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The Cost-Effectiveness of Podiatric Surgery Services

Jan Carter with Christine Farrell & David Torgerson

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Introduction

In 1994 a report of the NHS Executive Chiropody Task Force, *Feet First*, identified nine research priorities for podiatry. One of these was a comparison of podiatric surgery with orthopaedic surgery of the forefoot. Early in 1995 the King's Fund was invited by the NHS Research & Development Programme to consider ways in which the podiatry profession could be encouraged to do more research and to move towards evidence-based practice. The development programme set up to achieve this included the present exploratory study of the cost-effectiveness of podiatric surgery.

Aims

The question this research set out to answer was, 'Do specialists in podiatric surgery represent a clinically effective and cost-effective way of providing forefoot surgery?'.

Methods

- A literature review of existing published and unpublished research on the cost-effectiveness of forefoot surgery and the production of an up-to-date bibliography for use within the profession and elsewhere.
- Interviews with key stakeholders in provider and purchaser agencies about the benefits and dis-benefits for patients and purchasers of podiatric surgery services. The intention here was to identify models of good practice and to set out purchasing choices.

A steering group of experts in forefoot surgery, public health, health economics and project management was established in order to:

- decide the parameters of the work and offer advice to the researcher about the content and format of the literature review, the interviews with key stakeholders and the analysis of statistical and economic data;
- discuss the research outcomes;
- advise on the format of the final report and future directions for development.

In order to achieve an objective assessment, a principal researcher with a medical research and management background was appointed to work with the steering committee. Membership of the Steering Group is given in Appendix 1.

Literature review

A literature search, back to 1981, was carried out through Index Medicus, Biosis, Health, University of Brighton Index of Research in Podiatry, DHSS, CINAHL and EMBase.

The following words were used for the search: audit, survey, cost, cost-effectiveness, cost-benefit, cost-utility, quality, comparison, efficacy, management, podiatry, foot surgery, podiatric surgery, forefoot surgery, hallux valgus, excision of bursa, exostectomy, hammertoe.

All references were entered in a database. References in the bibliography are categorised under the following headings: cost-effectiveness literature; published audit literature on podiatric surgery; internal audit reports on podiatric surgery; theses and general references. Specific references quoted in the text are listed at the end of each section.

Surgical procedures – current practice

A list of all surgical forefoot procedures taken from *The Tabular List of Classification of Surgical Operations and Procedures, OPCS4*, Office of Population Censuses & Surveys, 1990 was sent to all members of the steering committee and decisions were made about which procedures should be included in the definition of forefoot surgery. All surgical procedures included in the questionnaires are invasive and performed by both orthopaedic surgeons and specialists in podiatric surgery (see Appendix 2).

Service models

Six health authorities using different models of provision for forefoot surgery services were selected (see Table 15). The reason for choosing these six different models was to evaluate whether or not the service to patients and GPs was affected by organisation. These models were:

- separate orthopaedic and podiatric surgery units within an acute trust but with no communication between them;
- separate orthopaedic and podiatric surgery units in separate trusts with good communication between them;
- separate orthopaedic and podiatric surgery units in separate trusts with good communication and shared clinics;
- separate orthopaedic and podiatric surgery units in separate trusts with no communication but some (few) referrals to each other's departments;

- separate orthopaedic and podiatric surgery units in separate trusts with little communication and no referrals;
- a combined service within an acute trust.

All the orthopaedic departments were based in acute trusts and the departments of podiatric surgery were in acute or community trusts.

The health authorities which demonstrated the different methods of practice were approached, through the Chief Executive, to take part in the research (Areas 1–6).

Interviews with key stakeholders

In each area, one orthopaedic surgeon, one specialist in podiatric surgery and the manager of the trust housing the podiatric surgery department were interviewed. A number of general practitioners (GPs) were nominated by the manager, orthopaedic surgeon and/or specialist in podiatric surgery. Two or three of these were interviewed in each area. Many of the GPs approached for interview said they did not have the time to be involved and in one area, two of the three orthopaedic surgeons who were approached to take part refused on the grounds that there was no place for podiatric surgery in the NHS. All interviews were face to face and done by the principal researcher. Questionnaires are available on request.

The report

The report is in two main sections: the literature review and the findings from the interviews with key stakeholders.

Definitions in the UK

Podiatric surgery is foot surgery. It is predominantly ambulatory, elective, day case surgery.

A specialist in podiatric surgery is a state-registered chiropodist with a three-to-five-year post-graduate qualification in the theory and practice of foot surgery.

Day case surgery is when a patient is admitted during the course of a day with the intention of receiving care which does not require the use of a hospital bed overnight and who returns home as scheduled. If this original intention is not fulfilled and the patient stays overnight, such a patient will be counted as an ordinary admission.

Section 1: The literature review

Introduction

A literature search was undertaken which aimed to find published and unpublished studies relating to the cost-effectiveness of forefoot surgery with particular reference to podiatric surgery. During the literature search other information on audit of forefoot surgery (both published and unpublished) was accessed and this has also been listed. The references are listed at the end of this section according to category and at the end of the report in alphabetical order.

To help with the interpretation of the cost-effectiveness literature, the section starts with a brief overview of key health economic ideas and methods.

Health economics

The key concept underlying economics is the concept of resource scarcity. There will always be insufficient resources to satisfy all of society's wants or need. Therefore choices have to be made. Economics and its sub-discipline, health economics, is the science of choice. As choices have to be made, costs are incurred. In economics there is a definition of cost which tries to highlight this aspect of choice, that is *opportunity cost*. Opportunity cost means that as we choose to use resources in one way there is an opportunity foregone, and consequently benefits of using the resources in another. If the benefit foregone is less than the benefit gained then the choice is efficient. However, if for various reasons the benefit foregone is greater than the benefit obtained then the choice is inefficient.

An ideal state of efficiency in, for example, a health care system is when resources are allocated in such a manner that no other pattern of choices will produce more health benefit. Whilst such a situation is unlikely to occur, economic study seeks to try to improve patterns of resource allocation such that more health care benefit is generated for any given quantity of resources. There are a number of different economic methods whereby the efficiency of a health care intervention is appraised. To understand these it is necessary to first consider the concept of cost.

Opportunity cost

Opportunity cost is the benefit foregone by not using a resource for the best alternative. Cost for economists is a resource which has an alternative use, such as

labour, buildings, energy, etc. Thus the time of a specialist in podiatric surgery undertaking soft tissue correction of hallux valgus is a cost because it has an alternative use, for example, excision of a bunion. Similarly, the patient's time has an alternative use which may be simply leisure activity or involvement with the formal or informal economy. Ideally, an economic analysis should quantify and value both of these forms of time costs.

Merely because a cost does not fall to the NHS does not mean that it should not be counted. Often some dis-benefits of a disease, such as pain and distress of a patient, are referred to as 'costs'. However, while alleviation of suffering or pain should be counted as a benefit or a dis-benefit, it is not a cost because it is not a resource which has an alternative use.

Total costs

Total costs are all the costs of undertaking a given health care activity. For example, the total costs of providing a podiatric service will include the cost of buildings, salary costs, consumables, etc.

Incremental costs

Incremental costs are the extra costs incurred by a change in health care provision. If a podiatric service were to provide an advanced forefoot surgical service then the incremental costs would be the extra costs of providing such a service.

Marginal costs

Often marginal costs and incremental costs are used interchangeably. However, strictly speaking the marginal cost is the extra cost to produce one more unit of output or benefit. Thus, for example, it would be the extra cost of treating one more patient.

In practical terms, decision making about most health care resource allocation involves changes at the 'margin'. A decision to expand podiatric services to encompass more forefoot surgery involves incremental changes in resource allocation. Therefore, it is important to consider incremental or marginal costs and benefits when considering alternative health care interventions.

Economic evaluation

Cost benefit analysis (CBA)

In a CBA all the costs and benefits are compared and if the benefits are greater than the costs then in theory the intervention should be undertaken. CBA can be used to inform resource allocation across different areas of the economy. For example, are the benefits of reducing hospital waiting lists greater than the benefits of spending the same resources to reduce class sizes in schools? However, for a direct comparison between costs and benefits they need to be described in the same units – that is, money. In health care, quantifying the benefits in monetary terms is difficult if not impossible. Valuing a human life, which is clearly an important benefit of health care, is fraught with difficulty. A once widely used, but now discredited method, is to value a person's life in terms of their contribution to the national economy – the human capital approach. However, this method discriminates against women, ethnic minorities, the unemployed and the low waged. Alternative methods are being used such as estimating people's willingness to pay for safety improvements, which implicitly places a monetary value on life. This method gives a much higher value to life than the human capital approach.

Whilst reductions in mortality are difficult to quantify in monetary terms, reductions in morbidity are even more difficult. Therefore, partly for these reasons CBA is not often used in evaluating health care although theoretically it is the best approach.

Cost-effectiveness analysis (CEA)

CEA avoids many of the practical issues of valuing life and health by expressing the benefits in natural units. For example, a comparison of two methods of treating verrucae (e.g. cryotherapy versus chemotherapy) might compare the costs in monetary terms with the effects in terms of the number of verrucae cured. The programme which produces the least cost per cure is often judged to be more efficient. However, by using this technique questions of whether more resources should be put into cancer therapy or podiatry cannot be answered as the units of output – cancers avoided and verrucae treated – cannot be directly compared.

Cost utility analysis (CUA)

CUA measures health benefit in terms of years of life gained by some weighting with respect to their quality. The most widely used method is the quality adjusted life year (QALY) approach whereby the results of evaluations are expressed in terms of a cost per QALY. For example, if a health care intervention increases someone's life span by ten years but at only half the quality of life of normal then this would produce five

QALYs. Thus by using a common unit of output it is possible to compare the relative efficiency of, say, breast cancer screening and routine podiatric treatment.

Average versus marginal analysis

A common mistake made in some economic evaluations is to compare the average rather than the marginal cost-effectiveness or utility ratios of two alternatives. This distinction is important since it can produce misleading results. For example, assume that ten surgical procedures are undertaken for £1,000. This then results in a cost-effectiveness ratio of £100 per procedure (i.e. £1,000/10). However, additional investment of £100 on some new equipment might mean that two more patients would be seen but the total costs would be increased to £1,100 and total benefits to 12 treated patients would yield an average cost-effectiveness ratio of about £92 (i.e. £1,100/12).

However, the marginal cost-effectiveness ratio is much lower at £50 (i.e. the extra cost of £100 divided by the extra benefit of two treated patients). Thus the extra investment might be considered much more worthwhile at £50 per treated patient than £92. Clearly, the decision to invest the extra resources should be made on the extra benefits gained from such investment; therefore it is important to consider the marginal cost-effectiveness ratios and not the average.

Literature on the cost-effectiveness of podiatric surgery

The literature search indicated a paucity of published literature on the cost-effectiveness of podiatric surgery. The six published papers concerned with cost-effectiveness are listed in Table 1 with descriptions and commentaries. In order to give the reader a feel for the quality of the evidence these papers have been graded according to the system used in the *Effective Healthcare Bulletins* (Figure 1). However, this grading was developed for clinical studies and therefore may not be appropriate for cost-effective studies. Only three papers are relevant to the UK setting and these are discussed in more detail below. None of these UK studies are about the forefoot surgery procedures covered in this study.

Four other publications, apart from internal audits, look at costs and cost-effectiveness of podiatric surgery. One thesis, one unpublished internal report and two published papers talk about cost-effectiveness without defining costs. These are discussed on pages 13 and 14. They are *not* listed in Table 1.

The studies are ordered by quality. The grades reflect the following features:

Grade I: Randomised controlled trial (RCT) or review of RCTs

Grade IA: Calculation of sample size, accurate and standard definition of outcome variables

Grade IB: Accurate and standard definition of outcome variables

Grade IC: None of the above

Grade II: Prospective study with comparison group (non RCT or good cohort study)

Grade IIA: Calculation of sample size accurate and standard definition of outcome variables, adjustment for the effects of important confounding variables

Grade IIB: One of the above

Grade III: Retrospective study

Grade IIIA: Comparison group, calculation of sample size, accurate and standard definition of outcome variables

Grade IIIB: Two of the above

Grade IIIC: None of the above

Grade IV: Cross sectional study

Source: *Effective Healthcare Bulletin. The management of primary breast cancer.* NHS Centre for Reviews and Dissemination, University of York, August 1996, Vol.2, No.6, p.4.

