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**Assessing Evidence Based Medicine: an investigation of the practice of surgery**

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## **Abstract**

*Objectives:* The thesis seeks to provide an analysis of surgical work and decision making, to identify the basis of the widely observed variation in surgical practice and to indicate what surgeons see as the source(s) of that variation. Against this background, it examines the strengths and limitations of the approach promoted by the evidence-based medicine movement to surgical work.

*Methods:* A qualitative study of surgical practice by urological and gynaecological surgeons in England and the USA involved in the treatment of female urinary stress incontinence. Depth interviews with 29 English surgeons and five American surgeons. Interviews were recorded and transcribed. Observation of 23 operations and additional ethnographic data collection at the hospitals and clinics where these surgeons worked. The observational data consist of near verbatim notes. All these data were analysed using the constant comparative approach described by Glaser and Strauss (1967). A variant of the split-half technique was used to test emerging themes.

*Results:* Surgical practice is contingent: it is dependent on a range of variables, and, it is serendipitous. Three categories of contingency are identified (case, surgeon and external contingency). It is argued that surgical practice entails the complex interplay of these conditional factors and chance happenings. In order to learn to deal with contingency, surgeons learn or acquire practice skills through first hand experience. The thesis explores the role of the surgical apprenticeship and models of learning used by surgeons.

*Conclusion:* The nature of surgical practice presents some fundamental challenges to EBM. The contingent and experiential features of surgical work raise serious doubts about the applicability of EBM to surgery.

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## Chapter 1: Evidence-based medicine - an approach to medical practice.

In the last decade 'evidence based medicine' (EBM) has become the fashionable coinage to describe a process of incorporating research evidence into medical practice<sup>1</sup>. The idea that research evidence should be a component of medical knowledge and the basis for medical decision making is not new, but what is novel, is the emergence of a distinct *social movement*<sup>2</sup> organised around the problem of getting research evidence into medical practice.

The genesis of this social movement is closely linked with the emergence of a particular research method in this century - the randomised controlled trial (RCT)<sup>3</sup> - and with the work of Archie Cochrane in its popularisation. In his monograph, *Effectiveness and Efficiency*, (1972) Cochrane argued that much contemporary medical practice was, at

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<sup>1</sup> Rosenberg and Donald (1996) stated that the term evidence based medicine originated from McMaster Medical School in the 1980s, and cited the EBM Working Group paper in the *Journal of the American Medical Association* 1992;268:2420-25 as their source.

<sup>2</sup> Blumer has defined social movements as "collective enterprises to establish a new order of life" (Blumer 1995:60). Blumer distinguished *reform* social movements as those which accepted the existing social order but sought to reform some specific or limited area of that order and suggested that the anti-slavery movement of the nineteenth century was an example of such a movement. EBM appears to be a contemporary reform movement within medicine.

<sup>3</sup> The terms randomised controlled trial, clinical trial and intervention study are sometimes used interchangeably. The term randomised controlled trial (RCT) is used here to refer to the specific research method in which the effects of an intervention are tested by randomly allocating subjects to an intervention group (who receive the treatment) or a control group (who receive another treatment or placebo). The effect of the intervention is judged by comparing measures taken from both groups before and after the intervention. Ideally, subjects and those carrying out the intervention should not know which group is receiving the intervention: this is the double blind RCT.

best, ineffective, or at worst, harmful. He campaigned vociferously for the application of the principles of epidemiology (the study of disease in populations or groups), and the experimental method of the randomised controlled trial to test the effects of medical interventions. Research evidence from such trials could be used to ensure that only effective treatments were used, and that precious financial resources for national health care could be more efficiently spent. Cochrane's ideas had a profound impact on medicine, primarily in public health where epidemiology was firmly established, but also more widely in emphasising the importance of evaluating medical treatments by subjecting them to RCTs.

The RCT has come to epitomise Cochrane's legacy to health services research, such that the results of trials are regarded as the yard stick by which other sources of information may be judged (Anon 1992:1131)<sup>4</sup>. Cochrane's ideas have been championed by the proponents of EBM who have argued that:

“[t]he best information on whether a given treatment does more good than harm to patients with a given disorder is the results of a randomised controlled clinical trial in which patients with the given disorder were randomly allocated to receive either the given treatment or placebo (or conventional therapy) and then followed up for clinically relevant outcomes of their disease and its treatment. Fortunately randomised controlled trials are becoming very much more common and have dramatically demonstrated the efficacy of many treatments and the uselessness or even harmfulness of several others.” (Sackett et al 1991:191-2)

However, despite this growth in the number of trials, research has largely failed to influence medical practice. The sheer volume of the evidence has meant that it is

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<sup>4</sup> However, as Dingwall et al (1998) have pointed out, Cochrane's ideas have been used rather selectively in the debate about EBM. Cochrane made it clear that there are areas of medical care where the RCT is an inappropriate or unsuitable method. More importantly, he suggested that while the RCT can measure effectiveness its results may not be directly replicable in clinical practice (Cochrane 1972:2).

difficult for practitioners to keep up to date with the literature, even within smaller sub-specialty areas. For example, Davidoff et al (1995a:1085) have suggested that within the field of adult internal medicine a doctor would need to read about 17 articles a day each year just to keep up with the evidence. An additional problem is that, the growth in trials notwithstanding, many treatments and health service activities have yet to be subjected to experimental testing using RCTs (Eddy, quoted in Smith 1991:798). By this criterion the vast majority of medical practice is not based on scientific evidence. It is also prone to wide variation: there are huge differences in rates of referral, admission to hospital and the use of surgical procedures and medications, across and within geographical areas. This variation cannot be explained by differences in disease prevalence or population characteristics. Instead it appears to be the result of differences in clinical decision-making - differences which the proponents of EBM see as stemming from the weak evidence base of medical practice. Rather than using rational evaluation of scientific evidence about populations of patients, clinicians tend to rely on personal judgements based on the clinical history and physical examination of an individual patient. These individual clinical judgements, because they are not rooted in rational scientific evidence, are prone to massive variation. Moreover, this gap between research evidence and clinical practice leads to harmful, ineffective and expensive decision-making (Rosenberg and Donald 1995:1122). Solving this problem of practice variation is thus central to the EBM movement.

### **Practice variation**

Systematic and persistent differences in the rates of use of surgical procedures were first highlighted in 1920s. A classic American study of 1000 school children demonstrated

the extent of variation in clinical decision-making for tonsillectomy. Of these children, 39% had not had their tonsils removed. These children were examined by a group of doctors who recommended that about half required tonsillectomy. The remaining 'healthy' children were examined by a second group of doctors, and again, about half were thought to require surgery. This process was repeated with similar results so that by the end of the study only 65 children were deemed not to require surgery (ACHA 1934). Meanwhile, Glover (1938) uncovered substantial variations in tonsillectomy rates between areas of England (up to 10 fold differences in the operative rates) which he speculated reflected inappropriate, overuse in many places.

More recent cross-cultural work has noted considerable variation in the types of disease entities and treatments offered in different countries. Payer (1988) revealed that while doctors in one country (Germany) identify and actively treat the disease 'hypotension' (low blood pressure), doctors in neighbouring countries do not recognise this physiological state (diastolic <70mmHg) as a disease, and therefore do not prescribe medications for it. Types of operations used also vary from one country to another: for example, French surgeons operating for fibroids are less likely to perform hysterectomy, preferring, for a range of cultural and social reasons, alternative operations which do not compromise the patient's fertility. Recent work by Eiseger et al (1999) has also found differences between treatments offered for ovarian and breast cancers in the USA and France.

A series of studies carried out in the 1970s and 1980s explored surgical variation.

Bunker (1970) compared rates of surgery by UK and US surgeons and concluded that



“the indications for surgery are sufficiently imprecise to allow for a 100% variation in rates of operation” (Bunker 1970:142). McPherson et al (1981) looked at variations in the rates of eight common surgical procedures carried out in the USA, Canada, and England and Wales, and at seven operative procedures carried out in USA, England and Norway (McPherson et al 1982). Both studies concluded that widespread variation in clinical judgements about some operations existed, particularly for conditions or diseases characterised by uncertainty regarding diagnosis and/or treatment. In another study, Wennberg et al (1982) concluded that professional disagreements about diagnosis and treatment were ‘ubiquitous features of [the] clinical decision process’ and that this explained the variation in use of different procedures. McPherson et al (1985) found wide differences in the clinical indications for cholecystectomy in the UK and US, and Black (1985) uncovered a similar lack of consensus about the indications for surgery for glue ear. In another study, US and British cardiologists and cardiac surgeons were given patient scenarios and asked to decide whether coronary surgery was indicated. The American physicians were four times more likely to consider that surgery was indicated than their British counterparts (Brook et al 1988).

The presence of such striking medical practice variations has led people to argue that the scientific base of medical practice needs to be strengthened. It is against this backdrop that the EBM movement has emerged, seeking to get doctors to use scientific evidence about effective health care (derived, in the main, from randomised controlled trials) in their everyday practice.

## The rise of EBM

Papers describing EBM have appeared in a wide variety of journals and the definitions of what EBM is have altered over time and to suit particular audiences. Sackett et al's book *Clinical Epidemiology* first published in 1985 contains the forerunners of many of the ideas encompassed by EBM, although it was not really until the early to mid 1990s that 'evidence based medicine' became an established phrase in the medical literature.

The Evidence-Based Medicine Working Group, a group of clinical academics, principally drawn from McMaster and other North American universities were at the vanguard of this movement. In 1992 the Group published a paper in the *Journal of the American Medical Association* which described EBM as 'a new paradigm for medical practice'. EBM has been defined as:

“the process of systematically finding, appraising, and using contemporaneous research findings as the basis for clinical decisions... Evidence based medicine is about asking questions, finding and appraising relevant data, and harnessing that information for everyday clinical practice.” (Rosenberg and Donald:1995:1122)

In another paper, 'On the need for evidence-based medicine'<sup>5</sup> Sackett and Rosenberg state that EBM was:

“[t]he ability to track down, critically appraise (for its validity and usefulness), and incorporate [the] rapidly growing body of evidence into clinical practice” (Sackett and Rosenberg 1995:249).

They suggested that EBM was 'a short hand term for five linked ideas'. First, that clinical and health care decisions should be based on the best patient and population

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<sup>5</sup> Sackett and Rosenberg's 1995 paper was published in several journals, a practice usually discouraged by journal editors. The multiple publication of this paper was criticised in letter by Holdsworth and Crampin (1996) *Health Economics* 5:271-2, which also printed a defence from the authors.

based scientific evidence, as well as laboratory based evidence. Second, that the clinical problem at hand determines the nature and source of evidence (rather than habits, protocols or tradition). Third, that the identification of the ‘best’ evidence combines epidemiological, economic and biostatistical thinking with personal experience. Fourth that the search and critical appraisal of evidence must be translated into action and fifth, that there should be continuous evaluation of the application of these ideas (Sackett and Rosenberg 1995:251; these ideas are also listed in Davidoff et al 1995a:1085). They proposed three strategies for incorporating EBM into practice. First, they suggested that individual health professionals could learn EBM as part of a formal education programme, such as that run at McMaster University, but also at the University of Oxford where Sackett had been based since the early 1990s. Second, they encouraged the use of summaries of the evidence prepared by others. These could be found in the new EBM journals (*ACP Journal Club* and *Evidence Based Medicine*) and/or systematic reviews (with or without statistical meta-analyses) such as those produced under the auspices of the international Cochrane Collaboration or the UK Centre for Reviews and Dissemination, York<sup>6</sup>. In addition, clinicians could accept protocols or guidelines drawn up by others who have appraised the relevant evidence. This might take the form of individual audit and feedback, or advice from ‘a respected teacher (who has learned EBM)’ (Sackett and Rosenberg 1995:253).

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<sup>6</sup> The Cochrane Collaboration was established in 1992 to extend the use of systematic reviewing of research evidence. Its stated aims are to prepare, maintain and disseminate systematic reviews of the effectiveness of health care. The UK Centre for Reviews and Dissemination was established in 1994, and is commissioned by the NHS R&D Programme to identify and review the results of good quality health research and to disseminate actively the findings to key decision makers in the NHS and consumers of health care services.

The EBM movement grew rapidly. By January 1996, Sackett noted that EBM had spread through several branches of medicine - in spite of some resistance (see for example, the *Lancet* editorial (Anon 1995) and the lively discussion which followed this call for EBM 'in its place', Sackett; Haynes; Marshall; Shahar; Morgan; Sleight; all 1995)<sup>7</sup>. Training workshops about EBM were held in the UK, and centres of evidence-based practice were established in various medical specialities. In addition the international Cochrane Collaboration, and the UK Centre for Reviews and Dissemination in York produced several important systematic reviews of medical interventions (Sackett et al 1996). A study by Ellis et al (1995) showed that the overwhelming majority of patients admitted to general medicine in a one month period were offered evidence-based interventions (Ellis et al 1995:409). Dawes (1996) reported the growing number of family practitioners using the techniques of EBM, and a retrospective study of general practice concurred that most interventions were evidence based (Gill et al 1996). Editorials in the *British Medical Journal* argued for the 'scientific basis of health services' (Smith 1991) and the need to extend the EBM approach to policy making and management (Ham 1995; Hayward 1996). This was reflected at the policy level in the UK with increasing interest in EBM, notably by the National Health Service (NHS) research and development (R&D) committees and the Department of Health.

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<sup>7</sup> *Clinical Epidemiology* had also by this time featured in a *British Medical Journal* filler 'A book that changed my practice' (Lancaster 1993)

## **EBM and surgery**

Much of the early development of EBM was linked to medical rather than surgical specialties; in particular internal medicine. While RCTs of different drugs were relatively common there were fewer trials comparing different surgical interventions. In this respect, the evidence base for surgery was particularly weak. The lack of RCTs of surgery meant that surgeons tended to rely on case series (retrospective studies of a series of cases) (Horton 1996), typically of their own recent cases. Yet the problem of practice variation - at the heart of EBM's mission - was predominantly identified with surgery<sup>8</sup> and the proponents of EBM were keen to encompass surgery and promote an evidence-based approach.

## **Aim and objectives of the thesis**

The aim of this thesis is to assess the role of EBM in surgical practice. The thesis has three main objectives. First, to describe surgical work and the nature of variation in surgical practice. Second, to identify what surgeons see as the source(s) of variation in surgical practice. Third, to examine the strengths and limitations of the application of EBM to surgical work.

## **Background**

### ***Surgery for stress incontinence***

The empirical work in this thesis is an investigation of gynaecological and urological surgery for the condition 'stress urinary incontinence'. Urinary incontinence is

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<sup>8</sup> Interestingly, some of the work on practice variation has shown greater variation in medical diagnosis and admissions than in areas of surgery (e.g. Wennberg 1984).

clinically defined as the involuntary loss of urine so severe as to have social and or hygienic consequences (Abrams et al 1988). The term 'stress incontinence' describes the leakage of urine due to a rise in abdominal pressure sufficient to overcome urethral outflow resistance (the pressure exerted on the tube connecting the bladder to the outside of the body). This can occur on coughing, sneezing, laughing or any other physical activity that causes an increase in abdominal pressure. Typically the stressor (such as a sneeze) causes temporary displacement of the urethra and the bladder neck, through the muscles of the pelvic floor, sometimes referred to as hypermobility. Stress incontinence can also occur through a weakness in the urethral sphincter (the muscles which control bladder opening) so that it cannot generate sufficient resistance to counteract increased abdominal pressure. This is referred to as intrinsic sphincter deficiency. Urinary incontinence may denote (Abrams et al 1988:423) a symptom (patient reported involuntary urine loss), a sign (objectively demonstrated urine loss) or a condition (urodynamic demonstration/measurement of urine loss). In an attempt to avoid confusion between stress incontinence as a symptom and a sign, and the clinical condition, the latter is referred to as 'genuine stress incontinence' (and is one cause of the symptom or sign of stress incontinence).

In managing stress incontinence, doctors may begin with conservative treatments, usually some form of pelvic floor muscle exercise (sometimes referred to as Kegel exercises) designed to strengthen the periurethral and pelvic floor muscles (the muscle groups supporting and adjacent to the bladder neck and outlet). Some drugs can be used to treat urethral sphincter deficiency. However, in severe cases, or where conservative treatments fail, a range of surgical procedures are used. These are anterior colporrhaphy

or vaginal repair (often shortened to anterior repair), retropubic suspension (the Burch colposuspension, Marshall-Marchetti-Kranz procedure), needle suspension (the Stamey, Raz or Pereyra procedures, sometimes also called endoscopic suspensions) and sling procedures. The aim of all these procedures is to provide additional support for the bladder neck to prevent hypermobility. Anterior colporrhaphy achieves this vaginally by dissecting (cutting) the back wall of the vagina from the bladder base and urethra, and plicating the pubocervical fascia (taking tucks from the tendon-like tissues in the back wall and stitching it to decrease the overall size). Retropubic suspension includes techniques performed via a low abdominal (retropubic) incision which aim to elevate the bladder neck. The Marshall-Marchetti-Kranz (MMK) does this by approximating (stitching to close the gap between) the symphysis pubis (the joint where the two front pelvic bones are held together) and the periurethral tissues (near the urethra). The Burch elevates or lifts the vaginal wall towards Cooper's ligament. Needle suspensions use a specially developed needle, sometimes with a tiny camera attached, which is inserted vaginally, or sometimes abdominally, to suture the tissues near the bladder neck. Sling procedures involve the placement of a sling (either a piece of fascia or an artificial material) under the bladder neck which is anchored to retropubic or abdominal tissue. In addition to these operations another new treatment for stress incontinence involves the injection of bulking agents, typically collagen (a fibrous protein) near the bladder neck<sup>9</sup>.

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<sup>9</sup> A further glossary of clinical terms is provided at appendix 1, and a comprehensive review of the scientific evaluative literature can be found in Black and Downs (1996). Surgical texts by Hendry (1987) and Lewis and Chamberlain (1989) also describe procedures for stress incontinence.

In the UK the operations to treat diseases or conditions affecting the female bladder are performed by either a urologist (the surgical specialist in urological, kidney and bladder conditions and diseases) or a gynaecologist (who deals with conditions or diseases of the female reproductive tract). The thesis focuses on the work of these two surgical specialties.

### *Origins of the thesis research*

This research was enabled by the researcher's prior involvement in an MRC funded project looking at the outcomes of surgery for female stress urinary incontinence.

Indeed, the research for this thesis grew out of an opportunistic study of a group of surgeons taking part in the MRC study.

In 1990, as part of the pilot work for the MRC project the researcher met with four surgeons to collect data about the operations they performed and develop the clinical questionnaires to be used in the project. A variety of different surgical procedures were used and, to assist the development of the questionnaires, the surgeons were asked to specify in some detail how they performed particular procedures. From these accounts it was apparent that there was considerable variation in how these operations were performed; different surgeons appeared to perform the same named procedures very differently.

In 1992 the MRC project began recruiting a cohort of patients to examine the outcomes of surgery. This phase of the project involved 49 surgeons based in 18 hospitals in two English regions. The bulk of the qualitative data reported in this thesis were collected



alongside this phase of the project. Following on from the earlier discussions with the surgeons in the pilot study, a group of surgeons involved in the MRC project were interviewed. In addition, observational data, from operations, but also from academic and clinical meetings, conferences and chance encounters with surgical staff were systematically collected.

The choice of specialties studied for the thesis was largely determined by practical considerations, not least, access to this group of surgeons. However, from the pilot work, it seemed that this area of surgery was characterised by some local practice variation. Firstly it was an area of surgical work undertaken by two distinct surgical specialties – urology and gynaecology. It was also an area where a number of different surgical procedures were being used including one that was undergoing some change. During the 1980s a number of new operative procedures for treating incontinence were developed, notably a range of minimally invasive and so-called ‘key-hole’ procedures. These approaches allowed access to the bladder via much smaller abdominal incisions, making surgery potentially less invasive and reducing the subsequent hospital stay. These developments had been made possible by the introduction of endoscopy, a means of directly examining internal organs visually using a flexible fibre-optic instrument. Many of these new surgeries had been developed in the US. By the early 1990s some had diffused into UK practice, but a wide variety of procedures, old and new, were being used at that time.

It was also an area where no consensus about treatment existed. In 1992 the US Agency for Health Care Policy and Research published its first clinical practice guidelines on

urinary incontinence in adults, based on the findings of an expert panel informed by scientific evidence on surgical treatment (AHCPR 1992). There were no such guidelines available in the UK and in the period in which the data were collected no systematic reviews of literature on surgery for stress incontinence were available <sup>10</sup>.

Meanwhile, the EBM movement was emerging in the UK, having been pioneered in North America. This research was thus well placed to assess EBM and surgical practice.

### **Structure of the thesis**

The structure of the thesis is as follows. Chapter 2 briefly reviews some of the main characteristics of surgical practice and previous research about the nature of surgical work. Chapter 3 describes the methods and study design. Chapters 4 and 5 describe surgical work, presenting data and developing concepts used to explore the nature of variation in surgical practice. These are organised around two central themes, ‘contingency’ (chapter 3) and ‘how practice is learned’ (chapter 4). These findings are analysed in relation to the key assumptions of EBM in chapter 6. The conclusions of the thesis are presented in chapter 7.

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<sup>10</sup> In the UK, a systematic review of this literature was subsequently carried out in 1995 (Black and Downs 1996).

## **Chapter 2: Surgical work**

Surgery is recognised as one of the most prestigious aspects of Western medicine. It is defined as “the treatment of disease, injury and deformity by physical, manual or instrumental intervention” (Collins, *Dictionary of Medicine* 1992). It entails a particularised set of actions and activities performed with the intent of making an improvement in a patient’s health state. Surgical success is thus constituted as an intervention which leaves the patient in a better condition than that prior to the intervention (Fox 1992:3). For a patient with incontinence, the condition studied here, being ‘better’ after surgery may mean an improvement in the condition (reduced frequency of urinary leakage, or leaking a smaller amount of urine) or complete cure (continence).

Fox has suggested that surgeons are exemplars of medicine in respect of the specialised expertise they possess and the heroic (life saving and curative) nature of the work they do (Fox 1992:1). Surgery is certainly a significant part of health care work in Western countries. In 1994/5 there were 5,753,000 inpatient operations in England and a further 2,487,000 day case operations. In the USA the ten most frequently performed surgical procedures totalled just over 7 million operations in 1994.

