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# Learning from Surgery: How Medical Knowledge is Constructed

**Abstract:** Using data collected from surgeons working in a transplantation unit in Portugal this article aims to identify how medical knowledge is constructed within the context of surgery. The key theoretical guidelines are drawn from the sociology of professions and medical sociology, particularly social constructivist studies. A qualitative methodological approach was adopted, in which we opted for a participant observation and on-site interviews. Three hypotheses are addressed: 1) the recent shift towards Evidence-Based-Medicine (EBM) influences the primacy of clinical experience in the construction of medical knowledge; 2) medical experience does not strongly links with EBM principles; 3) personal experience is central in the construction of medical knowledge and discourse. This article provides a new window into the study of medical profession, a step forward in the research field. Conclusions show new understanding about EBM practice, insofar as it ties the production of medical knowledge to professional dynamics and autonomy.

**Keywords:** Portugal, medical profession, EBM, surgery, power/knowledge, liver transplantation, qualitative study

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In the late 1960s, the social construction of knowledge and reality represented a phenomenological line of sociological thought, as popularised by Berger and Luckmann (1967). On the basis of this perspective, an extensive body of work has been built regarding the nature of medical knowledge. Across this field, the issue addressed emerges as a challenge to the modern idea of scientific rationality, insofar as it ties the production of knowledge to power and discourse. This argument has led the authors to strive to identify how diverse types of knowledge are produced and developed within the context of medical healthcare and professional practices.

This has led us to consider some of the contemporary contributions made in the field of medical sociology, particularly social constructivism and what is commonly termed as the Foucauldian approach, which highlighted the relationship between medical power, knowledge and discourse. In this way, this article seeks to provide a window into the understanding of medical profession, considering other contributes rather than only those traditional considered from sociology of professions body of literature.

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In this line, other contributions such as those of Turner (1995) and Atkinson (1995) are important, since both stress the central role of medical discourse, that is embedded in the interaction between medical work and technologies, from which they themselves construct medical knowledge, within the context of medical practices.

This issue has became more apparent in contexts involving a vast set of hyper-specialised technologies and medical practices, managed by particular actors acknowledged in medical and scientific circles for their mastery of a high-tech area in the world of medicine. Such is the case of liver transplant surgery, one of the most technically well-developed areas of medicine.

For the above reasons liver transplant surgery proves to be an interesting field of research. This medical area is particularly sensitive to power/knowledge strategies in view of the sophisticated levels of the medical cases concerned, the increasing use of non-invasive surgical technology in surgical procedures and the medical practices and knowledge involved. The sophistication of the medical practices associated with a specific technological innovation affords liver transplant surgery an undeniable social importance and a fertile terrain for sociological study.

In studies on transplantation, little attention has been paid to the different forms of knowledge and to the latest advanced technologies integrated in everyday medical practices, which are conducted in the intensely busy environments of high-tech hospital departments. However, over the past ten years, we have come across a number of sociological studies on surgery that used a social constructivist framework or a Foucauldian approach. These contributions are particularly relevant since they give detailed descriptions of daily surgeons practice in the operating theatre, highlighting how medical knowledge and discourse is constructed and reproduced.

The work of Prentice (2005) examines the application of new technologies incorporated in simulators designed to develop surgical skills, especially those required to perform minimally invasive procedures. The simulators reconstruct surgical knowledge, such as practical skills (or what surgeons call ‘good hands’) that remains tacit. Prentices’ main argument is that surgical learning occurs at the interface of the bodies and technologies, through the work in surgical situ, so to speak, and the training of the surgeon’s hands: a process that Prentice (2005) calls “mutual articulation.”

In her anthropological study on surgery, Katz (1999) deconstructs the stereotype surgeon’s image of the God-like hero. Through her observation of the operating theatre and its rituals, Katz (1999) shows how biomedicine is heavily ritualized, thus enforcing biomedicines’ attempts to reinforce and maintain the discursive realities that biomedicine creates. Also in his ethnographic study, Hirschauger (1991) presents surgical operations as encounters of two disciplined bodies: a parcelled “patient–body,” and an aggregated “surgeon–body.” The author describes the practices of making bodies operable by highly skilled manipulations and the application of optical technology. Hirschauger (1991) offers a constructivist approach discussing the features of surgical practice and the ritual aspects of scientific work.

On the other hand, most sociological and anthropological studies emphasize surgery’s masculine ethos. The focus on gender relations is central in Cassels’

(2000) study. The author explores the work of women in surgery, a medical speciality traditionally regarded as male–dominated. In a "men's world," Cassel shows how the fact of being a woman influences how the surgeon is perceived by her peers, patients and the other health professions.

Through a detailed description and sociological analysis of daily life in the operating theatre, Fox (1992) argues that the power of surgery is derived from techniques within its command. The conclusions of his study serve as a reference to an understanding of other medical specialities. Along the same lines, by observing surgery work, Zetka (2003) argues that surgeons have managed to maintain professional control by delivering outputs that are unachievable within other kinds of work organisation. By exploring medical intra-professional dynamics, the author compares the traditional techniques employed in intra-abdominal surgery with a non-invasive surgical technology, the video laparoscope. Zekta (2003) demonstrates the impact of this new technology and the way it changes the working lives of surgeons, challenging them to rethink their approaches to surgery and constructing new strategies in terms of organization of work.

