This guideline covers care before, during and after hip, knee or shoulder replacement. It includes recommendations to ensure that people are given full information about their options for surgery, including anaesthesia. It offers advice for healthcare professionals on surgical procedures and ensuring safety during operations. It also offers guidance on providing support and rehabilitation before and after surgery.

Who is it for?

- Healthcare professionals in primary, secondary and tertiary settings
- Non-NHS organisations commissioned to provide services for the NHS or local authorities
- People having hip, knee or shoulder replacement, their families and carers

This draft guideline contains:

- the draft recommendations
- recommendations for research
- rationale and impact sections that explain why the committee made the recommendations and how they might affect practice
- the guideline context.
Information about how the guideline was developed is on the guideline’s page on the NICE website. This includes the evidence reviews, the scope, and details of the committee and any declarations of interest.

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1.15 Finding more information and resources
People have the right to be involved in discussions and make informed decisions about their care, as described in your care.

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

1.1 Information and shared decision making for people offered hip, knee or shoulder replacement

Information for people offered hip, knee or shoulder replacement

1.1.1 When offering primary elective hip, knee or shoulder replacement, give the person and their families and carers (as appropriate) information specific to the procedure they are being offered. Provide information in a format they can easily understand, and follow the principles on communication, information and shared decision making in the NICE guideline on patient experience in adult NHS services. Include:

- who to contact if they have questions or concerns before or after surgery
- preparing for surgery, including steps they can take to optimise their recovery (also see the section on preoperative rehabilitation)
- pain after surgery and how it can be managed
- wound care
- returning to work
- returning to usual activities, for example playing sports, driving and sexual activity.
Shared decision making

1.1.2 Support shared decision making by discussing the options for joint replacement surgery with the person and their families and carers (as appropriate). Include in the discussion:

- the potential benefits and risks of the procedure
- the choice of implant
- the options for anaesthesia and the potential benefits and risks of each option
- what to expect before, during and after surgery, including length of hospital stay, recovery and rehabilitation
- the possible need for more surgery in the future.

To find out why the committee made the recommendations on information and shared decision making for people offered hip, knee or shoulder replacement and how they might affect practice, see rationale and impact.

Decision aids for elective joint replacement

The committee were unable to make recommendations for practice in this area. They made a recommendation for research on the components of a decision aid.

To find out why the committee were unable to make recommendations on decision aids for joint replacement see rationale and impact.

1.2 Preoperative rehabilitation

1.2.1 Give people having hip or knee replacement advice on preoperative rehabilitation. Include advice on:

- exercises that can be performed before and after surgery
- lifestyle including weight management, dietary advice and smoking cessation (see NICE’s guidance on NICE’s guidance on lifestyle and wellbeing)
- maximising independence and wellbeing after surgery.
To find out why the committee made the recommendation on preoperative rehabilitation and how it might affect practice, see rationale and impact.

1.3 Anaesthesia

Anaesthesia for hip replacement

1.3.1 Offer people having primary elective hip replacement a choice of:

- regional anaesthesia in combination with local infiltration anaesthesia (LIA)
- general anaesthesia in combination with LIA.

Consider a nerve block as an alternative to LIA in either of the options above.

To find out why the committee made the recommendation on anaesthesia for hip replacement and how it might affect practice, see rationale and impact.

Anaesthesia for knee replacement

1.3.2 Offer people having primary elective knee replacement a choice of:

- regional anaesthesia in combination with local infiltration anaesthesia (LIA)
- general anaesthesia in combination with LIA.

Consider adding a nerve block to either of the options above.

To find out why the committee made the recommendations on anaesthesia for knee replacement and how they might affect practice, see rationale and impact.

Anaesthesia for shoulder replacement

1.3.3 Discuss the options for anaesthesia with people having primary elective shoulder replacement, including general anaesthesia, regional anaesthesia, local infiltration anaesthesia and nerve blocks.
The committee were unable to recommend specific options for anaesthesia for shoulder replacement. They made recommendations for research on supplementary anaesthesia, and on regional compared with general anaesthesia or a combination in elective shoulder replacement.

To find out why the committee made the recommendation to discuss the options for anaesthesia for shoulder replacement and why they were unable to make recommendations on specific options for anaesthesia see rationale and impact.

