

# NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

## INTERVENTIONAL PROCEDURES PROGRAMME

### Interventional procedures overview of arthroscopic femoro–acetabular surgery for hip impingement syndrome

Hip impingement syndrome may restrict movement of the hip joint and can be painful. It is associated with an unusual shape of the hip socket (acetabulum) and/or the head of the thigh bone (femoral head). Arthroscopic hip-preservation surgery aims to reshape the hip joint by removing parts of cartilage or bone through a minimally invasive operation.

#### **Introduction**

This overview has been prepared to assist members of the Interventional Procedures Advisory Committee (IPAC) in making recommendations about the safety and efficacy of an interventional procedure. It is based on a rapid review of the medical literature and specialist opinion. It should not be regarded as a definitive assessment of the procedure.

#### **Date prepared**

This overview was prepared in September 2006.

#### **Procedure name**

- Arthroscopic hip preservation surgery

#### **Specialty societies**

- British Hip Society

#### **Description**

##### ***Indications***

Hip impingement, or femoro–acetabular impingement, occurs from a combination of abnormalities of the femoral head (i.e. the head of the thigh bone) and/or acetabulum (the hip socket). By instigation of a progressive degenerative process, it may be the cause of osteoarthritis previously

considered to be idiopathic. Impingement can be caused by jamming of an abnormal femoral head into the acetabulum during forceful motion (especially flexion), or as the result of linear contact between the acetabular rim and the femoral head–neck junction.

Symptoms may be noted in the groin during hip flexion activities resulting from sporting activity, or after prolonged sitting.

### ***Current treatment and alternatives***

Appropriate treatment may begin with a trial of conservative treatment, including activity modification, to reduce excessive motion and demand on the hip. Non-steroidal anti-inflammatory drugs may be useful in acute onset but may mask underlying degenerative processes. Open femoro–acetabular surgery can be used to correct offset in hip impingement. Advanced osteoarthritic degeneration may require total hip replacement.

### ***What the procedure involves***

Like open femoro-acetabular surgery, arthroscopic femoro–acetabular surgery for hip impingement syndrome aims to improve clearance of the hip motion and to alleviate femoral abutment against the acetabular rim. Under general anaesthesia, the patient is placed in a lateral decubitus position and the leg is held in a traction device. An arthroscope and surgical instruments are inserted into the hip through two or three portals. The site of impingement is identified and the labrum and acetabular cartilage are assessed for lesions. Surgical treatment involves removing any non-spherical sections of the femoral head and prominent sections of the anterior femoral neck to improve the offset of the femoral neck and increase clearance in the joint. Labral lesions are debrided using a shaver or radio-thermal device; femoral and acetabular osteoplasty are achieved where necessary with a burr. Once the hip is reduced, the range of motion and any residual impingement are evaluated.

### ***Efficacy***

The Specialist Advisers highlighted that no appropriate specialist scores for clinical outcomes evaluation have yet been developed; significant improvement in symptoms and delay or prevention of total hip replacement may be useful measures.

Efficacy outcomes were poorly reported in the studies identified; assessments were mostly qualitative.

In one case series of 158 patients undergoing arthroscopic femoro–acetabular surgery, nearly all patients reported resolution of impingement signs on clinical evaluation. In the majority of patients pain was reduced by 50% at 3 months, 75% at 5 months and 95% at 1 year (although how pain reduction was measured was not specified). Overall, 2% (3/158) of patients required a total hip replacement at a mean follow-up of 22 months.<sup>1</sup>

In a case series of 10 patients, the mean non-arthritic hip score on the McCarthy scale improved from 75 points to 95 points at 14 months' follow-up.<sup>2</sup>

## **Safety**

Specialist Advisers considered key safety outcomes to be similar to those for any arthroscopic hip intervention and may include infection, deep vein thrombosis, hip fracture and late-onset avascular necrosis of the femoral head. Only one study reported safety outcomes.

A pathological non-displaced or undisplaced fracture (not otherwise stated) requiring pinning occurred in 1 of 158 patients (<1%) undergoing arthroscopic femoro–acetabular surgery for hip impingement.<sup>1</sup>

## **Literature review**

### ***Rapid review of literature***

The medical literature was searched to identify studies and reviews relevant to arthroscopic hip preservation surgery for hip impingement syndrome. Searches were conducted via the following databases, covering the period from their commencement to 09-05-2006, and updated to 08-09-2006: MEDLINE, PreMedline, EMBASE, Cochrane Library and other databases. Trial registries and the Internet were also searched. No language restriction was applied to the searches. (See Appendix C for details of search strategy.)

The following selection criteria (Table 1) were applied to the abstracts identified by the literature search. Where these criteria could not be determined from the abstracts the full paper was retrieved.