According to the abovementioned and using the data collected from surgeons working in a Transplantation Unit (TU) in Lisbon (Portugal), this paper seeks to identify how medical knowledge and discourse is constructed and reproduced. Since medical knowledge is based on both formalised codes of knowledge (Evidence-Based-Medicine – EBM) and the exclusive knowledge set on clinical experience, there are tensions between EBM guidelines and individual clinical autonomy (including the value of subjectivities). Clinical experience and personal medical knowledge assume a central role in the definition of professional competence and differentiation along with EBM defined standards. Thus, three hypotheses will be addressed: firstly, the recent shift towards Evidence-Based-Medicine influences the primacy of clinical experience in the construction of medical knowledge and discourse; secondly, medical experience, built on clinical practice, does not strongly match with EBM principles; thirdly, personal experience is central in the construction and reproduction of medical knowledge and discourse.

The artickle is organised as follows: the next section gives a presentation of methods and material; thereafter follows three sections, each of them starting with a brief theoretical background according to the hypotheses addressed above; the paper concludes with a presentation of the main results.

## Methods and Material

A qualitative methodological approach was adopted, in which we opted for a central technique, participant observation and, as a complementary technique, semi-structured and in-depth interviews. Continuous participant observation extended over a period of roughly seven months, between February and October 2009. This was subsequently followed by semi-structured and in-depth interviews involving all the TU surgeons under observation (ten surgeons, all men; here numbered SG 1 to 10). All the surgeons observed and interviewed practise in the same hospital where the TU is to be found, besides having graduated and trained at the same medical school.

An open strategy was chosen to access the field, one in which the presence of the researcher was agreed upon, despite ones awareness that this type of strategy often hinders access to what goes on behind the scenes. It is possible that those being observed may prefer to conceal part of their performance. However, despite the researcher's awareness of these difficulties, besides the need to negotiate the nature of her role with one or more social subjects, coupled with the importance of clearly defining the aims of the research. From the ethical standpoint, this strategy certainly raises fewer problems. All the surgeons observed and interviewed, besides other health professionals and patients have had prior access to the research project and agreed to participate.

A selection was made of the places that made it possible to observe the work being carried out in surgery. The researcher was thus systematically present at surgery consultations, in the diagnosis rooms, at medical meetings, in the wards, workrooms, operating theatres and corridors, in short anywhere where it was possible to observe the work undertaken by surgeons.

The relationships between the various actors were investigated through the exploration of the surgical work undertaken in its relationship with technology, in the units of observation under study. To this end, different methods and levels of analysis were used. An attempt was made to analyse the way in which those who talk and those who listen develop and share discourses (Atkinson, 1995). During the observation period, in the end of every day, all the experiences and observations were recorded in a note book and transcribed, in order to guarantee the accuracy of the data collected and its subsequent analysis.

The purpose of such a presence in the field was to observe how surgeons talk and think about the cases handled in medical practice, highlighting how EBM influences the primacy of clinical experience, in the construction of medical knowledge, and differs from practice. The aim was to combine theoretical and empirical aspects, by testing hypotheses based on the systematic study of a particular set of observations. It involved formulating arguments based on an in-depth knowledge of the topics and subjects concerned, illustrating them with previously identified examples and then discussing them. The nature of the problematic in question reaffirms the advantages of this type of methodology, which makes it possible to continually validate the theoretical framework and hypotheses, in keeping with the analysis made of the data (Glasser et al. 1967).

The choice of the semi-structured interview type as the complementary information gathering technique may be accounted for by the flexibility of this approach when engaging in in-depth exploration of issues deemed important to the research project. The semi-structured nature of the interview enables the discussion to be conducted in accordance with the pre-established script. The questions asked (almost 37) fit into previously constructed categories: socio-demographic characterization; professional trajectory; technology; work organization; scientific knowledge; intra and inter-professional dynamics. However, the answers are open, thus facilitating the gathering of any information of possible relevance to the research and confirmation/validation of pre-existing data, as well as the production of new material for analysis.

The interviews, lasting an average of two hours, made it possible to clarify aspects that were less evident for the researcher, thus enabling her to dispel any

existing ambiguities. They also provided an excellent opportunity for each person being interviewed to individually mention and clarify aspects of importance to the research. The flexible nature of the interview also made it possible to test both the researcher's already previously formed hypotheses and those that had, in the meantime, arisen.

These interviews led to a wide range of different opinions, which clearly expressed the complexity of the different points of view witnessed at the unit, besides underlining the wealth of the material collected. In order to guarantee the accuracy of the data obtained and its subsequent analysis, all interviews were recorded and transcribed. This naturally equated to an enormous quantity of data in the form of a written text (two hundred single space pages) which ensured the anonymity of those interviewed. In this way, conversations regarding the medical practices under observation and data gleaned from the interviews formed the material for the analysis, performed in keeping with thematic and discourse analysis proceedings (Denzin et al., 1994).

The data analysis process can be represented in a spiral image, where the researcher engages in the process of moving in analytical circles rather them using a linear approach. The analytical process enters with data of text and exits with an account or a narrative. In between, the researcher touches on several facets of analysis and circles around. Following this steps, the researcher is constantly analysing by getting a sense of the whole data: from the transcribed conversations, patterns of experiences are listed; then, identified all data related to the already classified patterns and combined and catalogued related patterns into sub-themes. According to Creswell (1998), "the category formation represents the heart of qualitative data analysis." Here it is described in detail, developed themes and dimensions, and provided the researcher's views or views from literature or theoretical approaches.

