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▶ Editorials: Arthroscopic surgery for degenerative knee (*BMJ* 2015;350:h2983)

▶ Practice: Management of degenerative meniscal tears and the role of surgery (*BMJ* 2015;350:h2212)

Why do rates of knee arthroscopy differ between England and Scotland?

The “correct” rates of discretionary interventions are difficult to define. However, **David Hamilton** and **Colin Howie** point out that discrepancies in usage of knee arthroscopy within the UK suggest the organisation of the care pathway may be an important determinant

Osteoarthritis of the knee can result in joint pain and reduced physical function. Treatment includes analgesia, physical therapy, and surgery.¹ Although arthroscopic surgery has been widely used in the management of knee osteoarthritis for over 20 years, evidence of efficacy is lacking.²⁻⁶ Studies have shown no additional benefit compared with sham surgery or conservative treatments.² We examine patterns of use of arthroscopy in England and Scotland and look at possible explanations for differences between the two countries.

Evidence on effectiveness

The most recent Cochrane reviews highlight no benefit in terms of pain relief or physical function from arthroscopic washout or debridement for patients with osteoarthritis of the knee.³⁻⁴ Two meta-analyses also suggest no benefit,⁵⁻⁶ with the most recent noting that arthroscopy is not without hazard and that this should be considered in the light of poor efficacy.⁶ Arthroscopic meniscectomy does, however, have a role in specific patients. A recent randomised study in patients with no signs of osteoarthritis on plain radiography but who had persisting medial joint line knee pain despite conservative management found that meniscal resection was beneficial.⁷ Current

guidance from the National Institute for Health and Care Excellence (NICE) suggests that referral for arthroscopic lavage and debridement should not be offered unless the person has a clear history of mechanical locking.¹ But in a poll on thebmj.com after the most recent meta-analysis was published, 70% of respondents thought knee arthroscopy should continue to be offered.

Rates of arthroscopy in people over 60

A recent analysis of English Hospital Episode Statistics (HES) data suggested that rates of arthroscopy in the older population had reduced over recent years.⁸ The data were presented for the four arthroscopic codes separately. We re-evaluated the data presented and found that although rates of arthroscopic irrigations had fallen, this reduction was dwarfed by a large increase in the number of arthroscopic meniscal resections, resulting in an overall increase in procedures. The number of knee arthroscopies performed in England on people aged ≥ 60 between 2000 and 2011 has actually risen substantially, from 185 procedures per 100 000 population to 267/100 000, an increase of 69% (fig 1).

The data analysed comprised all arthroscopic knee procedures paid for by NHS England between 2000 and 2011 (incorporating all procedures carried out within the NHS in England and those done in the private sector under waiting

list initiatives). The figures do not include procedures paid for privately by patients and are thus likely to underestimate the total number of knee arthroscopy procedures carried out each year.

We then obtained directly comparative data for NHS Scotland for the same period from a nationally held dataset (using the same methods, patient groups, and coding structures; see supplementary data on thebmj.com). In Scotland, the arthroscopy rates for patients aged 60-74 rose from 111/100 000 in 2000 to 115/100 000 in 2013, an overall increase of only 4%. Rates of arthroscopic irrigation of the knee in the same group have reduced substantially, converging at a similar population rate as in England (10.7/100 000, see thebmj.com). The increases in arthroscopy rate in England are accounted for by increases in meniscal resection, particularly between 2007 and 2010 in those aged 60-74 (fig 2); there was no similar increase in Scotland.

Explanations for differing rates

Arthroscopic meniscectomy has a role in patients with symptoms of mechanical locking. However, the high rates of the procedure in people aged over 60 suggest it is being used in other patient groups. There is no evidence of a substantially increased prevalence of meniscal tears in this population over the past decade and no clear reason why rates of meniscal tears in the over 60s should have increased so rapidly in England compared with Scotland—the populations are essentially homogeneous.

Recent research suggests that two main factors drive variation in rates of surgery, clinician beliefs about the indications for surgery and differences in service provision.⁹⁻¹⁰ It seems unlikely that clinician beliefs can account for the different arthroscopy rates; surgical training and professional governance is consistent across the UK, with orthopaedic surgeons attending the same educational meetings. National guidelines on suitability for arthroscopic knee surgery apply both north and south of the border.

KEY MESSAGES

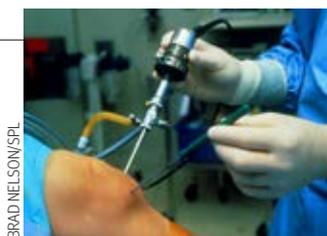
The number of knee arthroscopies in people aged over 60 has risen steeply in England over the past decade despite weak evidence

The increase in England was not mirrored in Scotland, where rates are now half that of England

Surgical indications, training, and management guidelines are consistent across the UK

It seems likely that the way England delivers services (using a disjointed and perhaps perversely motivated pathway) is responsible for this discrepancy

How we organise, finance, and deliver healthcare may drive rates of healthcare intervention more than need or benefit



BRAD NELSON/SPFL

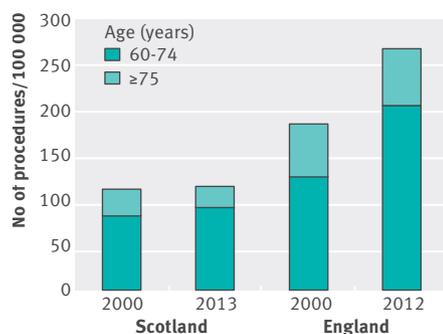


Fig 1 | Change in knee arthroscopy rate in Scotland and England among people aged over 60

McCulloch and colleagues suggest that when incidence, facilities, infrastructure, surgeon training, and patient demographics are not different, any variation in surgical rate may reflect provider priorities rather than patient need.⁹ The huge increase in knee arthroscopy in England over the past decade has resulted in rates that mirror those of the personal private insurance based healthcare markets of the United States¹¹ and Australia¹²: in excess of 200 procedures/100 000 population.

