

## ***Patient Bodies***

### **The fabrication of moving body landscapes in angiography and interventional radiology**

Christina Lammer

*The declared aim of modern science is to establish a strictly detached, objective knowledge. Any falling short of this ideal is accepted only as a temporary imperfection, which we must aim at eliminating. But suppose that tacit thought forms an indispensable part of all knowledge, then the ideal of eliminating all personal elements of knowledge would, in effect, aim at the destruction of all knowledge. The ideal of exact science would turn out to be fundamentally misleading and possibly a source of devastating fallacies.*

(Polanyi 1966: 20)

*Dit artikel, gebaseerd op veldwerk in de afdeling Angiografie en Interventie-Radiologie van het Algemeen Ziekenhuis aan de Universiteit van Wenen, onderzoekt de belichaming van kennis in dit specifieke medische veld. De centrale vraag is hoe lichamen zichtbaar worden gemaakt, hoe ze sociaal met elkaar zijn verbonden en hoe abstracte, bewegende, fluorescerende videobeelden worden gepercipieerd. De auteur betoogt dat de visuele kennis van het binnenste van het lichaam en de wijze waarop die kennis wordt geproduceerd door diagnostische en therapeutische machines de stilzwijgende kennis van patiënten, dokters en assistenten overheerst.*

*[belichaming van kennis, ontologische choreografie, visuele cultuur, radiologie, huid]*

#### **Prologue**

Bodies, including those of patients, those of the radiological personnel, and my own ethnographic one, are being fabricated in diagnostic and operating theatres of the hospital. In this article I ask how bodies work together in the diagnostic and therapeutic settings of angiography and interventional radiology, how they are physically transformed, costumed, and masked. In analysing and describing the procedures that take place in the operating rooms, I use the notion *patience* in a particular way. During my fieldwork I observed<sup>1</sup> interventional modes of picture production through digital video

fluoroscopy technologies in high-tech operating rooms, where (mainly) the blood flow is examined and treated. During these procedures the participating actors, patients, doctors, assistants and myself as an ethnographer, are defined as *patient*<sup>2</sup> living modules engaged in the routines of diagnosis and therapy. Seen equally as participants, I try to avoid a strict distinction between patients and radiological personnel. I will investigate the manifold facets of being *patient* by observing acting bodies in high-tech operating theatres. Being *patient* does not only mean ‘to shut one’s eyes’. I will reflect on the passionate moments of *patience*, on highly concentrating eyes, on fine moving hands with surgical gloves, on completely covered bodies lying on small operating tables, not being allowed to move for hours.

I am particularly interested in how the integrity of the body is treated during these interventions, in how identities are being transformed by the processes of image production and how knowledge is embodied in techniques, which are applied in interventional radiology. I question bodies of experience. My aim is to investigate procedures defined as *minimal-invasive*, which in the medical vocabulary are defined as such only in terms of the body proper. I investigate tacit levels of perception, meaning, and identity. In doing so, I had to develop an unconventional methodological framework. After spending a few months in the field, taking notes and photos, making little drawings of the settings and tape-recordings, and conducting thirty interviews with radiologists and medical technical assistants, I realised that I needed another tool in order to grasp the highly complex bodily processes, which constitute the core of my research interest. I decided to use a digital video camera for my observations. This might sound inappropriate for obtaining a sympathetic understanding of patients. But it turned out that my use of the camera was important for (younger) patients (who were able to deal with a video cam). They could see my video as a record of what happened during the actual intervention. In this manner, the patients, who had delegated and in fact lost control over their own bodies during the operation, are able to gain it back if only partially. I will develop this theme in greater detail further.



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Figures 1-2: Video stills of the ethnographic film material *PATIENT BODIES*, Vienna 2002. Recorded with permission of the *University Clinic / General Hospital* in Vienna.

Doctors are *patient* in a way that differs from that of their clients or technical assistants. What about the ethnographer's body? It is moving or being moved by other bodies, embedded in a particular *ontological choreography*. According to Charis Cusins: "The choreography is the coordinated action of many ontologically heterogeneous actors in the service of a long-range self" (1998: 192). My body is part of the choreography in the operating rooms of interventional radiology. It interacts and is being staged, undergoing processes of objectification and subjectification. Doing fieldwork at the radiology department involves more than participant observation and describing what has been seen. It is more of a physical endeavour, which requires a high tolerance for waiting, for wearing 'the costume', for moving slowly and quietly among other bodies, who are put in the right position, and who coordinate their hands, eyes, and limbs, while being hooked up to high-tech apparatuses. As a participant I sweated under sterile gowns and lead aprons and could hardly breathe behind the operating mask, which covers mouth and nose. By sharing those physical experiences with patients, doctors and assistants I used my memorising body as a medium for doing ethnographic fieldwork in this particular radiological area. Touching and being touched by those other bodies frame my research interests and give my text its *impatient* flesh.