## Shifting towards EBM: the primacy of clinical experience

According to Uttley (1991), in Western societies, the emphasis on the instruments, machines and procedures connected with healthcare may be explained through the direct association between progress in physics and medicine. Hence, knowledge of the body and disease is achieved on the basis empirical science and physical features.

As such, modern Western medicine is based on a particular type of discourse. It is synonymous with what has become known as the biomedical model that has determined our understanding of health and disease throughout the last 150 years. This model thus serves as a reference not only for the production of medical healthcare but also for the production of medical knowledge and discourse. The recent shift towards EBM seems to reinforce this contention. EBM sets out to apply "evidence" gained from scientific method to medical practice. It seeks to assess the quality of evidence as to the risks and benefits of treatment (including lack of treatment), by using what is currently the best evidence in making decisions regarding the care of individual patients. (Timmermans et al. 2001).

Social scientists have studied the emergence and consequences of this turn in medicine. Sociological literature is highly critical of EBM and is particularly relevant to understand how recent shift towards EBM influences the primacy of clinical experience in the construction of medical knowledge and discourse; most authors have located EBM as a continuous effort to render medicine more scientific through quantification (Marks, 1997; Porter, 1995). For critics, the preference of randomized clinical trials (RCTs) in all circumstances leads to the elevation of a study's research design over its quality. Therefore, a bad RCT is preferred over a good observational study (Grossman and MacKenzie, 2005). Lambert (2006) displays the endless of individual patient needs, the tendency toward individualized interventions, the elimination of clinical skills in EBM, the production of prescribed guidelines and failure to consider patient views in translating evidence into practice.

So, many aspects of medical care depend on individual factors, which are only partly subject to scientific methods. The great meaning of modern medicine does not lie only in the technological advances deployed to render the body legible (Foucault, 1975). Medical practices are established on the basis of medical knowledge reproduced through those practices (Atkinson, 1995). In this way it becomes possible for the principles underlying the production and circulation of this knowledge to work.

Such is the case of the TU surgeons' meetings, where surgeons get together to discuss new medical cases and decide to admit new patients for a liver transplant (field notes).[1] This is particularly so in situations when there seems to be greater controversy as to whether or not transplantation is the best solution. In the following interview, the surgeon expresses his point of view, in which he emphasises his learning acquired from training and what he calls "the critical sedimentation of experience":

> It is through direct observation of phenomena that science is discovered, that revelations appear … through direct and critical experience of the facts and not the accumulation of notions acquired without critical selection. There are scientific judgements that we all know, but there are situations where nothing is defined, where there are no scientific guidelines. We do not know how to make a decision because it's unclear … we shall see … I myself see the same problem differently from my colleague. And often we discover new things because of that. Science is born from this adventure, this receptiveness to learn from experience (SG 5).

To practice evidence-based medicine requires not only clinical expertise, but also expertise in retrieving, interpreting, and applying the results of scientific studies. At the interviews, TU surgeons argue that "the knowledge gained from medical-scientific research, does not directly answer the primary clinical issues in clinical

[1] Field notes in this article refer to various notes and reflections recorded by the researcher during or after the observation period.

decision making. The clinical experience should be valued" (field notes). According to this, the practice of evidence-based medicine must articulate the surgeons' own experience or individual clinical expertise with the best available external clinical evidence from medical-scientific research. EBM expresses many TU surgeons' feelings that, in fact, much of their practice "has not been based on scientific evidence but on medical experience, habits and trends built on clinical practice and experience" (field notes). Although EBM is becoming regarded as the "gold standard" for clinical practice, there are a number of reasons to justify why some surgical practices in TU do not possess a strong scientific research base as a support. According to ethnographic data, clinical practice was fundamental to the launching of the Hepatic Transplantation Program in 1992. "Several years of experimental surgery on pigs, performed in the laboratory, preceded the first liver transplant" (field notes). Through the practice of experiments, TU surgeons created a new, pioneering surgical technique, as one surgeon mentions:

> We performed transplants on lots of pigs and most of them are still alive. We carried out what we call experimentation. And we created a new surgical technique, the Piggy Bag. It's a very risky one, but we are very good at it because we have done it many times, first on pigs … (SG 7).

Close-up observation of TU surgeons work reveals the 'true meaning behind the learning and training of new specialists, undertaken through reflection on information derived from the body' (field notes). Thus, medical knowledge, created via medical practice, led to a gradual acculturation process among new members of the profession, which progressively internalise the medical gaze specific to their respective specialist fields. In addition to the theoretical classes given at university, TU observation reveals that "interns were constantly present in the operating theatre where they closely followed everything that took place, asking for and exchanging impressions with their tutors" (field notes). Sometimes, the surgeons would draw attention to some detail involved in the technique being undertaken at the time. «Some of these interns were an integral part of the transplantation team and displayed a certain degree of autonomy and mastery of certain techniques" (field notes). Hence, the operating theatre and hepatic transplant surgery represent one of the most important environments and periods of time for the reproduction of medical knowledge, as confirmed from an intern surgeon:

> My tutor is always giving me the opportunity whenever there is a transplant surgery. We are not there just to see how senior surgeons perform. We participate, we practise and often most of us may do it alone … we have the opportunity to learn from the transplant surgery. It wouldn't be possible otherwise. And you have to do it day after day … you have to do it constantly. You can't miss any transplant, or at least you try not to (SG 2).