### **Social science literature about surgery**

Despite the prestige and significance of surgery there are few contemporary descriptions of surgical work. There are a large number of clinical texts and journal articles devoted to surgical techniques which describe particular operative procedures,

but very little on the everyday work of surgeons. There are some historical accounts of surgical practice (some of which have looked at the specialty of gynaecology, for example, Shorter 1982; Wyman 1984; Moscucci 1990) but accounts of surgical work are largely absent from the social science literature. This absence is most notable in the field of medical sociology. Nicholas Fox (1992) has suggested that interest in the doctor-patient interaction has made surgery seem an unpromising subject for sociological study (Fox 1992:3). His work is one of a handful of pieces of research that has looked in detail at surgical work in the operating theatre. Based on fieldwork in an English district hospital over an 18 month period, Fox's study included observation of operations and ward rounds, and interviews with surgical staff. He detailed the complex relationships and rituals surrounding surgical practice and looked at the relations between the different health professionals involved in surgery. One important part of his analysis focused on 'circuits of hygiene' - sterile practices, rules about scrubbing up or washing prior to operating, the covering of the patient to ensure a sterile 'field' for the operation, and the wearing of gowns and masks in the operating theatre. This work then goes on to deconstruct the various discourses he identified in surgical work, and to examine power relations within the operating theatre.

Hirshauer (1991) also used ethnographic methods to explore surgical practice in German operating theatres, looking in detail at ritual in surgical work and the social construction of the body in surgery. Both Hirshauer's constructivist approach and Fox's more postmodernist analysis have provided salient descriptions of everyday surgical practice. Alongside these studies there are two important pieces of sociological research which have looked at one aspect of surgical work, namely the consultation. Bloor's

work on Ear, Nose and Throat (ENT) surgeons, in the late 1970s and Silverman's study of paediatric cardiac surgery clinics a decade later provide rich descriptions of the surgical outpatients' clinic.

Bloor's (1976) study of ENT surgeons centred on the decision making routines which form part of the doctor-patient interaction. Using observational data from outpatient clinics Bloor delineated different decision rules which govern the assessment and subsequent disposal (treatment decisions) of children referred for possible adenotonsillectomy. He argued that the decisions surgeons make are socially constructed, relying not only on clinical signs, but also on patient circumstances and individual surgeon's subjective preferences. Bloor argued that variation in these decision making rules helps to explain observed variations in rates of tonsillectomy across geographical areas and between surgeons.

Silverman's (1987) work on paediatric clinics examined the nature of surgical communication in the clinic setting. His research showed important differences in the way surgeons manage children with and without genetic disorders. As in Bloor's study, Silverman's research highlighted the crucial role of non-clinical factors in determining patient disposal. So, for example, the idea of patient happiness is used to support the surgeon's decision not to surgically treat Downs' syndrome children who have operable heart conditions.

Strong's (1979) comparative study of paediatric outpatient clinics in Scotland and the USA, although not about surgery, provides a broader context for these two studies.

Strong argued that, in their interaction with patients, doctors adopt different role formats depending on the context in which the interaction takes place. British NHS doctors commonly adopt what he described as a bureaucratic format, based on politeness and courtesy. This is contrasted with a clinical format in which the doctor is seen as the expert and may act authoritatively, and the private format in which the doctor asserts and displays competence and expertise (typically found in private clinic settings in the USA). These formats are also contrasted with a fourth category, the charity format, in which the doctor attempts to assign guilt or blame to the patients (or in the paediatric setting, the patient's mother) and asserts his/her authority, typically by treating the patient as technically incompetent.

Another aspect of surgical work which has received some attention is surgical documents, principally the patients' notes and operative records. Pettinari (1988) observed exploratory laparotomy and cholecystectomy procedures to see how resident (junior) surgeons in operating rooms in the USA constructed the written accounts of surgery (operative reports). Using conversational and discourse analysis, Pettinari highlighted the differences between the written operative reports and the operations she observed. She showed that the process of recording the operation in writing develops or evolves during the residents' training period and that the accounts they produce differ over time.

Cassell's study of American surgeons (1987) provides another view of surgical work. Carried out over a two year period, her analysis focused principally on the

psychological traits of surgeons. She suggested that the nature of the surgical event requires a particular personality:

“[a]t the operating table, the surgeon must manifest decisiveness, certitude, control.” (Cassell 1987:230)

Earlier work by Freidson (1970) made a similar point. He suggested that the ‘clinical mentality’ (Freidson 1970:158) derives from the uncertain nature of medical work. Doctors come to rely on subjective experience rather than formal knowledge, and begin to develop self-assurance as a way of managing the variability and indeterminacy of their work. Cassell argued that the surgical temperament, characterised by control and certitude, is accompanied by paranoia. She explained that the surgeon has to act in the face of hostile forces - disease and death, the vagaries of the hospital environment (staffing, operation room availability) and even the patient and his/her family. In addition, the surgeon has visible responsibility for the outcome of surgery. These factors, Cassell suggested, engender paranoia amongst surgeons. Bunker’s (1972) account of anaesthesiology (anaesthetics in the UK), the specialty most intimately linked with surgery, augments Cassell’s description of the surgeon’s personality. He contrasted the powerful, often tyrannical, surgeon with the less powerful, but nonetheless crucial, specialist in anaesthetics. While the American anesthesiologist is responsible for managing the patient (inducing unconsciousness, maintaining respiratory function and so on) Bunker suggested that the surgeon has to deal with

“the anatomical problem of the moment” (1972:146)

and is credited with the outcome - curing patients and saving lives.

Studies of surgical mistakes also provide some insights to surgical work. Millman (1976) and Arluke (1977) were among the first to expose these mistakes and document

their nature and frequency. Later work by Bosk (1979) and Rosenthal (1995) has emphasised the informal mechanisms by which doctors deal with errors. Although Freidson (1975) in his study of American group practice found little informal self-regulation, Bosk's study described an informal moral code of norms, ethics and responsibility, which guided surgical residents throughout their training. He suggested that this moral code, and the possible sanctions arising from it, has less weight once the training period is complete and the surgeon is deemed competent. (This possibly accounts for Freidson finding little self-regulation). More recent research by Rosenthal in Sweden and England looking at surgeons and general practitioners has described a repertoire of strategies adopted within the peer group to control or deal with incompetent colleagues. These studies have been useful in highlighting the distinctions between surgical and non-surgical work. As Cassell pointed out

“[s]urgery ...unlike specialties such as internal medicine, is based primarily upon *event*, rather than process... the act of *surgery* occurs in a measurable and sharply delimited period of time. During this event the surgeon does something that alters the patient's body irrevocably and, on occasion, radically.” (Cassell 1987:250 emphasis in original)

### **Rationale for the present study**

Surgery is clearly important, both in terms of the volume of health service activity it represents and the special characteristics of surgical work which have been alluded to in the brief literature review above. The research reported in this thesis examines surgical work, focusing on two specialties. It seeks to describe the everyday practice of a group of surgeons involved in the treatment of one condition, stress incontinence. Unlike previous research, this study explicitly explores the nature of practice variation in surgical work. In particular, it considers the surgeon's view of clinical practice by



examining what they see as the source(s) of variation in their work. This descriptive work, seeks to augment the existing literature about surgery. It intends to shed light on some of the reasons for practice variation in surgery. Against the background of this descriptive work, the thesis also provides a unique assessment of EBM and its applicability to surgery. Ideas drawn from the social sciences are used to develop concepts which in turn, inform a series of arguments about the strengths and limitations of EBM.

## **Chapter 3: Methods**

The data reported in this thesis were gathered over 28 months between 1992 and 1994. They come from a qualitative study of 35 English and North American surgeons. The primary data are from face to face, depth interviews with 34 of these surgeons. These data are supplemented by direct observation of surgery and additional observational and conversational material obtained from formal and informal settings in the hospitals where these surgeons practised.

### **Selection of cases**

#### ***English fieldwork***

In 1992 all 137 gynaecologists and urologists who performed surgery for stress incontinence in two English health regions (North West and North East Thames) were invited to participate in a cohort study of the outcomes of surgery for female stress urinary incontinence. Sixty-four of these agreed to participate, 13 declined and 60 did not reply. Forty-nine surgeons were selected from the 64 as representative in terms of caseload, specialty, whether they worked in a teaching or district general hospital and whether the hospital served a rural, suburban or urban population. In turn, 29 of these surgeons were approached and asked if they would agree to be interviewed as part of a qualitative study, the basis of this thesis. One declined to be interviewed on the grounds that he was too busy, but he was observed operating. In addition, one surgeon based at one of the study hospitals but not participating in the cohort study agreed to be interviewed on the recommendation of a colleague.

### *Interviews with English surgeons*

Of the 29 English surgeons interviewed between November 1992 and July 1994, 21 were gynaecologists (15 male and six female) and eight were male urologists. An effort was made to include female surgeons to capture possible differences in practice between them and their male colleagues. At the time the study was conducted there were no female consultant urologists working in either of the regions chosen. The smaller number of urologists included reflects the fact that only about 20% of surgery for stress incontinence is performed by urologists in England. Twenty-eight of the surgeons were in consultant posts and including both recently appointed consultants and senior clinicians who had been in post for approximately 30 years. One of the interviewees was a senior registrar (now called specialist registrar). Nine of the surgeons were based in teaching hospitals and the rest worked in district general hospitals.

The interviews took between 35 and 90 minutes, the average being one hour. Three of the surgeons interviewed at the beginning of the research were interviewed on more than one occasion. This provided an opportunity to pursue emerging themes and ideas which had not been examined in the first interviews. On two occasions junior surgical staff were present and contributed to the interview.

### *Observation of English surgeons*

Between 1993-1994 eleven operations carried out by 4 surgeons were observed. (Three of these surgeons were also interviewed.) During eight of the eleven operations the researcher was in the operating theatre, positioned near the surgeon and able to view the operative field, walk around the operating suite and take notes. Three operations were

observed as part of a teaching day via an audio-visual link to the operating theatre which displayed the operation on screen in a lecture theatre. In addition, two video films of procedures, one shown in the course of the teaching day, were observed.

During the data collection period the researcher had access to a range of formal meetings which included a meeting of the Royal College of Surgeons, the Continence Advisors Conference, the UK International Continence Society and three of a series of uro-gynaecological seminars at a London teaching hospital. Visits to the various hospitals provided informal opportunities to meet with surgeons in clinic, or during breaks, and proved to be a useful additional source of data.

### *USA Fieldwork*

A decision to conduct international comparative research was made towards the end of the English data collection period and a two week visit to the USA arranged<sup>1</sup>. The aim of this additional data collection was to explore the nature of surgical work in a different health care setting. The USA was chosen because rates of surgery in the US are about twice those in the UK, partly reflecting differences in funding systems. It was hoped this would provide a useful contrast to the UK NHS. In addition, the clinical literature suggested that, in this area of surgical endeavour, there were some differences in the types of surgical procedures used to treat stress incontinence in the two countries. The choice of the USA for this comparative work was also informed by the fact that much of the early research on surgical variation and the literature about EBM had originated in North America.

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<sup>1</sup> The USA fieldwork was funded by a Wellcome Trust Travel Grant and a grant from Lectromed Ltd.

Surgeons and academic colleagues in the UK provided names of six surgeons in the US who were invited by letter to take part in the research. All agreed in principle to participate. Given the limited time available four surgeons working in three hospitals and one private clinic in two Eastern states were chosen as the focus for this phase of the research. Two of the hospitals were located in urban centres and one was in a semi-rural location. The private clinic was located in a major city.

### *Interviews with American surgeons*

Interviews were conducted with four attending surgeons (equivalent in status to an English consultant), and one surgical research fellow, who from his background and training could be considered comparable to the final stage of the Specialist Registrar (previously the Senior Registrar) grade. Two were urologists (one female) and three were pelvic surgeons or gynaecologists (one of whom was female). The interviews conducted during the USA fieldwork were slightly longer on average than those conducted in England, at approximately 80 minutes.

### *Observation of American surgeons*

Alongside these interviews, twelve operations were observed in three hospitals. Additional material was gathered from periods spent observing the urodynamic investigation suite, consultations between surgeons and patients and their families, medical school lectures and the informal talk in the various cafeteria areas, between operations and so on.

The selection of respondents from two surgical specialties, from different hospitals and countries, and the combination of methods - interviews and observation - aimed to capture, as far as possible, the diversity of surgical practice.

### **The interview guide**

A pilot interview was conducted in October 1992 with an urologist who was not based at any of the study hospitals. This interview explored a range of issues surrounding surgical work and operative techniques. The data from this interview are not reported here but the subsequent interviews were guided by a topic list developed from this pilot interview. This guide was also informed by knowledge of surgical work gained from previous research observing outpatient clinics and operations, and from the clinical literature. The list of topics for the interviews began on a sheet of A4 and after four or five interviews this list was reduced to a 6"x4" card with the following prompts.

Sample questions are shown for each topic to illustrate the types of questions asked.

- Surgical techniques/methods

e.g. Please tell me about the surgical techniques you use to treat stress incontinence.

- Learning/teaching

e.g. Where did you learn this technique?

- Diffusion/ Innovation

e.g. How do you find out about new developments in the field?

- Areas of interest (sub specialism)

e.g. What would you characterise as your main surgical interests? How much of this particular surgery do you do?

- Boundaries between specialties

e.g. Would you refer to yourself as an uro-gynaecologist or gynaecologist? When would you refer one of your patients to urology?

- 'Ordinary work', everyday activities, surgical life

e.g. How many operating lists do you have each week? What proportion of your cases are women with stress incontinence?

- Client group: 'normal cases'

e.g. What is the make up of your typical outpatient clinic/list?

- Routines and decisions

e.g. How do you decide on a particular procedure/suture etc?

- Technology

e.g. What have been the most recent technological developments in your field?

- Formal/informal links (colleagues, associations)?

e.g. What opportunities do you have to meet with fellow surgeons here/at other hospitals?

- Influences/ barriers to innovation

e.g. What sorts of things would prevent you from adopting a new surgical technique?

The interviews were reflexive. In line with the description provided by Hammersley and Atkinson (1995:152) they did not follow a standardised interview schedule and not all topics were covered in the same depth with every respondent. The surgeons were encouraged to elaborate, introduce additional topics and to discuss other aspects of their work which seemed relevant during the interview.

## **Data Recording**

### ***Interviews***

All the interviews were recorded using a hand held tape recorder with an integral microphone. Detailed notes were also taken during interviews as an aide memoire, and as a means of including surgeons' drawings of anatomy, suturing diagrams and so on. These notes proved especially useful on two occasions when the tape recording failed<sup>2</sup>. All the interviews were transcribed and typed into a word-processing package. The resulting transcripts did not follow socio-linguistic conventions for detailing pauses, overlapping talk and so on, although long pauses, laughter and gestures were included to facilitate understanding.

### ***Observation***

The observational data consist of near verbatim notes which were made, where possible, during the observation period and failing that, immediately afterwards. In more informal meetings or circumstances such as lunch breaks or casual conversations in corridors, notes were written up as soon as possible afterwards from memory. All the observational material was written up in full on the day of collection and later typed into a wordprocessing package, following the same conventions as the interview transcripts.

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<sup>2</sup> Tape recording failed completely in one case and the account was salvaged from notes taken at the time of interview; fortuitously the conversation had been conducted at transcription pace and the notes recorded most of what was said. One quarter of another tape was corrupted and again this was reconstituted from notes. The notes taken during the interviews were annotated immediately after the interview.



## **Analysis**

The analysis of these data was closely linked to the data collection: ideas about the data already gathered fed into and shaped the direction of the ongoing research<sup>3</sup>. However, detailed and systematic analysis of the data did not begin until the fieldwork was completed in November 1994. This analysis used the constant comparative approach described by Glaser and Strauss (1967) in which categories and themes are generated from the data. The transcripts were initially indexed by noting recurrent and interesting words and phrases in the right hand margin. In this way a large number of coded units, or 'fuzzy categories' (Perry 1994) were developed. Similar units or items were grouped together to form categories and compared for further similarities and differences. Throughout the analysis, constant reference was made to the original transcripts to check the context of each unit or category. Particular attention was paid to recommendations by Silverman (1995:162) and Dingwall (1992:171) amongst others, to search for deviant or unusual cases.

### ***Use of the split-half technique***

As a way of checking the categories and emerging themes a variant of the split half technique was employed. Ten transcripts were selected and not looked at until the analytical categories had been refined using the other transcripts. These ten transcripts were then purposively analysed to see if the categories could be applied to these data.

The chapters which follow attempt to provide sufficient data for the reader to judge the plausibility of the analysis. Although there are few qualitative studies of surgical work,

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<sup>3</sup> Becker (1971) describes this analytical process as sequential analysis.

especially of the operating room, the data presented here bear comparison with similar work, such as Fox (1992).

### **Ethics: disclosure and consent in surgical settings**

The researcher's involvement with the MRC cohort study from 1990 until 1994 meant that the researcher was already known to the English surgeons who took part in this qualitative study. At the beginning of most, but not all, of the English interviews a brief explanation was provided of the purpose of the interview and it was explained that the information gathered would also be used for a separate qualitative study. On a few occasions the exact nature of the qualitative research was not explained in detail because of concerns about rapport and the amount of time available. A delicate balancing act was required, both to maintain the interview, and at the same time to ensure the surgeon's continued participation in the cohort study<sup>4</sup>.

The surgeons were assured of the confidentiality both of the interviews and statistical data - that no individuals would be identified by name and that any details which might be used to identify them would not appear in any published data. The data presented for this thesis have been anonymised to comply with this assurance.

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<sup>4</sup> There has been much discussion about the amount of information it is possible or pertinent to convey regarding the research of this kind (see for example, Dingwall 1980). Informed consent remains problematic. The tendency for research subjects to forget that research is happening once they get to know the researcher can mitigate against the ideal of fully informed consent and, as Bell and Newby (1977:59) and Dingwall (1980:877) have observed, continuous reminders may prove disruptive to the data collection or simply be ignored.

There are, however, wider issues about informed consent relating to access to operating theatres and other areas of hospital life. While all the surgeons knew that their work was the subject of research, patients with whom the researcher came into contact were not necessarily informed, or asked for their consent. Observing clinics and other hospital areas the researcher was variously introduced to patients and other medical staff as a social worker, a researcher, a student, and a visitor. That said, all these individuals were aware of the researcher's physical presence and that notes were taken and questions asked.

The majority of patients undergoing surgery were not informed of the researcher's presence in the operating theatre<sup>5</sup>. Although in teaching hospitals patients may be informed that students will be involved in their care, anaesthetised patients are seldom informed about all the individuals who will be present for their surgery. This remains a source of some unease despite the fact that the data gathered from these operations are illuminating. Given the intimate and invasive nature of the surgery and issues of dignity and privacy perhaps these patients should have been informed about the research.

### **Being a female researcher in a surgical setting**

Alongside the ethical concerns about disclosure and consent, this research raised a number of issues about the role of a researcher in surgical settings, and particularly of a female researcher researching a predominantly male group. The impact of gender on the research process has been discussed in some detail elsewhere, (Warren and Rasmussen

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<sup>5</sup> All the UK patients had a general anaesthetic and were thus unconscious, but some of the USA patients had a local anaesthetic and may have been aware of the researcher's presence, although in only one case (the collagen injection) was the role of the researcher explained accurately to the patient.

1977; Easterday et al 1982; Cockburn 1983; Punch 1994). This section briefly considers how the presence of a female researcher may have influenced the research.

Easterday and colleagues (1982) in their research about morgues vividly described some of the many roles which female researchers may be assigned by the male subjects of their research - for example, categories such as 'the mascot' or 'the daughter'. These resonate with the research reported here. Warren and Rasmussen have pointed out that the impact of gender depends on the research setting and the situation under consideration, but it can affect both access to the setting and data collection in positive and negative ways (Warren and Rasmussen 1977:365). The important point to make, which echoes Warren and Rasmussen's experiences, is that the impact of gender was not constant. In theatre, dressed like everyone else, gender was rarely an issue, but on a ward, in clinic or at a specialty meeting it might have been important. Changes in the research role over time reflected not only these gender issues but, perhaps more importantly, the transition during the research from outsider to insider. As the researcher's presence became established, 'being female' appeared to matter less and 'being there' was increasingly accepted. Nonetheless the presence of a female researcher undoubtedly had an impact: the combination of the gender (female), age (young, relative to the informants) and status (low) of the researcher may well have influenced the conduct of the research and access to the data. However, like Easterday and her colleagues, not all the 'problems' associated with being a female researcher in such settings are disadvantageous. The position in the group, even as mascot or daughter figure, was in many ways privileged and provided exceptional access to the everyday lives of this group of surgeons.

### **Interviewing elites: some other considerations**

Allied to the issues noted above, there are some more general issues related to studying an elite group. As part of the medical profession these surgeons are part of a professional elite and a prestigious occupation. Hertz and Imber have argued that social researchers have tended to avoid studying elite groups because they are difficult to penetrate (Hertz and Imber 1995:viii). Against this, Ostrander, has argued that although there are methodological issues relating to access, the problems of researching elite groups have been exaggerated (Ostrander 1995:135). Certainly the research presented here did not encounter the kinds of difficulties in gaining access described by Thomas (1995) in his work on large companies or Gamson (1995) on Hollywood elites. This was largely because initial access to the UK surgeons was obtained, and in part legitimated by, the MRC funded cohort study. However the ease with which access to the American surgeons was gained, without the apparent sanction of other related research, suggests that such access may not always be problematic<sup>6</sup>.

Whilst this research did not encounter problems gaining access, the interviews posed a novel problem for the surgeons involved. Some appeared uncomfortable with the interview process and had difficulties working out how to 'pitch' their account. The issue of rapport was also important. With some surgeons, establishing rapport was relatively easy and the conversation flowed, while in some interviews the talk seemed much more formal and at times constrained. Ostrander has argued that the social

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<sup>6</sup> Fox (1992) gained entry to the fields via a key informant, but he does not report difficulties gaining access to operating theatres or to individual surgeons. Atkinson (1995) recounts a series of happy accidents which enabled him to conduct his research about haematologists, but he also describes some less successful attempts to gain access to pathology (Atkinson 1995:2-3).

context of interviews with elites and non-elites is very different and that members of elite groups engage in particular kinds of presentation (Ostrander 1995:142). In such circumstances the researcher can lose control over the interview. In the context of the research presented here some surgeons had concerns (e.g. about the re-organisation of the NHS, the waste of money on research and so on) which they wanted to raise with a 'captive' researcher. The setting of the interview also influenced how far it was possible for surgeons to stray from the research agenda. The interviews were conducted in consulting rooms, private and NHS clinic facilities and operating theatre anterooms. Ostrander (1995) has described some of the strategies which can be used to regain control of interviews in unfamiliar settings, such as arriving early or choosing seating carefully, but it was not always possible in the types of settings described above to maintain such control. In addition, other staff were present during some of the interviews and conversations which took place in communal areas, and this also affected the interview dynamic and my opportunities to direct the interview.