1.4 Tranexamic acid to minimise blood loss

1.4.1 For people having primary elective hip, knee or shoulder replacement:

- Give intravenous tranexamic acid and, unless the person has renal impairment, also give 1 to 2 g of topical (intra-articular) tranexamic acid diluted in saline¹, given after the final wash-out and before wound closure. Ensure that the total combined dose of tranexamic acid does not exceed 3 g.
- For people who have renal impairment give a reduced dose of intravenous tranexamic acid on its own.

To find out why the committee made the recommendations on tranexamic acid to minimise blood loss and how they might affect practice, see rationale and impact.

1.5 Preventing infections

Antibiotic or antiseptic agents in wound wash-out solutions

1.5.1 Do not use an antibiotic or antiseptic agent in a wound wash-out solution for primary hip, knee or shoulder elective joint replacement.

¹ At the time of consultation (October 2019), tranexamic acid solution for injection is not licensed for topical (intra-articular) use. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council’s Prescribing guidance: prescribing unlicensed medicines for further information.
To find out why the committee made the recommendation on antibiotic or antiseptic agents in wound wash-out solutions and how it might affect practice, see rationale and impact.

1 Ultra-clean air ventilation in operating theatres
2 1.5.2 Use ultra-clean air ventilation in operating theatres for primary hip, knee or shoulder elective joint replacement.

To find out why the committee made the recommendation on ultra-clean air ventilation in operating theatres see rationale and impact.

4 1.6 Avoiding implant selection errors
5 1.6.1 Use an intraoperative 'stop moment' to check all implant details and ensure compatibility of each component before implantation.
6
7 1.6.2 Consider intraoperative real-time data entry before implantation using a system, such as the National Joint Registry database, that provides an alert of mismatched implant components.

To find out why the committee made the recommendations on avoiding implant selection errors and how they might affect practice, see rationale and impact.

11 1.7 Procedures for primary elective knee replacement
12 Partial and total knee replacement
13 1.7.1 Offer a choice of partial or total knee replacement to people with isolated medial compartmental osteoarthritis. Discuss the potential benefits and risks of each option with the person.

To find out why the committee made the recommendation on partial and total knee replacement and how it might affect practice, see rationale and impact.

16 Patella resurfacing
17 1.7.2 Offer resurfacing of the patella to people having primary elective total knee replacement.
1.8 Implants and surgical approaches for primary elective hip replacement

Implants for primary elective hip replacement

See the NICE technology appraisal guidance on total hip replacement and resurfacing arthroplasty for end-stage arthritis of the hip.

Surgical approaches for primary elective hip replacement

1.8.1 Consider a posterior, anterolateral or direct anterior approach for primary elective hip replacement.

The committee were unable to make recommendations on the direct superior and supercapsular percutaneously assisted (SuperPATH) surgical approaches. They made a recommendation for research on these approaches.

1.9 Procedures for primary elective shoulder replacement

Shoulder replacement for osteoarthritis with no rotator cuff tear

1.9.1 If glenoid bone is adequate, offer conventional total shoulder replacement to people having primary elective shoulder replacement for osteoarthritis with no rotator cuff tear.
Shoulder replacement for pain and functional loss for people with a previous proximal humeral fracture

The committee were unable to make recommendations for practice in this area. They made a recommendation for research on procedures for shoulder replacement for people with a previous proximal humeral fracture.

To find out why the committee were unable to make recommendations on shoulder replacement for pain and functional loss for people with a previous proximal humeral fracture see rationale and impact.

1.10 Postoperative rehabilitation

Inpatient rehabilitation

A physiotherapist or occupational therapist should offer rehabilitation within 24 hours of surgery to people who have had a primary elective hip, knee or shoulder replacement. Rehabilitation should include:

- advice on managing activities of daily living and
- home exercise programmes and
- mobilisation for people who have had knee or hip replacement or
- ambulation for people who have had shoulder replacement.

To find out why the committee made the recommendation on inpatient rehabilitation and how it might affect practice, see rationale and impact.

Outpatient rehabilitation after hip or knee replacement

A physiotherapist or occupational therapist should offer advice on self-directed rehabilitation after primary elective hip or knee replacement before the person leaves hospital.

Ensure that people who are undertaking self-directed rehabilitation know who to contact for advice and support.
1.10.4 Offer supervised group or individual outpatient rehabilitation if the person has difficulties managing activities of daily living, ongoing functional impairment leading to specific rehabilitation needs, or finds that self-directed rehabilitation is not effective.

1.10.5 Consider supervised group or individual outpatient rehabilitation for people with cognitive impairment.

To find out why the committee made the recommendations on outpatient self-directed rehabilitation after hip or knee replacement and how they might affect practice, see rationale and impact.