Teaching within the context of medical practices such as the operating theatre, provides the means whereby the educational component and medical training are merged. They produce a combination of theory and practice, of science with experience that are, on the whole, absolutely necessary to the training of competent

surgeons. It is within these contexts that clinical practice and medical knowledge are reproduced and the form of discourse is conveyed. Fox (1988, pp. 573–574) refers to the experience of harvesting organs from corpses as one of the most impressive instances of how doctors encounter the mystery of life with the enigma of death in the form of a naked body stretched out on the operating table. Dissecting a corpse and participating in harvesting organs constitute some of the most powerful symbolic moments in the construction of medical knowledge. The words of a surgeon demonstrate the unique opportunity given to the interns to practise the most sophisticated surgical techniques:

> The harvesting operation, I think, should be an operation that is compulsory for any intern surgeon. As a practice, it is the best there is; we try to operate in those exercises that are performed with corpses but this is with a living patient. Dead, in fact, but with the heart still beating. The problems that a real operation poses are all there. You can't mess it up. It does make a difference whether the donor bleeds or doesn't bleed. The operation needs to be bloodless as otherwise there'll be instability that will put at risk all the organs that we wish to harvest (SG 4).

In line with this, Fox (1957) argued that medical knowledge and discourse is inherently uncertain because it is pocked with gaps and unknowns and because it is always expanding and impossible to completely master. The dilemma for physicians consists in managing the limitations of their own cognitive ability in the face of the vast medical literature. Medical uncertainty emerges when doctors apply theoretical knowledge to clinical practices and handle both the physiological and psychological aspects of patient care. Fox stantes that medical training consists of a gradual socialization in medical confidence where doctors learn how to manage successfully the limitations of medicine. Training for uncertainty serves to imprint a professional attitude of objective expertise and discourse (Katz, 1984; Light, 1979).

According to this, Fox (2000) addresses that EBM reinforces collective oriented approaches in medicine at the expense of individualized patient–doctor interactions and individualized clinical expertise. In the same way, examining whether EBM reduces or enhances uncertainty, Timmermans and Angell (2001) studied how residents in two paediatric programs used EBM to manage the uncertainty and to weigh EBM knowledge against firsthand experience. They point out that residents were exposed to EBM but engaged with this scientific evidence in different ways. Most of the residents interviewed (designated as "librarians") read EBM as equivalent to consulting the medical literature, while for others (designated as "researchers"), EBM drives in an active evaluation of the research literature. The authors also found that EBM created a new source of uncertainty.

EBM critics are evident among patients and clinicians. Terms as "evidence based patient choice" (Hope 1996) or "patient centred medicine" (Bensing 2000) usually appear to attention to the need to include patient's perspectives on the process.

"Each patient is unique. Even when the diagnosis or disease are the same, patients' trajectories are always different" (field notes). This reaction is supported

by some of the problems related with the early application of EBM: rather than a focus on the meanings of illness and out-comes to different people, the focus in medicine moved away from the person to a focus on the condition or health issue, which presented problems in the practice of medicine. This links to the re-integration of the person in knowledge making and knowledge application in health care. Suchman et al. (2011) offer a new approach on relationship-centered health care to create a more spontaneous and reflective approach to change new patterns of communicating and relating at a personal level. EBM principles and discourse may thus silence the individual clinician and the patient, by ignoring illness narratives, patient's experience, doctor's experience and the "expert eye" in medical work (Greenhalgh, 1999).

The production of medical knowledge is beating clinicians' capacity to use it. Such conditions assured the application of EBM principles for knowledge filtering and treatment prioritisation. The fact is that such principles present a series of difficult questions in day-to-day care settings, such as "what is legitimate knowledge?," "how important is doctor's or patient's subjective experience?" (Broom and Tovey, 2007b); a question far from clear in an increasingly pluralistic medical scene (Broom and Tovey, 2007a).

In this way and according to the literature, the findings reveal some important contributions to explain the challenge to the modern idea of EBM guidelines, insofar as it ties the production of knowledge to power and discourse. The next section highlights the tensions between evidence principles, clinical autonomy and the value of subjectivity in clinical practice.

## Between evidence principles and surgical practice

The speed of knowledge production seriously outweighs the capacity of clinicians to understand, absorb and use knowledge. An extensive body of literature has looked at how clinicians view evidence and the question of what is evidence in practice (Armstrong, 2002; Broom, Adams and Tovey, 2009; Broom and Adams, 2010; Broom and Adam, 2012; Kessenich, Guyatt and Dicenso, 1997; Pope, 2003; Timmermans and Berg, 1997). The works of Broom and Tovey (2007a) and Broom, Adams and Tovey (2009) has illustrated that while "evidence," in the biomedical sense, is critical to clinical practice, EBM models and discourse avoid the subjectivities of clinical work and have in fact created new forms of clinical uncertainty. These studies are particularly relevant to explain how medical experience, built on clinical practice, does not strongly link with scientific evidence principles.