### **Generalisability**

The research was highly selective, in terms of the choice of settings, specialities and respondents. For the English interviews, not all the surgeons participating in the cohort study were interviewed, and even the larger group of forty-nine surgeons who were participating in that study, did not constitute all the urological and gynaecological surgeons in the two regions. However the surgeons participating in the MRC project were representative of the surgeons practising in the two regions in terms of surgeon volume (number of operations performed each year), speciality (gynaecology or urology), teaching status (teaching or non-teaching) and geographical location (inner London, outer London or rural) (Black et al 1998). The much smaller group of USA

surgeons, selected on the basis of personal recommendations from contacts in the UK may be particularly atypical because of their location in prestigious centres, and/or their particular expertise which meant they had reputations beyond their own institution and country. The observation of surgery was limited, and therefore partial, in terms of the number of procedures and surgeons seen. The data presented here represent only those operations that the researcher was allowed to observe and it may be that the surgeons who allowed this access were particularly confident or had different operative approaches to their peers. The current study cannot, therefore, make claims to generalisability in the statistical sense: these surgeons may not be representative of a wider population of surgeons.

### **Data presentation in the thesis**

Quotes taken from interview transcripts are presented in quotation marks and quotes from field notes and observational material are presented as indented prose. The data have been referenced to preserve anonymity but the numbering system (consultant code, occasion reference (first or subsequent meeting): page number : line number) aims to provide a guide to timing and location of the quotes. Evidence is presented from the full range of data available and the commentary attempts to make it clear when a particularly articulate individual or unusual occurrence is being reported. The variation in the quality of the accounts and material has not made this latter task easy. One of the American surgeons in particular provided some extremely articulate and imaginary analogies and the text attempts to make it clear when such data are being used.

## Chapter 4: Contingency in surgical practice

### **Introduction**

The operation is the central and defining act of surgical work. It is where the surgeon intervenes to manipulate or alter the patient's body. Much of this thesis focuses on the actions and practices that constitute the operative event. However, surgical work is not solely about the act of surgery. Other work is required in order for the patient to reach this point. The two additional aspects of surgical work discussed here are those leading up to the operative event, namely, the selection of patients as suitable for surgical treatment and the selection of a particular surgical procedure.

### *Three stages of surgical work*

In the UK NHS patients first meet with their surgeon in a hospital outpatient clinic. The majority of patients with stress incontinence are referred by their general practitioners to a consultant, either based in urology or gynaecology. A few patients are tertiary referrals, that is, referrals from other hospital consultants (in this context, typically from an urologist to a gynaecologist or vice versa). The patient meets with the consultant surgeon (or, more often with a junior member of the surgical team such as a specialist registrar) in the clinic. In gynaecology this may be a general gynaecology clinic, in urology (which treats both male and female patients) there may be a separate women's outpatient clinic. Some surgeons in both specialties hold uro-gynaecology clinics where only women with urinary disorders are seen. Patients in the USA are more likely to be self-referred, usually choosing a surgeon on the basis of personal recommendation, or



they are referred to a surgical specialist by a family physician. The first meeting with the surgeon may take place in the surgeon's consulting rooms or clinics away from the hospital. Some of the US surgeons in the present study also saw patients in rooms or offices at the hospital sites.

At the consultation the surgeon may already have the patient's medical notes and/or the results of prior examinations or investigations, but the task of the surgical consultation is to make or confirm a diagnosis and make a decision about treatment. In considering surgical treatment the surgeon must decide if the patient is suitable and then, which surgical procedure s/he will perform.

The decision to operate and the choice of procedure relies heavily on the clinical history taken by hospital doctor at the consultation, supported where possible by clinical (physical) examination. During the consultation the surgeon gathers information from the patient on her urinary symptoms and incontinent episodes, as well as other supplementary biographical and medical information (ranging from age, through to previous surgery and current medications). Some surgeons also use urodynamic tests, ranging from simple physical examination (asking the patient to demonstrate urine loss on coughing), or cystometry - the filling of the bladder - with or without the use of rectal and vaginal monitoring (or profiling) of abdominal pressures and sphincter contractions. Videocystometry or ultrasound imaging can allow this process to be viewed on a visual display. In cases of stress incontinence, these tests can be helpful in reproducing symptoms and ruling out diagnoses other than genuine stress incontinence.

There is some debate in the clinical literature as to the value of urodynamic investigations (Hilton and Stanton 1981; Lagro-Janssen et al 1991; Jarvis et al 1980; Haylen et al 1989) but many surgical texts encourage their use. Access to urodynamic facilities varies in the UK. The MRC cohort study established that roughly 40% of the women undergoing surgery for stress incontinence in the two regions studied did not undergo urodynamic testing prior to surgery (Black et al 1996a), indicating that such investigations are not necessarily a routine part of the decision making process. The US clinical practice guidelines describe urodynamics as specialised and optional (AHCPR 1992:23), suggesting that they have a similar status there.

The emphasis on the patient's subjective account of her symptoms, rather than on clinical tests or investigations is an interesting feature of this area of surgical work. Medical sociology and anthropology have long argued that a key feature of the modern biomedical model is the use of clinical investigation and objective measures. Both the clinical literature (Feinstein 1975) and sociological work (Armstrong 1983) contend that the clinical gaze of modern medicine has shifted away from the reported history in favour of the clinical examination. Incontinence may be an atypical condition within such a framework, perhaps because of its very nature. Central to the diagnosis is the idea that the involuntary loss of urine must be severe enough to be a *social* or hygienic problem. In common with a few other conditions (such as dysmenorrhoea or heavy menstrual bleeding) the patient has to judge the severity and social impact of her symptoms. This forces the surgeon to avert the clinical gaze and rely on reported symptoms and history.

Having decided that a patient's condition is amenable to surgical treatment, the surgeon then chooses a particular procedure. The UK NHS has waiting lists for elective surgery so it may be some weeks or months before the operation is performed. In the US there is typically much less time between the decision to operate and admission.

The operative event itself takes place in a hospital operating theatre<sup>1</sup>. The nature of surgery, its invasive, potentially shocking and private aspects, and the practical requirements of asepsis (the exclusion of harmful bacteria and other micro-organisms) mean that it is carried out backstage (Goffman 1959), away from the more public areas of the ward or clinic<sup>2</sup>.

### *The data used in this chapter*

The majority of data presented in this chapter come from the interviews with surgeons about their work. At the beginning of each interview the surgeons were asked to describe in detail the surgical procedure or procedures they used for treating female stress incontinence. For some this was not an easy task; several expressed nervousness regarding the tape recording of the conversation, or were uncertain as to the level of detail required - whether to 'pitch' their story at the level of another doctor or towards a non-expert. However in common with other interviews, the respondents seemed to want

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<sup>1</sup> Surgeons in the UK refer to the operating theatre or OT in the US the term operating room or OR is used.

<sup>2</sup> Only authorised personnel may enter the operating areas and special clothing is worn as part of the sterile procedures which surround the operation. Fox (1992) provides an excellent description of the layout of English operating theatres and the hygienic ritual surrounding this part of surgical work.

to make or to tell a story (Askham 1982) as a way of answering the questions asked. For some the operative event constituted the middle of such a story and they preferred to begin by explaining the processes by which a patient arrived at this point. They chose to detail their method(s) of patient selection and their decision making around the choice of operative technique(s). In other accounts these details emerged at later points in the interview and the operative event was discussed first. Nonetheless, all the interviews refer to each of the three operative stages of patient selection, procedure selection, and operative event.

In addition to these interview data, this chapter draws on some of the material obtained from periods spent observing operations to illustrate how variation affects this stage of surgical work. The interview and observational data are used to describe surgical work and practice variation. The chapter goes on to develop the concept of *contingency* as a way of understanding the nature of surgical work. This term captures both the sense of chance ('that which may happen') and dependency ('that which is conditional on') in surgical practice at each of these three stages of the operative process. For ease of presentation the English data are presented first.

### ***Developing a conceptual framework for surgical dependency***

That surgical work was dependent on a wide range of variables became apparent very early on in the analytical process. The phrase 'it depends on...' occurred repeatedly in the data. A wide range of factors appeared to influence all three stages of operative process. Some related to patients, for example, anatomy and co-morbidity, and some

centred on the surgeon, for example, preferences, skill and hand size. Further variation occurred around the type of equipment available, or the quality of assistance during the operation. As a way of exploring this further all references to conditionality or dependency - as statements which included the words 'it depends on', or sentences which used logical operators such as 'if A... then B', were selected and analysed<sup>3</sup>. A series of sub groups around the central theme of conditionality were identified and included a wide range of items such as 'tissue quality', 'suturing techniques', 'obesity', 'left handedness' and so on. A process of constant comparison enabled further refinement of these groupings until it was possible to place all the examples in one of three categories of dependency:

1. *case dependency* - all items relating to the individual patient, her anatomy, clinical history and so on
2. *surgeon dependency* - all items concerning surgical ease or difficulty, trial and error, seeing, feeling, personal preferences
3. *external dependency* - items which did not fit into categories 1 or 2 and which were features of the environment surrounding surgical work, or the resources which supported it, such as equipment, assistants.

The next stage of the analysis involved seeing how far these three categories ran through three key stages of surgical practice - the decision to operate, decisions about the procedure to use, and the operative event itself.

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<sup>3</sup> These items were re-typed into a new data file. This obliged the researcher to reconsider each item again and to re-read the quotes in context. This was an invaluable, if time consuming, part of the analytical process.

## Findings from the English data

### *Patient selection*

The decision to operate is not solely determined by the diagnosis of stress incontinence.

It is also dependent on whether the patient constitutes a suitable candidate or case for surgical treatment, and, whether the surgeon wishes to operate:

“the technicalities of doing the operation are secondary to assessing the patient properly and making sure they are the right patient. If you opt to do a colposuspension in a woman who’s had a previous repair, [or] who is grossly overweight, [or] has had masses of previous surgery you are going to be in that tummy a long time. You’ve not got any guarantee of success. So I think you need to think very carefully before you operate” G13.1;3:40

The surgeon may be influenced in his/her decision to operate by aspects of the patient’s medical history. Previous surgery may be taken into consideration:

“I would be very wary before I did any urinary procedure on a woman who’s had previous urinary procedures because I think it’s a specialised field.”  
G13.1.1;4:3

The presence of co-existing disease or other medical conditions (co-morbidity) can also affect the decision to operate, either because it contributes to the urinary symptoms or because it represents an operative risk. Respiratory problems, such as asthma or bronchitis, combine both these elements and are both causal factors in incontinence, as coughing may place strain on the muscles of the pelvic floor, and operative or anaesthetic risks.

“There are two other factors we haven’t even discussed yet and that is the patient who is a smoker and chronic bronchitic, ...I wouldn’t expect a good result from those... The other thing we haven’t talked about is obesity because if you’ve got stress incontinence in a 200 kilo woman whichever way you deal with it the technical problems are immense whether you do a laparotomy, colposuspension or colporrhaphy...” G14.1;8:15

The surgeons appeared to make a distinction between types of co-morbidity – those which were in some way the patient’s fault (for example, obesity, respiratory disorders caused by smoking), and those which could not be attributed to patient behaviour or lifestyle. Co-morbidity linked to lifestyle choices were spoken of negatively while other co-morbidity such as heart disease, high blood pressure and diabetes, which also need to be considered before proceeding to operation, did not attract negative moral judgements<sup>4</sup>.

Stage of the lifecycle, particularly in relation to reproduction and menopause influenced patient selection for some surgeons and highlights the interplay between case and surgeon dependency. There was some uncertainty amongst surgeons about whether pregnancy, labour and delivery necessitated re-operation for stress incontinence, with some surgeons favouring delivery by Caesarean section should pregnancy occur, as in this quote:

“completeness of the family is important. I’ve done colposuspensions and said if you get pregnant you’ll have a caesarean section are you happy with that? Rather than take down the colpo having a vaginal delivery. So having not finished your family is a barrier to having [surgery].” G17.1;5:18

While for others it precluded surgery:

“...depending on the woman’s age, if someone is going to have another three kids and they’ve got a lot of stress, I’m not going to operate on them at that time” G17.1;5:14

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<sup>4</sup> This distinction between good and bad has earlier origins in the sociological literature on the moral nature of sickness, notably in Parsons’ (1951) discussion of the sick role and the idea that illness represents deviance from the norm. The particular examples of ‘bad’ co-morbidity mentioned here are negatively sanctioned, in the same way that George and Dundes’ (1978) ‘gomer’ and Jeffery’s (1979) ‘rubbish’ cases are; a moral judgement is made about these co-existing conditions and the fault or blameworthiness of the individual.

Age might be a related factor to consider. Some surgeons said that they would not operate on young women, although some would<sup>5</sup>. In practice, many of the women presenting for surgery are older, and often post menopausal<sup>6</sup>.

Interestingly the severity of urinary symptoms was rarely mentioned, although there are symptom grading systems available. This may reflect the fact that only patients deemed to have symptoms severe enough to warrant surgery are referred to a surgeon<sup>7</sup>. Only one reference to grade of severity was found in the English data, but is illustrative of its use in patient selection:

“I must admit that still for the very mild incontinence I don’t operate, I would only operate on grade 2 and 3 stress rather than grade 1.” G3.1;10:39

The decision that surgery is indicated may or may not depend on the results of urodynamic investigations. Sometimes the decision to operate was made simply on the basis of the symptom history:

“if I have a patient who has pure urinary incontinence as far as I can tell then I’m, in some cases, prepared to go straight onto surgery without putting absolutely everybody through the urodynamic hoop.” G16.1;1:10

However, another surgeon claimed that

“virtually all our patients get urodynamics” G9.1;1:25

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<sup>5</sup> During one London Urodynamics Group meeting it was reported that the youngest female to undergo a Burch colposuspension was 14 years old – although several members of the meeting saw this as inappropriate.

<sup>6</sup> In the MRC cohort the mean age at operation was 52 years (Black et al 1996a)

<sup>7</sup> Although, as Black et al (1996b) discovered, there is considerable variation in the severity of symptoms.



The use of urodynamic tests was dependent on access to testing equipment. The amount and type of urodynamic equipment available varied across the different hospital sites.

Sometimes the urodynamic clinic was based in the urology department and gynaecologists had to cross-refer their patients for testing (or vice versa). Some surgeons did not have such facilities, or had to build them up:

“When I came here there was no urodynamics for gynae patients, they went to London and that was obviously a ludicrous situation so I started doing urodynamics... [CP] *What tipped the balance [in favour of setting up urodynamics clinic here]? My first clinic. I had four ladies who needed urodynamics... That was it pure and simple. I wasn't going to send four ladies down to London for urodynamics. [Although] I don't normally get four.*”  
G15.1;7:1

### ***Procedure selection***

Case dependency is also apparent in the selection of operative procedures. Co-morbidity is a significant factor here. Related uro-gynaecological conditions (such as cystocele and rectocele) may need surgical repair and this will influence the operation chosen:

“if they've got cystocele and stress incontinence then I might try doing a colposuspension first.” G4.1;2:41

Individual patients may present with a combination of other conditions so that a series of different conditions inform the surgeon's choice of procedure:

“if there is evidence of prolapse, urethrocele or a combination of the two then I initially approach the problem vaginally doing a standard anterior repair; if there is genuine stress incontinence and this is virgin territory in any other way and there is no prolapse then we'll do a Burch colposuspension. If there is recurrent stress incontinence and a failed previous repair then...” G2.1;1:6

“There are three procedures which can be used really for the stress incontinence, genuine stress incontinence. They can be the anterior repair, Burch colposuspension or the Stamey procedure. I use anterior repair generally when stress incontinence, genuine stress incontinence is part of a complaint in a patient in addition to utero-vaginal prolapse. So if I do an operation for prolapse, and if I'm going to do any operation for genuine stress incontinence I do anterior repair... On the other hand if I find somebody having genuine stress incontinence

without any evidence of prolapse I usually take the Burch colposuspension as the first method of choice to treat them. ...Stamey's operation I use when I find that the lady's very old, they find it difficult to stand the strain of the operation, or if the lady's very obese." G8.1;1:12

Alongside co-morbidity from pre-existing diseases or conditions, the surgeons also mentioned that the choice of procedure was influenced by previous surgical history. The clinical literature suggests that previous abdominal or vaginal surgery (notably hysterectomy) may be a causal factor in incontinence (Mommsen et al 1993). It also causes difficulties for operating due to the presence of older scar tissue. Scar tissue may be more difficult to cut and the surgeon may not be able to see anatomical landmarks as clearly. Similarly, the patient's age has an impact on the choice of procedure because of its impact on tissue quality. Hormonal changes associated with the menopause can alter the tissues so that the choice of operation

"really depends on who you are doing it on. If you are doing it on a post menopausal woman and she's got very thin vaginal epithelium and atrophic tissue they usually dissect very nicely." G2.1;2:4

"the determination of whether they get this operation is how much vaginal mobility they have, especially older ones." G2.1;4:5

The surgeons also indicated that their own preferences were a deciding factor in the choice of procedure.

"I don't do Stameys or slings at all. *[CP] Have you learnt either of these?* No. Although I'm aware that one tends to, therefore, send you patients to suit the operation. If I have someone who I think would be better for a Stamey I pass them to [a colleague]." G16.1;4:3

Some of the surgeons chose procedures because of the anticipated outcome:

"I perform a Burch procedure, or a Turner-Warwick, the difference would be if I feel that I'm going to achieve a very tight anterior repair with a Burch and have an immobile drainpipe urethra, or the possibility of [that, then] I'll perform a Turner-Warwick." G18.1;1:15

While others expressed their choice in terms of personal preference or enthusiasm:

“...the majority of surgeons, perfectly reasonably would prefer a colposuspension or if the patient is post hysterectomy and you’ve got stress incontinence they would prefer colposuspension. Now I’m different because I tend to get enthusiastic for vaginal surgery, unless the vagina is extremely narrow, and even then you enlarge it with episiotomy, unless the patient is post menopausal and nulliparous and you can’t get near it and a colposuspension is easier.” G14.1;2:1

Some simply felt that particular procedures were easier,

“the colposuspension is a very easy operation, for us very straightforward, akin to a prostatectomy really. So, it’s a doddle for us and the results seems to be very good.” U3.1;6:19

or more difficult,

“I do a vaginal operation simply because I’m more comfortable doing it than colposuspension, I found colposuspension is, it’s finikity.” (G14.1;4:18)

“I’ve had experience but not at consultant level of sling operations but I’ve never really wanted to do those. They seem to me to be very intricate and take a long time... [CP] *How did your chosen operation compare with the sling?* I think it is easier. I don’t think it’s more difficult. I mean it’s easier because I think you can, you are tying the stitches onto material which can hold the stitch.” G9.1;2:55

They also suggested that some operations seemed more logical or that particular procedures ‘made sense’

“the theory of course, if you believe it, is to restore the urethral anatomy, perhaps even elongate the urethra. The idea being that – if the theory holds - that once the urethra is in the abdomen then, in that way, you maintain the pressure distances. You maintain a high intra-urethral pressure, greater than the intra-vesicle pressure. You maintain the pressure gradient and therefore the continence. Well I think it works well and it makes a lot of sense.” G18.1;3:11

“a recent paper suggested we should use non absorbable [sutures]. I think that makes sense to me. It makes clinical sense” G3.1;2:9

Sometimes the nature of an operative procedure could affect how the surgeon felt about doing it. Anti-incontinence operations that sought to repair function were contrasted with operations where diseased tissue could be excised or removed. The latter were seen as easier. Some surgeons reported that difficult operations were emotionally uncomfortable and this emotional response affected their choice of procedure.:

“with these procedures it is difficult to be comfortable. There is no way I can look at the operations and say I’ve achieved that... You take something like cancer and you can operate and look and you can say you’ve taken it out, or done all I could but with these ops at the end point it might look alright, you still don’t know it will work.” G11.1;4:32

“I think I approach it with a certain amount of trepidation and circumspection.” G9.1;3:45

However, the same complex or difficult procedure could, for another surgeon, be seen positively:

“the more complicated the actual procedure I think for some people that is quite a, [pause] a high.” G2.1;6:4

In another case, dislike of a procedure was attributed to physical rather than emotional comfort and this influenced procedure selection:

“I get backache doing colposuspensions because I have to peer into the pelvis and the assistants like it even less than colporrhaphy because they have to heave like mad on the retractors... Given the choice I’d prefer to sit down and look straight ahead rather than stand up and peer down into the pelvis.” G14.1;4:22,52

The surgeons’ repertoire of procedures could vary over time. Individual preferences were not necessarily fixed and surgeons admitted that their views might change, with experience or with education. Perhaps the most striking example of this related to the use of prophylactic antibiotics, rather than the choice of procedure. This is illustrated by

the following discussion between two surgeons during a procedure being shown as part of a teaching day:

U1 asks U5 if he is using prophylactic antibiotics for this case. U5 says he is, although he does not use them for every case. He explains, 'I'm not very consistent on that, every time I read a new article in a journal I get confused and so sometimes I'm more pro than others, at the moment I'm fairly pro so this patient did have gentamicin.' U5.OBS1;2:10

A final variable constraint on surgeons was time. This was mentioned in the context of questions about ability to innovate and learn surgical techniques, but it also has consequences for the choice of procedure:

"[t]he thing is, in the NHS, if I can do a colpo in twenty minutes, or fiddle around with a laparoscope for two and a half hours, I can get four patients done instead of one and I'd rather get patients through. Theatre time is my problem." G17.1;5:49

### *The operative event*

The selection of patients and the choice of procedure are clearly dependent on a wide range of case, surgeon and external factors which vary. However, it is during the operative event itself that this variation really comes to the fore. This begins with the very first surgical manoeuvre, the incision to open the body. One surgeon explained that the size and depth of the incision varies in each case,

"depending on how much dislocation there is in the region of the urethra and normally with stress incontinence if I'm doing a repair for stress incontinence that will be right down to the external meatus." G7.1;1:22

As with patient and procedure selection, the physical characteristics of the individual case may be important. In this observed example, obesity is an issue:

The first case today is a needle suspension. The patient is physically large, and medically described as obese (her body mass index is 38). The surgeon explains that it will not be possible to perform a colposuspension because the patient is so

obese. There are some jokes between the surgeon and juniors about the patient's size during the operation. When the Pereyra needle is inserted the surgeon says 'there's such a mass of fat that I can't get it through. Normally there's no trouble but look at that...' He shows me a handful of the fatty tissue. Later when tying the sutures he says that he needs to tie up the whole area and make a bar across the vagina because of 'all of that pressure on the undercarriage'. G12.OBS4;1:3

In the interviews the surgeons suggested that variation in what they did might be measured around some norm or ideal of a normal case. This notional 'normal' practice was constantly adjusted to deal with each individual patient:

"then normally I do a Pfannensteil incision about that sort of length [holds finger and thumb apart to demonstrate two inches]. If the patient's fat a bit longer than that, if thin a little bit shorter..." G7.1;2:51

Patient anatomy varied with age, menstrual status (pre or post menopausal) and co-morbidities (such as prolapse). This necessitated varying one's surgical approach:

"I don't pull the sling quite as tight in a post menopausal woman as I do in a pre menopausal woman because post menopausal women tend to get more retention than pre menopausal women, presumably to do with muscle atrophy." G14.1;3:27

"I sometimes put three sutures in if they've got a quite a big prolapse" G17.1;2:4

"It's entirely related to the individual on the operating table and the quality of the tissues. If the first one [suture] is not any good then you do a second one, but sometimes the first is good enough...you find the tensioning process is a bit hit and miss." G5.1;2:5

Related to this last quote about suturing, previous surgery might alter the anatomy, thus making suturing problematic:

"...sometimes it is not possible to put three in, if they've had previous surgery, there may not be enough space for three stitches." U7.2;1:15

The surgeons claimed that success rates for anti-incontinence procedures were highly contingent on the quality of tissue. One operation - the Stamey procedure – was seen as especially dependent on tissue quality:

“everything hangs on whether or not you get good realignment of the vagina, the Stamey [operation] falls down because it doesn’t, the stitches don’t actually go through the vaginal tissues, it goes through these very flimsy tissues above the vagina and they don’t hold, they don’t hold anything” U3.1:3:15

Suturing techniques and dissection had to be varied to adapt to the tissue type and the demands of the individual case.