Outpatient rehabilitation after shoulder replacement

1.10.6 Ensure that people who are undertaking self-directed rehabilitation after primary elective shoulder replacement know who to contact for advice and support.

1.10.7 Offer supervised group or individual outpatient rehabilitation if the person has difficulties managing activities of daily living, ongoing functional impairment leading to specific rehabilitation needs, or finds that self-directed rehabilitation is not effective.

1.10.8 Consider individual outpatient rehabilitation for people with cognitive impairment.

To find out why the committee made the recommendations on outpatient rehabilitation after shoulder replacement see rationale and impact.

1.11 Long-term care

Follow-up and monitoring

The committee were unable to make recommendations for practice in this area. They made a recommendation for research on follow-up.
1 Referral from primary care

1.11.1 Primary care practitioners should refer people who develop new or worsening pain, limp or loss of function related to their joint replacement to the orthopaedic team.

To find out why the committee were unable to make recommendations on follow-up and monitoring in secondary care and why they made the recommendation on referral from primary care see rationale and impact.

6 Recommendations for research

The guideline committee has made the following recommendations for research.

8 Key recommendations for research

9 1 Preoperative rehabilitation

What is the clinical and cost effectiveness of preoperative rehabilitation given at least 2 months before hip, knee or shoulder replacement?

To find out why the committee made the research recommendation on preoperative rehabilitation see rationale and impact.

14 2 Information for people having a joint replacement

How should information for people having joint replacement surgery be delivered?

To find out why the committee made the research recommendation on information see rationale and impact.

18 3 Early mobilisation of the shoulder

Is early mobilisation of the shoulder after primary elective shoulder replacement more effective than delayed mobilisation in restoring rapid return of function and relieving pain?

To find out why the committee made the research recommendation on early mobilisation of the shoulder see rationale and impact.
4 Conventional compared with reverse total shoulder arthroplasty
What is the clinical and cost effectiveness of conventional compared with reverse total shoulder arthroplasty for adults having primary elective shoulder replacement for osteoarthritis with no rotator cuff tear?

To find out why the committee made the research recommendation on shoulder arthroplasty see rationale and impact.

5 Anaesthesia for knee replacement
What is the clinical and cost effectiveness of adding a nerve block to regional or general anaesthesia, in combination with local infiltration anaesthesia, for primary elective knee replacements?

To find out why the committee made the research recommendation on anaesthesia for knee replacement see rationale and impact.

6 Selective resurfacing in knee replacement
In adults having elective knee replacement, what is the clinical and cost effectiveness of total knee replacement with patella resurfacing compared with selective resurfacing?

To find out why the committee made the research recommendation on resurfacing in knee replacement see rationale and impact

Other recommendations for research

Decision aids
What are the components of a decision aid to support people referred for elective joint replacement in making decisions about their treatment (for example, the type of procedure, timing and implant choice)?

Supplementary anaesthesia in elective shoulder replacement
In adults having elective shoulder joint replacement with general anaesthesia, what is the clinical and cost effectiveness of supplementry local infiltration anaesthesia, a nerve block or regional anaesthesia?
Regional compared with general anaesthesia or a combination in elective shoulder replacement
In adults having elective shoulder joint replacement, what is the relative clinical and cost effectiveness of general anaesthesia, regional anaesthesia, and general combined with regional anaesthesia?

Avoiding implant selection errors
What is the most effective technological solution for minimising wrong implant selection during joint replacement surgery?

Surgical approaches in primary elective hip replacement
Do the direct anterior, direct superior and supcapsular percutaneously assisted (SuperPATH) approaches to hip replacement improve patient-recorded outcome measures and reduce length of hospital stays, revision rates, neurological complications and surgical site infections compared with the posterior and anterolateral approaches?

Conventional total shoulder replacement compared with humeral hemiarthroplasty for people aged under 60
What is the clinical and cost effectiveness of humeral hemiarthroplasty compared with conventional total shoulder replacement for adults aged under 60 having primary elective shoulder replacement for osteoarthritis with no rotator cuff tear?

Procedures for shoulder replacement for people with a previous proximal humeral fracture
In adults having primary elective shoulder replacement for pain and functional loss after a previous proximal humeral fracture (not acute trauma), what is the clinical and cost effectiveness of reverse total shoulder replacement compared with humeral hemiarthroplasty?