Many clinicians are increasingly focusing on incorporating the "human factor" into the decision-making and treatment process (Broom and Adams, 2010), stressing the problematic of EBM in daily medical practice (particularly the case of subspecialties of medicine). The everyday reality of "evidence" and the clinical practice is that they both involve ongoing value judgements and EBM often function to eliminate subjectivities and the social embeddedness of medical knowledge (Goldenberg 2006). So, in clinical practice there is concern regarding the separation between EBM and the actual character of contemporary medical work

(Broom, Adams and Tovey, 2009; De Vries and Lemmens, 2006). This is particularly worrying since the value judgements and subjectivities that often are neglected in an EBM framework constitute crucial skills in clinical practice. As Lambert (2006) stands, here lies the conflict between abstract epidemiological data and individual patient needs.

More recently, there is been a growing number of works stressing how differently positioned clinicians manage the practice of EBM and use forms of expertise in clinical practice; and how clinical intuition links with EBM principles. This body of literature proved to be very helpful to understand professional dynamics and autonomy. The inclusion of these studies in the sociological analysis of professions constitutes a step forward in the field.

Armstrong study (2002) on primary care physicians' illustrated a disconnection between formalised EBM guidelines and individual clinical decisions; the new evidence results in use of a different treatment emphasize the value of subjectivities in clinical practice. Also according to data collected, the persistence of "individual judgement and situated decision-making is rationalised by surgeons through the employment of notions such as uniqueness, indeterminacy, and the need to look to every patient as a unique clinical case" (field notes). In TU "medical knowledge and discourse inherent in surgery is reproduced through medical practices, dispersed over space and time, present in clinical experience and scientific research" (field notes). Medical knowledge is undergoing constant re-newal, founded on daily medical practices. In this interview, a surgeon reinforces this issue and explains his point of view:

> This service is a good example of how the various cases encountered provide important data on the basis of which we collect information and reconstruct this knowledge. In the operating theatre, at meetings where we discuss new patients, on rounds in the wards … each and every moment in which we talk about the patients are moments where we redefine our approach to disease, and compare our findings with what is written in books (SG 9).

Also in her study, Pope (2003) examines how urological and gynaecological/pelvic surgeons perceive EBM framework. Pope refers the intuitive and contingent nature of these surgical sub-specialities. On daily surgical practice, surgeons follow a model of "experientially learned practice" (Pope, 2003). Armstrong (2002) and Pope (2003) works draw attention to strategies of coping with and/or breaking with the growing systematisation in medicine, emphasizing the including the strategic re-emphasis on the significance of tacit and experiential knowledge, build in medical practice. Pope (2003) refers that many clinicians do not use up-to-date evidence in their clinical practice; her work shows how EBM provides a focus for segmental conflict within medical practice between "art" and "science", "practice" and "evidence."

In line with Pope (2003), the TU surgeons point out particular postures concerning this issue. The educational success of clinical contexts depends on the level of similarity and the capacity to transform the realty that clinical practice generates to ensure that positive results may be used in a predictable manner. However, "despite the existence of an enormous range of information and unique medical

knowledge produced and reproduced within the daily medical practice, this does not seem to be channelled into research or investigation, despite the occasional publication of results" (field notes). As one surgeon says:

> As for attending congresses and courses, we have made an effort, all of us. Therefore, we are all pretty much up to date with current practices throughout all the centres. And, indeed, our numbers are just as good and certainly up there with the majority of centres around the world. Therefore, it is not the work that should cause us to feel any shame. What might possibly be so is the lack of scientific work that is being presented (SG 6).

In fact, and according to the observation data obtained and the interviews performed, clinical experience takes on a central role in the construction and reproduction of knowledge to the detriment of other processes, such as scientific research. Hence, though "all surgeons consider the research component to be essential, it transpires that there is serious difficulty in reconciling research activities with clinical practice" (field notes), as exemplified by the following interview:

> We do little. Fundamentally, what is done is to present papers at congresses and, for me that is not very relevant. It would be much more important to publish. Now, to publish, what is fundamentally needed is ones availability, and that is difficult to achieve when working in a surgical unit, ensuring that hospital duties are completed. So it's difficult to find the time to think about publishing … to do research, you need some quiet, spare time (SG 10).

Here we may clearly see some important aspects regarding the construction of medical knowledge in the TU, as well as the characteristics of hospital themselves, which affect the ways whereby medical knowledge is reproduced. As illustrated in the following interview, the TU vocation is, above all, committed to the provision of medical care and not to research. This situation therefore conditions the way in which knowledge is reproduced: predominantly through clinical practice gained during the course of medical care.

> In terms of continuous medical training, I think that we're pretty much up there with the vast majority of centres around the world. We may not have the vocation to do our own jobs and then present them at international meetings but this is more due to a lack of time. Not because of any shortcomings in our vocation but rather on account of the lack of vocation on the part of the services themselves, which are not designed for this. I mean, the role of this Transplant Unit is still essentially to provide assistance, as I usually say (SG 6).

The "clinical practice among surgeons may be perceived as a device for the reproduction of knowledge, that is, the reproduction of knowledge founded on objective clinical facts. Furthermore, the "production of these factual registers depends on personal experience in interpreting the rules of surgical procedures" (field

notes) as, in fact, though clinical procedures are regulated and codified, the actual application of the spirit of these rules depends on a tacit understanding.

On surgery, the rhetoric of experience is that of a stratified profession, in so far as it stresses a vision of socialisation and specialisation gained over long periods of induction into the "mysteries" of the knowledge of the profession. Correspondingly, "the accumulation of relevant experience is actively gained in the course of one's professional career. Specialisation is only achieved through seniority and the range of experience. Similarly, a good level of technical knowledge and information about the specific case proves to be insufficient. The accumulation of medical experience is absolutely necessary for to a surgeon to be regarded as competent" (field notes). To this end, while the rhetoric of technicality expresses the knowledge common to the profession, it is that of experience that brings responsibility and autonomy.

