executive
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Information for the public

NICE has produced information describing its guidance on this procedure for patients, carers and those with a wider interest in healthcare. It explains the nature of the procedure and the decision made, and has been written with patient consent in mind. This information is available from www.nice.org.uk/IPG162publicinfo

Sources of evidence

The evidence considered by the Interventional Procedures Advisory Committee is described in the following document. 'Interventional procedure overview of mosaicplasty for knee cartilage defects', April 2005.

Available from: www.nice.org.uk/ip283overview

Ordering information

Copies of this guidance can be obtained from the NHS Response Line by telephoning 0870 1555 455 and quoting reference number N1004. *Information for the public* can be obtained by quoting reference number N1005.

The distribution list for this guidance is available at www.nice.org.uk/IPG162distributionlist

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