“I think one just has to vary it according to the tissue. If it’s thin and wishy-washy and weak then you are going to take another turn [stitch].” U8.1;1:30<sup>8</sup>

What the surgeon did in terms of cutting and suturing, depended on individual preference, instinct or ‘hunches’:

“I think I do a lot more dissection ...I see juniors and I see that they are not doing as much as I do and they have not been taught to do as much.” G11.1;1:39

“The only thing that can guide you is how much dissection you are prepared to think you can get away with.” G2.1;3:14

This rather nebulous instinct or ‘gut feeling’ may be guided by experience, by trying out manoeuvres and learning from past mistakes:

“I think it’s just trial and error. Prolene is a suture because it’s inert and I tried the Neurolon because I thought it would be stronger and it wouldn’t snap but it developed sinuses and was unacceptable so I’ve gone back to using Prolene.” G12.2;7:13

“it is not till you actually do a procedure for yourself, on your own that you discover all the difficulties... you have to make the mistake, make the errors to learn.” G2.1;7:55

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<sup>8</sup> The surgeon’s discussions about tissue quality are strikingly similar to the construction workers described by Clegg (1975) and the differences between the engineer’s drawings and the actual soil composition on a particular site.

These instinctive reactions might vary in different operations; sometimes things worked and sometimes, they did not:

“sometimes I do them and I think, ‘yep that’s a good result, I’m happy with that, I’ve got a good bite behind the symphysis and across’, and another I do and I think, ‘no I’m not happy with that’.” G21.1;6:42

The surgeon’s hands were also critical in surgical technique. They held instruments for cutting and sewing and were used for ‘blunt dissection’ (pushing or breaking tissues manually), feeling organs and ligaments and so on. For this reason, hand and finger size were often vital and, of course, these vary from one surgeon to another. In addition, differences in the presenting case may be influential:

“I do actually change to my own way on this, depending on... I’ve got rather short fingers, so if the lady is quite small I’m quite happy to do it with my fingers, but if she’s big then I don’t think my finger is big enough so I will use a swab on a stick.” U4.1;1:22

Similarly, being right or left-handed can affect choices:

“I then, being a right handed operator on the left hand of the patient insert two fingers and elevate the patient’s vagina, usually start on the patient’s right” G16.1;2:46

“I prefer to use my left hand, I’m right handed, so the fingers of the left hand go into the vagina and then the right hand can go into the abdomen.” G18.1;2:20

The surgeon’s sense of touch was central to the operative process. Many decisions during the operation were made on the basis of how tissues felt to touch. One referred to tissues that felt ‘alright’ (U8.1;2:55). Others indicated how each manoeuvre relied on touch:

“feeling for where the bladder neck is, and I dissect by blunt [manual] dissection down to the bladder neck . I palpate between my finger [in the vagina] and the finger in the cave of Retzius...I check that I haven’t got urethral bladder between my fingers... G4.1;1;10



“having identified the perineal membrane, which you can never see, but you can always feel, you’ve got to perforate it...this means putting your finger below the retropubic space.” G14.1;1:5

“I cut them with tenotomy knives from below which is quite tricky, but you can feel it, if you open up the vagina from below, and then out, and put your finger up by the bladder, you can actually feel the slings from below and you know where the urethra is and then you can actually cut.” U2.1;5:36

“it’s all in the feel, putting sutures up and putting your fingers against the bones and breaking through. It’s quite a difficult thing to do. It is very scary.”  
U1.1;3:33

The importance of being able to feel the body was highlighted during a discussion with a urologist about laparoscopic procedures. In these procedures an endoscope is inserted via a small abdominal incision and this allows the anatomy to be viewed on a visual display screen. Surgical instruments are introduced through a second small incision, so that the surgeon does not have to open up the abdomen. As a surgeon explained:

“the actual surgery has to be much slower, deliberate, defining structures have to be more accurate, it can’t be done by feel, which a lot of surgery has been traditionally, done by feel and touch. You have to develop a new type of feel and touch with your eye and that takes a long time.” G2.1;6:52

This quote indicates that as well as the sense of touch, visual perception is important in the operative event. Operations depended on surgeons seeing visual clues and recognising anatomical structures. One surgeon described how he dissected

“the bladder away from the vaginal wall so that the junction with the urethra and the bladder can be clearly seen” G7.1;3:39

Another surgeon, talking about laparoscopic procedures, underscored the importance of being able to see:

“you’ve got to fill this large chamber up with air and then you’ve got a cavity within which to work. In the extra-peritoneal space you don’t have that facility so you are never going to get a good view of things and as soon as you restrict your view you run into problems.” U4.1;5:21

In part, the ability to operate in such a way that the anatomy was clear was seen as a reflection of surgical skill. As one surgeon explained,

“a gifted surgeon is like a gifted pianist. They are just wonderful. Things never bleed, never go wrong. Tissues are always exposed. Planes of cleavage always appear. The operation looks easy.” G14.1;10:45

Nonetheless surgical skill might be challenged by an unforeseen or chance event, such as when this experienced surgeon was observed during a teaching demonstration accidentally piercing the bladder:

The surgeon checks the bladder using the cystoscope. He sees that he has put a stitch through the bladder. Comments that it is typical when an operation is being filmed to get a complication like this. The urine is bloodstained. The surgeon pulls on the second suture and establishes this is the cause of the bleeding. Gets the tweezers and unpicks the stitch. U5.OBS1;3:30

An external dependency, over which the surgeons had only limited control, was the type of equipment or ‘kit’ available in the operating theatre. This can affect the operation, either because it does not work,

“they got this kit in the hospital and I found it singularly useless” G7.1;8:1

or cannot achieve the desired result

“it needs an instrument which is too complicated to develop and I can’t do it on my own.” G3.1;8:4

Lack of access to equipment may be a problem, as was apparent early on in one operation observed:

Having made the incision the surgeon asks for what I hear as ‘divas’ and subsequently seems to be a type of ring retractor. The nurse looks for this piece of equipment. It is not on the instrument table. They then find out that this kit had been used by another surgeon in the morning operating session and had not come back from the main hospital block where it had gone to be re-sterilised. The operation continued without this equipment, and an alternative was used, although the surgeon makes several comments that he cannot get access to the abdominal space as easily. G12.2;13:44

Surgeons learn to adapt their operative procedures to utilise the available equipment, or as these surgeons explained,

“you tend to make do with what is there.” U6.1;2:7

“*[CP] Which needle do you use?* A single pronged needle, I tend to use what is available. If I think about it and look it up in the book then get the nurse will get a J150 or whatever.” U5.1;1:13

Sometimes working with unfamiliar equipment was a problem, as in this example for a surgical training day:

The surgeon is mid operation, and says ‘what I want to do is put in a retractor into this space here, it [the retractor] won’t close. It’s funny how on these training courses you always get given things you’ve never seen in your life before’. The scrub nurse says what this type of retractor is called. Surgeon exclaims, ‘Never heard of it! They use that in gynae? God, what are we coming to. Can I have a pair of magic scissors now...’ Later in the operation a problem arises with the anaesthetics and the surgeon suggests that the filming is temporarily interrupted. He gets more aggravated about the camera position and the retractor. He says ‘This bloody thing’s useless.’ The team perseveres for some minutes before swapping to another type of retractor. U5.OBS1;10:31

Further variation can be introduced to the operative event by the various surgical assistants, ranging from theatre nurses, junior surgeons and anaesthetists. The competency of an assistant can make a huge impact on the proceedings:

“I work with a nurse and we go through a whole operation without saying a word to each other, it’s just a question of, they know exactly what happens next, you see.” G7.1;8:14

“it’s extremely important not to have a dopey assistant. In my private practice I have a superb nurse, absolutely wizz kid, who does all my assisting and ties all my knots and she’s wonderful and we chat about wonderful things all the way through and she just follows one step after another. I’m lost when she’s not there.” G18.1;2:23

Any lack of speed, dexterity or precision can have adverse effects. In the following extract the reticence of an assistant is used for humorous effect during a teaching operation:

The assistant is asking the nurses for a thimble as he has been asked to place his finger in vagina as a guide for the surgeon's sutures. He seems concerned about getting a needle stick injury but there are no thimbles available. The surgeon laughs and says 'Where are you? You can't go away, you've got to trust me. [laughs again] I'm trying to find some decent anterior vaginal wall. One of the things you can do if you've got a rather whingey assistant like this one is...' He looks menacingly at the assistant and inserts the needle, apparently without getting the assistant's finger. There is laughter all round. U5.OBS1;12:4

Another external variable, which influences the operative event is an observer effect.

This is perhaps best described as a supervisory constraint, in that the trainee surgeon may be expected to alter the operative procedure in the presence of different teachers.

One senior registrar explained this contingency as follows:

"it depends on who you are working for but essentially I would do it[ colposuspension] with the patient in, with the legs up, lithotomy or Lloyd-Davies [position]...it is constrained a bit by who you are working for, or who is present in theatre. If they are not there then I'll just do it [midline incision], 'cos usually they're not. ...All three consultants do different things and you learn different things from different jobs." U4.1;1:2 and 4:17

One surgeon in the study was part of a surgical group that had adopted various standardised protocols as part of a reorganisation of patient care. This meant that a number of pre- and post-operative routines and surgical procedures had been standardised, so that all the surgeons followed the same guidance. This surgeon had modified his catheterising procedures although, as the quote illustrates, there remained some room for him to vary his technique:

"I have modified my catheter regime on two occasions since my original training. It's now modified to, I'll give you a copy of the protocol to show you what we have, because it is now standard for all the surgeons here... it's meant that people have to knuckle down and compromise, more or less. But if I choose

[I can] vary from that form, and then that variation will come to light and we will, perhaps redesign the protocol. It wasn't too difficult because we are, by and large, three permanent surgeons and at the moment, communicate fairly well, although they beg to differ on certain points, in techniques like this.”  
G16.1.3:5 and 7:25

## **Findings from the American data**

### ***Patient selection***

Like their English counterparts the American surgeons described case dependencies in their selection of patients for surgery. Co-morbidity was cited as an important variable :

“The ones I worry about most are the smokers, but only because as a fellow in X we had a lady break her sling on the table, coughing. We started to extubate her and she started coughing halfway round the tube ...all you can do is do it again.”  
USU1.1;15:25

An interesting extension of the case dependency category was found in these data. This was the inclusion of psychological co-morbidity as a determining factor. This came out of an interview with an urologist:

“The only other people I've put off is, I have another woman who is truly nuts. We insisted that she have a psych consult for two things. One to make sure - she's a head injury patient - we wanted psychiatry to say she was capable of signing consent, and our risk management people and our legal department, we talked to them about it. ...My concern was that she couldn't remember from one day to the next and she had to cath[eterise].” USU1.1;25:10

In the context of cases which did not involve anti-incontinence surgery, patients with addictive disorders were also seen as difficult in this way. The following case was described during a period of observation:

The surgeons discuss a patient to be brought in the following week. Dr E wants to bring the patient in the day before and keep her on clear fluids pre-operatively. She explains that this patient 'has been a bit of a drinker' in the past and it is not clear whether this is still the case. The patient has a nephritic kidney, which has to be removed. As part of annual re-certification for the Board Dr E has to compile a log of all her cases. The Board examines complications and cases which were problematic in some depth. Dr E suggests that it is important to manage complications well and demonstrate that attempts were

made to avoid complications. Cases like this one, because of the added risk introduced by possible alcoholism, are potentially damaging to the surgeon's record. USOBS3.1;3:12

As in the English data the surgeons also mentioned that older patients, and therefore older tissues, were problematic. This might be a reason for choosing not to operate, although many older women were operated on, as in this case:

The patient is a 74 year old. Dr F explained that this patient has 'tied my hands'. She is one of his long-term patients and has somehow persuaded him to operate on her. He claims that 'if she hadn't been one of mine I might not have gone to this, were she not a patient of mine.

Later in the operation he demonstrates the sacral ligament – explaining that it is not good 'but it's the best she has'. Dr F tells the junior surgeon assisting that the patient's 'internal tissues are as bad as her external ones. When the Lord gave her to us he gave us nothing to work with'

In a later case that day Dr F explains that one of the problems in gynaecology is older women having babies. He explains that the term elderly primipara was 'a signal to the OBGYN [surgeon] that this was going to be less lax tissue' and that an episiotomy would be required. USOBS1.1.1;31 and 4:45

### *Procedure selection*

Co-morbidity was also an important factor to consider in choosing a procedure. A surgeon explained that she did sling operations,

“on women who want a durable repair and women with COAD [chronic obstructive airway disease] or asthma in big time smokers, and in women who are really athletic.” USU1.1;6:15

Another recalled poor operative results in a case, related to co-morbidity,

Dr C is suturing near the bladder neck. She begins to tell me about a sling which got infected. She explains that the patient concerned was obese and a smoker. She feels this was the cause of the problem. USOBS1.2;4:35

In contrast to the English data, the American surgeons often referred to symptom severity grading systems to justify the choice of a particular procedure:

“I do them for specific indications, patients that have damage type 3, low pressure urethras and on occasion I will do them for someone with recurrent SI even when their urethral pressures are adequate, if they are a heavy smoker, or engaged in heavy activity that they are not going to stop doing.” USG3.1;9:2

Another key difference between the English and American data was the role that patient preference played in determining choice of procedure. American patients may be asked to choose from the range of operations available, although as in this case some direction may be given as to the appropriate choice:

“A physician, a good physician will usually tell the patient that in my hands this procedure has the best outcome. I could just do an anterior repair, but if I do a Burch on you then there’s a good possibility it’ll last 10 years and 15 years or the rest of your life. So the patient is presented with that choice.” USG.2.1;6:45

The surgeon’s operative choices may be predetermined by an earlier patient request:

“I will also do slings in women with type 2 who really want a durable repair. The kind of woman who says I really don’t want to come back here in five years.” USU1.1;6:5

In this example the patient would have a procedure which was not determined by the severity grade (for which this surgeon typically performed another procedure) but by the patient’s demands. The choice of procedure was a question of careful balancing of patient and surgeon preferences, and particular circumstances (expressed in the next quote as ‘the need of the patient’). For this surgeon the operative approach (vaginal or abdominal) depended on these factors:

“it’s a combination of abdominal-vaginal or through the skull depending on the circumstance and the need of the patient. I would be more happy to fix everything through the vagina... I tailor whatever I do to that particular patient. I would be much more happy to fix everything through the vagina.” USG1.1;2:35

While the USA fieldwork was limited and generalisations cannot be pushed too far, it may be that the absence of a similar example of patient preference in the English data is

indicative of the endurance of the bureaucratic mode posited by Strong (1979).

Comparatively, the UK patients appeared to be given less information about surgical alternatives and there was a correspondingly lower level of interaction with surgeons about treatment. The patients in the USA in contrast, seemed to be more involved in decisions about treatment options<sup>9</sup>. The surgeons' response to patient preferences in the USA do not necessarily mean that patients have or indeed, exercise completely free choice. On one occasion an American patient responded to a long speech about the surgical options by saying "well you know best, Doctor". It is clear from other work on surgeon-patient interactions, such as Silverman's study (1987), that the doctor's communication, whilst seemingly presenting options, can effectively convey the clinician's preferences.

The American surgeons tended to have a broader surgical repertoire than their English counterparts. In particular they were much more likely to use sling procedures in addition to the operations used in England. However, the technical demands of this procedure meant that it was chosen for selected cases only:

"it's a great operation but it's technically more challenging and that's why I reserve it for certain patients..." USG3.1;11:54

Two surgeons suggested that the range of procedures used might be limited by specialty:

"Well urologists by definition don't have a vagina to work with. They don't learn to operate through the vagina because [most of] their patients are male and

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<sup>9</sup> This seemed to be true for both patients paid for by traditional health insurance and covered by HMO (Health Maintenance Organisation) prospective payment, although the data are limited.



they don't learn vaginal surgery. It's a much different approach. The pelvis of the male and the pelvis of the female are different. There are different structures there. The male from birth is destined to be retentive of urine and the female is destined to be incontinence of urine. Urologists have not taken care of women through childbirth, ageing, menopause, um, so their approach by consequence is different and they fix things through the abdomen. Gynaecologists learn quite easily and quite quickly how to work through the vagina. They deliver their first baby as one of their first experiences and they can be doing vaginal surgery..." USG1.1;1:32

"I think anyone can do it [anti-incontinence surgery] who is comfortable operating in the pelvis and the vagina, and I think if you are not comfortable you should not be doing it. I have heard a gynaecologist say 'I don't like being anywhere near the space of Retzius, it bleeds too much'. Fortunately that gynaecologist isn't doing any anti-incontinence procedures and they shouldn't with that attitude. They're a little more cavalier in the vagina. I was impressed to see them do a cystocele repair 'cos they don't hack, that's the wrong word, they kind of use the scissors a lot more and the knife they kind of do ch ch ch [demonstrates slashing action], but we kind of carefully push it backward with the... It's just they are more used to it and they don't seem to mind the blood from the vaginal mucosa as I would mind it." USU1.1.16:32

How far this is an accurate reflection of specialty differentiation is difficult to assess.

However, one interesting event observed suggested that there was some, clear demarcation between the specialties. This was an occasion when both specialties worked together on the same case in the operating room. Dr A (urologist) joined another surgeon (gynaecologist) in theatre.