Figure 1 Grading of cost-effectiveness studies

Table 1 Literature on the cost-effectiveness of podiatric surgery

Author(s), country and objectives	*Design, population, setting and intervention*	*Main outcome measure and key result*	*Commentary*	*Grade*
Bryan *et al.* (1991); UK, Health Economics Research Group, 'Brunel, UK; to estimate the cost-effectiveness of routine chiropody treatment among elderly people.	Cost utility analysis; utility values derived from 10 podiatrists and 84 patients using the Rosser Matrix; random sample of patients and all podiatrists in Northumberland; routine (non-surgical) podiatry.	QALY gain and cost per QALY gained; cost per domiciliary visit (in 1989/90 prices) was £6.87 and clinic treatment was £4.85; cost per QALY ratios ranged from £229 to £694 depending on category of patient; this compares favourably with other health care interventions.	This study claimed to show that routine podiatry treatment was cost-effective relative to other interventions. However, study has a number of flaws – QALY changeseventually used werefrom a small sample of podiatrists (n=10); cost utility ratios relate to existing treatments not changes in service provision; incremental costs were not estimated.	IV
Clarke (1985); Northern Ireland, UK; to compare the costs of nail avulsion with phenolisation between inpatients, outpatients, podiatrists.	Cost analysis; NHS hospital, outpatients or chiropody clinics in Northern Ireland; partial phenolic ablation of nail bed.	Cost per nail avulsion; for inpatients was £396 (in 1985 prices), outpatients £77 and for podiatrists £6.	Average costs were used for all comparisons. A more appropriate comparison would have been to compare the incremental costs of transferring more patients to podiatrists from the hospital setting.	III C
Mortenson & Baum (1985); USA; summary of three research reports which have studied various aspects of foot care – John Hopkins Health Services Research & Development, Virginia Polytechnic Institute, ELM Services Inc. One section of the report was pertinent to the economics of podiatry.	Surveys of podiatrists and retrospective analysis of financial claims and charges data; podiatric physicians and insured patients; USA; comparisons of cost-effectiveness with other specialists who undertake podiatric care.	Podiatrists had much lower use of inpatient facilities compared with other practitioners, lower charges for most operations compared with other practitioners (although with some exceptions), podiatrists make a profit for foot-related procedures while others make a loss; this report claims that podiatrists are more cost-effective than other providers of foot surgery and would lead to extensive savings if more widely used.	The problem with this study is the extensive use of aggregate charge and claims data which may not reflect true opportunity costs. Also, there appeared to be no attempt to ascertain whether the cost differentials between podiatrists and others were due to differing patient mix. For example, orthopaedic surgeons might be more costly because they were dealing with difficult cases.	III B

Table 1 (cont.)

Author(s), country and objectives	*Design, population, setting and intervention*	*Main outcome measure and key result*	*Commentary*	*Grade*
Stevenson (1988); Western Australia; to examine the efficiency of tenotomy surgery performed by a podiatrist in private practice compared with an orthopaedic surgeon in a hospital.	Retrospective comparison of the costs of undertaking tenotomies in Western Australian orthopaedic departments compared with likely cost of private podiatrists undertaking same procedures.	Cost per operation performed; private podiatrists achieved a lower cost per operation performed which was $AS322 compared to $AS486 when only operating costs were included; this increased to $AS2,105 & $872 for orthopaedic surgeons and podiatrists respectively when time off work and bed day costs were included.	This is a poor study. Costs were estimated from either average bed day costs or recommended fees from various professional association. Such prices may bear little relationship to opportunity costs.	IV
Sykes & Kerr (1988); UK; to compare the effectiveness and cost-effectiveness of surgical treatment of ingrowing toenails by podiatrists compared with surgeons.	Randomised controlled trial; patients presenting to surgeons and podiatrists with ingrowing toenails (no other details given); segmental phenolic ablation.	Recurrence; podiatrists achieved 3% recurrence and surgeons a 7% (difference = 4%; 95% CI of difference -0.7% to 9%*); segmental ablation by podiatrists cost £20 compared with surgeons of £68. Some surgeons undertook total avulsion with a knife (Zadik's operation); for this subgroup recurrence was high (53%; 95% CI 30% to 60%).	This study showed a better effectiveness for podiatrists in terms of recurrence, which was close to statistical significance. Also podiatrists were more cost-effective than surgeons. However, the method of costing was not outlined in detail.	I B
Weiner, Steinwachs, Frank & Schwartz (1987); to compare the relative cost-effectiveness of forefoot surgery provided by either podiatrists or orthopaedic surgeons.	Case control study using financial claims records of an American Insurance company; USA; federal employees; 6 surgical categories compared: bunion-related, tumour excision, digit correction, corrective bone removal, soft tissue, metatarsal.	Average total charge per patient; podiatrists tended to have higher procedure charges per patient partly because they undertook more procedures per patient than other surgeons; however, due to reduction in inpatient stay overall charges were less.	This study suffers from the problem of equating charges with costs which might not be the same. Furthermore, like all observational studies, patient groups may not be comparable; such bias can either underestimate or over-estimate the relative cost-effectiveness of the two groups. This paper has been the subject of extensive criticism by Rudicel (1995).	III C

** Calculated from data within the paper*

Commentary

Bryan *et al.* (1991) do not address the economic issue of surgical intervention in feet, but seek to assess whether routine chiropody in elderly patients is cost-effective. An important drawback of this study is that it does not assess whether there should be more or less resources put into routine chiropody therapy but makes an estimate of cost and benefit of existing resource allocation. Ideally, in order to help resource allocation decisions, two estimates need to be made. Firstly, the costs saved and benefits lost if resources were withdrawn from parts of the chiropody budget and secondly, what the extra benefits would be from any extra resources allocated to chiropody.

Clarke (1985) compares the average costs of treating ingrowing toenails either by surgeons (inpatient or outpatient setting) compared with treatment within a chiropody department. The key question that this study should have addressed is what resources would be needed by chiropody departments to treat cases which would otherwise have been treated by surgeons. As such, the incremental costs to the chiropody department and conversely the incremental savings to the hospital need to be estimated. Average cost analysis is inappropriate for this purpose. However, it is likely that for the chiropody department the average costs are a closer approximation of marginal costs than for the hospital department. Hence, it is likely in this instance, that average costs slightly overestimate the cost to the chiropody department of increasing throughput of surgical cases, whist largely overestimating the saving to the hospital of not undertaking surgery. This is mainly because much of the costs of using expensive capital equipment in hospital will not be saved, if no forefoot surgery is undertaken, as it is required for other purposes.

Sykes & Kerr (1988) report the only randomised trial in the UK literature of forefoot surgery. There are certain methodological deficiencies which may, in part, be due to the fact that the paper is a short report which has a strict word limit; for example, the method of randomisation has not been reported. The paper asserts that there is no statistical difference in the recurrence rate of ingrowing toenails between surgeons and chiropodists. Whilst chiropodists had a 3 per cent recurrence rate, surgeons experienced more than a two-fold increase in recurrence (7 per cent). This difference in recurrence of nearly 4 per cent is very nearly statistically significant, as witnessed by the fact that the 95 per cent confidence interval of the difference only just passes through zero (–0.7 per cent to 9 per cent). As confidence intervals or p values are not reported in the paper and require separate calculation this is not readily apparent. The method of calculating the different costs of treating ingrowing toenails has not been reported. However, *a priori*, we would expect that chiropodists should be able to treat ingrowing nails at lower cost than surgeons.

Of the other three papers listed in Table 1, two are from the USA and one from Australia.

Mortenson and Baum (1985) summarised three research reports which study various aspects of foot care including forefoot surgery. One section of the report is relevant to the economics of podiatric surgery and claims that podiatrists are more cost-effective than other providers of foot surgery and, if more widely used, would lead to extensive savings. The problem with this study is the extensive use of aggregate charge and claims data which may not reflect true opportunity costs. There was also no attempt to ascertain whether the cost differentials between specialists in podiatric surgery and orthopaedic surgeons were due to differing patient mix.

The efficiency of tenotomy surgery performed by a podiatrist in private practice as compared to an orthopaedic surgeon in a hospital is reported by Stevenson (1988). This is a retrospective study comparing the costs per operation performed and concludes that private podiatrists achieve lower costs. However, costs were estimated from either average bed day costs or recommended fees from various professional associations. Such prices may bear little relationship to opportunity costs.

Weiner *et al.* (1987) compared the relative cost-effectiveness of forefoot surgery provided by either podiatrists or orthopaedic surgeons. The study found that podiatrists tended to have higher procedure charges per patient, partly because they undertook more procedures per patient than orthopaedic surgeons, but that due to the reduction in inpatient stay, overall charges were less. This paper has been the subject of extensive criticism by Rudicell (1995) because it equates charges with costs which might not be the same and furthermore like all observational studies, patient groups may not be comparable and such bias can either underestimate or overestimate the relative cost-effectiveness of the two groups.

Four other publications accessed during the search address the issue of the cost-effectiveness of podiatric surgery (see page 8). Galloway (1992) in a BSc thesis looks at the effect of providing chiropody treatment or a combination of chiropody and podiatric surgery. Cost-effectiveness is measured by the post-podiatric surgery change in the need for chiropody (see page 20).

Gilbert and Galloway (1990) in an unpublished internal report from the Herefordshire Health Authority (Table 3) look at the cost implications of podiatric surgery compared with palliative chiropody treatment.

In the other two unpublished papers, cost-effectiveness is discussed but no actual costs given. In order to determine whether patients with common foot disorders have different medical outcomes depending on whether podiatrists, orthopaedic surgeons or other physicians provided the care in rural or urban areas, Glenn (1995) measured effectiveness of treatments of patients who had foot conditions treated by either a physician, podiatric surgeon or orthopaedic surgeon. After statistical adjustment for potential confounding variables the results suggest that podiatrists were twice as effective as other providers. Older (1988) examined whether day case orthopaedic surgery is beneficial to patients compared with inpatient day case surgery. This is a descriptive study; no comparison of outcomes is made with inpatient surgery and no comparison was made with podiatrists.

Conclusions

Only one UK randomised trial dealing with podiatric surgery was identified and that did not deal with invasive surgery. Ideally more randomised trials of forefoot surgery comparing the relative effectiveness and cost-effectiveness of specialists in podiatric surgery and orthopaedic surgeons with other providers should be undertaken.

Specialists in podiatric surgery will be more cost-effective than other providers if one of the following three conditions are met:

- specialists in podiatric surgery can produce the same or better effect for lower cost;
- specialists in podiatric surgery can produce a better effect for the same cost;
- specialists in podiatric surgery can produce a better effect for an acceptable extra cost.

Literature on clinical audits/surveys of podiatric surgery

The Department of Health defines audit as: 'The systematic, critical analysis of the quality of medical care, including the procedures used for diagnosis and treatment, the use of resources, and the resulting outcome and quality of life for the patient' (HMSO, 1989).

This section looks at the published and unpublished audits from the UK concerned with podiatric surgery accessed during this study. The section is divided into three parts: audits concerning podiatric surgery which have been published in journals; audits of podiatric surgery published as internal reports; and audits contained in postgraduate theses. The published papers on audit of podiatric surgery listed in Table 2 are given an audit quality grade and a satisfaction survey grade.

Published audit on podiatric surgery

Published papers concerning audit of podiatric surgery, accessed during the literature search, are listed in Table 2. There are 13 papers, seven originating from the UK, five from the USA and one from Japan. The table outlines the main features of these papers according to: the aim of the study, patient groups, outcomes assessed, assessment tools and results. Each paper is graded according to audit quality and survey satisfaction.

These audits mostly cover the area of patient satisfaction with podiatric surgery. Post-operative infection rates, post-operative pain, chiropody treatment required after surgery, satisfaction of podiatrists and orthopaedic surgeons with own results, use of orthoses and preference for day case surgery with local anaesthetic are also presented.

Audit quality grading

The criteria for assessing the quality of research designs to generate effectiveness and cost-effectiveness data is not easily applied to audit. However, it is important to consider the quality of audit papers. Furthermore it has been cogently argued that audit should be classed as a clinical science (Russell & Wilson, 1992). Therefore a different typology of classifying audit papers has been developed bearing in mind that audit, if it is to be defined as a clinical science, should be subjected to a quality classification system at least as rigorous as that used to assess effectiveness and cost-effectiveness studies.

The classification system was developed as follows. First, the four key elements of audit were defined as:

1. audit should be directed at quality of care;
2. audit should include the setting of standards;
3. audit should compare performances with these standards;
4. audit should lead to beneficial change.

For quality of care one could read effectiveness of care. Therefore, for the first two elements standards should be set that maximise the quality (effectiveness) of clinical care. To do this, ideally, a systematic review of available evidence should be undertaken and standards which optimise quality ought to be based on such a review. Therefore the first essential element of high quality audit study is:

1. Evidence that the audit has undertaken or used a systematic literature review
After a literature review the audit needs to set *a priori* standards on which to judge the performance of existing medical practice. Therefore, the next essential step of audit is:

2. A description of standard setting
For a reader to judge the appropriateness and quality of standards this needs to be clearly described. After standard setting measuring existing performance of medical care against those standards need to be undertaken. Therefore audit should contain:

3. A description of how existing performance is compared with the standards
Finally, audit should lead to *measurable* beneficial change. Therefore audit should include:

4. A robust research design measuring beneficial change.
Audit like other forms of research should use the most robust research designs available, which often means randomised controlled trials.
The available research designs are as follows.

A Randomised trials
B Quasi-experimental (e.g. interrupted time series analysis)
C Case control
D Before and after

The following classification system is proposed.