Supporting rehabilitation after hip, knee or shoulder replacement for people with additional needs
What are the best ways to support rehabilitation after hip knee or shoulder replacement for people with additional needs (such as people with dementia, a learning difficulty or multiple disabling medical comorbidities)?
Supervised compared with self-directed outpatient rehabilitation after hip or knee replacement

What are the clinical features that identify people who are likely to benefit from supervised group or individual rehabilitation?

Postoperative rehabilitation after shoulder replacement

For people who have had primary elective shoulder replacement, does self-directed, supervised group or supervised individual rehabilitation produce the most improvement in health-related quality of life 2 years after surgery?

Follow-up after shoulder replacement

What is the optimum time between follow-up appointments for people who have had shoulder replacement, who should lead follow-up and how this should be organised between hospital and community care?

Rationale and impact

These sections briefly explain why the committee made the recommendations and how they might affect practice. They link to details of the evidence and a full description of the committee’s discussion.

Information and shared decision making for people offered hip, knee or shoulder replacement

Recommendations 1.1.1 and 1.1.2

Why the committee made the recommendations

Studies using interviews and focus groups highlighted the importance of giving easily understandable information to people before they have joint replacement surgery. Specific areas of concern included preparing for surgery, managing postoperative pain and aftercare at home, expected recovery time and returning to work. The committee also drew on their own experience to detail the information that should be given to people offered hip, knee or shoulder replacement.

The committee highlighted the importance of supporting shared decision making when discussing options for hip, knee or shoulder replacement. People offered these
procedures should have the opportunity to express their preferences in light of the potential benefits and risks of the procedure itself, the anaesthesia, the choice of implant and what the outcomes are likely to be in the short and long terms.

How the recommendations might affect practice

The recommendations largely reflect current practice and are not expected to result in substantial changes.

Full details of the evidence and the committee’s discussion are in evidence review A: information needs.

Decision aids for elective joint replacement.

Why the committee were unable to make recommendations for practice

Evidence showed that use of a decision aid can be beneficial for people having elective joint replacement surgery. However, the content of joint replacement decision aids varies widely and the definition of what constitutes a joint replacement decision aid is unclear. The committee’s view is that a decision aid should not simply be a means of providing information, but should actively help people to participate in making decisions about their care. Because of the lack of clear evidence enabling comparison of joint replacement decision aids, the committee were unable to make a recommendation for the use of any specific decision aid. They made a recommendation for research on the components of a decision aid for joint replacement.

Full details of the evidence and the committee’s discussion are in evidence review B: decision aids.

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Preoperative rehabilitation

Recommendation 1.2.1

Why the committee made the recommendation

Evidence from non-NHS settings showed that preoperative rehabilitation reduced length of hospital stay for adults having a hip or knee replacement. Although hospital
stays for this type of surgery in the NHS are usually shorter than in non-NHS settings, the committee thought that these reductions might be achieved in NHS settings if preoperative rehabilitation is provided. The economic evidence suggested that the cost of preoperative rehabilitation programmes would be recouped by shorter hospital stays.

The committee agreed, based on the evidence and their experience, that preoperative rehabilitation should, as a minimum, provide advice on exercises, lifestyle and ways to maximise independence and wellbeing after surgery.

There was no evidence on preoperative rehabilitation for people having shoulder replacement. The committee agreed that the benefits seen in people having hip and knee replacement might not apply to those having shoulder replacement, and made a recommendation for research to include preoperative rehabilitation for people with shoulder replacement.

How the recommendation might affect practice
Current practice varies widely, ranging from no preoperative rehabilitation to comprehensive individualised preoperative rehabilitation programmes. The recommendation will not involve a significant change in practice for services because most already offer preoperative rehabilitation advice to everyone having hip or knee replacement. For some services, providing information, exercise and lifestyle advice may increase the time needed from the multidisciplinary team. However, this cost can be expected to be offset by reductions in length of hospital stays.

Full details of the evidence and the committee’s discussion are in evidence review C: preoperative rehabilitation.

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Anaesthesia for hip replacement

Recommendation 1.3.1

Why the committee made the recommendation
Evidence confirmed that regional and general anaesthesia are equally effective for people having hip replacement surgery.
Based on their experience, the committee agreed that using multiple types of anaesthesia reduces postoperative pain. Clinical evidence showed that local infiltration anaesthesia (LIA) or a nerve block are both beneficial when used with general or regional anaesthesia. However, the cost of LIA is minimal and its administration does not increase theatre time whereas a nerve block is only likely to be cost effective if it can be administered in around 5 minutes, and if long-term outcomes are taken into account. A nerve block can therefore be considered if systems and staff are in place to ensure that it does not increase theatre time by more than 5 minutes, to minimise resource impact.