**Table 1 Inclusion criteria for identification of relevant studies**

<b>Characteristic</b>	<b>Criteria</b>
Publication type	Clinical studies were included. Emphasis was placed on identifying good-quality studies. Abstracts were excluded where no clinical outcomes were reported, or where the paper was a review, editorial, or laboratory or animal study. Conference abstracts were also excluded because of the difficulty of appraising methodology.
Patients	Patients with hip impingement syndrome
Intervention/test	Arthroscopic hip-preservation surgery
Outcome	Articles were retrieved if the abstract contained information relevant to safety and/or efficacy.
Language	Non-English-language articles were excluded unless they were thought to add substantively to the English-language evidence base.

### ***List of studies included in the overview***

This overview is based on two case series.<sup>1,2</sup>

Other studies that were considered to be relevant to the procedure but were not included in the main extraction table (Table 2) are listed in Appendix A.

### ***Existing reviews on this procedure***

No published reviews were identified at the time of the literature search.

### ***Related NICE guidance***

Below is a list of NICE guidance related to this procedure. Appendix B details the recommendations made in each piece of guidance listed below.

#### **Interventional procedures:**

IPG **XXX** Open femoro–acetabular surgery for hip impingement syndrome

#### **Technology appraisals**

None

#### **Clinical guidelines**

None

#### **Public health**

None

**Table 2 Summary of key efficacy and safety findings on arthroscopic femoro–acetabular surgery for hip impingement syndrome**

Abbreviations used:			
Study details	Key efficacy findings	Key safety findings	Comments
<p>Sampson (2005) <sup>1</sup></p> <p><b>Case series</b></p> <p>USA</p> <p><b>n = 158</b></p> <p>Population: Age = 14-73 years; length of symptoms: 3 months to 25 years</p> <p>Indications: All patients had a positive impingement clinical sign, and a small pop at point of maximal pain when the flexed hip is rolled from maximal internal rotation into extension.</p> <p>Technique: Arthroscopic treatment using three portals. Labral lesions were debrided with a shaver or radio-thermal device; articular cartilage was debrided or smoothed. Resection osteoplasty was undertaken where needed with a rounded burr. Patients used crutches for 2–4 weeks postoperatively.</p> <p><b>Follow-up = 22 months maximum (mean / median and minimum follow-up not specified)</b></p> <p>Conflict of interest: Not stated</p>	<p><b>Operative success</b></p> <p>'Nearly all' patients had positive impingement clinical signs eliminated and were quite happy with the results.</p> <p>2% (3/158) of patients went on to have total hip replacement during a maximum follow-up of 22 months.</p> <p>In the majority of patients, pain was reduced by 50% at 3 months, 75% by 5 months and 95% by 1 year.</p>	<p><b>Long-term complications</b></p> <p>One patient suffered a pathological fracture (non-displaced) requiring a closed pinning. Site of fracture not stated.</p>	<p>No details of case selection were provided.</p> <p>Qualitative evaluation of outcomes only.</p> <p>Outcomes used in pain reduction assessment and measurement is not clear in the paper.</p> <p>Mean, median and minimum length of follow-up not stated.</p> <p>All procedures were undertaken by two surgeons.</p>

Abbreviations used:			
Study details	Key efficacy findings	Key safety findings	Comments
<p>Guanche and Bare (2006)<sup>2</sup></p> <p><b>Case series</b></p> <p>USA</p> <p><b>n = 10</b></p> <p>Population: Age = 34 years</p> <p>Indications: Patients with femoro–acetabular impingement.</p> <p>Technique: Arthroscopic treatment using two or three portals. Labral and chondral injuries were debrided with a shaver; acetabular chondral injuries were treated by chondroplasty, drilling or microfracture. Acetabular rim excision was undertaken in cases with significant anteversion or peripheral osteophyte impingement of the femoral neck. Resection osteoplasty of the lateral neck was undertaken where needed with a rounded burr.</p> <p>Patients were limited to toe-touch weight bearing for 4 weeks postoperatively, followed by full weight bearing. Resumption of high-impact athletic activities was possible by 12 weeks.</p> <p><b>Follow-up = 16 months</b></p> <p>Conflict of interest: Not stated</p>	<p><b>Operative success</b></p> <p>The eight patients with no intra-articular degenerative disease did significantly better than those with degenerative disease.</p> <p>Mean non-arthritic score on the McCarthy scale improved from 75 points to 95 points at 14 months' follow-up.</p>	<p>None reported.</p>	<p>Consecutive patients.</p> <p>One surgeon undertook all cases.</p> <p>Minimal outcome data were provided; the report focused on surgical technique.</p> <p>Experience with the technique not stated – perhaps these are the first cases.</p> <p>Considerable variation in intervention depending on individual patient characteristics.</p>

### ***Validity and generalisability of the studies***

- There was difference in surgical technique between the two publications.
- Very limited efficacy outcomes as well as very limited outcome measurement details are reported in the case series.
- The degree of impingement and arthritic degeneration of hips in patients included in the series is not well defined.
- Only two studies.