A1 = All of the 4 steps of audit described with beneficial change measured by using a randomised trial
A2 = All of the 4 steps of audit described with beneficial change measured by using a quasi-experimental design
A3 = All of the 4 steps of audit described with beneficial change measured by using a case control design
A4 = All of the 4 steps of audit described with beneficial change measured by using a before and after
A5 = No further attempt was made to measure beneficial change

B1 = 3 of the 4 steps of audit described with beneficial change measured by using a randomised design
B2 = 3 of the 4 steps of audit described with beneficial change measured by using a quasi-experimental design
B3 = 3 of the 4 steps of audit described with beneficial change measured by using a case control design
B4 = 3 of the 4 steps of audit described with beneficial change measured by using a before and after design
B5 = No further attempt was made to measure beneficial change

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C1 = 2 of the 4 steps of audit described with beneficial change measured by using a randomised design
C2 = 2 of the 4 steps of audit described with beneficial change measured by using a quasi-experimental design
C3 = 2 of the 4 steps of audit described with beneficial change measured by using a case control design
C4 = 2 of the 4 steps of audit described with beneficial change measured by using a before and after design
C5 = No further attempt was made to measure beneficial change

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D1 = 1 of the 4 steps of audit described with beneficial change measured by using a randomised design
D2 = 1 of the 4 steps of audit described with beneficial change measured by using a quasi-experimental design
D3 = 1 of the 4 steps of audit described with beneficial change measured by using a case control design
D4 = 1 of the 4 steps of audit described with beneficial change measured by using a before and after design
D5 = No further attempt was made to measure beneficial change

Satisfaction survey grading

Because some of the papers accessed are not truly audit, but rather poor satisfaction surveys, the following classification has also been used:

1. Evidence of a valid satisfaction questionnaire
2. *A priori* sample size calculations
3. Statistical featuring of results

A = All 3 B = 2 of above C = 1 of above D = 0

Source: Designed using criteria identified by Russell, I.T., Wilson, B.J. Audit: the hard clinical science? *Quality in Health Care* 1:51–55, 1992.

Table 2 Published audit literature for podiatric surgery

Author Year Country	*Aim of study*	*Patient groups*	*Outcomes assessed*	*Assessment tools*	*Results*	*Audit quality grade*	*Satisfaction survey grade*
Ariori *et al.* 1989 UK	To assess the impact of a new day surgery unit for podiatric surgery	49 procedures on 36 patients. 29 returned questionnaire	Subjective assessment by patients of outcome. Objective assessment by staff	Ad hoc patient questionnaire	79% patients said they were totally cured. Patients less critical than staff – 52% without post-op problems	E	D
Bellacosa & Pollak 1993 USA	To assess objectively and subjectively patient expectations of elective foot surgery	73 patients (16–75 yrs) attending 5 podiatrists	Expectations before and after first ray and lesser digit surgery about symptoms and return to work	Ad hoc two part patient questionnaire pre- and post-operative	92% said would have foot surgery again and recommended it to a friend	E	D
Fick *et al.* 1992 USA	To assess treatment of foot injury by orthopaedic podiatric of family physicians	78 runners concerning their most recent treatment for non-invasive foot injury	Reasons for choosing a doctor; expectations of care and satisfaction with treatment	Ad hoc patient questionnaire	No difference in the overall patient satisfaction with treatment received from 3 groups of physicians. This was a volunteer sample of runners who had all healed. A random sample of all runners would be better	E	B
Hood *et al.* 1994 UK	To determine the effect of podiatric surgery on the need for chiropody treatment	33 patients who had received chiropody treatment for > 1 year prior to surgery compared with 25 matched patients receiving conservative chiropody care. Early referral group with care < 1 year (n=36)	Chiropody treatment requirements for post-operative patients. Surgery includes digital amputation, excisional arthroplasty or arthrodesis of less toe/s	Retrospective controlled study in 2 NHS community chiropody clinics	Podiatric surgery produces a significantly more successful outcome than conservative chiropody treatment. 90% had less need, 51% had no further need. A successful outcome for both patients and service is more likely the sooner the patient is referred.	C3	–
Hugar *et al.* 1990 USA	To determine the infection rate for outpatient podiatric surgery	148 patients undergoing day case forefoot, midfoot and rearfoot surgery. 61 had bilateral surgery. 495 procedures performed	Post-operative infection rate	1 year retrospective studyAd hoc patient questionnaire	Infection rate of 1.35% compares favourably with reported hospital infection rates of 2.2% and 5.34%	D5	–
Laxton 1995 UK	To demonstrate and improve the quality of forefoot surgery in Suffolk	Audit of all nail (n=353) and forefoot (242) operations conducted by orthopaedic and general surgeons, GPs and podiatrists over 6 months 1991/2	Process and patient outcome data from a multi-professional group	Patient questionnaire 9 months after surgery. Assessment of medical records for those patients not having surgery. 62% response rate for nail surgery. 83% response rate for forefoot surgery	Nail surgery: podiatrists practice met agreed standards. Forefoot surgery: case mix differed significantly between groups as did recording indications for operations (OS 87%, SPS 55%). In comparable cases, OS (19 cases) and SPS (35 cases) were satisfied with their colleagues' results	C5	–
Moraros & Hodge 1993 USA	To examine the therapeutic effects of prescribed orthoses in a varied population	523 patient records	Patient satisfaction with orthoses, effectiveness of orthoses in relieving chief complaint, effectiveness of orthoses with overweight patients and prevention of surgery (specifically hammer toe and hallux valgus)	Physician questionnaires to patients at initial visit, dispensing visit and 2,6 and 14 week follow-up visits	Patient satisfaction 83.1% (n=403). Effectiveness of orthoses ranged from 62.5% completely resolved to 4.7% unresolved (n+465). Overweight 55.7% resolved, 8.7% unresolved (n+104). Orthoses reduced or delayed the need for surgery	E	D

Table 2 (cont.)

Author Year Country	*Aim of study*	*Patient groups*	*Outcomes assessed*	*Assessment tools*	*Results*	*Audit quality grade*	*Satisfaction survey grade*
Shaw & Alvarez 1992 USA	To examine the use of digital implants for the correction of hammer toe deformity and their potential complications and management	672 implants over an 11 year period	Patient satisfaction with type of shoes, elimination of lesion, swelling and pain relief	Ad hoc patient questionnaire 12 months post-operative	82% very satisfied, 10% satisfied and 8% dissatisfied	D5	D
Tibrewall & Foss 1991 UK	To examine the practice of Wilson's osteotomy on a day care basis and explore the potential and pragmatism of day surgery in orthopaedic practice	51 patients treated by a Wilson's osteotomy for the correction of hallux valgus (17–68 years)	Patient satisfaction, pain relief and appearance	Ad hoc patient questionnaire 12 months post-operative. 84% response rate	All patients left hospital within 10 hours of surgery – no readmissions. 88% reported higher than 75% satisfaction after surgery. 86% pain-free at final follow-up. All satisfied with shape	–	D
Tollafield 1993 UK	Does evidence exist to support the practice of podiatric surgical procedures by non-medical specialists. Do doctors and patients agree that this system of care works and should continue	290 GPs in Northamptonshire. 299 patients having surgery ranging from hammer toe to multiple metatarsal reconstruction	Expectations of GP knowledge of podiatrists' scope of practice, attitude towards that scope, satisfaction with surgery by podiatrist. Patient satisfaction with decision for surgery, care and benefits	5 year follow-up GP survey, patient survey and case record survey	38% GPs responded. 88% believed podiatrists could operate on more than just nails and skin. 59% of patients responded. 93% preferred day surgery under local anaesthetic	–	D
Turbutt 1992 UK	To report on the introduction of day case foot surgery, patient satisfaction and referral	324 surgical procedures on 247 patients. Lesser digit and first ray. 190 GPs in area	Post-operative infection and patient and GP satisfaction	Hospital records. Otherwise not defined	1.6% post-operative infection rate. Patient satisfaction high (many letters). Referrals from 130 GPs	E	–
Vohra 1995 UK	To monitor and measure patient satisfaction and surgical care after podiatric surgery	200 patients undergoing day care foot surgery	Pre-operation assessment, post-operative pain satisfaction, preference for day care	Retrospective study. Postal questionnaire after date of discharge	81% response rate. 90% satisfied with pre-operation treatment, 88% preferred day case surgery, over 90% satisfied. 70% had mild to moderate pain, 30% moderate pain	E	D
Yamamoto *et al.* 1990 Japan	To examine the results of corrective surgery of foot deformities after stroke	104 patients treated after stroke. Hammer toe deformity, equinus deformity and varus deformity	Patient satisfaction – correction maintained, use of orthoses, bathe unassisted	Clinical follow-up and patient questionnaire. Telephone call if house bound	72% response rate. 76% satisfied. 74% correction maintained, 79% did not use orthoses, 51% could bathe unassisted	D4	–

Unpublished internal audit on podiatric surgery

The internal audits concerned with podiatric surgery accessed during this study are listed in Table 3. Aspects of audit include patient satisfaction, waiting times, pre- and post-operative information, surgical care, post-operative pain and satisfaction with day case surgery.

Theses

The *Index of Research in Podiatry* (1996) revealed three theses with some relevance to this study.

Galloway (1992) looked at the cost-effectiveness of providing chiropody treatment or a combination of chiropody and podiatric surgery. The cost of providing foot surgery by using podiatric, orthopaedic or casualty surgery was compared. Cost-effectiveness was measured by the post-surgery change in the need for chiropody. Clinical records were examined for 204 patients who received care for two years pre- and post-operatively. The conclusion was a reduction in future costs of routine treatment attributed to podiatric surgery.

Rendall (1988) reports on a survey to assess the effectiveness of criteria employed in the selection process for patients and the choice of procedure in relation to hallux valgus surgery. The results demonstrate that surgery is a successful method of dealing with hallux valgus and that the type of surgery used or the levels of activity by the patient do not affect the outcome.

Williams (1992) discusses the acceptable cost to patients of podiatric surgery. Patients who had suffered with a painful digital deformity for at least a year were asked how much they would be prepared to pay to have the toe corrected and made symptom free. A second group who had already had a toe corrected by podiatric surgery were asked how much they would be prepared to pay in retrospect. Pre-surgically across all income groups, a mean fee of £287 was chosen and a mean fee of £331 was chosen by patients post-surgically.

Table 3 Unpublished internal audit literature for podiatric surgery

Sources	*Aim of audit*	*Patient groups*	*Outcome assessed*	*Assessment tools*	*Result*
Harrow & Hillingdon Healthcare Trust, Middx, 1995	To examine patient satisfaction after podiatric surgery	321 patients with 223 episodes of care	Satisfaction, with surgical outcomes, waiting times and patient care	Ad hoc patient questionnaire	93% satisfied
Harrow & Hillingdon Healthcare Trust, Middx 1996	To look at the effects of mechanical therapy, i.e. the use of orthoses on the outcomes of treatment plans	50 patients	Resolution of symptoms by use of orthoses	Ad hoc patient questionnaire	76% of sample reported improvement of complete resolution of symptoms. Need for further training of staff in maximising effect if mechanical theory
Harrow & Hillingdon Healthcare Trust, Middx 1996	To establish the complication rate following podiatric surgery	127 patients with 127 episodes of care	Overall complication rate	Hospital records	9.4% overall complication rate, includes 1.6% infection and 3.9% revision. Foot surgery can be performed successfully with predictable outcomes
Herefordshire District Health Authority 1990	To examine a new initiative of tiered levels of foot care	Annual community statistics 1977–87	Patient needs; waiting time; % variation activity	HA records	Improves patient care; saves money; eliminates waiting lists; reduces ortho. overload
Ilkeston Hospital, Derbyshire 1994–95	To assess patient satisfaction with podiatric surgery	79 patients after discharge	Pain; waiting times; satisfaction; recommendation to a friend	Ad hoc patient questionnaire	95% said improved; 96% satisfied; 96% would recommend it to a friend
Optimum Health Services, London 1994–95	To look at patient satisfaction following podiatric surgery services	161 patients	Waiting times; information; follow-up	Ad hoc patient questionnaire	78% response rate. 78.2% found waiting times acceptable; > 90% happy with information; 96.7% satisfied with follow-up
Princess Royal Hospital NHS Trust, Telford, Shropshire 1993–96	A review and comparison of foot surgery by orthopaedic surgeons and specialists in podiatry. GP referral patterns, post-op patient follow-up and opinions on forefoot surgery by OS and SPS	158 patients, 74 for surgeons (inpatient for average of 6 days with general anaesthesia) and 74 for podiatrists (day case with local anaesthesia)	Severity of op score; waiting times; information to patient; hospital stay; pre- and post-op pain and analgesia infection rates and revision surgery; satisfaction and return to normal activity	Post-op. surgeons questionnaire; pre-op, 1 wk and 6 mth post-op patient questionnaires; 3 mth post-op GP questionnaire for each patient	Patient response rates 84-96% (SPS); 63-85% (OS). GPs response rates 78% (SPS) and 70% (OS). 96% (SPS) and 76% (OS) happy with pre-op info. Post-op pain 14% (SPS) and 20% (OS), 12 wk post-op pain 5% (SPS) and 70% (OS). Satisfaction 90% (SPS) and 70% (OS). Made worse 5% (SPS) and 13% (OS). Revision surgery 0% (SPS) and 11% (OS). Post-op infection 0% (SPS) and 5% (OS)
West Middlesex University Hospital 1995	To substantiate the claim that there is high patient satisfaction following podiatric surgery	226 patients after discharge. Surgery included digital, first ray and lesser metatarsal osteotomies	Waiting times; information; care; day case surgery; satisfaction with surgery; pain	Ad hoc patient questionnaire 6-18 weeks post-op	35% response rate. 83% happy with day case surgery; 97% happy with care; 96% either very satisfied or satisfied with outcome; 60% had either no pain or moderate pain

Conclusions

Overall, the range and quality of this literature is poor:

- there are no RCTs of podiatric practice compared with orthopaedic practice, therefore differences in clinical effectiveness and cost-effectiveness are uncertain;
- no audit study has shown beneficial changes in practice (yet);[1]
- only one (US) satisfaction survey has attempted to use robust methodology to validate questionnaire surveys.