There was no evidence to support the use of LIA together with a nerve block in regional or general anaesthesia.

How the recommendation might affect practice

All orthopaedic units currently offer a choice of general or regional anaesthesia. Most augment this with either LIA or a nerve block. Although the cost of nerve blocks varies, it is not expected that services currently offering LIA will change to nerve blocks. This recommendation is unlikely to lead to significant changes in practice.

Full details of the evidence and the committee’s discussion are in evidence review D: anaesthesia hip.

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Anaesthesia for knee replacement

Recommendation 1.3.2

Why the committee made the recommendation

Evidence confirmed that regional and general anaesthesia are equally effective for people having knee replacement surgery. There was no evidence to support using a combination of regional and general anaesthesia.

Evidence showed that adding LIA or a nerve block to regional or general anaesthesia is beneficial. Additionally, evidence suggested that adding both LIA and a nerve block to regional anaesthesia is more beneficial than adding either LIA or a nerve block alone, although this benefit was less pronounced with general anaesthesia.
anaesthesia. The committee noted that the lack of evidence for these interventions may conceal their effectiveness. They made a recommendation for research to explore the use of a nerve block together with LIA in either regional or general anaesthesia for knee replacement.

The cost of LIA is minimal and its administration does not increase theatre time whereas a nerve block is only likely to be cost effective if it can be administered in around 5 minutes, and if long-term outcomes are taken into account. Adding a nerve block to regional or general anaesthesia with LIA can therefore be considered if systems and staff are in place to ensure that administration of a nerve block does not increase theatre time by more than 5 minutes.

How the recommendation might affect practice

In current practice regional anaesthesia for knee replacement surgery is usually augmented by LIA, a nerve block, or both. Services that use LIA are not expected to see a substantial change in practice. Those that use a nerve block are likely to see a move to LIA but this will not have a resource impact. Services that currently use both LIA and a nerve block should see a reduction in the use of nerve blocks. Services that do not currently provide nerve blocks in addition to LIA should not see an increase in resource impact as long as administration of the nerve block does not increase theatre time by more than 5 minutes.

Full details of the evidence and the committee’s discussion are in evidence review E: anaesthesia knee.

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Anaesthesia for shoulder replacement

Recommendation 1.3.3

Why the committee made the recommendation

The committee emphasised the importance of discussing different options for anaesthesia with people having shoulder replacement. There was not enough evidence to support a recommendation for specific types of anaesthesia. Although benefits were seen in studies combining general with regional anaesthesia, they
were offset by phrenic nerve palsy events. The committee made recommendations for research to investigate supplementary anaesthesia for people having general anaesthesia and on the use of general, regional, or general with regional anaesthesia. They noted that using regional anaesthesia alone has the potential to increase day-case shoulder replacement surgery.

**How the recommendation might affect practice**

This recommendation is not expected to change current practice.

Full details of the evidence and the committee’s discussion are in evidence review C: anaesthesia shoulder.

**Tranexamic acid to minimise blood loss**

**Recommendation 1.4.1**

**Why the committee made the recommendation**

Good evidence showed that, in people having primary elective hip or knee replacement, topical (intra-articular) tranexamic acid in combination with intravenous tranexamic acid reduces the number of blood transfusions needed when compared with topical or intravenous tranexamic acid alone. Although one study suggested that combining topical with oral tranexamic acid is the most clinically and cost effective administration method, this evidence was not strong enough to support a recommendation for this combination.

Evidence in people having primary elective shoulder replacement also showed a benefit from tranexamic acid but did not address combined administration. However, the committee reasoned that the benefits seen in hip and knee replacement would also apply in shoulder replacement. They noted that tranexamic acid is an inexpensive treatment.

The BNF advises a reduced dose of intravenous tranexamic acid for people with renal impairment. Because the absorption is uncertain when tranexamic acid is administered topically, the committee agreed that it should be given only intravenously to people with renal impairment.
How the recommendation might affect practice

Although the use of tranexamic acid is widespread in current practice, the method of administration varies. In the committee’s experience, topical (intra-articular) tranexamic acid is commonly used in combination with intravenous tranexamic acid in hip and knee replacements, but not in shoulder replacements. Increased use of this combination in shoulder replacements might increase doses and the use of disposables. However, the associated costs are expected to be more than offset by the savings produced by a reduced need for blood transfusions.

Full details of the evidence and the committee’s discussion are in evidence review G: tranexamic acid.

