Mosaicplasty for knee cartilage defects

Interventional procedures guidance
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nice.org.uk/guidance/ipg162

Your responsibility

This guidance represents the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, healthcare professionals are expected to take this guidance fully into account. However, the guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

Commissioners and/or providers have a responsibility to implement the guidance, in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity, and foster good relations. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

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.
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.
- 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.

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 ACI, 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 ACI 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 ACI 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 section.

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 haemoarthrosis 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 section.

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](https://www.nice.org.uk/).
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.

4 Changes since publication

As part of NICE’s work programme, the current guidance was considered for review in June 2009 but did not meet the review criteria as set out in the IP process guide. This guidance therefore remains current.

20 January 2012: minor maintenance.

5 About this guidance

NICE interventional procedure guidance makes recommendations on the safety and efficacy of the procedure. It does not cover whether or not the NHS should fund a procedure. Funding decisions are taken by local NHS bodies after considering the clinical effectiveness of the procedure and whether it represents value for money for the NHS. It is for healthcare professionals and people using the NHS in England, Wales, Scotland and Northern Ireland, and is endorsed by Healthcare Improvement Scotland for implementation by NHSScotland.

This guidance was developed using the NICE interventional procedure guidance process.

We have produced a summary of this guidance for patients and carers. Information about the evidence it is based on is also available.

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Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the
guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way which would be inconsistent with compliance with those duties.

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Endorsing organisation

This guidance has been endorsed by Healthcare Improvement Scotland.