Although the use of audit in podiatry is increasing, publication of results is still relatively rare. Audit is at an early stage of development. The podiatry profession needs sustained help to develop good quality audit techniques and publications.[1]

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Section 2: Interviews with key stakeholders

Description of podiatric surgery departments

The six areas selected by the steering committee were, in alphabetical order, Derby, Doncaster, Luton, Northampton, Oxford and Shrewsbury. These areas were chosen because they represent the different models of practice between orthopaedic and podiatric surgery departments. These range from a unit where the two disciplines are combined, through to ones where there is little or no communication, to those where the two disciplines work side by side but are housed in different trusts (see Table 15). A brief description of how each model operates is given below (in random order).

Area 1

Podiatric surgery was part of the community trust until 1993 but became a part of the acute trust in 1994 when a new day case unit was established. It is a self-contained, independent service which has good relationships with GPs and other podiatrists but does not have a good relationship with the orthopaedic department. Other surgeons are felt to be equivocal towards podiatric surgery. The orthopaedic surgeon felt that there was very little advantage to having communication between podiatry and orthopaedics. Usually a couple of cases are referred from podiatry to orthopaedics each year. These are made directly to the orthopaedic department with a covering letter to the GP concerned.

Area 2

This community trust was set up in 1986/87 and a new day case unit was built in 1994. The service is self-contained and independent. Where GPs are aware of the service, there are good relationships; but those who were not aware were equivocal. Communication with orthopaedic and other surgeons is good. Referrals are made from podiatry to orthopaedics when patients need a general anaesthetic or inpatient care. Approximately ten cases a year are referred back to their GPs to go onto orthopaedics. The orthopaedic department refers patients to podiatry for orthoses.

Area 3

Podiatric surgery is a department in the community health care trust which was set up in 1990. It is a self-contained and independent department with good

relationships with GPs and other podiatrists. Relationships are equivocal with surgeons in general but there is good communication with the orthopaedic department. The orthopaedic surgeon and specialist in podiatric surgery share a two-monthly clinic and communicate regularly on a one to two week basis. The appropriate person does the appropriate operation, the orthopaedic surgeon doing the larger bone procedures. Second opinions are sought on an ad hoc basis. There are, on average, 10 referrals from podiatry to orthopaedics in one year. These go directly through the clinic when advanced surgery needing general anaesthetic or inpatient treatment is required.

Area 4

The Department of Podiatric Surgery is a part of the community health services trust and is self-contained and independent within the trust. Relationships with GPs, other podiatrists and surgeons other than orthopaedic surgeons are considered to be good. There is no communication between the podiatric surgery and orthopaedic departments other than letters to GPs or correspondence from the DoH. No referrals are made from orthopaedics to podiatry except for non-surgical procedures. Podiatrists refer (less than five cases/year) to orthopaedics via the GP for inpatient treatment or treatments requiring general anaesthetic.

Area 5

The Department of Podiatric Surgery was set up in 1994 within the community health care trust. It is independent and self-contained. Relationships with local GPs and other podiatrists are good. There is little communication between the orthopaedic and podiatric surgery departments other than cross referrals made through the GP (less than five cases per year each way). Other surgeons have been equivocal until recently, but following a presentation to the rheumatology department, referrals are now being made to surgical podiatry.

Area 6

Podiatric surgery is a combined service with orthopaedics within the acute trust. Relationships with GPs are equivocal and there are no other podiatrists in the unit. Communication between the foot and ankle orthopaedic surgeons is very good although other surgeons are equivocal. The specialist in podiatric surgery and orthopaedic surgeon communicate weekly and share a clinic twice a month. All clinics are in the orthopaedic surgeon's name who also sees all the notes before the clinics. Twice a month the orthopaedic surgeon sees second opinions in clinic and the podiatric specialist runs a separate clinic. Follow-up appointments could be seen

by either. A multidisciplinary service is offered where the orthopaedic surgeon, specialist in podiatric surgery, podiatrist and orthotist work together.

Podiatric surgery departments: budgets, referrals and facilities

Tables 4 to 8 show data obtained from the managers of the departments of podiatric surgery. All managers are budget holders and three of them are also operational managers. The only similarity in the start-up costs for the six departments is that no costs are given for buildings, some only had the salary of the specialist in podiatric surgery, others had monies for equipment (see Table 4). None of them started with new buildings, although one made modifications to existing buildings. The current managers were not aware of any figures other than those produced here.

Annual budgets for podiatry services include podiatric surgery. These figures and those for podiatric surgery alone are shown in Table 4. Trusts 1 and 6 are acute trusts, the others are community trusts and the data for Trust 6 is the budget for the whole of the foot and ankle service. Table 4 also shows data for the number of podiatrists, the number of specialists in podiatric surgery, their grade and salary. One acute trust and two community trusts have full time specialists in podiatric surgery.

The number of cases of forefoot surgery and the total number of referrals to the podiatry service are shown in Table 5. Figures were not available for all departments as far back as 1993–94. The average proportion of patients having surgery for the year 1995-96 is 39 per cent and ranges from 19.9 per cent to 53.0 per cent. The reason for the low percentage for Trust 6 is that 718 is the total number of referrals to the foot and ankle service and 143 is the number of patients having only forefoot surgery.

The orthopaedic surgeons in Areas 1–5 spent between 5 per cent and 15 per cent of their time in surgery on the forefoot and this averaged 70 cases per annum. The orthopaedic surgeon in Area 6 does 450 cases and spends 80–90 per cent of surgical time on foot surgery. All specialists in podiatric surgery reported that they spent 100 per cent of their time in surgery on the forefoot and this averaged approximately 450 cases per annum. The cases per annum for both orthopaedic surgeons and specialists in podiatric surgery include NHS and private work.

An approximate estimate of the cost per case can be calculated by dividing the budget for podiatric surgery (see Table 4) by the number of surgical cases (see Table 5). These range from £75–£502 per case (see Table 6).

Back-up services, other facilities and the wide range of source level agreements for consulting rooms, theatres, staffing for theatre and pre-and post-operative facilities are described in Table 7. All the departments have X-ray and pathology facilities, although some are in house and others contracted to the local acute units. All departments have access to orthotics and five of the six have access to surgical shoes; the sixth is looking at shoes as part of the service for the future. Five of the departments have or have had, surgical pupils in place.

The managers were asked what were the sources of referrals to the specialists in podiatric surgery. These are listed in Table 8. The patterns range from departments that receive almost all referrals from GP fundholders, to departments where only 20 per cent come from fundholders. Managers commented that they needed to go out and advertise. There are very few referrals from orthopaedic or other surgeons directly to departments of podiatric surgery.

Table 8 also shows the source of referrals to the orthopaedic surgeons and specialists in podiatric surgery. In this part of the Table there is no distinction between fundholders and non-fundholders. In Areas 1, 4 and 5 over 90 per cent of referrals to both orthopaedic surgeons and specialists in podiatric surgery come from GPs. These three areas are where there is little or no communication between the orthopaedic and podiatric departments. In Areas 2 and 3 there is more communication between the departments and the data show a different pattern with more cross referrals between the two departments. The specialist in podiatric surgery in Area 6 receives 95 per cent of referrals from the orthopaedic surgeon. This is an integrated department where initially the orthopaedic surgeon sees the patient's notes and the two practitioners share clinics.

Table 4 Financial information from departments of podiatric surgery within acute (A) and community (C) trusts

	Trust 1 (A)	*Trust 2 (C)*	*Trust 3 (C)*	*Trust 4 (C)*	*Trust 5 (C)*	*Trust 6 (A)*
Start-up costs	£5,000 (1)	£10,000 (2)	NA	£325,000 (3)	£22,138 (3)	£6,000 (1)
Budget for podiatry services (1995–96)	£60,000,000	£580.000	£445,000	£1,000,000	£332,857	£12,159,837
Budget for podiatric surgery (1995-96)	£71,000	£27,715	£45,000	£110,000	£64,819	£180,000 (4)
No. of podiatrists/ No. of specialists in podiatric surgery (5)	0 / 1	16 / 1	14 / 1	29.3 / 0.5	14 / 0.4	/2 sessions per week
Grade & salary of SPS	Chief 111 £46,439 (6)	Chief 11 £22,500 (7)	Asst Specialist NA	Snr Manager £42,000 (6)	Consultant £16,620 (6)	Asst Specialist £5-6,000 (7)

Notes: (1) Salaries only
(2) Salaries and instruments
(3) Equipment
(4) Foot and Ankle budget
(5) Full time equivalent
(6) With costs
(7) Without costs

NA = not available

Table 5 Number of surgical cases/total referrals to podiatry services (as a percentage of total referrals)

Date	*Trust 1 (A)*	*Trust 2 (C)*	*Trust 3 (C)*	*Trust 4 (C)*	*Trust 5 (C)*	*Trust 6 (A)*
1995–6	325 / 731 (44.5%)	126 / 371 (33.9%)	600 + / 1400 (42.8%)	545 / 1029* (53.0%) 2 yrs	129 / 323 (39.9%)	143 / 718 (19.9%)
1994–5	NA	114 / 328 (34.7%)	400 / 1100 (36.4%)	NA*	83 / 154 (53.9%)	NA
1993–4	NA	96 / 294 (32.7%)	250 / 1000 (25.0%)	NA	NA	NA

Note: * for the period Aug 1994–Sept 1996

NA = not available

Table 6 Approximate cost per case for 1995–1996 = budget for podiatric surgery (see Table 4)/ number of surgical cases (see Table 5)

Date	*Trust 1 (A)*	*Trust 2 (C)*	*Trust 3 (C)*	*Trust 4 (C)*	*Trust 5 (C)*	*Trust 6 (A)*
1995–6	£218	£219	£75	£402	£502	£250

Table 7 Facilities available to departments of podiatric surgery

Source level agreements	*Trust 1 (A)*	*Trust 2 (C)*	*Trust 3 (C)*	*Trust 4 (C)*	*Trust 5 (C)*	*Trust 6 (A)*
Consulting rooms	3 outpatient sessions in-house	4 rooms, 1 dedicated to surgery, in-house	in-house	3 rooms in-house	in community clinic access to 4 rooms	use of main outpatient clinic and rooms
Theatre facilities	day case unit, 2.5 sessions increasing to 3	day case in-house and Acute Trust. 1 of 6 dedicated to PS backs onto main theatres	day case in-house	1 day case theatre in house. 2 sessions	in community clinic 1 theatre	day case in main theatre 1 session / 2 weeks
Staffing for theatre	belong to day surgery complement. No anaesthetist	1 theatre sister on a session basis, 1 snr podiatrist II – not scrubbed, 1 snr podiatrist II – scrubbed	podiatric specialist, pupil, chiropodist, 2 assistants	podiatric specialist, 3 podiatric registrars, 1 nursing auxiliary, 1 theatre manager	podiatric specialist, 1 scrub nurse – snr chief I, 2 non-scrub nurses – chief II, 1 other on 1 day each week	podiatric specialist, 3 theatre nurses, 1 anaesthetist, 1 anaesthetic nurse
Pre-operative facilities	attached to day case unit	in-house separate pre-op room	in-house	attached to theatre – same staff rotation	same staff	attached to theatre suite
Post-operative facilities	attached to day case unit	in-house	in-house	attached to theatre – same staff rotation	same staff	attached to theatre suite
Other facilities	X-ray, path lab, internal market operating so access to anything	service agreement with Acute Trust for all facilities – not from podiatric budget	X-ray, path lab	X-ray, path lab, physio, pharmacy	X-ray & path lab on contract with acute unit	X-ray on site. Path lab in another trust
Backup services	surgical care group – shoes & orthotics	full service in podiatry, – shoes and orthotics	orthotics	full service in podiatry,shoes & orthotics	orthotic lab in-house. Looking at shoes for future	orthotist in clinic – shoes and orthotics
Surgical pupils in place	1, but not always	not at present, have in past, will in future	2 pupils	1 pupil, 2 registrars on a permanent contract	1 pupil who works 1 day per week	1 pupil who works 1 day per week