### **Specialist advisors' opinions**

*Specialist advice was sought from consultants who have been nominated or ratified by their Specialist Society or Royal College.*

Mr J Witt, Mr D Pegg, Mr R Villar.

- Two advisors considered this procedure to be a minor variation of an existing technique, and one that it was an established procedure and no longer new.
- Hip impingement is a relatively recently recognised pathological process.
- Techniques are evolving to treat femoro–acetabular impingement in a minimally invasive manner rather than by open surgery.
- Practitioners require expertise in hip arthroscopy; training should involve experienced surgeons. It should be undertaken by experienced theatre staff and dedicated equipment and imaging
- There are some cases when intervention is indicated but there is a worry that impingement is being overdiagnosed and that some unnecessary surgery is taking place as a result.
- A number of centres are undertaking the procedure, and published results are expected in due course.
- Reported and anecdotal adverse events are similar to those with open surgery but may be exacerbated by increased time in traction.
- Additional theoretical adverse events include avascular necrosis of the femoral head, a lack of improvement in symptoms, infection, loose bodies in the joint, damage to cartilage and bleeding into the joint.
- If the procedure was considered to be safe and efficacious, it would be expected to be used in a minority of UK hospitals, but at least ten.

### **Issues for consideration by IPAC**

- There is a lack of evidence to determine whether the procedure successfully slows the rate of progression to osteoarthritis.

## References

- 1 Sampson TG. (2005) Arthroscopic treatment of femoroacetabular impingement. *Techniques in Orthopaedics* 20: 56–62.
- 2 Guanche CA and Bare AA. (2006) Arthroscopic treatment of femoroacetabular impingement. *Arthroscopy* 22: 95–106.



## Appendix A: Additional papers on arthroscopic femoro–acetabular surgery for hip impingement syndrome not included in summary Table 2

The following table outlines the studies that are considered potentially relevant to the overview but were not included in the main data extraction table (Table 2). It is by no means an exhaustive list of potentially relevant studies.

Article title	Number of patients/ follow-up	Direction of conclusions	Reasons for non-inclusion in Table 2

## Appendix B: Related published NICE guidance for arthroscopic femoro–acetabular surgery for hip impingement syndrome

Guidance programme	Recommendation
Interventional procedures	<p><b>IPG XXX open femoro–acetabular surgery for hip impingement syndrome</b></p> <p>Current evidence on safety and efficacy of open femoro–acetabular surgery does not appear adequate for this procedure to be used without special arrangements for consent and for audit or research.</p> <p>Clinicians wishing to undertake open femoro–acetabular surgery for hip impingement syndrome should take the following actions.</p> <ul style="list-style-type: none"> <li>• Inform the clinical governance leads in their Trusts.</li> <li>• Ensure that patients understand the uncertainty about the safety and efficacy of the procedure in both the short and long term, and provide them with clear written information. Use of the Institute’s information for patients (‘Understanding NICE guidance’) is recommended (available from <a href="http://www.nice.org.uk/IPGXXXpublicinfo">www.nice.org.uk/IPGXXXpublicinfo</a>).</li> <li>• Audit and review clinical outcomes of all patients having open femoro–acetabular surgery for hip impingement syndrome (see section 3.1).</li> <li>• Publication of safety and efficacy outcomes will be useful. The Institute may review the procedure upon publication of further evidence.</li> </ul>
Technology appraisals	None applicable
Clinical guidelines	None applicable
Public health	None applicable

## Appendix C: Literature search for arthroscopic femoro–acetabular surgery for hip impingement syndrome

IP: 365 Hip preservation surgery for impingement syndrome: arthroscopic		
Database	Date searched	Version searched
Cochrane Library	9.5.06	Issue 2: 2006
CRD databases	“	-
Embase	“	1980 to 2006 week 18
MEDLINE	“	1966 to April week 4 2006
Premedline	“	May 8th
CINAHL	“	1982 to May week 1 2006
British Library Inside Conferences	“	-
NRR	“	Issue 1: 2006
Controlled Trials Registry	“	-

The following search strategy was used to identify papers in MEDLINE. A similar strategy was used to identify papers in other databases.

1. Surgical Procedures, Minimally Invasive/
2. arthroscopy/
3. arthroscop\$.tw.
4. percutan\$.tw.
5. ganz m\$.au.
6. ((hip\$ or femor\$ or femur\$ or acetab\$) adj3 impin\$).tw.
7. ((hip\$ or femor\$ or femur\$ or acetab\$) adj3 (catch\$ or trap\$ or obstruct\$)).tw.
8. FAI.tw.
9. (cartilag\$ adj3 impin\$).tw.
10. (cartilag\$ adj3 (catch\$ or trap\$ or obstruct\$)).tw.
11. or/6-10
12. key hol\$.tw.
13. keyhole.tw.
14. or/1-4,12-13
15. 11 and (5 or 14)