Antibiotic or antiseptic agents in wound wash-out solutions

Recommendation 1.5.1

The recommendation is expected to reduce the routine use of antibiotic or antiseptic agents in wash-out solutions. It is not expected to affect the use of prophylactic antibiotics and ultra-clean air ventilation in operating theatres, which are part of current practice.
Full details of the evidence and the committee’s discussion are in evidence review H: wound lavage.

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**Ultra-clean air ventilation in operating theatres**

**Recommendation 1.5.2**

**Why the committee made the recommendation**

There was little good evidence on the use of ultra-clean air ventilation. Evidence from randomised controlled trials supported ultra-clean air ventilation, but these trials may not have fully reflected current practice. Evidence from observational studies supported conventional air ventilation systems, but it was unclear whether these studies followed up participants for more than 2 years, which the committee agreed is the minimum follow-up period needed to produce an accurate picture of infection rates. It was also unclear whether the registry data used in the studies produced an accurate record of the number of infections over the longer term, and whether prophylactic antibiotics were used in all of the observational studies. Although the committee noted the limitations in the evidence, they agreed that ultra-clean air ventilation is likely to be more effective at reducing surgical site infections than conventional turbulent air ventilation.

**How the recommendation might affect practice**

The recommendation largely reflects current practice and is not expected to result in substantial changes.

Full details of the evidence and the committee’s discussion are in evidence review I: ultra clean-air.

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**Avoiding implant selection errors**

**Recommendations 1.6.1 and 1.6.2**
Why the committee made the recommendations

The committee’s recommendations were based on their experience and expertise. They reasoned that a ‘stop moment’, when theatre staff stop other activity and formally inspect each implant component, would ensure that all components are compatible. They agreed that intraoperative real-time data entry could be considered as a further means of ensuring that mismatched components are identified before implantation. The committee agreed that research to investigate technological solutions to help avoid implant selection errors would be useful and made a recommendation for research.

How the recommendations might affect practice

An intraoperative ‘stop moment’ to check implant components before implantation is common and is not expected to change current practice. Intraoperative real-time data entry is not current practice and, if implemented, is likely to increase theatre time.

Full details of the evidence and the committee’s discussion are in evidence review J: wrong implant selection.

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Partial and total knee replacement

Recommendation 1.7.1

Why the committee made the recommendation

Studies that compared partial with total knee replacement showed that, 5 and 15 years after knee replacement, ratings on the Bristol Knee Score were better for people who had partial knee replacement. They also had shorter hospital stays and fewer incidences of deep vein thrombosis within 5 years of their surgery. However, this evidence has limited relevance because these studies either looked at implants that are no longer in use, or were restricted to people who had both knees replaced.

In the committee’s experience, the potential benefits of partial or total knee replacement depend on individual factors such as age and physical activity level. People who have more active lifestyles might prefer the shorter recovery time
associated with partial knee replacement. This needs to be balanced against the
evidence showing a greater likelihood of revision surgery within 10 years in partial
knee replacement. However, this may be partly the result of revision surgery being
suggested earlier for partial knee replacement because it is more straightforward. On
balance, the committee agreed that both types of knee replacement are effective for
this population, and that the benefits and risks of each should be discussed with the
person.

How the recommendation might affect practice
This recommendation may result in an increase in the number of partial knee
replacements undertaken. It is expected that all orthopaedic services will need to
provide both partial and total knee replacement surgery. The committee noted that
total and partial knee replacement are very different types of procedure, and
surgeons need to ensure they perform a sufficient number of each procedure every
year to ensure good surgical outcomes.

Total knee replacements make up the majority of current practice, so offering a
choice of partial or total knee replacement is likely to increase the number of partial
knee replacements. The economic evidence largely suggested that partial knee
replacements are cost effective compared with total knee replacements. Therefore,
increasing the proportion of partial knee replacements is likely to be cost saving.

Full details of the evidence and the committee’s discussion are in evidence review K:
total knee replacement.

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Patella resurfacing

Recommendation 1.7.2

Why the committee made the recommendation
The committee looked at 3 options: resurfacing, no resurfacing and selective
resurfacing. There was not enough clinical evidence to indicate whether any of the
options was more beneficial than the others. However, strong economic evidence
showed that resurfacing is cost effective compared with no resurfacing over a 10-
year time horizon because of reduced hospital readmissions. Because of the lack of clinical evidence, the committee also made a recommendation for research on selective resurfacing in knee replacement.