Table 8 Source of referrals (%)

(1) To departments of podiatric surgery (data from managers of podiatric surgery dept)

	Area 1 (A)	*Area 2 (C)*	*Area 3 (C)*	*Area 4 (C)*	*Area 5 (C)*	*Area 6 (A)*
GP (fundholders)	30	20	65	99	99	80
Orthopaedic surgeons	rare	5	1	0	0	0
Other surgeons	rare	5	0	1	1	10
Other (incl. non-fundholders)	70	70	34	0	0	10

(2) To orthopaedic surgeons (OS) and specialists in podiatric surgeon (SPS) (data from clinicians themselves)

	Area 1 (A)		*Area 2 (C)*		*Area 3 (C)*		*Area 4 (C)*		*Area 5 (C)*		*Area 6 (A)*	
	OS	*SPS*	*OS*	*SPS*	*OS*	*SPS*	*OS*	*SPS*	*OS*	*SPS*	*OS*	*SPS*
GPs	90	95	70	19	80	75	100	100	95	95	80	5
Podiatrists	10	2	20	80	5	20	0	0	0	5	10	0
Other surgeons	0	3	10	1	5	5	0	0	0	0	10	95
Others	0	0	0	0	10	0	0	0	5	0	0	0

Current prices and numbers of surgical procedures (OPCS4)

Orthopaedic surgeons and specialists in podiatric surgery

Tables 9 and 10 show the prices for and numbers of surgical procedures performed by orthopaedic surgeons and specialists in surgical podiatry as defined by OPCS4 codes. Prices are for 1996–97 and numbers of procedures for 1995–96. The procedures are categorised into lesser toes, soft and bony procedures and first metatarsal, soft and bony procedures. All prices quoted for orthopaedic surgeons (Table 9) are for day case (*dc*) surgery; those for specialists in podiatric surgery (Table 10) are for day case and inpatient (*ip*) surgery. The list was put together after discussion with specialists in podiatric surgery and orthopaedic surgeons about which forefoot procedures both performed. It may not cover all procedures performed by all specialists in podiatric surgery or orthopaedic surgeons but is meant to be a comprehensive cross section.

Comparison of prices

The prices charged for different day case procedures do vary from specialist in surgical podiatry to specialist in podiatric surgery but if OPCS4 code W57.1 is considered (Kellers or Modified Kellers) then the average price is £409 with a range from £353–£469. The average price charged by orthopaedic surgeons for the procedure as an inpatient is £1,014 with a range of £479– £1,799.

Prices charged for the same day case surgery by both specialists in podiatric surgery and orthopaedic surgeons where there is a community trust can only be considered for Area 3 where the specialist in podiatric surgery and orthopaedic surgeon share clinics and operating lists and there are no major differences in prices for day case surgery. For example, W09.1 prices are £294 and £282 and W15.1 prices are £459 and £479 respectively.

A simple inspection of the charges for specialists in podiatric surgery and orthopaedic surgeons could indicate that podiatrists are more cost-effective than surgeons. However, such a comparison *cannot* be made without some form of adjustment for case mix. For example, specialists in podiatric surgery might be performing operations on relatively low risk patients while orthopaedic surgeons are operating on the higher risk patients. Such scenarios are likely to occur particularly when specialists in podiatric surgery and orthopaedic surgeons work closely together and cases are referred from one to the other.

Review of prices

The orthopaedic surgeon and specialist in podiatric surgery from acute Trust 1 both quoted almost the same cost per day case procedure regardless of the type of foot surgery (£358 and £353 respectively, see Tables 9 and 10). This type of costing is a form of average costing. The total cost of forefoot surgery, in the case of specialists in surgical podiatry has been divided by the total number of procedures undertaken. This average price will overestimate the cost of some procedures and underestimate the cost of other procedures. For example, the cost of undertaking a bony correction of a hammer toe (W59.5) is likely to be lower than the average price, while the cost of undertaking an advanced surgical procedure which involves expensive (£200) implants will be much greater (W57.1).

Assuming that purchasers have an alternative provider of forefoot surgery, then for a purchaser to maximise the number of procedures within their budget they will contract with the specialist in surgical podiatry from Area 1 for procedures whose true cost is greater than the average price charged and contract with other providers whose prices correlate more closely with the true cost of the less expensive procedure.

Over time this will have the effect of driving up the total costs of and thus the average price charged for the specialist in podiatric surgery in Area 1, which in turn will mean that more purchasers will contract only the most expensive procedures with the specialist in surgical podiatry there. Ultimately, this could mean that there are insufficient procedures undertaken to justify the capital equipment required for surgery and the specialist in podiatric surgery thus may be unable to offer forefoot surgery.

At the other end of the spectrum, Trust 6, which has an integrated department, has five charge bands for podiatric surgery. The same charges apply for day case surgery whether performed by the specialist in podiatric surgery or orthopaedic surgeon. This is a great improvement because the costs of each procedure have been taken into account. In comparison to Trust 1, where the day-case price for both a bony correction of a hammer toe (W59.5) and for a Kellers or Modified Kellers (W57.1) is £353, the prices quoted for Trust 6 are £241 and £421 respectively.

The other four specialists in podiatric surgery have structured their charges in three bands: low, medium and high. This is also an improvement as such charges are more likely to resemble the true cost of providing the service. However, given a choice of providers there will still be some incentive for purchasers to shop around within the bands so that they purchase the expensive procedures for the lowest price possible.

If there is a wide diversity of 'true' costs within the charge bands this may, over time, gradually increase the upper two price bands. Pricing bands may need review over time and there may need to be an increase in the number of price bands.

As an example of how a purchaser might exploit the different charges between two specialists in podiatric surgery, let us consider a hypothetical example. Let us assume that a fundholding GP has three patients with the following problems which require surgery: toe amputation (£260); osteotomy of the first metatarsal (£457); and correction of mallet toe (£358). The total cost of these three procedures to the GP would be £1,075 assuming the patients were referred to the first specialist in podiatric surgery. Now let us assume that another specialist in podiatric surgery charges an average cost for these three procedures of £358 per patient (i.e.£1,075/3). The GP would be able to reduce the total costs to his/her budget if the most expensive patient were referred to the first specialist in podiatric surgery, the cheaper patient being referred to the second specialist in podiatric surgery . Thus the GP would be able to save £99. However, now the first specialist in podiatric surgery has a throughput of only two patients, one costing £358 and the other costing £475. To prevent the service going over budget, the first specialist in surgical podiatry will have to raise the average price charged to £417 (i.e. (£475 + £358)/2). Again there is an incentive for the GP to refer the cheaper patient to another provider until the first podiatrist cannot provide a forefoot surgical service

The foregoing example demonstrates simply what problems there are with charges based on average costs. As a minimum, some refinement of charge bands is required so that prices relate to marginal costs.

Example of costing

Ideally, it would be best to have all podiatric procedures priced at their marginal cost, that is the true cost of undertaking one procedure. Current NHS data systems are probably unable to meet the challenge of marginal costing. However, it is possible to price different procedures such that their price more closely approximates to the marginal cost of undertaking a surgical operation. The two examples in Table 11 show how it is possible, using routinely available data, to construct a procedure price which differentiates between a high cost procedure (a bunion correction and lesser toe correction) and a lower cost procedure (lesser toe correction only).

Numbers of procedures

The total numbers of procedures performed by each clinician are shown at the bottom of Tables 9 and 10. These do not tally with the data in Table 5 for the number of surgical cases for 1995–96. The reason for this would appear to be that often when a patient goes for surgery, more than one procedure is performed but only the most expensive is charged for.

Table 9 OPCS4 codes – 1995/6 and prices

	Orthopaedic surgeons											
	Area 1		*Area 2*		*Area 3*		*Area 4*		*Area 5*		*Area 6*	
	No.	*price dc/ip**	*No.*	*price dc/ip*	*No.*	*price dc/ip*	*No.*	*price ip*	*No.*	*price ip*	*No.*	*price dc/ip*
Lesser toes soft tissue procedures												
W03							14	NA			10	£963
W56.2												
W79					1	£479	75	£310			31	£241/605
X11					1	£277	39	NA			3	£271/745
X11.2					1	£277	2	NA	1	£700		
X11.8			3	£1,884			9	NA	1	£789		
X27					1	£277	4	NA			2	£308/963
X27.4											1	£241/605
Bone procedures												
W03.2							4	NA	1	£1,275		
W08.2					1/1	£282/479						
W08.3			2	£786	3	£479			2	£718	1	£406/633
W09.1			2	£786	2/1	£282/479			2	£718	8	£406/633
W15.4									1	£563	5	£271/745
W59.5	1	£1,799			1	£631	1	NA	12	£705	1	£241/605
First metatarsal soft tissue procedures												
W03.4							1	NA			1	£241/605
W79.1					1	£479	70	£310			5	£271/745
W79.2							5	£310	7	£563	3	£271/745
Bone procedures												
W08.2					1/1	£282/479						
W15.1					1/3	£479/631	41	£724	18	£785	15	£367/858
W15.2	1	£1,799			2	£631	1	£724			2	£367/858
W15.3	1	£1,799			1	£631	8	£724	1	£563		
W57.1	2	£1,799			3	£479	12	£724	6	£1,148	28	£421/921
W59					1	£631	26	NA			8	£241/605
W59.1	1	£1,799										
W59.3	1	£1,799					8	NA	1	£601	5	£271/745
W59.4							3	£724			1	£271/745
Subsidiary procedures												
W28.2					1	£631			2	£717		
W28.3	4/13	£358/ 1,799	2	£442/ 786	21/10	£479/631			31	£668	13	£229/592
Total	**24**		**9**		**59**		**323**		**86**		**143**	

* 1996–1997 prices

Table 10 OPCS4 codes – 1995/6 and prices

	Specialists in podiatric surgery											
	Area 1		*Area 2*		*Area 3*		*Area 4*		*Area 5*		*Area 6*	
	No.	*price*	*No.*	*price*	*No.*	*price*	*No.*	*price*	*No.*	*price*	*No.*	*price*
Lesser toes soft tissue procedures all prices include 3 follow-up visits												
W03												
W56.2			19	£358	160	£294						£241
W79												
X11			1	£260	14	£294			8	£264.71		£271
X11.2	5	£353					2	£318.84	5	£264.71		
X11.8			14	£260			5	£318.84				
X27												
X27.4									1	£264.71		£241
Bone procedures												
W03.2									1	NA		
W08.2			3	£358			5	£318.84–£378.71				
W08.3					10	£294						
W09.1	11	£353	1	£358	2	£294						£406
W15.4	19	£353	3	£457	16	£469	5	£378.71	19	£365.65		£271
W59.5	3	£353	19	£358					66	£264.71		£241
First metatarsal soft tissue procedures												
W03.4												
W79.1	2	£353					27	£438.57				£271
W79.2	21	£353										£271
Bone procedures												
W08.2			10	£358	2	£294	5	£318.84–£378.71				
W15.1	2	£353	3	£457	64	£459			7	£509.85		£367
W15.2	1	£353			7	£469						
W15.3	3	£353					2	£438.57	41	£509.85		
W57.1	23	£353			53	£469	20	£438.57	20	£365.65		£421
W59												£241
W59.1												
W59.3					1	£469						£271
W59.4					2	£469			1	NA		£271
Subsidiary procedures												
W28.2												
W28.3	1	£353			1	£294	11	£167.30	11	no charge		£229
Total	**91**		**73**		**332**		**82**		**180**		**NA**	

Table 11 Example costs per session

	Cost of bunion and lesser toe correction	*Cost of lesser toe correction*
Theatre costs	£22.00	£65.00
Consumables	£10.00	£10.00
Bunion screws	£10.00 (£5 each)	NA
Implant	£120.00	NA
Specialist in podiatric surgery	£42.00	£14.00
Assistants		
Podiatrist	£22.00	£7.00
Podiatrist	£22.00	£7.00
Nurse	£22.00	£7.00
Outpatient visits	£25.00	£25.00
Consumables	£10.00	£10.00
X-ray	£18.00	£18.00
Anaesthetic post-operative pain relief	£10.00	£10.00
Secretarial support	£2.00	£2.00
Total	**£278.00**	**£132.00**
(and implant)	(£398.00)	

Cost components:

Theatre charges per session	£130.00
Theatre general consumables	£23.00
Outpatient consumables	£10.00
SPS salary per session	£83.00
Clinical assistant	£44.00

Data from general practitioners

Number of referrals

Table 12 shows the number of patients referred by the GP to the different departments. These patients all received forefoot surgery. GPs in Areas 1, 2 and 5 refer patients to both departments. GPs in areas 3 and 4 only refer patients to the podiatric surgery department for forefoot surgery. In Area 6 only one of the GPs was aware that they were referring to an integrated department where a specialist in podiatric surgery may operate on patients. (The implication is that at the primary care level a decision is being made about which department is best for the patient and a second decision could be made by either the specialist in podiatric surgery or orthopaedic surgeon.)