## The voice of experience in training and learning

Though clinical practice is apparently open to questioning by medical gaze, knowledge of the world of medicine is seen as being acquired slowly and carefully through long exposure to this world (Atkinson, 1977). To achieve this, firsthand experience is to be built into the development of the biographical and career record of the doctor. The accumulation of this personal knowledge is central to the definition of competence and professional differentiation. Direct exposure to this reality, present in clinical practice, generates guaranteed personal knowledge for the surgeon.

The importance of personal knowledge has also been referred to by Freidson (1970) who regarded it as fundamental to an understanding of the reproduction of medical knowledge and discourse. Freidson calls this the "clinical mentality" and "clinical mind" of physicians (see Freidson, 1970, pp. 168–172). In appealing to his personal knowledge, the doctor does not do so on the grounds of any uncertainty or necessarily out of any uncertainty among peers. On the contrary, "the doctor bases his actions and decisions on an unquestionable foundation, that is, on the certainty that he derives from personal experience" (field notes).

In TU, there was a constant stream of noted examples confirmed through interviews in favour of this idea. Through the surgeons' own words, we may deduce the role of the TU director and his personal experience, in terms of reproduction of medical knowledge:

> Indeed, the very origin of this transplant unit and the launching of its hepatic transplantation program, is intrinsically linked to one of the surgeons, the unit's director and recognised across the medical community as a transplant pioneer in Portugal. This recognition is, above all, based on the track record of results built up over time and all the personal clinical opinions accumulated throughout his career as surgeon (SG 8).

This is very much personal experience learned from the reproduction of knowledge. "This takes shape in forms ranging from teaching at university through to

the training of doctors in TU medical practices" (field notes). On the basis of observation and interviews, we may state that surgeons channel their personal medical knowledge and reproduce it at teaching level since "some of the surgical team members, including the unit director, also perform lecturing" (field notes). We were told at the interviews that it was the very fact that these members were engaged in hepatic transplantation, besides the knowledge and cutting edge techniques inherent in this specific area of surgery, which opened the doors of university teaching to surgical team members. One surgeon explained: "one of the reasons we surgeons give classes is because we have the transplants. If we were just any other surgical team, this wouldn't happen" (SG 7).

Then, in TU the teaching of surgical techniques remains an important path in terms of the reproduction of medical knowledge. At this point, the surgeons interviewed state that the differences between the teaching of medicine and all other fields of university education lie in the fact that the former involves long term professional training. Despite its multidisciplinary nature, the core of the teaching is provided exclusively by doctors, as one surgeon states:

> True surgical education is direct and lives off personal influences. That is how the truths are conveyed: I do not remember all the books I read but I do remember all the men who taught me, from the older to the younger ones (SG 1).

Therefore the construction of medical knowledge across the surgical team follows its own model, where the voice of experience plays a crucial role. This reproduction of medical knowledge, from senior surgeons to their less experienced juniors, is reflected in terms of decision making, as one surgeon explained:

> Surgery is basically a group speciality. People learn from one another and within the same group everyone learns from each other. The younger ones also learn from the older ones. And the older one has, in turn, already learned from the one before him. And the role of the tutor in surgery ends up being a bit like this as well … it somewhat sponsors this kind of relationship (SG 8).

However, Atkinson (1981, p. 3) referred to the sharp control over knowledge conveyed to medical students. In the learning process based on clinical practice, the students learned about clinical competences but were only able to handle the simplest and most straightforward aspects. In the case of TU, one of the senior surgeons alluded to the "need to control interns when applying specific surgical techniques, given the risks involved" (field notes). Nevertheless, the opportunities created by the service as regards deployment of specific surgical techniques within the operating theatre represented an exception when compared with other services, as one intern explained:

> We are never left outside. We have the opportunity. Anywhere else in Europe it would be inconceivable for an intern in the first or second year to be doing anything at the level of a transplant. That was a gift opportunity … (SG 10).

Following Foucault (1963), we may state that clinical practice has always been the place of experience in contrast with the theories that constantly change and mask or distort the purity of clinical experience. Consequently, the appeal to experience is made to ensure regular, stable knowledge. However, this order is both inherent in the situation and open to clinical gaze, and beyond any system of theories or trends. Hence, medical practice bears responsibility for providing an irrefutable demonstration of reality through the direct perception of its regularities. To this end, the doctor does not act within any context of uncertainty but rather within the security created through experience. As one surgeon argues:

> It is from the availability to risk and to go forward, sometimes against the medical canons, that medical science has made progress. I think I can say that here, in this transplant unit, our work has something to say on this chapter (SG 10).

Thereby, each surgeon reproduces the certainty of personal experience based on medical practice. In concrete clinical practice, the surgeon furthers medical knowledge, building it up and strengthening it, such as practical skills, or what surgeons call as "good hands" (Prentice (2005). The opportunity provided by performing clinical practice serves as the statement of what has been read and thereby reinforces what has been learned in theory. This is medical knowledge reproduced and reconstructed in surgical practice, a process that Prentice (2005) calls of "mutual articulation" between bodies and technologies. In this way the certainty of personal medical knowledge and the primacy of experience are consolidated, on the strength of the medical practices that guarantee and sustain them.