How the recommendation might affect practice

Current practice varies, with resurfacing carried out in around 35 to 40% of knee replacements. This recommendation can be expected to increase the number of knee replacement operations with patella resurfacing. There may be an initial increase in costs because of more costly hospitals stays for resurfacing, but this is expected to be more than offset by reduced numbers of hospital readmissions in the long term.

Full details of the evidence and the committee’s discussion are in evidence review L: patella resurfacing.

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Surgical approaches for primary elective hip replacement

Why the committee made the recommendation

The committee looked at evidence on 5 surgical approaches for hip replacement: posterior, anterolateral, direct anterior, direct superior and supercapsular percutaneously assisted (SuperPATH). The evidence did not indicate that any of these approaches was more beneficial than any other. The National Joint Register for 2017 reported that 97% of hip replacements were done using the posterior or anterolateral approach. The committee also noted that the direct anterior approach is now used routinely by some surgeons and that this approach has the benefit of being minimally invasive, does not cut muscles and may shorten recovery time. They concluded that any of these 3 established approaches could be considered, with the choice of approach based on the knowledge and experience of the surgeon and individual patient characteristics. There was not enough evidence on the newer approaches (direct superior and SuperPATH) to enable the committee to make a recommendation. They made a recommendation for research to investigate these approaches.
How the recommendation might affect practice

The recommendation reflects most current practice and is not expected to lead to substantial changes.

Full details of the evidence and the committee’s discussion are in evidence review M: hip approach.

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Shoulder replacement for osteoarthritis with no rotator cuff tear

Recommendation 1.9.1

Why the committee made the recommendation

Evidence showed that conventional total shoulder replacement provides more overall benefit than humeral hemiarthroplasty. The recommendation is limited to people with adequate glenoid bone because this is necessary for conventional total shoulder replacement to be considered. For people without adequate glenoid bone another solution, such as reverse shoulder replacement or other surgery, would be needed. The committee noted that modern imaging now offers further information to surgeons when assessing the adequacy of glenoid bone stock.

Conventional total shoulder replacement is increasingly being offered to people aged under 60 as confidence grows in its long-term durability. There is a lack of evidence in this age group so the committee made a recommendation for research to compare conventional total shoulder replacement with humeral hemiarthroplasty.

The committee were unable to make a recommendation for practice on reverse total shoulder replacement in this context because of the lack of evidence and their uncertainty about its effectiveness compared with other procedures. The committee noted that although reverse total shoulder replacement was originally designed for people with a rotator cuff tear, it is being used more widely for people with no rotator cuff tear to obviate the need for early revision surgery after rotator cuff failure. The committee made a recommendation for research to compare reverse total shoulder replacement with conventional total shoulder replacement in people with osteoarthritis with no rotator cuff tear.
How the recommendation might affect practice

The recommendation reflects most current practice and is not expected to lead to substantial changes.

Full details of the evidence and the committee’s discussion are in evidence review N: joint replacement shoulder surgery.

Shoulder replacement for pain and functional loss for people with a previous proximal humeral fracture

Why the committee were unable to make recommendations for practice

The committee looked at 3 types of procedures for people with a previous proximal humeral fracture: reverse total shoulder replacement, humeral hemiarthroplasty and conventional total shoulder replacement. They were unable to make recommendations for practice because of a lack of evidence. They made a recommendation for research on procedures for shoulder replacement for people with a previous proximal humeral fracture.

Full details of the evidence and the committee’s discussion are in evidence review O: hemiarthroplasty proximal humeral fracture.

Inpatient rehabilitation

Recommendation 1.10.1

Why the committee made the recommendation

Evidence in people who have had primary elective hip or knee replacement showed that rehabilitation within 24 hours of surgery, including mobilisation, reduces length of hospital stays. They agreed that early discharge improves wellbeing and is likely to be cost saving. They acknowledged concern about increased pain from early mobilisation, but noted the evidence showing that, for most people, the benefits outweigh any adverse effects. The committee noted that the physiotherapist or occupational therapist may delay mobilisation if clinically necessary.
There was no evidence on inpatient rehabilitation after shoulder replacement. However, in the committee’s experience, the benefits are similar to those seen after hip or knee replacement. They agreed that people who have had shoulder replacement should ambulate within 24 hours of surgery but mobilisation of the shoulder should not be included because it depends on the orthopaedic team’s clinical assessment. They discussed the wide variation in practice in the timing of shoulder mobilisation. Some services advise using a sling for 10 days whereas others advise using it for 6 weeks. There was no evidence available on when the shoulder should be mobilised so the committee made a recommendation for research.