### **Looking beneath the skin**

A day before the actual proceedings take place the attending radiologist informs his or her patient about the specific modes of treatment and possible risks. Both the patient and the radiologist have to sign a (standardised) form. They talk a few minutes in the waiting zone of the department, in the same area where, after the intervention, patients wait in their beds before being transported back to their rooms. For such radiological operations patients have to stay at the hospital for several days. I meet with the patients right before their interview with the radiologist.

Because I have to wear a uniform (green shirt and trousers, and a white coat), I have to introduce myself very carefully, making it clear that I do not belong to the medical staff. I tell the patients what my research is about and what I am interested in, before I ask them to participate. I show them my video camera, and assure them that I will not record any sensitive situations. Until now I have had only positive and curious reactions from the patients. Persons who have to undergo these procedures are usually happy to have someone to talk to, someone who is with them. Often they are nervous and anxious. Talking about their fears calms them down and makes them feel better. Some people do not even speak about their anxieties. They tell me personal stories, which are only vaguely or not at all related to their stay in the hospital or to their particular health problems.

I learn much about the private lives of patients and their identities. It is verbal communication as well as non-verbal and more bodily articulation which touches me. Sometimes I feel uneasy when people express deeply emotional and existential details of their lives, although they hardly know me. I try to remain as open as possible, being aware that no answers from my side are required. From the start, my relationship with

patients is generally close and intimate. I am confronted with a form of trust that one hardly experiences in everyday life. The people I meet under these specific conditions let me literally look beneath their (emotional) skin. I am touched by personalities of *flesh and blood* (Leder 1990: 65 f). My view within these relationships cannot be distanced at all.

However, the radiological practice is nurtured by the idea of a transparent skin. According to the body historian Barbara Duden, Leonardo da Vinci opened with his anatomical drawings “einen unmerklichen Übergang vom Oberflächensehen zum Tiefensehen” (Duden 1991: 51). Gazing into the depth is becoming increasingly common and multiple nowadays. The radiological gaze is created through different optical devices and technologies. Patients’ bodies are illuminated and transformed into (digital) moving pictures, which bring highly abstract layers of skin and inner organs – in real time – to the surface of computer screens.

José van Dijck, in her new book on *The Transparent Body* (2001), addresses the question of how the illusion of transparency is produced through medical imaging techniques. I will compare her analysis of the endoscopic gaze from within the body with radiological interventions. Examining the inside of the body with the help of an endoscope with a camera inserted into organs, like the colon or the stomach, through natural or artificial openings, belongs to the domain of surgery. Radioscopy works differently: the X-ray tube does not touch the body of the patient at all. Although in interventional radiology and angiography – like surgeries these examinations take place in particularly equipped operating rooms – the radiologist penetrates the skin and blood vessels, introducing contrast media through a catheter. The optical instrument (in form of the X-ray apparatus) must not enter the body.

I will draw a sharp line between surgical and radiological operations, because the notion of *invasive* is defined in different ways in both areas [fig. 1]. Examinations in radiology usually are seen as non-invasive or at least as *minimal-invasive*. The notion itself refers to the living body and whether there is cutting into its flesh – more or less regardless of whether the body is entered through natural openings like the mouth or rectum, or with the help of a scalpel to produce artificial openings. Through the development of highly technological image devices like endoscopes, which are hooked up to video cameras, or digital video fluoroscopy, the meaning of the term *invasive* is constantly transformed. Its diverse and even confusing connotations are vague and interchangeable, although for patients there is a huge difference between the various types of intervention and this influences their decisions and experience. Interventional radiologists deal with the terms *invasive* or *minimal-invasive* in their daily routines with clients. From their perspective, many of the interventions are indeed hardly invasive.

What about the patients? How do they experience these operations, which they have to undergo fully consciously, with only a local anaesthesia through injection? How is their bodily integrity affected by such procedures? And how would non-experts define *invasive*? These questions are central to my research interests and for my work with patients and radiology personnel. To answer them, I analyse bodily processes between patients and radiologists in the theatres of interventional radiology.

I will show that diagnostic and therapeutic methods as they are indicated for the examination of the blood flow are invasive. The integrity of the body is deeply touched and transformed through these proceedings. This goes hand in hand with a continual ‘disappearance’ of skin, which renders individual forms of bodily expression impersonal and anonymous. Identities are changed during these operations. Bodies are dressed and skin is entirely covered. Persons are hardly recognisable as the markers of identity, like the face or hands, are kept unseen under operating gowns, sheets, masks and gloves. On the other hand, inside the patients’ bodies structures, which are not even visible on X-rays, are made to be seen. This is made possible by fluids, contrast media (like barium), wires and catheters, inserted into the body through artificial openings. Bodies are radically transformed even before the actual radiological diagnoses and therapies take place.

Bodies rub against each other within the clinical high-tech environment. Space and time play important roles in how the choreography in the operating rooms functions, how the skin of actively moving, living bodies almost disappears, how inner structures are recorded and screened on radiographic filmstrips. The choreography in radioscopy theatres includes manifold optical devices through which the body’s inside is being framed. Moving pictures on several video monitors depict abstract structures and form new artificial images of the inner body and its parts. Bruno Latour writes, referring to Martin Heidegger: “Man – there is no Woman in Heidegger – is possessed by technology, and it is a complete illusion to believe that we can master it. We are, on the contrary, framed by this *Gestell*, which is one way in which Being is unveiled” (1999: 176).