We find out that the Raz procedure will not be coming into theatre 10 because it is a joint procedure with gynaecology. The gynaecologists are to perform an hysterectomy. Dr A has been told when it is expected that the hysterectomy will be complete and we go to OR 10 at about 1.45 to see how it is progressing. By 2.15 the hysterectomy is complete. There is lots of blood on the floor which we are warned about. A rectocele repair is to follow which the gynaecologist does. Then Dr A takes over to perform a Raz suspension procedure. The gynaecologist leaves briefly but is bleeped to come back in time for the end of the procedure. Dr A says thank you to the gynaecologist. USOBS3.1;7:4

### *The operative event*

Techniques used during the operation were case dependent:

“...my incision depends on what else I’m doing. If I’m just doing a suspension I’ll do two lateral incisions and it’s sort of as if you were going to make a U shaped incision on their anterior vaginal wall but I don’t actually make the cross bit of the U...but if I think I might have to do a form of cystocele repair...then I use a midline.” USU1.1;9:25

They were also dependent on tissue quality and on tissue. Good tissues are those which dissect easily, or hold a suture without tearing, and are contrasted with poor quality tissues. The comments by Dr F (page 62) demonstrating that a poor sacral ligament in an elderly patient is a case in point. The effect of previous surgery, in producing scar tissue that is dense and difficult to dissect, was another variable factor:

“sometimes it depends on their other scars, sometimes we go in through an old scar, if it’s very scarred sometimes we’ll completely avoid an old scar ...occasionally in someone, particularly who had a Marshall [operation] in the past or a Burch there’ll be a lot of scarring, dense scarring in there and sometimes you can sort of, hopefully you can do it with blunt dissection but occasionally you may have to use Metzenbaums’ in there just to sort of free things up.” USU1.1;2:11, 54

Often the individual anatomy was unclear. Standard medical terminology was inadequate in the face of this source of variability as this quote indicates,

“the pubo-urethral ligament is really not a ligament, it’s a condensation of connective tissue and anatomy can really vary from patient to patient depending on what she’s had, previous surgery or not. So it’s a lot more vague I think, where a surgeon, what they are gonna find, and where they are going to end up putting the stitch.” USG2.1;7:1

As in the English interviews, the surgeons talked about the importance of seeing and feeling the anatomy:

“it’s very subjective. I sort of do it by what I feel from below.” USG2.1;2:44

One surgeon described how she gauged her dissection

“Then dissect down using the cautery to the rectus fascia, and ideally you like to clean off a piece of rectus fascia so you see a good inch of fascia maybe a little more, wider. Then I take a Stamey needle and first I’ll just pop it through the rectus fascia and then sort of, aiming it at what, towards the vagina with my

finger in the vaginal incision I'll push it through. When I put my finger through after I've popped the endo-pelvic fascia with the scissors then I put my finger in and bluntly dissect any attachments that I can feel off the pubic bone and what you should almost be able to do is put your finger in your vaginal incision on both sides, you could feel up to the urethra, round the top...it feels like the urethra is just hanging there"USU1.1;10:5

Later describing this process of dissection this surgeon said

"That's probably kind of an eyeball thing. I don't know if there is a right way to assess it" USU1.1;12:17

In common with the English surgeons these surgeons said that differences in hand size led to variations in technique:

"I can always put one or two fingers under [the sling suture] but I think my fingers are a little bit smaller too [laughs]." USU1.1;5:37

A lot of the decision making depends on the unique circumstances which the individual case presents, and what it is physically possible to achieve:

"normally just one [suture] at the top, it really depends how it seems at the time... I put them into the top of the symphysis if I can get in there, occasionally I'll leave it and actually put it to the back of the rectus fascia, you have to start to close things almost and then put them in.... Sometimes if I'm having a lot of problems getting everything to come up I have the assistant put a sponge on a stick in the vagina and push up." USU1.1;3:45 and 13:29

Another surgeon suggested that surgical success was dependent on surgical skill in 'getting' this unique anatomy

"the variability in failure rates for anterior colporrhaphy is that it depends on what tissue people are getting, and people who take care to get that tissue that's on the back side of the symphysis ...they have very high success rates ...and I think it's a choice of suture but mostly I think it's getting surgical landmarks." USG3.1;3:1

The surgeons frequently cited instinct as the source of their decisions about what to do next. One articulate surgeon described it using these metaphors:

“it’s like the soccer player knowing when to use his head and when to use his foot to kick the soccer ball in. But there comes a time in a soccer game when the ball is in the air and the ball is somewhere between his belly button and his foot. He’s never been taught to use his knee but yet he’ll instinctively hit the ball in the goal with his knee. It’s not in the rules, not written you are supposed to use your knee, you just know. ...I don’t know where it comes from, instinct maybe. It’s something that can’t be taught. With some people they just don’t tell you how to, you know, ‘how did you do it?’ They say, ‘it felt right, just something about it’. Who knows what visual clues your mind is reading that are not really coming out, like ‘hey, there’s a bleeder there’. Who knows what you’re seeing, what’s all the stimuli, all the visual things that are going into your brain at that moment and coming out and telling you ‘hey slow down there’s a pothole in the road’.” USG1.1;10:17 and 11:2

They also talked about procedures making sense anatomically,

“I’ve modified that procedure to how I feel comfortable with it. But I think it really is the future of retro-pubic operations, because it makes such anatomical sense” USG3.1;8:14

“I modified the operation] a little bit...one of the changes I made is I now place the two arms of the suture for the Burch through Cooper’s ligament and then tie the knot on top. I think that makes sense.” USG2.1;5:32

However, a procedure could be justified by instinct even where the apparent aim of the surgery, such as permanently moving anatomical structures, did not seem to pertain:

“I shouldn’t say intuitively it doesn’t feel right. It feels right in that you know you have lengthened the urethra. People might say, ‘so what?’ lengthening makes no difference. But I feel that the bladder neck begin above the pelvic floor is important because it’s subject to the same pressures that the bladder is subject to. So intuitively it makes sense to do it that way, but in terms of how well it’s really staying up in the back of the symphysis, I’m not really sure.”  
USU1.1;14:10

One surgeon suggested that for all the emphasis on suturing to specified ligaments, actually the unintended consequences of surgery were paramount,

“I have a hunch that this is one procedure where you really need to let everything scar in and heal, so we’ll see.” USG3.1;8:49

In addition to these intuitive responses, these surgeons, like their English counterparts, mentioned that their emotional approach was also an important factor in the operative event:

“I sweat it out every time. It’s in my nature to do that. I worry about my patients a lot but I have very low complication rates.” USG3.1;16:38:2

One of the striking differences between the USA and UK surgical settings was the amount of surgical equipment available. The English surgeons typically worked with a single trolley or table of equipment and might have limited duplicates of some tools. In contrast, their American counterparts had three or four times more equipment available to them, often on separate instrument tables which were wheeled into position at different phases of an operation. The two countries also differed in terms of the type and age of equipment used. The USA surgeons had access to more modern equipment, ranging from disposable instruments through to surgical lights worn on a headband to direct light into the surgical field. This contrasted with the UK situation where most equipment was re-usable and somewhat older.

Although there was more equipment this did not seem to reduce the contingencies associated with its use. Several of the sites visited had, or were moving towards, surgical supply contracts, which tied them to a single supplier and restricted access to equipment from other sources. The American surgeons had to be just as adaptable as their English colleagues are as this extract shows:

C makes two attempts to insert a disposable trocar to facilitate pumping CO<sub>2</sub> into the abdominal space. Dr B takes over and manages to get it in place. Trying to pump gas in and the machine measuring the flow is not responding. The supplies rep is here watching. Dr B is unhappy with the trocar and asks for the old reusable one. Now the gas goes in. The trocar still isn’t in the right place so a

different disposable one is used. Dr B says to the representative of the equipment company, 'Marie, I'm just not impressed. I'm not getting at you, I'm trying to be honest here. I'll give all your tools a try but this isn't working.' USOBS2.1;2:30

Another surgeon reported that the main reason for taking up a post in the USA, was the lack of up to date equipment in the equivalent institution in Canada. USOBS.3.1;2:42<sup>10</sup>.

The quality of assistance during the operative event can also make a huge impact on the proceedings. One of the American surgeons, recounting his operative mistakes stated,

"we only got into the bladder on four occasions. The four occasions were two days, once last year, once about 1983, both two new residents, both because I let them make the incision and they made it a little bit deep and I thought they knew what they were doing." USU2.1;4:4

The operative event is conditional on all these different variables – the patient's history, presenting anatomy, the surgeon's perceptions and instincts and the surgical resources and environment. In any one operation some features may be more important than others, and variables will interact differently. The following extract taken from the notes of one afternoon's observation of an American operating room illustrates this point. Those present in the operating room were Dr B (attending surgeon, status equivalent to UK Consultant); C, a student/junior equivalent to SHO; scrub nurse; circulating nurse; the anaesthetist and the researcher.

The first, midline, incision is made on the patient's abdomen just after 12.00 by C. She is not very precise in her cutting and seems hesitant compared to the other surgeons I have watched. Dr B is telling her how to use the diathermy (high frequency alternating current applied to tissue to cut and burn).

... an abdominal hysterectomy is performed, but it takes some time because Dr B has to explain each step of the procedure to C who appears somewhat slow. As

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<sup>10</sup> The American hospitals studied were all major teaching institutions. Differences in the amount of equipment available may well be a reflection of this teaching status rather than of typical surgical practice. The different payment system allows the cost of equipment, especially disposable items, to be offset against surgical fees.

they start the Burch they hit problems and Dr B becomes more agitated and concentrates harder. (In the previous operation there had been conversation and some joking about a pop quiz and comment on Dr B's 'advanced years' - he is in his late thirties). They are having problems getting through the tissue near the bladder. Dr B says "I've never seen scarring like this, it's like cement" as they attempt to cut through with scalpel and diathermy. There is a brief crisis about the number of swabs which the scrub and circulating nurse are counting. On the third count they account for them all.

...At 2.25 the operation is still proceeding. The amount of blood loss in the abdominal cavity seems to be causing some problems for visibility. The bladder is punctured unintentionally and Dr B decides that he will not be able to perform a Burch procedure and says that he will do a Mayo stitch instead. He looks into the abdominal cavity and remarks, "Gee, I can really tell why I went in the bladder." Then to C he says, "we need to get her dry... make sure her bladder integrity is okay."

... By 3.00 Dr B and C are still dealing with the suturing in the bladder area and are creating a woven effect with several running threads. Throughout this phase of the operation there are lots of glove changes as each time Dr B puts hand into the vagina to support the suturing he 'dirties' the glove which is changed when he goes back 'on top' and has both hands in abdominal cavity. (This procedure of glove changing seems to be unusual, not witnessed in UK and derided by urologists at other US site). Dr B is having quite a tough time with C. She is concerned about tangling the sutures and is not able to assist in the vaginal manoeuvres and is not swabbing the abdominal cavity enough. Dr B is working 'one handed' (he later uses this phrase to refer to this situation) and by 3.20 is complaining that his hand aches. No one is talking anymore in the OR and the only voice is Dr B issuing instructions. At one point he takes the suture clamps away from C saying this is "'cos you are thinking he's getting grisly and if I break that now there'll be more."

At 3.35 Dr B decides to take out two of the sutures and go back to original plan of doing a Burch. C is not holding the clamps properly. Dr B has to swap sides by walking around the patient. At 3.55 Dr B becomes irritated as C loses the tension in the sutures she has been asked to hold taut by pulling away from the patient. She says "I don't know how it happened" to which Dr B retorts, "I don't know how it happened but it happened." It's now 4 hours since the operation started and my legs ache and I have been able to sit for part of the time. Everyone appears drained and tired. Dr B does a stitch and suddenly a load of saline shoots across the room and the scrub nurse has to change her visor. Dr B apologises.

At 4.10 Dr B asks for an 18 Foley (catheter). There are none in the OR so they have to send out. Then Dr B changes his mind and gets another size. The catheter is inserted and the bladder is irrigated with saline and Dr B and C begin suturing to close.

By 4.45 they start closing the abdominal incision. We leave theatre at 5.30. USA  
USOBS.2.1;4:23-5:36

This excerpt provides a somewhat extreme example of a lengthy operation that combines case, surgeon and external dependencies. It illustrates the ‘messy’ and variable nature of surgery. The operation was affected by, among other things

- aspects of the individual case, such as the quality of patient tissue (scarring “like cement”)
- the responses of the surgeon - altering the surgical procedure during the operation (from Burch to Mayo and back to Burch).
- the quality of the assistant (lack of speed, dexterity) and lack of equipment (the Foley catheter)

As well as being conditional on these three factors this operation highlights an additional dependent feature of surgical work, namely chance. In performing this procedure the surgeon accidentally perforates the bladder. The surgical trainees mentioned in the previous quote, managed, unintentionally, to do the same thing. Surgical practice also depends on these types of accidental and unforeseen events. Such events do not neatly fit into the three categories of dependency already developed. Surgical accidents are at once unique to the individual case, linked to the surgeon’s actions, and a feature of the environment or resources external to the patient and the surgeon. The term *contingency* allows these serendipitous features of surgical work to be incorporated into the conceptual framework. It is not just that surgical practice is dependent, it is also subject to chance.



## **The nature of contingency in surgical work**

The term contingency captures this sense of chance ('that which may happen') in surgical work and its conditionality on a range of case, surgeon and external variables.

The contingencies associated with each case centre on the interaction of the surgeon and a particular patient. Conditional features of an individual case – ranging from previous surgery and co-morbidity, to patient preferences determine decisions made at each operative stage. Chance events also play a part, for example, the patient who coughed and undid her sling sutures (page 61).

Surgeon contingency is slightly more complex. It refers to contingencies arising from the past socialisation, experiences, sensory responses and abilities that the surgeon brings to the situation. The operation, and the decisions about which procedure to use and whether to operate at all are conditional on the surgeon. The surgeon's disposition is central. Mouzelis's work on practice describes dispositions as 'generative schemata of action' and 'a system of predispositions'(1995:102-3). He suggests that dispositions play a part in determining the outcome of action. Bourdieu (1990) has used the concept of habitus to similar effect. He argues that habitus

“ensures the active presence of past experiences, which, deposited in each organism in the form of schemes of perception, thought and action, tend to guarantee the ‘correctness’ of practices and their consistency over time.”  
(Bourdieu 1990:54)

This concept is perhaps best explained in Bourdieu's description of learning a foreign language. He argues that in the process of acquiring a first language one is already equipped with the habitus to learn another: we have “an already constituted disposition”

(Bourdieu 1990:67) - an understanding of rules of grammar, sentence construction and so on - which enable us to confront a new language. This concept has links to earlier theorising by Schutz (1954) about the ways in which actors determine 'the problem at hand' by drawing on experience, interests and biography to determine their response to a situation. Yet surgical practice is not solely determined by disposition. It is also dependent on the surgeon's sensory responses (such as to visual stimuli) and sense of touch. Surgical work depends on the surgeon being able to discern a ligament, recognise good tissue or feel where to place sutures. This is typically learnt from experience. As Atkinson has shown, medical students 'learn' to read x-rays: responses to a monochrome film are not necessarily obvious, rather students have to be trained, or shown how to 'see' organs and abnormalities (Atkinson 1981). Surgeon contingency encapsulates these ideas about disposition/habitus and sensory perception and denotes those variable features that the surgeon brings to the practice of surgery.

The third type of contingency relates to factors external to the surgeon and the patient and includes such things as availability of surgical equipment<sup>11</sup>, or the quality of assistance provided during the operation. Patient and procedure selection can depend on the availability of urodynamic testing equipment. The success of the operative event may be conditional on having a good assistant. As the examples above have indicated, it may also depend on chance events, the absence of a piece of equipment because it

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<sup>11</sup> Although there was a striking contrast between the UK and US surgeons with regard to their access to equipment, in both settings equipment can be viewed as contingent.

happened to be used by another surgeon in the previous operating session, or the failure of a new disposable instrument.

These data suggest that case, surgeon and external contingencies run through all three stages of surgical work. They can be presented in a three by three matrix (see figure).

*Figure: Three types of contingency in surgical work*

Stage of surgical work	Contingency		
	Case	Surgeon	External
Patient selection	X	x	x
Procedure selection	X	X	x
Operative event	X	X	X

The thesis contends that all three types of contingency occur in each surgical phase, but some contingencies appear to be more important or visible at some stages than at others.

This relative importance is denoted by the large Xs in the table.

The surgeon's decision to operate is predominantly contingent on the case. It appears to be carefully tailored to the individual patient. The variable features of each case which can influence this decision include the co-morbidity, medical and surgical history, age, parity and, in the US, patient preferences.

The selection of operative procedure appears to combine case and surgeon contingency.

The sorts of disposal decisions made by the surgeons in this study mimic the personal rules of thumb found by Bloor (1976) and Silverman (1987) in their analyses of surgical decision making. Patient variables (for example, severity, symptom history, associated conditions) are again decisive, but the surgeon's own preferences, for particular procedures, affect which operation is chosen.

The operative event is highly contingent. It depends on the particular configuration of a unique case with an individual surgeon at a particular moment. External contingency is also explicit at this stage as the operation depends on the actions of assistants, and on the equipment available<sup>12</sup>.

The surgeons recognise contingency in their work. The particularities of the case and the surgeon influence their practice:

it turns out that, examining the patient now under anaesthetic that she has a vault decent problem [prolapse] not previously apparent on vaginal examination. The surgeon explains that this means that they cannot do the planned para-vaginal repair. He remarks that this calls for versatility on the part of the surgeon, an ability to change his mind in the face of change. USOBS.1.1;1:42

“I think we both do our own operation, what is called a colposuspension I'm sure will vary up and down the country and within any one unit, to a greater or lesser degree...I can't assume that everybody is doing it like me, God Forbid!”G16.1;7:35

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<sup>12</sup> Initially it seemed that external contingencies only occurred during surgery itself. However on reflection constraints on equipment and other resources occur throughout surgical practice. However in the operative event this dependency is commented on, and its immediacy is apparent. In contrast during patient selection the absence of resources, or other external constraints are so embedded in the organisational life that they are not mentioned or noteworthy, and thus disappear from view.

“You know, not all anterior colporrhaphies are created equal. What we do, and what the next gynaecologist will do using chromic, which is put in a couple of Kelly type sutures, that’s not an anterior repair...” USG1.1;5:39

“one has to accept that no two surgeons do the same procedure exactly the same. We’re not automatons and we’re not robots... In reality an anterior repair is as individual as the individual that tackles it, wherever you get variables like patients, it’s not like mending your TV where it’s the same procedure, you take your bit out and put another bit back, the same bit every single time. It isn’t like that. It never will be.” G2.1;9:15

Contingency in surgical work creates and sustains variation in practice. It also makes the assessment of surgery highly problematic:

“the thing is that you are bringing up a very important point, what are all these things like in the hands of an average person? And is there an operation that is better in the hands of an average person? That I think is very very difficult to assess, the reason it’s difficult is there are so many variables.” USU2.1;15:47

“whatever they say is coming from various studies the fact remains that a surgeon might get better results with one particular procedure because he’s just good at it, so it doesn’t represent the true difference in results for the procedure as such.” G3.1;4:35

“they [two experts in published paper] are putting permanent suture on the Burch colposuspension, they are using four sutures and they are probably, I don’t know what their anterior repair was, it is so variable. I don’t know what an anterior colporrhaphy is, I have no idea, most people tell me that’s exactly what they do.” USG1.1;4:53

## **Conclusion**

Contingencies are at once conditional features and circumstances or incidents that *may happen*. The concept of contingency is particularly apposite because it captures not only the conditional character of practice, which depends on a host of variables, some of which lie outside the control of the surgeon, but also, crucially, the serendipitous or chance nature of surgery. This chapter has shown that case, surgeon and external contingencies are features of surgical practice, running through the decision to operate,

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## Chapter 5: Learning to practice

### **Introduction**

Chapter 4 has explored the nature of surgical work and looked at the sources of variation in what surgeons do. This chapter looks at how surgeons learn to practice and to deal with contingency in their work. It draws on data from the surgeons' accounts of how they learned to perform surgical procedures for stress incontinence. Much of the chapter is concerned with the surgical apprenticeship, the period of specialist training during which a junior doctor is assigned to work with, and to learn from, a senior experienced surgeon. The chapter also presents data about how surgeons acquire further surgical skills and learn new operative techniques once the apprenticeship part of their training is completed.

To set these data in the wider context of medical education, the chapter begins by briefly outlining the formal education which surgeons receive.

### ***Surgical training***

In the UK, doctors spend five years as undergraduate medical students. This is followed by twelve months as a pre-registration house officer, and two to three years as a senior

house officer 'rotating' or moving through a range of medical and surgical specialities<sup>1</sup>. By the end of this period, and on becoming a registrar, the individual begins to specialise, spending longer periods working in those specialties relevant to his/her chosen field. During this time there is an expectation that the surgeon will pass the first part of the relevant Royal College examination. One examination, the FRCS is set by the Royal Colleges of Surgeons (in London or Edinburgh) for surgeons, and for obstetrics and gynaecology there is a separate qualification awarded by the Royal College of Obstetricians and Gynaecologists, the MRCOG. In recent years many gynaecologists have chosen to take both the RCS and the RCOG examinations. After approximately two years as a registrar the surgeon becomes a senior registrar - effectively a junior consultant - within the specialty, and seeks to gain full College fellowship/membership by passing a second examination.

The system of medical education in the USA is slightly different in that students enter medical school after four years of undergraduate college education. Medical school training takes a further four years and is followed by four years training called the residency. The initial year, in the past referred to as the internship, but now called postgraduate year one, consists of a general year rotating through different specialties

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<sup>1</sup> Dowie R. (1987) *Postgraduate medical education and training: the system in England and Wales*. London: King Edward's Hospital Fund for London provides a more detailed description of this training, although it is now slightly dated. As well as various revisions to medical education at undergraduate level, in response to the General Medical Council's (1993) *Tomorrow's Doctors* there have been changes to postgraduate training to bring the UK into line with the rest of the European Union. The registrar and senior registrar grades have recently been merged to form a single specialist registrar grade. In addition, postgraduate education has been extended by the introduction of continuing medical education (CME) for consultant grades.



after which a single specialty is pursued. After the residency period additional specialist training may be acquired in the form of a fellowship, usually for three years.

The early pre-clinical period of medical school focuses on the basic sciences of medicine, such as microbiology, pharmacology and anatomy, and alongside these subjects medical students are taught some social science. During the subsequent clinical period, they are introduced to the skills they will need in order to communicate with patients, examine them and take medical histories. ‘Hands on’ experience of surgery, and responsibility for patients, comes in the later period of training and in the years immediately following graduation. As house officers (or residents in the US) they may observe procedures, and learn to assist with suturing and basic surgical tasks such as suctioning blood from the operative site. As the doctor becomes more senior s/he engages in more surgical work and more complex procedures, and eventually performs surgery alongside, or supervised by, the consultant (attending) surgeon or experienced senior registrar (resident).

### *The data used in this chapter*

Questions about learning and teaching surgery were included in the interviews with surgeons. Initially these questions focussed on learning at consultant level, specifically looking at how new procedures and operative techniques were acquired in the years beyond the formal medical training described above. Discussion about the process of learning to practice surgery frequently arose during the interviews without much prompting, as part of the surgeons’ accounts of their operative technique. As they

described the surgical incision, the suturing technique and so on they also recounted how and from whom they had acquired knowledge of these procedures. The surgeons referred both to recent learning experiences and their formative surgical training, which for some had taken place thirty or forty years previously. This was often interwoven with biographical information and details about their own careers: 'I learnt this from X' was part of the story the surgeons told in response to questions about how they worked. In addition to these data, the fieldwork provided various opportunities to observe the surgeons teaching their junior staff, in clinic settings and in the operating theatre.

The data analysis for this chapter focuses on the two periods of learning identified above – the surgical apprenticeship and beyond. A number of factors emerged as influential in learning to practice. These included the role of other surgeons, masters or experts and colleagues, the quality of surgical teachers, and the value of practising or doing procedures oneself. The chapter uses these data to outline two models of learning and to discuss how different approaches to learning enable surgeons to deal with contingency. As in chapter 4, the English data are presented first, looking firstly at the surgical apprenticeship and then at learning beyond this formal period of training.