How the recommendation might affect practice

The recommendation largely reflects current practice and is not expected to result in substantial changes. Starting inpatient rehabilitation within 24 hours of surgery might mean that some hospitals will need to reorganise or increase physiotherapy and occupational therapy services to ensure they are available throughout weekends for people who have surgery on a Friday or Saturday. Most hospitals will already have physiotherapy or occupational therapy staff present at weekends; however, in some hospitals they may not be seeing elective hip and knee replacement patients as part of current practice. For those hospitals that do need to take on additional staff, these costs are expected to be offset by a reduction in the length of hospital stays.

Full details of the evidence and the committee’s discussion are in evidence review P: inpatient hip and knee postoperative rehabilitation and evidence review Q: inpatient shoulder postoperative rehabilitation.

Outpatient rehabilitation after hip or knee replacement

Recommendations 1.10.2 to 1.10.5

Why the committee made the recommendations

The committee agreed that outpatient rehabilitation after hip or knee replacement is essential. Evidence suggested that self-directed rehabilitation and supervised rehabilitation are similarly effective. Moreover, supervised rehabilitation represents a
substantial cost to services. The committee noted that, in their experience, self-directed rehabilitation is effective for most people if undertaken with advice, and ongoing support if needed, from a physiotherapist or occupational therapist.

The committee recognised that provision needs to be made for people with additional needs that make self-directed outpatient rehabilitation difficult or ineffective, and who would benefit from supervised group or individual rehabilitation. They noted the lack of evidence in this area and made recommendations for research to investigate how to identify people in these groups and how best to support their rehabilitation.

How the recommendations might affect practice
The recommendations reflect current practice and are not expected to result in substantial changes.

Full details of the evidence and the committee’s discussion are in evidence review R: outpatient hip and knee postoperative rehabilitation.

Return to recommendations

Outpatient rehabilitation after shoulder replacement
Recommendations 1.10.6 to 1.10.8

Why the committee made the recommendations
There was no evidence to enable the committee to make recommendations for all people who have shoulder replacement surgery so they made a recommendation for research. They agreed, based on their experience, that provision needs to be made for people with additional needs that make self-directed outpatient rehabilitation difficult or ineffective, and who would benefit from supervised group or individual rehabilitation.

How the recommendations might affect practice
The recommendations reflect current practice and are not expected to result in substantial changes.
Full details of the evidence and the committee’s discussion are in evidence review \textit{S: outpatient rehabilitation after shoulder replacement.}

\textbf{Return to recommendations}

\textit{Follow-up and monitoring}

\textbf{Why the committee were unable to make recommendations}

There was no evidence available to inform recommendations on follow-up and monitoring after joint replacement surgery. The committee were aware of an ongoing study to investigate follow-up after hip and knee replacement surgery. That study does not include people who have had shoulder replacement, so the committee made a recommendation for research on follow-up after shoulder replacement.

Full details of the evidence and the committee’s discussion are in evidence review \textit{T: long-term monitoring.}

\textbf{Return to recommendations}

\textit{Referral from primary care}

\textbf{Recommendation 1.11.1}

\textbf{Why the committee made the recommendation}

The committee agreed that, in the absence of recommendations on follow-up and monitoring after joint replacement surgery, a recommendation is needed to ensure that people who have problems with their joint replacement are referred to the orthopaedic team.

\textbf{How the recommendation might affect practice}

The recommendation reflects current practice and is not expected to result in changes.

Full details of the evidence and the committee’s discussion are in evidence review \textit{T: long-term monitoring.}

\textbf{Return to recommendations}
Context

Hip, knee and shoulder joint replacements are among the most common orthopaedic operations performed in the UK. Around 90% of joint replacements are done to reduce pain and restore function in joints affected by osteoarthritis.

Surgical procedures for joint replacement vary. In addition, a wide range of joint implants are used. They can be made of metal, plastic or ceramic, and can be fixed into place using a variety of methods. These factors can all affect the longevity of the implant. They also have an effect on short-term outcomes such as postoperative pain and complications.

There are wide variations in the care provided before, during and after joint replacement surgery, particularly the provision of rehabilitation. This care is a vital factor in the success of this surgery.

The guideline aims to ensure that people having joint replacement surgery understand the various options and are offered the best possible care before, during and after their surgery.

Finding more information and resources

To find out what NICE has said on topics related to this guideline, see our web page on musculoskeletal conditions.

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