## Conclusions

Using the data collected from surgeons working in a Transplantation Unit, we identify how different types of knowledge are produced and reproduced within the context of hepatic transplant surgery.

Considering the first hypothesis addressed (the recent shift towards EBM influences the primacy of clinical experience in the construction of medical knowledge and discourse), findings reveal some important contributions to understand how surgeons manage the practice of EBM and use forms of expertise in clinical practice; and how clinical intuition links with EBM principles, highlighting the tensions between therapeutic rationality, clinical autonomy and the value of subjectivities in clinical practice. The data also reveal the disconnection between formalised EBM guidelines and individual clinical decisions, as showed in recent sociological literature (Grossman and MacKenzie, 2005; Lambert, 2006); findings also show, according to Atkinson (1995), that medical practices are established on the basis of medical knowledge reproduced through those practices, becoming possible, for the principles underlying, the production and circulation of this knowledge to work.

Results also confirm that medical knowledge and discourse are constructed from daily medical practices. Surgeons do not use up-to-date evidence in their everyday work: knowledge gained from medical-scientific research, does not

directly answer the primary clinical issues in clinical decision making. The practice of EBM sets out to articulate the surgeons' own experience or individual clinical expertise with the best available external clinical evidence from medical-scientific research. However, much of the surgeons' practice seems not to have been based on scientific evidence but on medical experience, habits and trends built on individualized clinical expertise (Fox, 2000; Greenhalgh, 1999; Suchman et al., 2011; Timmermans and Angell, 2001).

These findings also confirm our second hypothesis: medical experience, built on clinical practice, does not strongly link with scientific evidence principles. Data reveal that surgical experience takes a central role in the construction and re-production of knowledge to the detriment of other processes, such as scientific research. Nevertheless, all surgeons acknowledge the research component to be fundamental and cite the difficulties experienced in reconciling research with clinical practice owing to the characteristics of both the hospital, which impact on the forms whereby medical knowledge is reproduced. Similarly, an extensive body of literature show how medical experience, built on clinical practice, does not strongly link with scientific evidence principles (Armstrong, 2002; Kessenich, Guyatt and Dicenso, 1997; Pope, 2003; Timmermans and Berg, 1997; Broom and Adam, 2012).

Findings also confirm the third hypothesis of this study: personal experience is central in the construction and reproduction of medical knowledge and discourse. According to data, the opportunity provided by teaching through clinical practice acts as the statement of what has been read, thereby reinforcing that which is learn-ed in theory. In this way the certainty of personal medical knowledge and the pri-macy of experience are consolidated and is central to the definition of compe-tence and professional differentiation; firsthand experience is to be built into the develop-ment of the biographical and career record of the doctor (Atkinson, 1977), also referred to by Freidson (1970) who regarded it as fundamental to an understanding of the reproduction of medical knowledge and discourse. As Foucault (1963), clinical practice has always been the place of experience in contrast with the theories that constantly mask the centrality of clinical experience. Consequently, the appeal to experience is made to ensure regular, stable knowledge.

Finally, we would like to highlight the main research contributions of this study and directions for future research. This paper provides a new window into the understanding medical profession, by considering other frameworks not usually deemed on sociological analysis of professions, especially social constructivism and what is commonly termed as the Foucauldian approach. The inclusion of these studies constitutes a step forward in the research field, since they proved to be very helpful in the understanding the challenge of EBM principles, insofar as it ties the production of knowledge to power and discourse and how this affect professional dynamics and autonomy.

Additional research on other medical specialties and different health settings is necessary to deepen knowledge and address current and future trends in the field. In future research we aim to analyze how the balance between EBM principles and clinical practice lead to new forms of professionalism.

## References


Armstrong, D. (2002). Clinical autonomy, individual and collective. *Social Science and Medicine*, *55*(10), 1771–7. http://dx.doi.org/10.1016/S0277-9536(01)00309-4

Atkinson, Paul (1977). The reproduction of medical knowledge. In R. Dingwall et al (Eds.). *Health care and health knowledge*. London: Croom Helm.

Atkinson, Paul (1981). *The clinical experience: The construction and reconstruction of medical reality*. London: Gower.

Atkinson, Paul (1995). *Medical talk and medical work*. London: Sage Publications.

Berger, Peter & Luckmann, Thomas (1967). *The social construction of reality*. Garden City: Doubleday Anchor Books.

Broom, A. & Adams, J. (2010). The reconfiguration of expertise in oncology: the practice of prediction and articulation of indeterminacy in medical consultations. *Qualitative Health Research*, *20*(10), 1433–45. http://dx.doi.org/10.1177/1049732310373042

Broom A. & Adam J. (ed.) (2012). *Evidence-based healthcare in context. Critical social science perspectives*. London: Ashgate.

Broom, A., Adams, J. & Tovey, P. (2009). Evidence-based healthcare in practice: A study of clinical resistance, professional deskilling, and inter-specialty differentiation in oncology. *Social Science and Medicine*, *68*(1), 192–200. http://dx.doi.org/10.1016/j.socscimed.2008.10.022

Broom, A. & Tovey, P. (2007a). Therapeutic pluralism? Evidence, power and legitimacy in UK cancer services. *Sociology of Health and Illness*, *29*(3), 551–69. http://dx.doi.org/10.1111/j.1467-9566.2007.01002.x

Broom, A. & Tovey, P. (2007b). The dialectical tension between individuation and depersonalisation in cancer patients' mediation of complementary, alternative and biomedical cancer treatments. *Sociology*, *41*(6), 1021–39. http://dx.doi.org/10.1177/0038038507082313

Cassell, J. (2000). *The woman in the surgeon's body*. Cambridge, MA: Harvard University Press.