## **Findings from the English data**

### ***The surgical apprenticeship***

The surgical apprenticeship is a central part of learning to practice as a surgeon. It is the period when the trainee surgeon works alongside an experienced consultant surgeon. As house officers and senior house officers, doctors may work alongside consultant

surgeons and have opportunities to learn basic surgical techniques, as this surgeon explained:

“Basically I suppose I learnt most of my vaginal surgery when I was a houseman at D, where I worked for a variety of surgeons, well all the surgeons, ten in all. I ended up working for them all. And I was also fortunate in that one of the registrars used to take me through operations. I did no operating there unsupervised and had the advantage of seeing a great many different techniques.” G7.1;4:25

However it is really only once they have chosen a surgical specialty, and become registrars (and later, senior registrars) that more advanced skills are acquired. Many of the surgeons said that they had learnt how to perform anti-incontinence procedures at this stage of their training:

“When I was a registrar I worked with X at Y and saw slings etc.” G21.1:1:20

“That operation that I learnt, a modification of the Burch, I learnt with A at B, in 1977. He supervised every case I did for 5 years.” G16.1;1:20

The surgeons suggested that seeing these operations performed by a master or experienced surgeon was central to learning how to do them. As apprentices (registrars) they gained surgical skills by imitation, by working alongside the master surgeon, by seeing operations being performed, and, crucially, participating in them:

“I learnt it when I was a senior registrar, watching my consultant. That’s where I learnt the basic technique... My first colposuspension, mm, I watched one, was taken through several with the consultant operating and she then told me to put the stitches in, ‘you do this bit’, and then I did one with her and she thought that was fine and then I did them.” G2.1;4:45 and 8:13

“I think it’s quite a difficult procedure to learn. I went to see Mr A do them and I watched him do two and then I did the third one with him, and then I started doing them.” U7.02;3:50

Surgical teachers were an important influence on surgical practice. They provided a model to be emulated and had a lasting impact on all aspects of surgical work, from using a particular type of suture material to ways of holding surgical instruments:

“it’s very strange, I never quite realised it but while I was working with T. He does things in a particular way and yet when I started to operate, and use these instruments I was almost using the way he did things. They’d come into my hands somehow, never having done the thing necessarily with him... It’s amazing how you can imitate and that imitation is terribly useful, because of course, if you watch people who are very good surgeons, you can pick up some of their techniques.” U1.1;8:39 and 9:3

“from the time I was a registrar I was taught by somebody who was really keen on the repair part and he said, ‘the repair, the vaginal work, if you don’t repair that really well then it’s not worth doing it. The patient should not come back’.” G8.2;4:16

One surgeon claimed that he never used surgical scissors in an operation because he’d worked with a consultant

“who said, ‘Never use scissors’. He used to say ‘Scissors are for women, knives are for surgeons’. So I always use a knife.” G14.1;7:26

The quality of the teaching in the apprenticeship was important:

“I worked for one guy who was probably the best surgeon I’ve ever come across, really brilliant. I haven’t seen anything like him again. I don’t think I will. I had done no surgery before that and sort of picked everything up from him and I think that made a big difference to my training. I owe everything I learnt to him, or the way I learnt it.” G3.1;8:45

Learning alongside a surgeon who was confident or comfortable doing a procedure engendered the same response in the learner:

“She [teacher] is a very good surgeon and I felt very comfortable learning with her and I have continued feeling comfortable doing the procedure.” G18.1;5:1

Just as being taught by an enthusiast or expert made a difference to how well the procedure was learnt:

“I learnt a modification of the Burch colposuspension with S... Sort of the root training for colposuspension in this country ... That [training] was unique. Every case we put through he came to do, so he could include them in his research series, so it was a unique opportunity to learn one operation really well.”

G16.1;1:20 and 3:42

“I did an SHO job. Then I got my MRCOG and I was working with a registrar, the same registrar on a 1:3 rota for about ten, twelve months of the year. He was quite keen to teach me and take me on as it were. He taught me quite a lot.”

G21.1;5:18

However, this did not mean that for teaching to be effective it had to be good quality.

Some suggested that their surgical practice had been shaped by a poor quality learning experience:

“then I became a registrar at X, having been a registrar somewhere else before, where, in a way, I learnt how not to do vaginal surgery. There were two surgeons there, and I had no great respect for either of them from a technical point of view.” G7.1;4:30

“if I tell you I had an exceedingly bad experience just before I left H where I, the consultant I was with said ‘Oh, I’ll do the bottom end for you, you stitch,’ and I did and I tied off both ureters, that confirmed my original feeling that that was not the way to do the operation.” G4.1;4:8

The apprenticeship also had its limitations. The teacher or master may constrain what the trainee does:

“when you are a registrar you have to do things the way you’re taught them. You’re not really in a position to develop your own technique.” U3.1;4:45

However, as one surgeon explained, this constraint was a fundamental feature of teaching in the apprenticeship: in order to teach a procedure one had, first, to master it

“If I’m operating with an SHO [senior house officer] and we’re doing a procedure then we use the sutures that I use, and the techniques that I use, because I can’t teach someone something that I don’t do.” G1.1;7:3

As in the earlier examples of poor quality teaching (G7 and G4 above) surgeons used negative experiences to develop their own ideas about how operations should be

performed. In this quote, the surgeon explains that as an apprentice he copied a technique, but once qualified he altered his practice:

“I worked for a boss who insisted that you put methylene blue in the bladder which I thought was moronic. I only ever performed it like that because he was the boss.” G18.1;4:39

Another claimed that, despite differences of opinion between master and apprentice, adherence to the model of practice set by the teacher was a necessary part of learning to operate:

“There are some consultants you work for and they say, ‘if you do it my way and something goes wrong I will defend you, right. If you do it your own way and something goes wrong you are on your own’. There’s an argument in favour of that. It’s much easier to sort something out if it’s been done the way you expected it to be done.” G21.1;7:38

These data show how the apprenticeship provided opportunities to observe experts or masters performing surgery. It also, crucially, provided opportunities to practise, to learn or improve techniques by doing them. Implied in the apprenticeship model is a notion that practising surgery is supervised. However, some of the surgeons indicated that one of the ways they had learned surgery was via unsupervised operating<sup>2</sup>.

Sometimes this took place at night:

“I think a lot of surgical training in Britain is leave it to the boys, you know, go out and do a few, and I think particularly at night is [when] British surgeons tend to learn, they see the boss do one and then [at night] they do one.” G14.1;9:32

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<sup>2</sup> McKee (1990) and McKee and Black (1993) confirm that out of hours operating is used by junior surgeons to practise procedures unsupervised. Recently, Wilson (1997) has attempted to quantify the extent of unsupervised training within UK surgical specialties, and has suggested that first time unsupervised procedures are common (Wilson 1997:1803).

Such out of hours operating would typically be for emergency cases, but unsupervised practise was not confined to these ‘on call’ periods; one surgeon claimed to have practised bladder surgery without supervision on a number of occasions:

“[CP] So how much of your operating is unsupervised? Ninety percent. Basically two of them, two of the consultants have shown me how they do it with me operating with them and then, more or less since then... it depends on what the operation is, number one, and secondly it depends how much previous surgery you’ve done”. U4.1;1:36

That said, it should be noted that not all surgeons were prepared to perform a procedure they had not been taught:

“I never worked for somebody who did colposuspensions and it would be a matter, I felt I shouldn’t embark on doing them in that I haven’t been actually trained to do them. ...I had planned to go to a uro-gynaecologist to actually see the operation but the time constraints and the whatever, I haven’t...” G19.1:1:40

From these data it seems that the surgical apprenticeship provides trainee surgeons not only with models of surgical practice but also, and perhaps more importantly, opportunities to *practise* (sometimes unsupervised). The surgeons suggested that they developed their own surgical practices partly by copying what their teachers did, occasionally rejecting the techniques their teachers used, and by doing operations themselves. Learning to perform surgical procedures, or developing one’s own surgical approach, was informed by the same instinctive responses described in chapter 4. If a procedure ‘made sense’ it was more likely to be adopted:

“initially when I was taught it I was only taught buttress sutures, but one person that I worked with did urethral plications and it seemed to be a more sensible thing to do and seemed to work.” G19.1:1:26

“you do things in a way that you think is right, all consultants tend to do this, and whether or not techniques are perpetuated depends on the judgement of the juniors as to whether they work or not...if you think someone’s technique is good you use it, or if you don’t think too much of a particular technique you don’t use it and you find another one.” G1.1:6:38

“[I was training with] a young consultant who felt that by doing it with the patient flat on the back, legs together he got a, just as good a result. *[CP]* but *you don't feel that?* I just don't feel that it's as good.” G17.1;2:14

As well as being reliant on these intuitive and instinctive ‘senses’ the surgeons also pointed out that learning to operate was highly dependent on physical senses of sight and touch. Seeing and feeling were as important in the learning process as they are in actually performing procedures. The surgeons suggested that learning to perform a procedure, or teaching someone else to do it relied on touch:

“when you're teaching someone to do the Pereyra it's all in the feel, putting the sutures up and putting your fingers against the bones and breaking through, it's quite a difficult thing to do. It's very, it is very scary when you do it, and you are not quite sure where you are.” U1.1;3:32

“it's not an easy procedure to teach because so much of it is in the feel of what you are doing.” G16.1;6:33

Thus the apprenticeship enabled surgeons to practise surgical techniques, and to use and develop the sensory and intuitive skills required to practice surgery.

### ***Learning beyond the apprenticeship***

While supervised surgical training ends once the surgeon becomes a consultant, past teachers remained a source of advice, particularly about surgical innovations or changes in technique, as this surgeon explained:

“I have kept in touch with S on his modifications. I've gone over to using Ethibond [sutures] on a J shaped needle... That change would have been in the last 4 years. What I tend to do is every 2-3 years I ring in to his department and ask them if they've changed their antibiotic prophylactic, suture material or technique so that I keep abreast of what one of the largest units in the country are doing.” G16.1;2:16



The role of these experts changes in this phase of the surgical career as the apprenticeship is replaced by new patterns of learning. The one time teacher may become a colleague or friend:

“T is a good friend and she shouts down the phone at me and tells me what I should be doing.” G17.1;2:34

Alongside past teachers, other experts were a source of information about surgical techniques. These experts were typically the principal specialists working in uro-gynaecology or incontinence surgery and the surgeons suggested that they often waited to see what these experts thought of innovations in the field:

“I know that S is just beginning to have a look at them [a new operation] himself and so I think that what I would do is wait a year or two and see what the opinion is from the experts before trying to do it.” G10.1;5:17

These experts were important referents, as the quotes below indicate. Although, just as the practice of one’s teachers might not be followed, so too, the advice of experts was open to question at times:

“old L told me after you’ve done about 30 there’s no need to do cystoscopy in your endoscopic suspension.”

“Well I was brought up to the old J theory that what you are trying to do [in this operation] is to recreate an angle between the urethra and bladder neck”  
G9.1;4:13

“I remember J always said you change the urethro-vesicle angle, but I think that’s too mechanical. I don’t think you are consciously trying to change an angle.” G14.1.6:9

One of the difficulties with learning from the experts was that sometimes their opinions were contradictory, or subject to change:

“K said, I hope I’ve got this the right way round, he said he always used, did, the MMK operation using non-absorbable sutures, and Professor J said he always

did the MMK using absorbable, I may have got it the other way round, but they were diametrically opposed.” G14.1;5:23

“my registrar said to me - he’s just come back from an RCOG course - he said S had changed his mind to the last time I heard him speak. Three years ago, bladder vaginal neck repairs were a complete waste of time and they shouldn’t be done, and people who did them were criminals and should be strung up. This time he said, ‘as long as you go to someone who can do them well they are a very good operation’.” G21.1;9:22

The surgeons suggested that where there was doubt about the quality or veracity of expert opinion, their practice was guided by personal experience:

“S of course, is the sole voice. He says that Burch colposuspension still has the long-term good results. But you’ll see from my paper [a case series] up to 34% develop enterocele following Burch colposuspension long-term, there is no, there doesn’t seem to be any panacea, complete operation, otherwise there wouldn’t be a hundred and twenty odd procedures.” G12.1;3:43

As well as experts and past teachers, surgeons said that they learnt surgical techniques from their peers. These learning relationships were less hierarchical than those found in the apprenticeship, but followed the familiar pattern of seeing and imitating another surgeon’s work:

“Since Mr R has come here, he is interested in new techniques. I asked him what he did and he said the modifications I’ve suggested were fine, and appropriate and you didn’t need to be perhaps as meticulous as the original description of the operation, in his view. So I’ve adopted them and so far I feel it is certainly a lot simpler doing it that way. *[CP] Have you had any chances to see his operation?* Not yet. But we have very recently discussed some newer techniques that he’s going to use and he’s invited me along to theatre.” G2.1;4:27

“We have links with consultants in Cyprus. Last year I was invited there to show two or three consultants how to do this technique. *[CP] how did you establish this link?* We had a drug rep here from Cyprus and he set it up, became friendly – everyone in Cyprus is related – so he made contact with the chaps there and asked me over. People meet at conferences and chat, ‘can I come and watch you?’, ‘Will you come and watch me?’” G18.1;6:36

“We have an international meeting every year, usually the Alps. Those who’ve never been think it’s a skive, but I was the secretary some years ago and I got them working at 7.15, the first papers. Within a week we got through 42 papers.

And everybody turns up because you can hardly ski with people you haven't been to the meeting with. So you have the papers first thing and we talked shop the whole time. You talk. A small meeting like that. When the first ones were held they were the younger consultants and a bit older, not juniors. People were a bit more honest. They'd say 'I cut a ureter', 'I've made holes'. Somebody would say 'Well so have I'. And somebody would say 'I've never had a complication in my life' and we never believed him. That's very healthy. You go and meet friends, friends who are business friends, and you will talk quite a lot and learn things" U8.1;9:6

Again, watching another surgeon performing, seeing how techniques were used appeared to be an important element of learning:

"About two years ago, one of my colleagues here had already been doing that operation for a long time and I did one or two with him to start off with and really just sort of learned by watching somebody else... I didn't encounter the Burch until, oh gosh, until way on in my consultant career. People like S and T saying that really this was a far better procedure and that awakened my interest in it. Actually having a colleague who was doing it I popped along to see them do it and it seemed great." G9.1;2:35 and 3:36

Further examination of the data suggested that the period after the apprenticeship was marked by fewer opportunities to observe others operating. The interviews revealed the relative isolation of many consultants from their peers. One paradox of the consultant grade was that while the consultant surgeon had greater access to surgical time, he or she had far fewer opportunities to watch other surgeons and learn from them. So whilst there were benefits in terms of more opportunities to practise techniques, there were fewer chances to observe operations:

"it's the only opportunity you have for regular operating, because you are a consultant and you have your own operating session whereas as a registrar you may or may not get to operate regularly for a long period of time. I've been here 8 years, operating two times a week so you are bound to fill that up with patients you are bound to improve." G2.1;8:37

"I would dearly love to go and watch some of these people working. I'd love to go up to Manchester and sit with T for a week and watch him operate, and just see... There's no reason I shouldn't go up and see him, it's just that it isn't part of the ethos of training, and we've all got clinics, and we're all double time-

tabled, and we don't have time to go and see it. The one thing that I think I miss is the informality of being able to go, and get the time to go, and watch somebody and just stay and follow them. That's the thing that's not done in the NHS." G15.1;10:1 and 11:18

Some surgeons indicated that as a result of this isolation and lack of access to senior surgeons, they tended to learn new operative techniques from juniors:

"I'm talking to registrars who say to me, 'Oh, I've done it with Mr So and So and we keep the patient flat all the time and he doesn't put his fingers in the vagina and ...'" G16.1;3:22

"I think in fact that sometimes changes occur because a senior registrar has learnt something from somebody else, either at a meeting or from another consultant, then he brings it back and that modifies the chap, the technique of the chap he is then working with. I think I was originally shown how to do it by one of the senior registrars, this Stamey type procedure." U8.1;1:1

"I think as you get older you go on less and less courses and I think you get taught by senior registrars. I think you've got to keep going on the courses. *[CP]* So how did you hear about this new procedure? Well I read about it. Read a couple of articles. I had Z's views on it, which can't be repeated on tape. I actually went on a course, one of the half days. So I'd read about it and then if I had an interest in it I'd do more, or go to somebody who was doing it and watch them. I'm still not averse to going to people and watching them operate." G17.1;4:52

A few surgeons admitted that, in the absence of opportunities to see operations, they were self-taught. This highlights the value of practising operations in order to learn surgery:

"when I was training as a senior registrar in X the only procedure for urinary incontinence which I saw were anterior repairs. At the end of my time one of the consultants started doing Burch colposuspension but we were all very much feeling our way. This was ten years ago of course. All new procedures I do I have taught myself as a consultant in my own right." G10.1;4:25

"slings and things like that I've sort of taught myself because they are sort of variations on a theme. As long as you know what you are doing in a colpo it's not actually a lot different to doing a sling or Marshall or all these things." U2.1;6:55

Performing procedures was seen as essential to learning to practice:

“there is no model that we have, standard, to take you from the step of seeing a procedure and trying it out without having to do it on a live patient. There is no standard procedure. You actually go and see it, assist and the time constraints are that probably that’s as much as you will get before you then have a go at doing it and of course like most procedures even if you assisted at lots and lots it is not until you actually do a procedure for yourself on your own that you discover all the difficulties.” G2.1;7:41

## **Findings from the American data**

### ***The surgical apprenticeship***

Although there are important differences in medical education in the UK and the USA (most notably that American system is a postgraduate one) the training of surgeons is broadly similar in the two countries. American trainee surgeons are apprenticed to an attending surgeon and learn by the same processes of watching and performing procedures as their English counterparts:

“as far as the PULP, I didn’t know anything about it before I came here and started watching F do his procedures and started doing it myself. I scrubbed in with him probably on a few patients and few meaning two or three, had him help me with some, assisted him with his and watched, oh, hundreds.” USG2.1;5:44

“it’s interesting actually I started in residency learning how to do Burch procedure. I went to a residency where we have about sixty different private physicians that I operated with at one time or another so I saw a tremendous variation of ways to do things, and I scrubbed on a couple of Marshalls, but basically people did Burch procedures. When I went out to do my scholarship they do a specific procedure in the Mayo clinic which is the Mayo modification of the MMK procedure. What they do is unique.” USG3.1;4:48

One surgeon had not had opportunities to learn the sling procedure in the early phase of the apprenticeship, but had learnt this operation later, as a surgical training fellow:

“Basically I learnt the sling from Dr M, and throughout my four years of urology residency I read about the sling but never did one and none of the people I worked with did them...I guess as a resident I did one Raz. That was the only kind of sling I’d done. Then I went to Dr M and I did a couple with him and then

when I went to work with him as a fellow I really learnt them. Basically with slight modifications I do them the exact same way as he was doing it then.”  
USU1.1;1:1

Typically the surgeons learnt anti-incontinence procedures from senior surgeons, although one recalled being taught an operation by a fellow student during his apprenticeship:

“there was a guy there who was tuning up to go be a Mayo attending at the Mayo clinic and he’d been a Mayo resident and he’d gone on to do a fellowship with D down on the West Coast and he had learned the procedure there and was a strong believer in it. We scrubbed together a few times when no-one was looking and he showed me the dissection, where it all went and everything.”  
USG3.1;7:45

One striking feature of the American apprenticeship, and surgical work more generally was the team approach to learning. The relationships between apprentice and master appeared less hierarchical than was the case in the UK as the notes from these observations show. The first describes a rule about how part of a procedure was performed, a rule which had been negotiated between master and apprentice. The second shows how the trainee and teacher work together:

The operation requires removing a piece of fascia from the abdomen to use as a sling. This is an important, fairly delicate part of the operation. Dr B explains that harvesting fascia in a patient who has had previous surgery is difficult, as the fascia is not ‘nice and clean’ (presumably it is scarred). M (trainee) is going to take the piece of fascia. I ask if he is always able to locate enough. He says ‘I think you can always find a good piece of abdominal wall, somewhere.’ He uses diathermy to remove the piece of fascia. Dr B explains, with some pride, that ‘M is a real expert in getting these slings. He did a whole rack of these and got the operation down to 39 minutes’. The anaesthetist jokes that it’s going back up to 45 minutes... M sews the ends of the fascia – preparing it for re-insertion into the body. He explains that he and Dr B have a rule about who touches the sling and when. Only they can touch it, ‘so that if they drop it on the floor we know who to blame’.” USOBS3.1;4:10

By now I am standing on a raised platform so I can see the operation. Dr F and Dr D are trying a new needle and there is some discussion about what suture to use. The team use first names and the discussion might be between equals. Dr D

(trainee) is on Dr F's right hand side and discusses the case confidently, without the deference or hesitancy I have observed among UK registrars. Later during a lull, waiting for anaesthetic to 'take' Dr F and Dr D have a discussion comparing size 1 and size 0 PDS suture. While they are talking, almost oblivious to the other people present, Dr F casually ties some of the suture around Dr D's finger to see how it knots. They discuss it, its merits, the feel of it etc. Dr F seems genuinely interested in D's opinion. At one point in this discussion they briefly hold hands, almost in a hand shaking gesture and then the suture is removed and given to Dr D. USOBS1.1;2:10 and 4:41

A later interview with this trainee (Dr D) provided further insights to the apprenticeship relationship:

"I didn't learn that till I came here. I learned how to do Pereyras and Razes and stuff through the vagina. I didn't do any slings in my previous training, and when I came here I basically put it all together. I watched Dr F do the first one and after that I've been doing it... Before, I worked with other people and things clicked, things click. It has never clicked to the point that it has now with Dr F simply because I've worked with him longer, because I love the man, because he is a much superior surgeon than I am and he is taking me further than anyone has ever taken me before. I mean if it wasn't for him, I probably would have went out on my own and done this for a little bit and then gone on my own and developed my own skills. I've found someone who is much superior than I am and it's taken my skill above and beyond what I could have done in ten years and by the end of the year, after one year, I think I will have surpassed my wildest expectations of myself." USG1.1; 8:50 and 15:11

Although it is clear that this relationship is especially close, the training of the more senior apprentices (equivalent to registrar and senior registrar) seemed to be more egalitarian in the USA than in the UK. Observation of more junior trainees, such as C who appears in the extract in chapter 4 (page 70-71) suggests that this period of training is less a relationship of equals.