Waiting times

Waiting times are listed for podiatric surgery and orthopaedic surgery to the forefoot and as a comparison, times for orthopaedic surgery to hips and knees (Table 12). Times are given from the time of the request by the GP to the time of the first visit and from the time of the first visit to the time of surgery. In all cases the departments of podiatric surgery take less time to complete the process through to surgery if the maximum times for both are used. There is a range for podiatric surgery of 6–60 weeks and for orthopaedic surgery of 14–104 weeks. GPs from the same area report differences in waiting times to the same departments. All GPs were fundholders.

Table 12 Patient numbers and waiting list times for surgery (from GPs)

	Area 1 (A)		*Area 2 (C)*			*Area 3 (C)*		*Area 4 (C)*		*Area 5 (C)*		*Area 6 (A)*	
	GP1	*GP2*	*GP1*	*GP2*	*GP3*	*GP1*	*GP2*	*GP1*	*GP2*	*GP1*	*GP2*	*GP1*	*GP2*
No of Patients Receiving Surgery in:													
Podiatry dept	13	13	2	20	0	24	12	15	20	32	40	0	0
Orthopaedic dept	blanket referral	10	4	6	9	0	0	0	0	5	12	14	0
Integrated dept	0	0	0	0	0	0	0	0	0	0	0	* not aware	6
Waiting List Times (Weeks): Podiatric surgery from request to 1st visit/from 1st visit to surgery													
	16/8 36	12-24/ 24-36	4-6/ 12-24	13/ 13	NA	12/ 12-24	8-9/ 21	8/ 8	12/ 1-4	4/ 8	2-4/ 2	NA	NA
Orthopaedic surgery from request to 1st visit/from 1st visit to surgery													
Foot	13/36	12-32/ 24-36	8-12/ 12-24	28/ 13-26	8/ 20	NA	8-9/ 26	8-12/ 8+	6-10/ 4	12/ 52	36-52/ 52	12-16/ 36-52	12/ 74
Hip	52 total	12-32/ 12-36	8-12/ 24+	6-10/ 13-26	23-28/ 40	24-36/ 52	8-9/ 20	8-12/ 52	6-10/ 4	8/ 52	52 total	12-36/ 36-52	12/ 74
Knee	52 total	12-32/ 12-36	8-12/ 24+	6-10/ 13-26	23-28/ 16	24-36/ 52	9/ 12	8-12/ 52	6-10/ 4	8/ 36	52 total	12-36/ 36-52	12/ 74

NA = not applicable, do not refer to this service.

Effectiveness

Orthopaedic surgeons' views of local podiatric surgery

Orthopaedic surgeons were asked if they thought the local podiatric surgery services were clinically effective and cost-effective.

Clinical effectiveness

Three of the six surgeons said they did not know whether the service was clinically effective. They were however not aware of any major clinical problems.

The other three surgeons thought that podiatric surgery was clinically effective, that specialists in podiatric surgery took minor and intermediate surgery from the orthopaedic department and that there were very few complications. One orthopaedic surgeon said that since the specialist in podiatric surgery had been in post, no patients had come to the department of orthopaedic surgery with post-operative complications as had been the case before the appointment.

Cost-effectiveness

Four orthopaedic surgeons did not know whether podiatric surgery was cost-effective but felt that it had to be because it was day case as opposed to inpatient care and required less staff. Two orthopaedic surgeons thought that podiatric surgery was cost-effective, that specialists in podiatric surgery use a lot less resources to achieve the same end result and that because specialists in podiatric surgery used local anaesthesia, day case surgery and had shorter waiting times then the economics for the patient and the country had to be better.

Other comments made about effectiveness were that as yet there was no satisfactory clinical audit in the area and that although there was a move afoot by the local health authority to do a formal audit, the local foot surgeon did not want to co-operate. Another surgeon said that there was concern from his colleagues because the specialist in podiatric surgery only did three operations in one three and a half hour session whereas an orthopaedic surgeon would do five.

Views of specialists in podiatric surgery on local podiatric surgery

Specialists in podiatric surgery were asked whether they thought local podiatric surgery services were clinically effective and cost-effective.

Clinical effectiveness

The six specialists in podiatric surgery all thought that podiatric surgery was clinically effective for the following reasons:

***[1]	specialists in podiatric surgery develop meticulous surgery because limited to such a small area and practice makes perfect
***	education process for podiatric surgery based on foot structure, biomechanics of locomotion and pathology
**	patient feedback very positive
**	each patient has 20–30 minutes consultation – patients very aware of procedures and problems
**	use of internal fixation – allows patients to return to normal more quickly than plaster casts
**	full waiting lists – GPs very happy, increasing number of referrals

Cost-effectiveness

The six specialists in podiatric surgery all thought that the local podiatric surgery services were cost-effective for the following reasons:

******	use of local anaesthetic
******	day case surgery
***	fewer staff in theatre
*	usually no physiotherapy – patient taught to do exercise
*	salary of specialist in podiatric surgery less than that of orthopaedic surgeon
*	comprehensive knowledge of non-surgical treatment to the foot allows these techniques to be employed at the same time as surgery in 70 per cent of cases

Views of specialists in podiatric surgery of local orthopaedic forefoot surgery

Specialists in podiatric surgery were asked whether they thought local orthopaedic forefoot surgery services were clinically effective and cost-effective.

Clinical effectiveness

The specialist in podiatric surgery from the integrated department thought that local orthopaedic forefoot surgery was very effective because the surgeon specialised in foot surgery.

1. The number of stars indicates the number of times a particular statement was made. All asterisked statements are quotes.

Of the other five specialists in podiatric surgery, three said they had mixed feelings about the clinical effectiveness of local foot surgery performed by orthopaedic surgeons and two thought that local orthopaedic foot surgery was not clinically effective. They were all concerned about the number of cases that they had had to revise after surgery by an orthopaedic surgeon but recognised that some of these had not always been operated on locally. Three specialists in podiatric surgery said that the effectiveness of forefoot surgery was on a par if it was carried out by an orthopaedic surgeon or senior registrar, but not a junior doctor who had little comprehension of the effect of foot surgery on foot function.

Cost-effectiveness

One specialist in podiatric surgery was unsure because the issue brings into question the case mix. An orthopaedic surgeon, for example, will do three hips, one bunion etc. in one session, therefore making effective use of their time. However, because of the cost of general anaesthetic and bed stays, they thought that local forefoot surgery performed by orthopaedic surgeons could not be cost-effective.

Three other specialists in podiatric surgery thought orthopaedic surgery was not cost-effective although one did say that they did not have a real understanding of the protocol or fiscal structure of the orthopaedic department. The reasons given were that there were so many people in theatre, the general anaesthetic, inpatient treatment, the use of plaster castes and the long waiting times for a ten-minute pre-operation assessment which could not be a thorough analysis.

General practitioners' views on the effectiveness of local forefoot surgery

Department of podiatric surgery

Clinical effectiveness

One GP was not aware of the podiatric surgery department and could not comment, one said he did not know because he was confused about the allocation of responsibilities. The other 11 all thought podiatric surgery was clinically effective and mentioned the following reasons:

********	patients more than satisfied
********	results excellent, very few problems with post-operative management
****	podiatrists were more available, waiting list times shorter
**	more personal service – patients see the same person

** expertise excellent, specialists in podiatric surgery live and breath forefoot surgery
* patients really understand what is happening
* in the past it was unusual for patients to comment to GP how satisfied they were
* specialists in podiatric surgery don't rush into surgery if not appropriate
* very efficient
* patients want to have second foot done

Cost-effectiveness

Three GPs did not know whether podiatric surgery was cost-effective. One of these said that they had overspent on their chiropody budget because they had no specific budget for podiatric surgery. One was unaware of the department of podiatric surgery and nine thought podiatric surgery was cost-effective, for the following reasons:

**** costs are lower
* more options – 'First question is can we do it here? Second is should the patient go to the orthopaedic department. Now there is a third option which is cheaper than orthopaedic surgery'
* aftercare goes back to the GP
* district nurse not involved in aftercare, therefore cheaper for the fundholder
* less waste of time
* thinks cost of surgery by the specialist in podiatric surgery is higher but much more effective for the patient

Advantages of collaboration with podiatric surgery

One GP was unaware of a specialist in podiatric surgery in the area. One saw no advantages because his group had a natural alliance with the orthopaedic department and thought it would be better if the specialist in podiatric surgery was in a hospital setting where they could get all the services the patient requires. The other 11 GPs saw advantages in collaboration with podiatric surgery for the following reasons:

* GP had close relationship with specialist in podiatric surgery
* received letters and educational feedback
* specialist in podiatric surgery helps with understanding of problems of foot that GPs not aware of
* specialist in podiatric surgery trains GPs in making diagnoses, this has really helped referrals

* integrated service is good, if we had a separate service it would be difficult to know where to refer
* very productive experience for us and the patients
* excellent service
* genuine foot expert
* unfortunate experiences with orthopaedic department and foot surgery
* service of podiatric surgery should be expanded
* good as long as a limited supervised list
* logically it would be better to have an integrated service where the specialist in podiatric surgery and orthopaedic surgeon could work together
* good because it removes pressure from orthopaedic surgeons, frees them to work in more appropriate ways
* cautious to begin with but as time has gone on with positive results, refer more to specialist in podiatric surgery
* had assumed that because treating patients in a curative rather than palliative way that the numbers needing chiropody would plateau, but this is not happening

Department of orthopaedic surgery

Clinical effectiveness

Two GPs thought that orthopaedic forefoot surgery was not clinically effective, two did not know (one of these had not heard any criticisms but was suspicious because there hadn't been adequate feedback from the partners who used the orthopaedic department for foot surgery). Nine GPs said that orthopaedic surgery was effective for the following reasons:

*** positive feedback from patients
* well selected cases
* not many cases but effective-usually congenital cases
* no problems
* works when orthopaedic surgeons perform surgery
* always used orthopaedic department; majority of patients get some benefit

Cost-effectiveness

Two GPs did not know whether orthopaedic foot surgery was cost-effective or not, seven thought it was not cost-effective because it was more expensive and there were

longer waiting times. Four thought it was cost-effective because it was cheaper and because orthopaedic surgeons did not follow patients up unnecessarily.

Advantages of collaboration with the orthopaedic department for forefoot surgery

Three GPs saw no advantage in collaboration with the orthopaedic department, one was not sure and nine saw the following advantages:

* more extensive surgery which takes longer but results as good
* now that orthopaedic surgeons are specialising in foot surgery it is better because GP knows where to refer patients
* have mutual respect for orthopaedic surgeons because been through same training
* post-operative analgesia available to patients

Other comments from GPs about collaboration

** joint protocols would be useful where GP does initial referring – the orthopaedic surgeon would probably resist
** orthopaedic surgeons and specialists in podiatric surgery should work together
* advice from orthopaedic department not so consistent because staff changes – impression that foot surgery not regarded as important, but for patients it is – pain the same
* results of orthopaedic surgeon not comparable with those of specialist in podiatric surgery
* orthopaedic department does not have manpower to deal with feet
* waiting lists would reverse if all patients went to specialist in podiatric surgery
* not the GP's job to sit in judgement – expect system to be controlling itself – HA should be sure it employs the best people to do the job
* waiting lists too long – total waiting time of maybe two years is not effective
* orthopaedic surgeon came and gave clinics in surgery for 3 years but now they have stopped the clinics the orthopaedic surgeon is not unhappy about losing forefoot surgery because 'unloved' work can be transferred
* if only orthopaedic surgeons could be reassured about how good podiatric surgery really is
* important to build communication between orthopaedic surgeons and specialists in podiatric surgery

Outcomes

Orthopaedic surgeons and specialists in podiatry

Each clinician was asked what they thought the outcome of their foot surgery was in the short and long term. They were asked to make a percentage estimate using 'good', 'satisfactory' or 'patient made worse' categories (Table 13). The short term was considered to be less than five years. The specialists in podiatric surgery in Areas 1, 4 and 5 had done internal audits. All participants thought they produced a high proportion of good outcomes.

General practitioners

Each GP was asked what their views were on the outcome of foot surgery performed by specialists in podiatric surgery and orthopaedic surgeons (Table 14) using the categories, 'good', 'bad' or 'equivocal'.

Surgery performed by orthopaedic surgeons

Four of the 13 GPs felt equivocal about forefoot surgery performed by orthopaedic surgeons in the short term (less than five years) and five in the long term. Two of these had not used the orthopaedic department for forefoot surgery for six years. The other nine were all happy with the outcome of forefoot surgery performed by orthopaedic surgeons.

Surgery performed by specialists in podiatric surgery

All GPs were happy with the outcome of forefoot surgery by specialists in podiatric surgery in the short and long term, although some of the specialists in podiatric surgery had not been in post for five years. In Area 6, GP 1 did not know a specialist in podiatric surgery was in post in the department to which they referred patients for forefoot surgery.