Kim and colleagues report a 49% increase in knee arthroscopy procedures in the US but note falling rates of arthroscopy for diagnosis of osteoarthritis. They suggest that changes to diagnostic coding are the cause; Medicare does not support arthroscopy for osteoarthritis, whereas meniscal resection remains eligible for insurance reimbursement, irrespective of age group.¹¹

Hollenbeck and colleagues record a shift in practice from hospital care to ambulatory surgery centres in the US, which has facilitated an increase in surgeons' productivity and reduced the costs of surgery.¹³ They also note that this has resulted in an increased propensity for surgery, either adding the necessary capacity to meet patient demand or reflecting overtreatment. The growth of these treatment centres has been underwritten by private investment. It is in the interests of shareholders that the facilities work at maximum capacity, which may create a perverse incentive to operate. Hollenbeck and colleagues speculate that the financial incentives inherent in these "treatment centres" may prompt lower thresholds for discretionary interventions or procedures.¹³ This view is supported by data from Florida on rates of cataract removal, colonoscopy, cystoscopy, and knee arthroscopy in patients aged ≥65. Age adjusted rates of surgery were shown to be 50% higher in areas with a large number of independent ambulatory treatment centres compared with areas with fewer centres.¹³

The complex interaction between medical evidence and patient preference make it challeng-

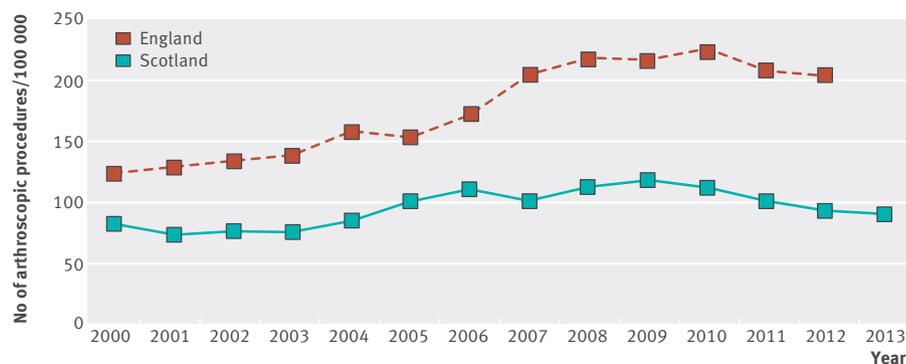


Fig 2 | Variation in arthroscopy rates among 60-74 year olds in England and Scotland, 2000-13

The current care pathway for knee pain in England is fragmented, with initial assessment and imaging often disconnected from surgical services

ing to define the correct rates for discretionary interventions. Hollenbeck and colleagues, however, draw correlations with previous findings on induced demand, citing the well publicised conflicting relation between physician owned services, including imaging, and use of physical therapy in the early 1990s.¹⁴ It seems investigation and care has become commoditised and delivery commercialised.

Influence of service delivery model

McCulloch and colleagues note that whether patients receive surgery will vary according to whether there is a decision to investigate symptoms, whether they are referred to a surgeon, and the beliefs of that surgeon about whether and when an intervention is appropriate.⁹ This clinical decision pathway may help explain the variation in the UK rates of arthroscopic meniscectomy in the over 60s.

The current care pathway for knee pain in England is fragmented, with initial assessment and imaging often disconnected from surgical services. Patients are referred to independent centres for assessment, which often initiate (and are rewarded for) conservative treatments and subsequent investigation such as magnetic resonance imaging (MRI). Surgery is then requested from a provider unit, which may be NHS or private and rewarded for surgery. This system can create perverse incentives, with success and remuneration dependent on volume and not patient outcome. In contrast, in the Scottish healthcare system the clinician maintains responsibility from initial referral through to surgery and subsequent follow-up. Most patients are seen by physiotherapists working within a team, a hybrid model that includes a hospital based surgeon responsible for the total pathway of care and patient outcomes.

The Right Care atlas of variation shows a four-fold variation in MRI rates around the country, greater than that for arthroscopy.¹⁷ As such, it seems likely that widespread use of MRI as a screening tool has, at least in part, driven the increase in arthroscopic surgery.

Changing practice

Substantial increases in use of an investigation or procedure with poor supporting evidence is hard to justify. There is often a greater willingness to accept evidence that promotes current practice than evidence that refutes it.^{18, 19} However, the Scottish experience shows it is possible to shift behaviour. The variation in arthroscopy rates in the over 60s was highlighted in Scotland in 2006, reported to surgeons, and published in the medical literature.²⁰ This exercise was repeated five years later, with a detailed sprint audit of practice (including post-surgery outcomes) reported directly to all responsible surgeons.²¹ This dissemination of local results created a sense of ownership and responsibility among the healthcare team that helped facilitate change. However, it is difficult to ascribe variation in arthroscopy rates to one factor. The maintenance of a chain of clinical responsibility within one coherent team together with feedback and discussion of variation in outcomes ensures a lean pattern of service delivery with no hidden incentives for providers. As Don Berwick notes, "when responsibility is diffused it is not clearly owned; with too many in charge no-one is."²²

The fragmentation of care and commoditisation of treatment has created perverse incentives to overtreat. A single point of clinical responsibility for the total care pathway, with success determined by patient outcome and not volume seems key to achieving appropriate rates of investigation or treatment. This seems the most appropriate model for the NHS to deliver services.

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