The American surgeons also stressed the importance of the practical, 'hands on' element of the apprenticeship, learning how techniques felt and practising surgical manoeuvres:

“I think you just have to see a lot of these cases. I think you have to understand the anatomy you are trying to recreate, be able to picture that in your mind, especially the Burch. Try not to overcorrect, but you are trying to make a hammock effect for the bladder neck. But there isn't a substitute for being there and seeing it. Can you watch a video and watch Dr F take that arm of the sling up a little bit. No. You really can't.” USG3.1;11:33

“How do you get judgement? Well judgement is the right formula between knowledge and experience and some people think there's, well they can get more experience, 'cos they don't like reading, or they don't get the time, or they work with great mentors, they can make up for lack of knowledge. Other people because they lack appropriate mentors think that they can make up for the lack of experience by reading a lot. It takes the right combination of knowledge and experience to acquire judgement.” USG1.1;10: 34

They indicated that the learning process required something more than just seeing an operation: in this quote a surgeon talks about another surgeon who claimed to have been taught by Dr M (with whom she had worked):

“I remember one guy that came to learn his slings and basically he saw one, he didn't learn how to do them. He basically had a fellow to teach him and three residents and they would be allowed to help at the top and bottom and always sort of feel everything. ...Four months later this guy phones me...It was kind of funny because he started the conversation as 'I trained with Dr M' and I recognised him and thought, 'you didn't train with Dr M you just watched.'” USU1.1;23:13

### *Learning beyond the apprenticeship*

Like their English counterparts, in the period after the apprenticeship the American surgeons learnt surgical techniques from their peers:

“I went and visited M at TUFTS who did most of his fellowship at the Mayo clinic and they actually have a different approach to vaginal surgery than F.” USG2.1;7:40

“I just recently did one with one of the gynaecologists in V and it was interesting because he used more sharp dissection that I would have used. But I would have done much more extensive dissection in terms of taking it down either side.” USU1.1;12:9

As a result learning in this phase of a surgical career was often friendship based:



“There’s a group of us who were all his fellow or his residents and you know, they worked enough with him that many then have the sort of jobs that are sub-specialist... we’re kind of spread out now. We talk at meetings, we’ve had a lot of conversations about how to do leak point pressures and some of them have their urodynamic suites exactly as Dr M had them.” USU1.1;19:5

These surgeons also continued to rely on their mentors and teachers:

“Dr M (teacher) I will phone him. I haven’t talked to him now for about 3 months and that’s probably the longest period I’ve gone and I actually want to call him soon. He and I talked a lot the first couple of months I was here. We seemed to talk lots, he will often tell me something on the phone like, not about slings or collagen, but the reconstructive stuff, he’ll say ‘you know we did it this way, well I’ve changed it.’” USU1.1;20;35

However, like the English surgeons, they often experienced isolation once they had qualified:

“I never get to operate with people. It’s rare that the other attendings on the staff here, that we operate together, so it’s almost always I’m operating with the chief resident and the medical student. I’m always in the mentor position. I really like it when I get to operate with another one of the attendings here, or assist them, because it’s one of the few times I get to learn what you were calling new tricks. They come down and scrub with me, I’ll show them something that I did, or ‘this is something R taught me, or D taught me’. That’s how we all learn but it’s a frustration of mine that in my job, my job is to teach here, when I wanted to learn laparoscopic Burch I flew to Louisiana to learn how to do it, it was the only way for me to get time, two days away to do that. It’s a very difficult thing. So in a way I do a lot of difficult surgery, but I feel hungry because I feel like I’m stagnating a little bit because I’m not getting out... *[CP] Do people watch you operating?* They do. Now that Dr F is here on occasion I go over to see what he’s doing, and if he’s doing something new. I can do that because it is two hours out of a day, it’s a mile away. But to go to A or M, or C it’s hard. It’s hard to learn new things.” USG3.1;14:20 and 15.1

One of the American surgeons initially suggested that another surgeon had demonstrated a procedure to him, however, it then emerged that this ‘teaching’ had been based, not on observation, but on a conversation:

“*[CP] So how did you learn it?* It was M and my own experience. *[CP] So you watched slings with M?* No, just talking. *[CP] So you had never seen anyone else do it?* I don’t think so.” USU2.1;7:31

They also suggested that learning from peers was not always straightforward; finding the ‘right’ teacher could be difficult:

“I was real keen to learn to do it when I first got here. I was a little bit put off by the gynaecologists because the one person who everybody said, or 2-3 people told me was the best, he made them sound like the biggest, hardest operation to do and I knew it wasn’t. He was sort of like, it wasn’t that he wouldn’t show me it was just, even from what he was telling his patients, [that] it was really tricky and I thought, well he’s not the person to learn from.” USU1.1:18:23

As the quote from USU2 above suggests, not being able to see a procedure being performed did not always prevent it being adopted. There was, however, a problem with trying to learn without practising:

“I went to a meeting one year when a fellow, he has these beautiful pictures, you know, slides and you can tell from people’s questions that they don’t understand it but they are going to go straight home and start doing it.” USU1.2;1;6

“There is no substitute for being in the OR like you were, even better scrubbed so you can put your finger on something and feel it...I think in the OR scrubbed is where you learn surgery. I’ve done a lot of cadaver dissection and this and that, all very helpful but I think you have to be together in the OR doing surgery to really learn surgery.” USG3.1;15:17

Like the English surgeons these interviewees stressed the importance of doing procedures and developing a ‘feel’ for an operation:

“I’m really someone that likes to scrub on it and get a feel for it before I’m going to try it on my own on a patient. I did this with C, a very skilful surgeon, and it made a lot of sense.” USG3.1;8:2

One surgeon reflected during the interview that the nature of surgical work made teaching problematic:

“I need to think about how you teach this stuff. Until you brought this up I never really thought about it. A lot of this stuff is intuitive.” USU2.1;18:41

The learning processes in the apprenticeship and beyond it are therefore concerned with transmitting or developing these intuitive, ‘felt’ responses.

## Discussion

The surgical apprenticeship provides opportunities for surgeons in training to see operations being performed and to do them: a process crudely characterised by the aphorism 'see one, do one, teach one'. The role of the teacher is influential in this learning process. Beyond the apprenticeship, other surgeons - colleagues within the specialty, peers, friends, fulfil this teacher role by demonstrating techniques. These individuals are central to the 'see one - do one' model of learning. They provide exemplars or patterns of surgical practice which may be observed and copied. As such they are clearly influential in shaping how surgeons practice, as these data have shown.

However, another finding from these data is that opportunities to watch operations are limited. Formal access to teachers ceases once the training period is over and several surgeons pointed out that opportunities to see and do procedures were circumscribed by the way surgical work was organised. The time-tabling of clinic and theatre sessions meant that senior surgeons were seldom able to see their colleagues working, and travel to other hospitals was difficult to organise without cancelling cases. In the UK, policy changes, notably those resulting from *Achieving a balance* and proposals to increase the numbers of consultants may increase this isolation for surgeons<sup>3</sup>. Combined with the aim of reducing junior doctors' hours, and creating a consultant based service, consultant surgeons may lose not only the opportunities to learn from each other but also the apparently useful exposure to new ideas from juniors rotating through their

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<sup>3</sup> For example the proposals in UK Health Departments, (1986) *Hospital medical staffing: achieving a balance*, and in the NHS and Community Care Act (1990).

specialty or 'firm'. The more limited American data suggest that this problem of isolation was not confined to the UK. There too qualified surgeons mentioned the lack of opportunities to see other surgeons operating.

Moreover, the surgeons' accounts emphasise the practise or 'do one' aspect of their learning. The knowledge offered by teachers - whether formal ones in the apprenticeship phase of surgical training, or the informal networks of colleagues and juniors present in later stages of the surgical career - cannot bypass, or obviate this need for first hand experience. The surgeons suggested that learning to operate was about learning the 'feel' of an operation. Their accounts also revealed some important tensions between the more formalised, technical knowledge which other surgeons attempt to pass on, and their own experientially based knowledge. Thus the surgeons 'slightly modify' procedures they have been shown, or reject these models entirely.

As further evidence of the importance of practising surgery, the data suggest that competence in a given procedure is dependent on doing a critical number of operations. The surgeons would often say how many operations they had performed whilst learning a procedure. Competency was acquired over time with repeated practise. The surgeons' accounts echoes those described by Sudnow (1967) in *Passing on*. He suggested that

“new student nurses and, apparently, young medical students, make it a habit of counting such events as deaths, and locate their own growing experience and sophistication by reference to 'how many times' such and such has been encountered, witnessed, done etc.” (Sudnow 1967:37).

This experiential knowledge is a prerequisite for dealing with contingency in surgical work. As chapter 4 has shown, surgery, by its very nature, is contingent. Variation in the case, the surgeon's disposition and even the external environment mean that no one case is exactly like another. Surgeons learn to draw on experience - memories of similar situations and technical skills which they have practised - in order to proceed. Dealing with difficult or complex cases requires practical knowledge and developing this, as this surgeon explains, is a matter of time and experience:

“I think as I recall the principles of the MM procedure were really quite straightforward and it is in principle the most straightforward operation. In practice it can be an absolute beast because of the anatomy of the patient. I think what you learn as the years go by is how to cope with those difficulties.”  
U6.1:5:30

Watching another surgeon operate cannot provide this practical knowledge. It is no substitute for doing the operation yourself. As Polanyi has argued, imitating others provides only a guide to practice,

“but, in the last resort we must rely on discovering for ourselves the right feel of a skilful feat. We alone can catch the knack of it; no teacher can do this for us.”  
(Polanyi 1961:126)

## **Conclusions**

This chapter has described the surgical apprenticeship and how surgeons learn in the period beyond this apprenticeship. It has suggested that much learning follows the ‘see one - do one’ model which relies on observation and imitation. However, the analysis has suggested that *doing* or performing surgery is the chief mechanism by which surgeons learn to practice and to deal with contingency. Working alongside another

surgeon provides opportunities to observe and copy techniques but this is not a substitute for experience.

The next chapter discusses the thesis findings and examines the implications of these for evidence based medicine.

## Chapter 6: Tensions between evidence and practice

### **Introduction**

The social movement around Evidence Based Medicine grew out of the recognition that clinicians did not apply research evidence – specifically the findings of randomised controlled trials – to their practice. As chapter 1 has noted EBM was also a response to widespread and persistent medical and surgical practice variations seen partly to be a consequence of this lack of an evidence base for medicine. Since its inception in the mid-1980s the EBM movement has tried to encourage doctors to use ‘evidence’. Yet studies of medical practice suggest that the findings of scientific research often fail to penetrate everyday medical work (Stocking 1992a, 1992b; Harrison 1996; Davis and Howden-Chapman 1996). An editorial in the *Lancet* suggested that national and international consensus statements and guidelines appear to be “largely ignored by the clinicians to whom they are directed.” (Anon 1992:1198). Another commentator noted that the huge Oxford Database of Perinatal Trials, containing meta-analyses of RCTs in perinatal medicine, regularly updated, was neither widely disseminated nor widely used (Paterson-Brown et al 1993:1464). Dawes et al (1992) reported that routine weighing of pregnant women, a practice unsupported by research evidence, continued to be performed as part of standard antenatal care. Buekens et al have described the failure of circulating information about obstetric intervention rates within maternity units to change practice, concluding that, “awareness is not enough to change behaviour” (Buekens et al 1993:623). Other studies have shown that many general practitioners do not routinely carry aspirin, and many hospital doctors failed to prescribe intravenous thrombolysis for heart attack victims, despite both these treatments being shown, in the

research literature, to reduce mortality (Freemantle 1995:1369). Haines and Jones have suggested that,

“the medical literature is littered with examples of research findings that have not found timely acceptance in practice” (Haines and Jones 1994:1488)

and Davis and Howden-Chapman concluded that there are

“equivocal indications that [EBM] affects clinical behaviour. Proven treatment efficacy is not always a passport to implementation, nor lack of efficacy always a barrier.” (Davis and Howden-Chapman 1996:871).

The proponents of EBM have tended to attribute the failure of EBM to penetrate everyday practice to practitioners/clinicians. Clinicians are viewed either as ignorant of EBM (in which case they need to be formally taught it) or miscreant (in which case they need to be told to use evidence, via guidelines). Against this, the critics of EBM assert that the problem doctors have with EBM concerns the evidence, that there are fundamental differences between research and practice which underlie their reluctance to adopt the EBM approach. This chapter looks at these arguments and attempts to integrate them with the findings of this thesis to consider the role of EBM in surgery.

### **Clinicians' reasons for rejecting EBM**

The arguments marshalled by the critics of EBM fall into two broad categories. The first focuses on problems with the evidence base. In essence, it questions the nature of the evidence, in particular the reliance on RCTs. The second set of arguments centres on the idea that EBM fails adequately to understand the nature of medical practice and that as such it threatens that practice.



### *Limits to evidence*

One of the difficulties facing EBM is that despite an increase in the number of RCTs there are still many areas of medical work where trial evidence is lacking or simply poor quality. Where there is research evidence from RCTs it is often equivocal, incomplete or contradictory. Thus, a recent Canadian Task Force on the Periodic Health Examination (carried out by family doctors) concluded that there were seventy six preventive manoeuvres for which evidence was inconclusive, and about which decisions could not be guided by scientific evidence (Naylor 1995:841). Elsewhere, the editor of a leading British journal has suggested that only one percent of articles in medical journals were scientifically sound (Smith 1991:798). Another (Blavias 1995) has pointed out the poor quality of evidence on which recent meta-analyses of urological surgery are based.

One reason for the continuing lack of evidence in key areas of medicine is that RCTs may be inappropriate or impossible to conduct. Trials are of limited value in areas where interventions are well established and have dramatic effects (for example the use of penicillin). They can also be too difficult or expensive to conduct (for example where treatment outcomes are long term and would need to be measured over several years or decades rather than months). Within surgery the lack of RCTs has been linked to the reluctance of surgeons to participate, either because they feel that individual equipoise is absent or because of ethical and/or legal objections. They are also criticised for low external validity because the surgeons who participate in trials are often enthusiasts and innovators, typically based in teaching hospitals and may not, therefore be representative of 'typical' or average surgeons. As one commentator suggested,

“perhaps many surgeons do not see randomised controlled trials as a feasible strategy to resolve questions about surgical management. Cynics might even claim that the personal attributes that go to make a successful surgeon differ from those needed for collaborative multicentre research.” (Horton 1996:984)

The patients who take part in RCTs may also be unrepresentative. Exclusion criteria can mean that eligible patients represent a fraction of those being treated in normal practice, thus

“the whole philosophy of the double-blind randomized controlled trial is to exclude individual differences and concentrate on group similarities... the attempt to derive rational practice from group studies will always be incomplete when applied to the individual consultation, because so many clinically important factors have been excluded in conducting a group trial.” (Charlton 1991:356)

This is further confounded by the suggestion that recruitment rates may be low (Downs et al 1996)

These problems have led some authors to question the EBM movement’s reliance on RCTs as the ‘gold standard’ for research. Black has suggested that it is necessary to utilise alternative, observational research methods (cohort or case control studies), (Black 1996b:1218) when it is not feasible, practical or appropriate to conduct a trial.

This argument has been augmented by various appeals for the acceptance of other methods for obtaining research evidence, notably those used in qualitative social science (see for example, Malterud 1990; Strong 1992; Britten 1993; Charlton 1995; Black 1994; Fitzpatrick and Boulton 1994; Mays and Pope 1995). Such methods, it is argued can enable the investigation of areas of medicine where quantitative methods are inappropriate or impossible. They are also seen as a way of overcoming the artificial nature of experimental research and reflecting the nature of ‘normal’ or ‘typical’ medical work.

## *EBM and the art of medicine*

Alongside these arguments about the limitations of trial evidence, the critics of EBM suggest that there are fundamental flaws in the EBM project. These stem from differences between experimental or scientific practice within trials and medical practice in the context of everyday medical work. These differences, according to Charlton provide doctors with very good reasons for resisting the ‘hegemony of the double-blind randomized controlled trial’ (Charlton 1991:355).

RCTs provide an overview of the effect of an intervention on all the patients included in the trial. The problem with this sort of evidence is that

“it describes the potential benefits from an intervention that is applied to a *group* of people with a common and defined condition, and expresses the impact of that intervention upon outcomes for that group usually both in terms of average effect and some measure of variance (spread). It is the task of the clinician to decide whether average benefits seen in trials or overviews of trials [ ]...apply to the individual patient who sits in front of them.” (Freemantle 1996:73 emphasis in original)

Making this shift between the evidence about groups and the presenting individual case is seen as inherently problematic. Charlton argues that EBM

“aspires to a world where effective medicine is so simple that the vagaries of doctor expertise and patient peculiarity are rendered unimportant compared with the objective probabilities established by rigorous evaluation.” (Charlton 1991:356)

Some commentators have claimed that this is especially true for surgery:

“it is a failure of the academic to understand surgery. The problem is that surgery is not like a pill which is refined and guaranteed to be similar; each procedure introduces a variable that is uncontrolled”. (Russell 1996:1480)

Although others have suggested that this tension between group evidence and individual cases is a feature of all medical work:

“the doctor does not deal with illnesses alone but with people who are ill, and for each individual the illness is unique in terms of his or her experience of it and in its presentation to the doctor.” (Sullivan and MacNaughton 1996:941)

The critics of EBM argue that the ability to make sense of the unique circumstances of the individual case requires individualised judgement. This judgement has been referred to as the 'other kind of medicine' (Balint 1961:42) or the 'grey zones' of clinical practice' (Naylor 1995; Sullivan and MacNaughton 1996). Naylor has suggested that

“the limits to medical evidence continue to limit the ambit of evidence-based medicine. The craft of caring for patients can flourish not merely in the grey zones where scientific evidence is incomplete or conflicting but also in the recognition that what is black and white in the abstract may rapidly become grey in practice, as clinicians seek to meet their individual patients' needs.” (Naylor 1995:841-2)

It is not only clinicians who recognise this aspect of medical work. The sociologist Eliot Freidson (1975) has argued that, in medicine

“the human patient is the problem whose needs set the task. The amount of discretion granted workers in health care not only reflects a particular conception of their task but also reflects a particular conception of the patient... [Medicine] alone is flexible enough to serve as faithfully as possible the needs of varied individual patients, recognising and respecting their individuality.” (Freidson 1975:254)

This 'individualising' aspect of medicine marks it out as a particular type of work, namely, *craft work* or an 'art directed to the person' (Jacob 1988:49).

Malterud has suggested that

“medical craftsmanship, characterised by the relationship between the craftsman, the material and the tools, constitutes a professional ability to encounter complex tasks requiring individual choices and judgements.” (Malterud 1995:187).

This ability or judgement is acquired not from the sorts of formulised technical knowledge embodied in scientific evidence, but from experience. It is derived from exposure to concrete medical problems (van der Vleuten and Newble 1995:1033).

Schmidt argued that

“expert clinical reasoning is, to a large extent, based on the similarity between the presenting situation and some previous patient available from memory.” (Schmidt et al 1990:617)

Rather than following a logical algorithm or pre-defined set of rules, the practice of medicine follows an iterative process rather like the one used in map making:

“after finding certain signs, [the doctor] may go backwards and delve further into the history; even after completing the clinical part of the consultation and learning the results of certain investigations he may go back yet further. Classically, an algorithm does not permit changes in the order in which bits of information are sought because solution of the problem depends upon the order in which they are found.” (Campbell 1987:850)

This description echoes Bittner’s description of police work, another craft occupation:

“that experience plays an important part in [police] decision making goes without saying, but it is not the kind of experience that lends itself easily to the systemisation one associates with a body of technical knowledge... In sum, what policemen do appears to consist of rushing to the scene of any crisis whatever, judging its needs in accordance with canons of common sense reasoning, and imposing solutions upon it without regard to resistance or opposition. In all this they act largely as individual practitioners of a craft.” (Bittner 1974:32-34)

It also resembles other craft work, from laboratory science (see for example, Latour and Woolgar (1979) and Lynch et al (1983)) to such diverse occupations as bespoke tailoring, bridge building, architecture, pottery and fine art<sup>1</sup>.

The opponents of EBM suggest that work of this nature requires something more than simply the scientific or *technical knowledge* embodied in EBM. The evidence base of EBM is capable of formulation: it can be written down in journals, and specified as rules (which may become practice guidelines). Craft work draws on a more nebulous, unformulisable individualised type of knowledge. The philosopher Michael Oakeshott (1991) has referred to this type of knowledge as *practical knowledge*. This practical knowledge exists alongside technical knowledge, but whereas technical knowledge is susceptible of precise formulation and can be specified as rules, written down, and

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<sup>1</sup> This description of how prior experience or knowledge is incorporated in decision making is also reminiscent of how prior beliefs about probability are used in Bayesian statistical analysis (see Lilford and Braunholtz 1996).

learnt by rote, practical knowledge is experiential and cannot be specified as rules.

Other social theorists and philosophers have described this dualism, albeit using slightly different terms. For example, Ryle (1945) and Nyiri and Smith (1988) have distinguished 'knowing how' and 'knowing that', Polanyi (1958) and Knafl and Burkett (1975) referred to practical knowledge as 'judgement'. Elsewhere, Jamous and Peloille (1970) have used 'indeterminacy' to capture this component of medical work.

If this second type of knowledge is indeed a component of craft forms of work it may explain the reluctance of many clinicians to adopt the EBM approach. The remainder of the chapter looks at the findings of the thesis alongside these ideas about practical knowledge and considers the role of EBM within surgery.

### **Surgery and practical knowledge**

This thesis has examined the nature of surgical work and surgical variation. It has shown that surgery is contingent. Chapter 4 described how surgeons identified case, surgeon and external factors as sources of variation in their work. Variation in the individual case, and the surgeon's disposition and even the external environment meant that no one surgical case was exactly like another. The surgeons made decisions about which patients to operate on and which procedures to perform using personal 'rules of thumb' (Bloor 1976) - routines developed from previous experience and personal preference - to respond to the features of each unique case as it presents. Within the operation itself surgeons drew on instinct and hunches, perception, and responses to sensory signals to deal with the myriad variable, contingent factors they are faced with.

These data suggest that surgery is a craft and that it utilises the type of practical knowledge described above.

Further confirmation of the presence of practical knowledge in surgical work comes from the data presented in Chapter 5. These indicate that experience or ‘doing’ surgical work is central to developing the necessary skills/knowledge required to practice surgery. Just as the policemen studied by Bittner (above, page 109) learn to deal with their work experientially, surgeons learn to deal with contingency by practising, by repeatedly performing the activities of surgery. The data suggested that the surgical apprenticeship was important because it provided opportunities to witness other surgeons at work, but that watching another surgeon was no substitute for performing an operation (or making the decision to operate on a particular patient). Performing surgery was the chief mechanism by which surgeons learned to practice. Again this is a feature of practical knowledge and craft work. Practical knowledge is acquired through continuous practise (Oakeshott 1991:15). Forms of work that require practical knowledge use apprenticeship models of learning as vehicles for this practising. However, as has already been noted, imitating others can only provide a guide to how to practice; learning to perform is based on discovering “the right feel of a skillful feat” for oneself (Polyani 1961:126).

Based on these findings the thesis argues that surgical work entails the use of practical knowledge, that it is a form of craft work. This has some important consequences for the EBM movement.

## **The role of EBM in surgery**

There appears to be a fundamental difference between the way the EBM movement and its opponents understand surgical practice. EBM is firmly rooted in a 'technical knowledge' model of surgical work. It views what surgeons do as technique – something that can be formulised and rule governed. The evidence or knowledge base of EBM is a technical one: it can be written down in journals, and can be specified as rules for practice. Practice guidelines represent the archetype of this form of knowledge.

Practice or clinical guidelines are systematically developed statements about appropriate care or treatment, designed to assist clinical decision making (Battista and Hodge 1993:385; Delamothe 1993:218). They provide a synthesis of the results of RCTs in a specified area and recommendations about good or 'best' practice. Such guidelines can be, and have been, used to inform everyday medical practice and decisions about the purchase and provision of care. Guidelines have rapidly proliferated in the UK and North America, across a wide range of specialties (Haines and Feder 1992; Haines and Jones 1994; Hopkins 1995; West and Newton 1997). They have been hailed as a means of ensuring that research evidence is incorporated into practice.