Table 13 Percentage assessments of their own foot surgery (good (G), satisfactory (S), patient made worse (PMW)), by orthopaedic surgeons and specialists in podiatric surgery (long term is < 5 years)

	Area 1 (A)			*Area 2 (C)*			*Area 3 (C)*	*Area 4 (C)*			*Area 5 (C)*			*Area 6 (A)*		
	G	*S*	*PMW*	*G*	*S*	*PMW*	*G S PMW*	*G*	*S*	*PMW*	*G*	*S*	*PMW*	*G*	*S*	*PMW*
Orthopaedic surgeon																
short term	100	0	0	60	35	5	above average	0	75–89	5–10	90	0	5	80–90	10	5
long term	100	0	0	75	22	3	above average	0	75–80	5–10	90	0	5	80–90	10	5
Specialist in podiatric surgery																
short term	97	2	4	75–80	0	5–10	in six years one patient	90	9.9	0.1	84	15	1	100	0	0
long term	95	0	5	75–80	0	5–10	with ongoing problem	85	15	0	90	9.9	0.1	100	0	0

Table 14 GPs subjective outcome of local podiatric and orthopaedic forefoot surgery (good, bad, equivocal)

	Area 1 (A)		*Area 2 (C)*			*Area 3 (C)*		*Area 4 (C)*		*Area 5 (C)*		*Area 6 (A)*	
	GP1	*GP2*	*GP1*	*GP2*	*GP3*	*GP1*	*GP2*	*GP1*	*GP2*	*GP1*	*GP2*	*GP1*	*GP2*
Orthopaedic forefoot surgery													
short term	good	good	good	good	good	equivocal**	equivocal **	good	good	not so good	equivocal	good	good
long term	good	good	good	good	good	equivocal**	equivocal **	good	good	not so good	equivocal	good	good
Specialist in podiatric surgery													
short term	good	good	good	good	good	good	good	good	good	good	good	NA	good
long term	good	good	good	good	good	good	good	good *	good *	NA***	good ***	NA	NA ****

* only three years
** not used this service for 6 years
*** only two years
**** only 6 months
NA = not available

Local foot surgery services

Control

Assessment of the activity of the specialist in podiatric surgery by the orthopaedic surgeon

The orthopaedic surgeons and the specialists in podiatric surgery were asked whether they thought that local orthopaedic surgeons felt the need to control the activity of the specialist in podiatric surgery.

Four specialists in podiatric surgery said they did not think so; one said yes and one said that, in general, the answer would be 'yes' but in that particular case the orthopaedic surgeon trusted the specialist in podiatric surgery and did not feel the need to control his/her activity.

Although four specialists in podiatric surgery said they thought the local orthopaedic surgeon did not need to control them, two of these orthopaedic surgeons said they did need to have control. One said that control was essential because of possible complications; the need to set boundaries about which operations were appropriate; and the need for specialists in podiatric surgery to work as a part of a team of people doing surgery and not in isolation. The other surgeon thought that he was not so much in control but the leader of a team, the lead clinician rather than the consultant in charge.

Of the four orthopaedic surgeons who said they did not feel the need to control the podiatrist, one was very positive and said that the specialist in podiatric surgery was on an independent contract with the community trust, so there was no question of control, but there was a healthy interest in their joint work. Two other surgeons agreed it was difficult to feel that one didn't need to be in control until trust was established. One of these surgeons who was also a clinical director/manager was concerned about the budgeting by fundholders for foot surgery, as monies which used to go to orthopaedics now went to podiatry and running the department was difficult without this money. The fourth surgeon said that the specialist in podiatric surgery was nothing to do with him.

Concerns

Concerns of orthopaedic surgeons

Three surgeons said they did not have any concerns about local foot surgery services, although the anaesthetic department in one of the trusts had said that they would

prefer not to do general anaesthetic for a podiatric surgery operating list. This particular unit gets around this by both the orthopaedic surgeon and the specialist in orthopaedic surgery being in theatre at the same time. The three other surgeons had concerns of a general nature:

* patients don't realise that specialists in surgical podiatry are not medically qualified – local specialist in surgical podiatry is called a consultant surgeon
* all podiatric surgery has to be done under local anaesthetic and this is not always appropriate
* some foot surgery should be treated with prophylactic antibiotics and specialist in surgical podiatry cannot prescribe
* local podiatrist does inappropriate surgery which is badly executed
* objections to people doing surgery who are not surgeons

Concerns of specialists in podiatric surgery

Five of the six people interviewed had no concerns about local foot surgery services. The other was concerned about the long waiting times, sickness from general anaesthesia and long bed stays, associated with surgery in the orthopaedic department.

Concerns of general practitioners

Only one GP had no concerns about local foot surgery services. The other 12 expressed the following concerns.

Organisational

*** podiatric surgery not widely available, only to fundholders – doesn't like the tiers of service because patients not getting the best deal from orthopaedic foot surgery
*** waiting times for orthopaedic foot surgery too long
** lack of knowledge of structure and collaboration in local area of orthopaedic and podiatric surgery
* the service will become grossly oversubscribed – too good for own good
* not enough specialists in podiatric surgery
* political agenda is unfortunate because nobody recognises how good surgical podiatry is – it is seen as an 'add on', second rate service – health authority needs to recognise it

Emotional

* the record and training of the specialists in podiatric surgery make them highly competent so concerned about the lack of backing by the local orthopaedic department
* resentment by orthopaedic surgeons

Financial

* understand the service is under threat because the set-up cost more than thought
* underfinanced service – there is a growing demand as more people reach old age

Clinical

* what happens if things do go wrong – grey area of responsibility
* specialists in podiatric surgery not able to prescribe; have to contact the GP, who would be happy for the specialist in podiatric surgery to prescribe from a limited list
* the problem of junior staff in the orthopaedic department carrying out surgery with results that are not successful – two instances where patients considered taking action

The way forward

All interviewees were asked whether would like to see local foot services develop with more or less collaboration; joint clinics; joint surgery sessions; or in other ways.

Orthopaedic surgeons

One orthopaedic surgeon thought that there should be less collaboration and that the specialist in podiatric surgery should be dismissed. He felt that this was in the best interests of the patients and the only ethical thing to do. The other five all thought there should be more collaboration, more clinics and more surgery sessions. They thought that addressing the following issues would move foot surgery forward in their area.

* both services should be under the umbrella of orthopaedic services, that they shouldn't be separate because this leads to suspicion and hostility
* to have orthopaedic surgeons and specialists in podiatric surgery operating at the same time in adjacent theatres
* foot surgery to develop as a specialty like hand surgery so that orthopaedic surgeons and specialists in podiatric surgery could have different referral lists
* to look at the problem of training junior doctors
* to have joint clinical meetings

Specialists in podiatric surgery

All the specialists in podiatric surgery thought that more collaboration was important: 'The worst relationships are when there are no relationships at all. We must at least talk to one another'. There are already joint clinics and surgery sessions

in two of the areas, four other specialists in podiatric surgery would like to see joint clinics and three would like to see joint surgical sessions. In one area, joint clinics had been tried in the past but hadn't worked because the orthopaedic surgeon was always in control. Other suggestions for the future included:

* meetings to discuss X-rays
* meetings to discuss audit
* case history conferences
* joint research projects

General practitioners

The majority of GPs supported collaborative working between the orthopaedic department and the department of podiatric surgery. Ten of the 13 GPs said they would like to see more collaboration. Two did not comment. Six suggested that joint clinics and surgery sessions would be advantageous.

Three GPs thought it would be beneficial to develop referral protocols to clarify which cases should be operated on by which practitioner. For example, orthopaedic surgeons should do major surgery and special cases requiring general anaesthetic and specialists in podiatric surgery should do cases suitable for local anaesthetic. If GPs were educated to do this there would be a single referral point and waiting times would be reduced.

Other ways in which GPs thought the local situation could be improved included employing another specialist in podiatric surgery and integrating the service so that orthopaedic surgeons and specialists in podiatric surgery could work together as members of the same orthopaedic team.

Generally GPs thought it was important to clarify the political situation between orthopaedic surgery and podiatric surgery and felt that podiatric surgery should not be pushed to one side.

National policy awareness

Orthopaedic surgeons, specialists in podiatry and GPs were asked if they were aware of any national policy or organisation expressing concerns about podiatric surgery, what these concerns were, whether they shared the concerns and whether they had any other concerns. They were also asked how they would resolve these concerns, nationally, locally or in some other way.

Orthopaedic surgeons

Awareness

Three of the surgeons mentioned the concerns expressed by the Royal College of Surgeons. They were aware that the college is concerned about protecting the title of 'surgeon' and about non-medically qualified people (not only podiatrists) being allowed to do invasive surgery. One surgeon thought that only in the United Kingdom and Spain are non-medically qualified people able to perform invasive surgery.

All six orthopaedic surgeons were aware of the concern expressed by the British Orthopaedic Association that patients were being misled by podiatrists when they called themselves 'specialists' or 'surgeons'. Other comments fell into three categories: patient care; training and standards and clinical (technical) issues.

From the patients' point of view, orthopaedic surgeons were concerned about the overall care of patients (because podiatric surgery was only day case surgery) and the lack of ability of specialists in podiatric surgery to prescribe drugs. They thought that all operations done by specialists in podiatric surgery should be under the care and control of an orthopaedic surgeon.

Training and standards were a concern for four orthopaedic surgeons who felt that it was difficult to maintain standards of Fellowships for Podiatrists as they were self-regulating. There was a worry about pioneers and bulk production of specialists in podiatric surgery and concern because orthopaedic surgeons were appointed against a high level of competition which is not available in podiatry. The possibility that junior doctors would not be able to train on foot surgery was also a concern.

Clinical (technical) concerns were raised about the fact that GPs need to be aware of any differences in transferral of care to orthopaedic surgeons and specialists in podiatry. Also that consent forms for surgery need the signature of a medical practitioner.

There was an awareness that within the British Orthopaedic Association there are several factions within the membership: a few orthopaedic surgeons work happily with podiatrists; lots are bitterly opposed; those in the middle 'go with the flow'. 'The council members are over 50 years of age and there is concern about the loss of foot surgery from private practice'.

Share of concerns

Five of the six surgeons interviewed shared the concerns they stated. The other surgeon had slight reservations about podiatric surgery because so many patients had been taken from the orthopaedic lists that junior staff did not have the opportunity to do simple operations and because the smaller operations had been taken out of the lists the basket of operations had become more expensive to the purchasers. He did not, however, share the concerns of the national organisations and said he had never seen a specialist in podiatric surgery misrepresent him/herself and believed that if a specialist in podiatric surgery is employed by the health authority then the health authority has to take legal responsibility for them.

Resolution

One of the surgeons believed that podiatric surgery should be banned altogether and that there should be reorganisation of medical practice so that non-medically qualified people were not able to perform invasive surgery. From the other five surgeons there was agreement that the issues should be resolved nationally and that clear guidelines were required from the Royal College of Surgeons and the British Orthopaedic Association because orthopaedic surgeons did not want to be held responsible for the clinical activities of specialists in podiatry without guidelines. Two of these surgeons already work alongside a specialist in podiatry and felt that the concerns shown could be overcome by the demonstration of good practice. The other three, who at present work independently, felt that the way forward was for orthopaedic surgeons and specialists in podiatric surgery to work together under the umbrella of the local orthopaedic service and that quality, training and audit should be shared. The isolation of podiatric surgery was not good practice, and although the majority of specialists in podiatric surgery were extremely responsible, it was necessary to be sure the required safeguards were in place in order to protect the patient.

It was clear that the majority of the surgeons interviewed could see benefits from working collaboratively with specialists in podiatry as long as there were clear guidelines set by the national organisations. They did point out that the statements they made represented their own views and that there were other surgeons within the same orthopaedic departments who held different opinions.

Specialists in podiatric surgery

Awareness

Two of the specialists in podiatric surgery said that they were aware the Royal College of Surgeons was concerned that specialists in podiatric surgery were not medically

qualified and yet could have total unsupervised clinical freedom. The other four were aware that The British Orthopaedic Association had concerns and mentioned that specialists in podiatric surgery were not medically qualified and this was often misrepresented to patients. Clinical concerns covered post-operative complications and outcomes and who should take responsibility. Emotional issues were discussed: 'the BOA is a trade union and is behaving like one'; 'the BOA is not basing its concerns on clinical effectiveness, it just wants to protect its territory'; 'pure protectionism'!

Share of concerns

One of the specialists in podiatric surgery agreed with the concerns of the national organisations and felt that there should be a much more structured training programme for specialists in podiatric surgery to include 'house officer/registrar' rotation together with some medical and general surgery rotations and at least six months in A & E. Another specialist in podiatric surgery could appreciate the concerns to a certain extent although the level of discomfort was not as high as that of orthopaedic surgeons. This person felt that specialists in podiatric surgery need backup facilities if things went wrong (which happens to everybody at some time). Four of the specialists in podiatric surgery did not share the concerns of the national organisations.

They thought that there was plenty of work to go around and that the BOA had no right to interfere in such an appalling way in another profession, that infighting between medical disciplines was counter-productive for everybody.