Creswell, John (1997). *Qualitative inquiry and research design: choosing among five traditions*. London: Sage.

De Vries, Raymond & Lemmens, Trudo (2006). The social and cultural shaping of medical evidence: case studies from pharmaceutical research and obstetric science. *Social Science and Medicine*, *62*(11), 2694–2706. http://dx.doi.org/10.1016/j.socscimed.2005.11.026

Denzin, N. K. & Lincoln, Y.S. (1994). *Handbook of qualitative research*. Thousand Oaks, CA: Sage.

Foucault, Michel (1963). *Naissance de la clinique*. Paris: Gallimard.

Foucault, Michel (1975). *Surveiller et punir: naissance de la prison*. Paris : Gallimard.

Fox, Nicholas (1992). *The social meaning of surgery*. Milton Keynes, Philadelphia: Open University Press.

Fox, Renée C. (1957). Training for uncertainty. In R. K. Merton, G. Reader, and P. L. Kendall (Eds). *The student physician*. Cambridge, Mass.: Harvard University Press.

Fox, Renée (1988). *Essays in medical sociology: Journeys into the field*. Oxford: Transaction Books.

Fox, Renée (2000). Medical uncertainty revisited. In G. L. Albrecht, R. Fitzpatrick, and S. C. Scrimshaw (Eds). *The handbook of social studies in health and medicine*. London: Sage Publications.

Freidson, Eliot (1970). *Profession of medicine. A study of the sociology applied knowledge*. Chicago: The University of Chicago Press.

Glasser, B. & Strauss, A. (1967). The *discovery of grounded theory*. Chicago: Aldine.

Goldenberg, M. (2006). On evidence and evidence-based medicine: lessons from the philosophy of science. *Social Science and Medicine*, *62*(11), 2621–32. http://dx.doi.org/10.1016/j.socscimed.2005.11.031

Greenhalgh, T. (1999). Narrative based medicine in an evidence based world. *British Medical Journal*, *318* (7179), 323–5. http://dx.doi.org/10.1136/bmj.318.7179.323

Grossman, Jason, & Fiona J. MacKenzie. (2005). Randomized controlled trial: gold standard or merely standard. *Perspectives in Biology and Medicine*, *48*(4), 516–34. http://dx.doi.org/10.1353/pbm.2005.0092

Hirschauger, Stefan (1991). The manufacture of bodies in surgery. *Social Studies of Science*, *21*, 279–319. http://dx.doi.org/10.1177/030631291021002005

Hope, T. (1996). *Evidence-based patient choice*. London: King's Fund.

Katz, Jay. (1984). *The Silent world of doctor and patient*. New York: Free Press.

Katz, P. (1999). *The scalpel's edge: the culture of surgeons*. Boston: Allyn & Bacon.

Kessenich, C., Guyatt, G. & Dicenso, A. (1997). Teaching nursing students evidence-based nursing. *Nurse Educator*, *22*(6), 25–9. http://dx.doi.org/10.1097/00006223-199711000-00014

Lambert, H. (2006). Accounting for EBM: notions of evidence in medicine. *Social Science and Medicine*, *62*(11), 2633–45. http://dx.doi.org/10.1016/j.socscimed.2005.11.023

Light, Donald (1979). Uncertainty and control in professional training. *Journal of Health and Social Behavior*, *20*(4), 310–22. http://dx.doi.org/10.2307/2955407

Marks, Harry (1997). *The progress of experiment: science and therapeutic reform in the United States, 1900– 1990*. Cambridge: Cambridge University Press.

Pope, Catherine (2003). Resisting evidence: the study of evidence-based medicine as a contemporary social movement. *Health*, *7*(3), 267–282.

Porter, Theodore (1995). *Trust in numbers: objectivity in science and public life*. Princeton, N.J.: Princeton University Press.

Prentice, R. (2005). The anatomy of a surgical simulation: The mutual articulation of bodies in and through the machine. *Social Studies of Science*, *35*(6), 837–866. http://dx.doi.org/10.1177/0306312705053351

Suchman, Anthony, Sluyter, David & Williamson, Penelope (2011). *Leading change in healthcare: transforming organizations using complexity, positive psychology and relationship-centered care*. London, Radcliffe Publishing.

Timmermans, S. & Angell A. (2001). Evidence-based medicine, clinical uncertainty, and learning to doctor. *Journal of Health and Social Behavior*, *42*(4), 342–67. http://dx.doi.org/10.2307/3090183

Timmermans, S. & Berg, M. (1997). Standardization in action: achieving local universality through medical protocols. *Social Studies of Science, 27*(2), 273–305. http://dx.doi.org/10.1177/030631297027002003

Turner, Bryan (1995). *Medical power and social knowledge*. London, Sage.

Uttley, Stephen (1991). *Technology and the welfare state: the development of health care in Britain and America*. London: Unwin Hyman.

Zetka, J. (2003). *Surgeons and the scope*. Ithaca: Cornell University Press.