Individual practice guidelines have varied in their prescriptiveness, but there has been considerable opposition to the imposition of guidelines on practice, particularly their use in health care purchasing decisions (Hunter 1996; Hopkins 1995; McKee and Clarke 1995; Anon 1992; Brook 1989). Part of this opposition uses the arguments about the limits of the evidence base – the over-reliance on trials, the poor quality of some evidence and questions of generalisability. Yet at heart the opposition to guidelines appears to revolve around the differences between technical and practical knowledge.



Clinical guidelines are largely concerned with technical aspects of care and typically, with single disorders or conditions. They have limited applicability to complex, contingent and highly varied individual cases. As has been demonstrated in this thesis, surgeons use practical knowledge to deal with contingency and variation in their work. Over rigorous application of guidelines erodes this. It represents an important constraint to clinical freedom, one that strikes at the heart of what it means to be a doctor (Delamothe 1993:218).

This tension between the technical knowledge embodied in guidelines and the practical knowledge used by clinicians is increasingly being recognised. It has been used to temper the use of guidelines, as the following arguments reveal:

“There are, however, enormous differences between research studies and the messy realities of everyday clinical practice. The difficulties of translating research into practice lie not only in transferring information, but also in building different systems.” (Hopkins 1995:74)

“Medical practice is not a simple application of medical science: it requires technical and scientific competence and an interpretive interaction between physician and patient. Effective guidelines recognise this distinction.” (Battista and Hodge 1993:388)

However the attractiveness of guidelines from the viewpoint of EBM is that they provide a formal mechanism for getting research evidence into practice. They are a way of introducing rational decision making into apparently irrational, chaotic practice. EBM is clearly rational in the Weberian sense. Weber argued that rational action entailed the systematic assessment of the means of achieving a goal and the selection of appropriate means for achieving that goal (1968). The proponents of EBM are explicit about this rationality – the underlying assumption of EBM,

“is that *medicine is rational and so are you*. That is, your acts of clinical diagnosis and management reflect your assessment of the evidence that this or that diagnostic test or treatment is valid and will do more good than harm.” (Sackett et al 1991:306-307 emphasis added)

In contrast, surgeons stress the importance of a more nebulous, instinctive, practical knowledge in what they do. Surgical work is craft work. Practical knowledge allows surgeons to deal with the contingencies of their work. It is about responding to ‘a bleeder here’, or a curious combination of co-morbidities, or a poor assistant. It is not rational in the sense of always following calculable predetermined formulised rules. Some part of what surgeons do, in order to respond to contingency is instinctive and non-rational. In trying to foster rationalism EBM has neglected, and often dismissed the practical knowledge component of surgery. In essence it has overplayed its hand by focussing exclusively on technical knowledge.

The contingent nature of surgical work and the experiential way in which it is learned suggest the surgery requires practical knowledge as well as this technical knowledge.

The presence of contingency in surgical work thus provides ‘good’ reasons for resisting EBM.

### **Concluding comments**

The tension between the technical and practical knowledge components of practice has not gone unnoticed by sociologists. Twenty years ago, Armstrong argued that the emergence of the RCT had upset the balance between science and experience as sources of medical knowledge. He claimed that clinical science and what he called ‘clinical sense’ (practical knowledge or clinical judgement) offered alternative, and conflicting bases for clinical practice (Armstrong 1977:600). Clinical sense served not only to

legitimate professional autonomy and the doctor's dominant position in the doctor-patient relationship, it crucially ensured freedom from external interference:

“evaluation or control over the quality of medical care was virtually impossible as an observer could rarely claim the necessary experience to know whether a particular outcome was an effect of the treatment or the natural course of the illness.” (Armstrong 1977:600)

The advent of EBM means that practice may no longer be regarded as a mysterious art known only to the practitioner. EBM allows outsiders, health care managers and purchasers, or patients, to question and possibly dictate how medicine is practised. One commentator noted that guidelines (and behind them the EBM movement) could spell the end of surgery as playschool for adults and asked “would anyone other than surgeons lose out if they lost the right to make their idiosyncratic decisions?” (Delamothe 1993:218).

This research has suggested that practical knowledge is a distinct and necessary component of surgical practice. What appears to be idiosyncrasy and thus *irrational* might more accurately be seen as non-rational and reasonable responses to the nature of surgical work. The final chapter of the thesis reviews the key findings of the research and considers the implications of this conclusion for surgery and EBM

## Chapter 7. Conclusions

The aim of this thesis is to assess the role of EBM in surgical practice. To do this the thesis set out to describe surgical work and the nature of variation in everyday surgical practice. It was particularly concerned to identify what surgeons saw as the source(s) of variation in their work.

The thesis has examined three stages of surgical work, namely patient selection, procedure selection and the operative event. It has shown that each stage is characterised by contingency - that surgical work is dependent on a wide range of factors and subject to chance. A surgeon's decisions and actions are influenced not only by the presence of the clinical condition called stress incontinence. They are also shaped by other factors which relate to the nature of the presenting case, the surgeon's disposition and/or aspects of the external environment ranging from the equipment available to the dexterity of the surgical assistant.

The thesis has explored how surgeons learn to deal with this contingency in their work. It looked at the formal period of surgical training - the surgical apprenticeship - and learning by surgeons in the period beyond this training. These data suggested that practising surgery is central to learning to deal with contingency in everyday surgical work. Part of the knowledge base for surgical practice is experiential. It is acquired partly by observing and imitating other surgeons, but predominantly by doing surgical work.

These two findings – that surgery is partly contingent and is acquired experientially have been used to argue that surgery is a form of craftwork. Part of what surgeons do requires the exercise of indeterminate, clinical judgement. The thesis has used Oakeshott's term practical knowledge to refer to this knowledge. Practical knowledge enables the surgeon to deal with contingency; it is a way of making sense of the variation inherent in surgical work. It exists alongside a second form of knowledge referred to as technical knowledge. The thesis has suggested that EBM embodies technical knowledge which can be formulised and specified. This emphasis on technical knowledge creates difficulties for surgeons because it appears to undermine or the practical knowledge component of their work. The 'E' in EBM – which is scientific, technical and rational - is difficult to reconcile with that part of everyday surgical work which requires individualised, practical and possibly non-standard solutions to the problem of contingency.

In addition, the EBM movement has not grasped the experiential mechanisms by which knowledge is transmitted in surgery. Much of the learning involved in surgical practice is experientially based. What surgeons do and how they work is largely shaped by the process of performing operations, practising decision making and by continual exposure to the work practices of other surgeons. By contrast EBM is predicated on a technical model of learning in which formulised technical (scientific) information is provided - in the form of journal articles or practice guidelines - and incorporated into practice. The proponents of EBM, largely drawn from academia and general or internal medicine (i.e. not from within surgery) have assumed that simply telling the surgeons about the

evidence will change their behaviours. The promotion of EBM, both by these ‘outsiders’ (non-surgeons) and via journals does not use either personal networks within surgery or this experiential approach to learning. This may explain why surgeons do not apply ‘evidence’ to their practice.

### **Implications for surgical training**

The thesis has demonstrated that experience, acquired mainly in the apprenticeship period underpins the surgeon’s ability to deal with contingency. The importance of this period of supervised practice in medical education has been noted (Charlton 1991:356) yet the surgical apprenticeship is currently being eroded.

Policy initiatives in the UK in the late 1980s and early 1990s have attempted to increase the number of consultant posts and at the same time reduce the number of training grades<sup>1</sup>. Alongside these initiatives, junior doctors’ hours have been reduced, with the effect that both the number of hospital placements and the length of time spent apprenticed to a ‘master’ surgeon are likely to decrease. There has been considerable debate in the medical journals about the impact of reductions in the length of specialist training. It has been suggested that the new medical training programmes do not allow sufficient experience for trainees (see Barber, Goodman, Alberti and London, Allison et al, Daggett, Hobbs, Alexander, Elkeles, and Calman, all 1997). Similar concerns have been raised in the USA where it has been argued that the current residency training program does not provide sufficient experience for general surgical trainees who are

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<sup>1</sup> See UK Health Departments et al (1986) *Hospital medical staffing achieving a balance* and Secretaries of State et al (1989) *Working for patients*.

increasingly being expected to deal with more complex procedures (Way 1996). The experiential training which the urologists and gynaecologists studied for this thesis received was central to their ability to deal with variability, conditionality and chance in their everyday work. Reductions in the length of the surgical apprenticeship may have an adverse effect on practice by diminishing these practical skills.

In examining mechanisms for developing surgical practice and learning beyond the period of formal surgical training, this thesis has suggested that personal contacts and opportunities to work with other surgeons continue to be important. However, the research has shown that surgeons in the UK and the USA experience considerable isolation once their formal training is complete. There are few opportunities to undertake supervised practice or observe how other surgeons work. Often there are considerable organisational barriers – limits of time and money – to prevent this. In addition, this sort of continuing experiential learning is largely left to the individual to organise and thus varies between surgeons. Studies of the diffusion of innovations in surgery and elsewhere in medicine (Coleman et al 1966; Greer 1977 1988; Stocking 1992a and b) suggest that these types of personal contacts are important routes by which new ideas are passed. Where there are innovations or changes to technical knowledge, for example resulting from RCT evidence, it would therefore seem fruitful to utilise such personal networks. In addition, increased opportunities for more senior surgeons to work alongside other experienced surgeons would encourage the sharing of technical knowledge and allow ‘peer supervision’ when new procedures are practised.

### **How far are the findings of this thesis generalisable beyond surgery?**

As noted in Chapter 3 the research presented here was highly selective in terms of the choice of settings, specialties and surgeons involved. It focussed on a small sub-specialty area and on a limited range of surgical procedures. The methods used were qualitative and the findings are not statistically generalisable. The number of surgeons interviewed and the observational data gathered were limited and are not intended to be representative of a wider population of surgeons. The data presented here show that contingency is a feature of the surgical work involved in treating stress incontinence. It seems probable that case, surgeon and external contingencies are a feature of all surgical work as many of the examples – for example, complex co-morbidity, surgical preferences, availability of equipment - could be found in most, if not all, areas of surgery.

The research indicates that the same broad types of dependencies and chance factors are features of surgical work in the UK and the USA sites studied. The key differences between the practices of English and American surgeons were the inclusion of psychiatric morbidity and the greater use of explicit symptom severity gradings by the American surgeons. Their decision making also appeared to be informed more by patient preferences. These appear to be features of the two health care systems. It seems likely that the system of general practitioner referral in the UK may ‘screen out’ patients who are psychologically unfit for surgery. The English surgeons seldom used explicit severity grades, but that may reflect the lower level of provision and the associated higher severity threshold for qualifying for surgery. Patient choice is an established



feature of North American health care, which is largely fee for service and has had to respond to its 'consumers': this has, until fairly recently not been a feature of the UK NHS which is free at the point of delivery. The greater amount of surgical equipment used may also be a feature of the funding mechanism in that items used in a procedure may be billed for. The US surgeons used a broader range of operations – including sling procedures, which are rarely performed in the UK. This appears to be related to the way innovations diffuse. For example, sling procedures were popular in the US (possibly because of their use in a number of prestigious clinics) and this popularity meant that American surgeons had more opportunities to work with, and learn from, surgeons who performed them. The final difference also concerns learning. The observations in the US suggested that the American surgeons favoured team-working styles of practice. This was apparent in their teaching of more senior trainees (such as the surgical research fellows) and in the 'joint' operations with surgeons from other specialties. In the training situation this may reflect the age and status of trainees, who, in the American system are older having completed an initial college degree and then four years of medical education, prior to entering surgery. Or it may be a reflection of a different emphasis on hierarchy in the two countries.

While there are these differences in the data, both the English and American data confirm that surgical work is contingent. Both sources indicate that case, surgeon and external contingency are features of surgical work. They also demonstrate that learning is, largely, experiential in this area of surgery. These findings suggest that surgical work requires practical knowledge.

However, it is clear that the surgical treatment of incontinence is a complex area. The existence of several different operative procedures may indicate that it is particularly contingent and that greater practical knowledge is required for this work. Most of the surgeons conducting these procedures were consultant level and this may reflect the greater need for clinical judgement (practical knowledge) in these cases. There may be areas of surgery where the work is more technical, and can be routinised, where there are single operative procedures, with clear and simple clinical indications (appendectomy or hernia repair might be examples) which require less practical knowledge.

This thesis is about surgery. The data presented here have been used to support an argument about practical knowledge in surgery. These data cannot be used to generalise to other areas of medicine. Nonetheless the arguments against EBM reviewed in Chapter 6 indicate that the role of 'art', 'judgement' or what has been referred to here as practical knowledge has been recognised by doctors working in other areas and specialties. Further research will help gauge the extent to which practical knowledge is a feature of all medical practice.

### **The future of EBM**

EBM is just one of a number of contemporary attempts to rationalise professional work. A similar movement may be identified in education - evidence based teaching

(Hammersley 1997 and Hargreaves 1997). The president of the Royal Statistical Society has gone so far as to speculate about the 'evidence-based society' (Smith 1996:381).

The social movements articulated around evidence-based practices in these spheres of social life can be seen as part of a broader rationalising process described by the sociologist Max Weber (1968, Gerth and Wright-Mills 1958). Medicine is simply one site of a rationalising trend. EBM can be seen as part of a wider social reform movement - a movement that has yet to be comprehensively studied. This would require consideration of why EBM (or evidence based teaching etc) has emerged in this period of history.

One explanation for the rise of evidence based social movements is that rationalism provides a mechanism to control the professions. Certainly EBM, through guidelines and protocols, has the potential to prescribe how doctors should practice and what work they should do<sup>2</sup>. However if medical work requires practical and technical knowledge, such strategies may fail because they only deal with the technical side of medical work. If part of what surgeons (and possibly all doctors) do when confronted with variation is to draw on this unformulisable, intuitive knowledge, then, this thesis argues, the role of EBM is limited. Allsop and Mulcahy, in a recent review (1996) of professional regulation described numerous attempts at external control of the profession of medicine, and concluded

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<sup>2</sup> Eisenberg (1985) has described how third party payers for health care in the US, such as Blue Cross, have begun to restrict medical practice, for example by limiting the number and types of tests or investigations which can be performed.

“what is clear is that, whatever regulatory style, the profession is still in a position to determine what constitutes appropriate medical practice. Their knowledge is unique and, even if guidelines and protocols were to be generally implemented, there would remain a large element of judgement in medical decision making about their application to a particular patient.” (Allsop and Mulcahy 1996:203)

Where EBM does have a role is in strengthening the technical knowledge base of surgery or medicine. The incorporation of the technical skills of appraisal and evaluation, along with awareness of scientific research methods within formal medical education allows doctors to weigh up the growing technical knowledge behind their practice. The findings of RCTs provide a reference point for practice, indicating the effectiveness of treatments or interventions. EBM can inform a wider decision making process which may incorporate other information about costs, values, and so on. Alongside this technical knowledge there is also a role for judgement - or practical knowledge. This provides the surgeon with the ability to respond to and adapt in the face of contingency and variation. It is important that this element of the ‘art’ of surgery is also protected.

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## Appendix 1: Glossary

**catheter** - a flexible tube inserted into bladder, for drainage or filling, through urethra or through an abdominal incision (supra-pubic catheter)

**COAD** - chronic obstructive airway disease; a general term for respiratory conditions in which below normal quantities of oxygen are taken into the lungs and transferred to the blood

**Cooper's ligament** - a white line/thickening of the fascia between the vagina and bladder

**cystocele** - protrusion (prolapse) of the bladder into the front wall of vagina

**diathermy** - high frequency alternating electrical current applied to tissue to cut and burn, seal blood vessels etc

**epithelium** - cellular layer lining or coating surfaces of the body and organs

**fascia** - tendon-like connective tissues in layers between muscles, around organs, vessels and nerves (rectus f. straight muscle on either side of midline of abdomen)

**meatus** - any passage or opening into the body

**Metzenbaums** - a type of surgical scissors

**nulliparous** - woman who has never given birth to a child

**pelvic floor** - muscles and tissue structures with the pelvic region

**perineal** - part of the pelvic floor that lies between the anus and vulva

**periosteum** - fibrous membrane/tissue surrounding or on the surface of the bones

**ramus** - branch or subdivision arising from the division of a blood or lymphatic vessel or a nerve

**prolapse** - downward displacement/movement to abnormal position of a body part or tissue e.g. uterus, rectum

**prophylactic antibiotic** - preventative (usually before or during operation) antibiotic given to fight off potential infection

**Pfannensteil incision** - transverse incision or cut made in a line just above pubic hairline

**rectocele** - bulging (prolapse) of rectum into vagina

**retractors** - instruments used to hold a surgical incision open

**sinuses** - used by one surgeon to refer to fistula, an abnormal communication between organs or skin and interior of the body which can arise due to abscesses

**symphysis** - joint where bones are held together by strong fibrous cartilage, s. pubis between two pubic bones at front of pelvis

**trocar** - sharp pointed surgical stilette, used with, and to allow insertion of, a cannula (tube) into the body, the trocar is withdrawn leaving cannula in place

**ureter** - tube which carries urine from the kidney to the bladder

**urethra** - tube which carries urine from the bladder out of the body

**urodynamics** - investigation of bladder function. A catheter and a probe for measuring pressure are inserted into the bladder and rectum. The bladder is filled and a series of pressure readings are taken. The patient may be asked to cough or jump to demonstrate genuine stress incontinence. Readings are also taken during voiding and the patient may be asked to interrupt micturition to demonstrate any sphincter weakness

**Volsella forceps** - long grasping instrument with sharp teeth used to grasp pull or rotate tissue

## Appendix 2: A record of interviews and observation periods

### *Surgeon interviews (England)*

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Surgeon Identifier	Sex	Teaching Hospital	Interview date(s)
U1	male	✓	21.06.93 (+ junior staff present)
U2	male	✓	08.11.93
U3	male	✓	03.08.93
U4	male	✓	06.08.93
U6	male		02.12.93
U7	male		09.05.94
U8	male		15.06.94
U9	male		17.06.94
G1	male	✓	25.06.93 (+ junior staff present)
G2	male		07.07.94
G3	male		30.06.94
G4	female		25.02.94
G5	male	✓	13.12.93
G6	male	✓	08.12.92/ 09.08.93
G7	male		15.09.93
G8	male	✓	03.12.92/ 16.04.93
G9	male		23.02.94
G10	female		07.03.93
G11	female		20.05.94
G12	male		23.11.92/ 10.05.93/ 27.06.94
G13	female	✓	26.05.94
G14	male		16.05.94
G15	male		05.11.93
G16	male		04.07.94
G17	male		22.06.94
G18	male		27.06.94
G19	female		23.03.94
G20	female		07.03.94
G21	male		26.01.94

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*Operations observed (England)*

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Surgeon

Operation

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U1

Vaginal needle suspension

U5

Stamey  
Cystoplasty  
Colposuspension

G12

Abdominal hysterectomy and Raz  
Abdominal hysterectomy for carcinoma  
Laparoscopy (beginning only)  
Vaginal needle suspension  
Pereyra

G21

Hysterectomy  
Bladder neck repair (Pereyra)

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*Surgeon interviews and observations (USA)*

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Observation identifier	Data source
USOBS1.1	Operations (USG4, USG1, male) - <i>Para vaginal repair/colpopexy</i> - <i>Fistula repair</i> - <i>PULP</i> Interview (USG1, male)
USOBS1.2	Interview (USG2, female) Operation (with J, visiting surgeon) - <i>PULP</i>
USOBS2.1	Operations (USG3, male and C, female Resident) - <i>Laparoscopic investigation (with Urologist)</i> - <i>Hysterectomy and Burch</i>
USOBS2.2	Interview (USG3, male) Ward round & recovery room Teaching sessions - <i>Lecture on vaginal prolapse</i> - <i>Board revision session</i>
USOBS3.1	Operations (USU1, female and M, male Resident) - <i>Removal of stent</i> - <i>Sling</i> - <i>Bladder tumour</i> - <i>Hysterectomy and Stamey</i> - <i>Sling</i> Family/relatives room Ward round Interview (with USU1, female)
USOBS3.2	Operation (USU1, female) - <i>Collagen injection</i> Urodynamic investigation suite (E, female Physicians Assistant)
USOBS4.1	Interview (USU2, male) Private clinic

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**Appendix 3: Letters to the surgeons inviting them for interview**

Mr/s [ name ]  
Consultant Gynaecologist  
[ address ]

[ date ]

Dear [ name ]

Re: MRC North Thames Stress Incontinence Study

You may remember at our meeting last year at the launch of this study I mentioned that I would be interviewing the participating surgeons to find out more about the surgical techniques they use in treating stress incontinence. Would it be possible to meet with you on any of the following dates, at a time to suit you?

[insert dates]

The interview will take about 45 minutes, and with your permission I would like to tape our conversation for ease of transcription. Afterwards I will send you the technical part of the transcript so that you can make any revisions/clarifications you feel are necessary. Of course the transcripts themselves remain confidential and are anonymised so that individuals and hospitals cannot be identified.

I will telephone your secretary sometime next week to see which of the dates is suitable. Thank you very much for your help.

Yours sincerely

Catherine Pope  
Research Fellow

Dr [ name ]  
[ address ]

[ date ]

Dear Dr [ name ],

I am writing to you at the suggestion of Dr [ name ] to ask if it would be possible to meet with you, for an hour, during my visit to the US planned for November this year.

I am currently co-ordinating a three year study examining the outcomes of surgery for stress incontinence in women, based in two English regions. In addition to this I am working on a PhD thesis about innovations and the diffusion of ideas in the treatment of female stress incontinence. My background is in health services research and medical sociology. For my thesis I have been interviewing a number of surgeons in England about the surgical techniques they use, how they develop techniques, and where they learn about innovations in this field of surgery. I have also been observing some operations.

I am currently attempting to obtain funding for a period of study leave in the USA and have to submit an itinerary for my visit to the funding body. I would be most grateful if you could suggest possible dates when it would be convenient for me to meet with you. The aim of my proposed trip is to gather comparative information about the diffusion of innovations in the USA, and between the USA and the UK. I am particularly interested to learn about new techniques and modifications to procedures and how knowledge about such developments is passed on.

I would be most grateful if you could spare some time to meet with me. Thank you for your consideration.

Yours sincerely

Catherine Pope  
Research Fellow