One specialist in podiatric surgery suggested that orthopaedic surgeons were poorly informed about podiatric surgery and that those orthopaedic surgeons who had least experience of working with a specialist in podiatric surgery seemed to be the most opposed. The education and training systems for podiatric surgery stands scrutiny even though it is not a medical degree. It bears comparison with dental surgery and indeed there are many parallels.

From the patients' point of view, specialists in podiatric surgery felt that podiatric surgery has developed because of the lack of orthopaedic interest in the foot and that the development of practitioners with special interest in the foot can bode nothing but good for those many people with foot problems. They felt that the concerns of the BOA do not relate to patient welfare.

Resolution

Two of the six specialists in podiatric surgery believed that the concerns expressed should be resolved nationally, two locally and two thought that both methods were important. Negotiation at a national level and work to build goodwill at a local level were both necessary in order to bring about an acceptance of the existence of surgical podiatry.

General practitioners

Awareness

Ten of the 13 GPs interviewed were unaware of any national policy or organisation expressing concerns about podiatric surgery. One of these was aware from local surgeons that there was a genuine concern about opening the gates to surgery by non-medically qualified practitioners.

In one district the GPs had received a letter from the orthopaedic department outlining the fact that the GPs had to take total responsibility for referrals to specialists in podiatric surgery. At a meeting with the orthopaedic department the GPs said they were very happy with the service that they received from podiatric surgery and assumed that the specialists in podiatric surgery were covered by the trusts where they were employed. The GPs would have preferred to have had the backing of the orthopaedic surgeons but had no complaints about the specialists in podiatric surgery. There was a known policy of which cases to refer and there had been no problems. One other GP in another area was aware of the national concerns and had been approached by the BOA about: the role of non-doctors in invasive surgery generally; the responsibility for general condition of the patient; the management of complications; the threat to the referral system.

Share of concerns

Of the three GPs who were aware of any concerns, two were from the one area and did not share the same concerns. The other GP did not share the political concerns but did share the technical concerns and would be pleased when an evaluation and guidelines were complete.

Resolution

National and local resolution through dialogue were the routes suggested by the three 'aware' GPs. They thought that GPs needed to know where they stood and that national guidelines which took into consideration the best treatment for patients should be published as soon as possible.

Table 15 Models of practice

Model	*Type of trust*	*Orthopaedic surgeons*	*Podiatric relationships with other surgeons*	*GPs*
1. Self-contained independent	Acute	–	+ –	+
2. Self-contained independent	Community	+	+	+
3. Self-contained independent	Community	– – –	+	+
4. Self-contained independent	Community	– – –	+	+
5. Self-contained dependent	Community	+ + +	+ –	+
6. Integrated	Acute	+ + +	+ –	+ –

+ = positive relationships
– = no relationship

Conclusions

The question this research set out to answer was, 'Do specialists in podiatric surgery represent a clinically and cost-effective way of providing forefoot surgery'? The literature review in Section 1 demonstrated the paucity and poverty of existing research which does not yet allow a satisfactory answer to be given to that question. The financial information collected from the six districts demonstrated how difficult it is to get good quality statistics about costs. Different agencies are using different pricing methods. The prices presented on pages 38 and 39 illustrate how complicated it would be for GPs to work out the cheapest deal for their patients.

The six districts chosen for the pilot study were selected because they had different models of service organisation. The analysis demonstrated that the structure of the organisation does not appear to influence fundholders' views of the service or levels of satisfaction. The findings from the survey of key stakeholders indicate that there is a considerable amount of support for changes in administrative structures to enable greater collaboration between orthopaedic surgeons and specialists in podiatric surgery. There were some shared professional concerns about patient care, training standards and clinical issues. These concerns are discussed on pages 51–53.

The attitudes and views of the professional clinicians responsible for forefoot surgery services were not too far apart. They all wanted to provide a good service for GPs and patients. Where specialists in podiatric surgery and orthopaedic surgeons worked together they did so harmoniously for the most part. Where they did not it was mainly due to tradition or one or two hostile individuals.

Recommendations

1. The evidence base in podiatric surgery could be improved by:

- the dissemination and encouragement of research and audit methods within the profession;
- the agreement of terms, definitions and methods of working with orthopaedic surgeons and specialists in podiatric surgery and the development of a shared language;
- the promotion of at least one RCT to compare the cost-effectiveness of podiatric and orthopaedic forefoot surgery.

2. Agreed definitions of clinical audit for forefoot surgery need to be determined and practitioners encouraged to become involved in the audit cycle.

3. Purchasers should be encouraged to ask for refinements of charge bands so that prices are more closely related to marginal costs.

4. Trusts and health authorities should develop new models of service provision for foot surgery which allow specialists in podiatric surgery and orthopaedic surgeons to work more closely together.

5. Greater collaboration between health authorities, orthopaedic surgeons, GPs and specialists in podiatric surgery would create more efficient administrative systems.

6. Integrated referral systems where podiatric specialists and orthopaedic surgeons receive and allocate GP referrals in one place would save time for patients and GPs.

7. The development of referral protocols for GPs would clarify which patients should be operated on by which forefoot practitioner.

8. The current difficulties of training junior orthopaedic surgeons due to the reduction of forefoot surgery patients referred to orthopaedic departments should be discussed by the training agencies responsible.

9. Shared use of operating theatres could, where it is physically possible, save time and help to develop professional relationships.

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Appendix 1

Steering group

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Paul Cooke	Consultant Orthopaedic Surgeon, Nuffield Orthopaedic Centre, Oxford
Christine Farrell	Programme Director, King's Fund Development Centre, London
Tim Kilmartin	Specialist in Podiatric Surgery, Ilkeston Community Hospital, Derby (until June 1997)
Clare Laxton	General Practitioner and Consultant in Public Health Medicine, Sussex
Marcel Pooke	Podiatric Adviser to the Department of Health
David Torgerson	Research Fellow, University of York
Moyra Wright	Podiatry Services Manager, Essex Rivers NHS Trust (until 1996)

Appendix 2

OPCS4 codes

LESSER TOES

Soft tissue procedures

WO3 complex reconstruction of forefoot
W56.2 proximal or distal interphalangeal arthroplasty
W79 same as W56.2, as in a child
X11 amputation of toe
X11.2 amputation of phalanx of toe
X11.8 other amputation of toe specified
X27 correction of minor congenital deformity of toe
X27.4 correction of congenital abnormality of 5th toe

Bone procedures

WO3.2 multiple metatarsal ostectomy
W08.2 excision of overgrowth of bone
WO8.3 excision of excrescence of bone
WO9.1 excision of lesion bone
W15.4 ostectomy of head of metatarsal bone
W59.5 bony correction of claw, hammer or mallet toe

FIRST METATARSAL

Soft tissue procedures

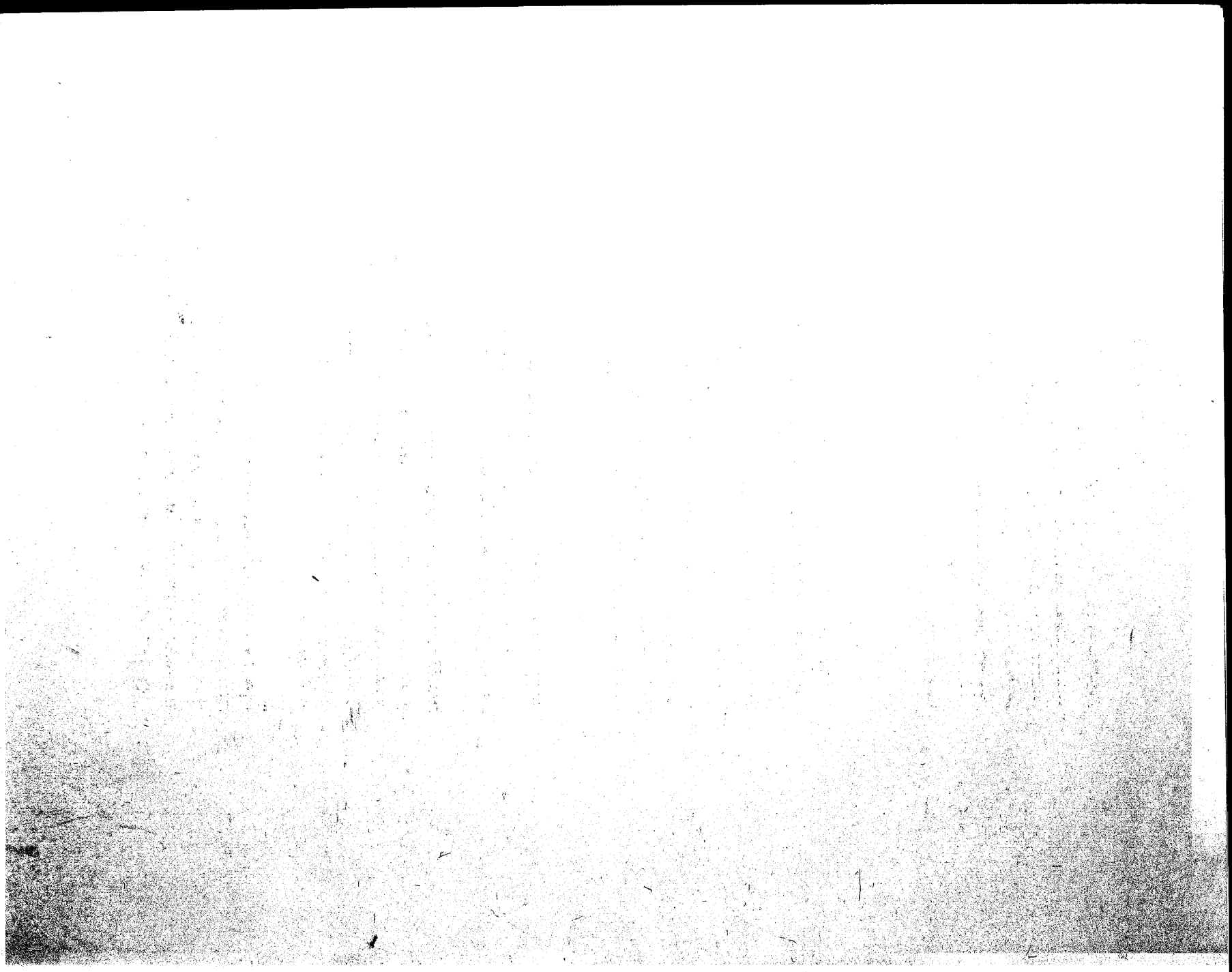
WO3.4 transfer of EHL to head of 1st meta and fusion of inter joints
W79.1 soft tissue correction of hallux valgus
W79.2 excision of bunion neck

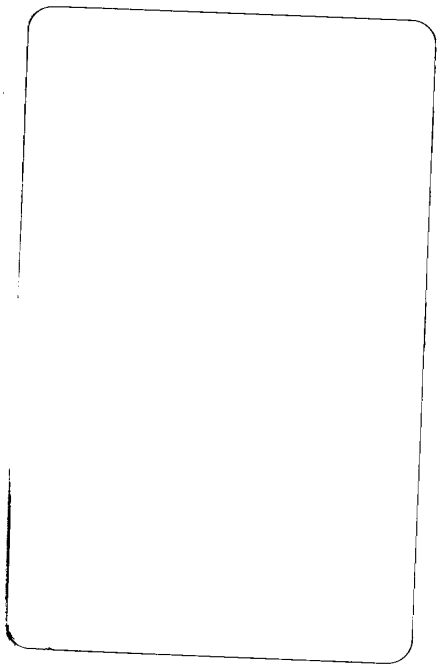
Bone procedures

W08.2 excision of overgrowth of bone
W15.1 ostectomy of neck of 1st metatarsal bone
W15.2 ostectomy of base of 1st metatarsal bone
W15.3 ostectomy of 1st metatarsal bone neck
W57.1 W57.10 Kellers or Modified Kellers
W59 fusion of joint of toe
W59.1 fusion of 1st meta joint and replacement of lesser metatarsal joint
W59.3 fusion of 1st metatarsophalangeal joint nec
W59.4 fusion of interphalangeal joint of great toe

Subsidiary procedures

W28.2 adjustment to internal fixation of bone nec
W28.3 removal of internal fixation from bone nec





The Cost-Effectiveness of Podiatric Surgery Services reviews the latest research in this specialist area of health care.

It also reports the findings from a study of podiatric surgery services in six English health districts. The two parts of the research complement each other. The first, which contains the results of a comprehensive literature review, illustrates how little good-quality research has been carried out to enable purchasers and providers to assess the relative merits of these services. The second, based on interviews with GPs, managers, providers and clinicians, illustrates that both purchasers and providers support greater collaboration between orthopaedic surgeons and specialists in podiatric surgery. Both groups of clinicians want to provide a good service for GPs and patients and where they work together they do so effectively.

The report makes recommendations for the improvement of the evidence base in podiatric surgery and for greater collaboration between purchasers and service providers.

The book contains a detailed bibliography; ratings of existing research and audit and evaluation of different models of service organisation. It will be useful for the podiatry profession, purchasers and providers of podiatry services, students and clinicians.

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