Now my “writing body” (Foster 1995: 3 f) will move on into more detail, looking inside the *black box* of image production in diagnostic laboratories, showing processes that make “the joint production of actors and artifacts entirely opaque” (Latour 1999: 183).

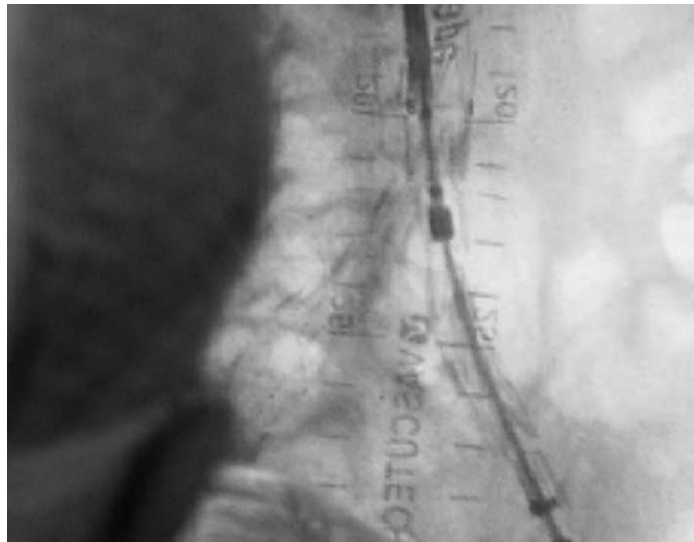
Endoscopes, compared with X-ray techniques, are moved inside the organs or body parts under examination. The eye of the camera is directed through organic layers and projects colourful film pictures on several monitors. There is no outer skin to be seen on the screenings – not even a transparent shadow of it, because the optical instrument records the body from inside out. The images display the most secret depths and offer spectacular journeys through the inner body. The technical gaze of radioscopy moves under the skin, exploring and displaying hollows and inner structures without touching the body surface.

### **Being framed**

In the morning before the intervention I see the patient in her hospital bed in the wake-up zone of the department, nervously waiting for the proceedings to begin. At first sight, I can hardly recognise Anna<sup>3</sup> as she is lying in a bed. This is a quite unusual situation for me, meeting a person at the bedside without having a close relationship with him or her. I feel ashamed although I get the impression that she does not feel uneasy at all, at least not because of my company. I realise that being in a hospital causes immediate transformations of how people would normally behave, act, communicate and

articulate themselves. Every day life at the clinic has its specific rules, which are followed depending on the role one has to play.

We have a few minutes to talk; I ask Anna how the night went and whether she got some sleep. “Hardly” – she was too anxious. Then she starts talking about her pain in one knee and in her back. Actually this was the reason why she decided to see a doctor a few months ago. Further examinations revealed an aneurysm of the abdominal aorta, a rather acute reason for her surgeon to send Anna to his colleagues in interventional radiology. Until her aorta was fixed, he would not operate on her knee. Such an operation would be high risk considering the aneurysm. She also speaks about her family and her husband, who died some years ago, about her daughter and her son. Anna’s life changed fundamentally since the death of her husband. After a short while a (male) nurse joins us to transport her to the operating room and to prepare her body for the intervention. I follow them, but before the cleaning and shaving procedures begin, I leave the scene for a moment. I find it too embarrassing to observe these processes. In the meantime I pull on one of the lead aprons, take a sterile facemask out of a carton box and cover my hair with a surgery cap. I find the mask and cap right next to the handbasin one room away from the radiology theatre. Fortunately I do not need gloves and surgery gowns, because I won’t come that close to the operating field. My own body is only partly costumed. Ten minutes later, back in the operating room, I ask Anna if she recognises me hidden behind a mask and with a cap on. “Your dark eyes are still visible”, she responds. In the meantime she got a cross-stitch from the anaesthetist, rendering her body from waist down completely numb. It is a complicated intervention, which is why this form of anaesthesia is appropriate and more convenient for her. She experienced the stitches – unfortunately she needed more than one to infer the serum at the right location in her spine – as painful. Usually before operations in interventional radiology patients are anaesthetised only locally through an injection.



The room is comparable to a surgical operating theatre. The difference is that additional diagnostic equipment like a moveable X-ray tube and several monitors are present. Anna has already taken her position on the small operating table and is covered with surgery clothes. A bottle full with a transparent fluid hanging on a metal stand is connected to her blood system through a catheter, which directs the liquid into the arm vessel. For this artificial body opening a needle was introduced beforehand. On her chest and on one of her fingers some sensors with fine wires are being fixed and link her organism to an apparatus, through which breathing and heart frequencies are displayed on one of the monitors. Bodily functions are transformed into colourful curves and tiny blinking symbols.

Two radiology assistants enter the room, exchange a few words with Anna and start their preparations. Entering through a door from the opposite side of the diagnostic theatre, two surgical nurses and two surgeons join them. Because they are from another department, they introduce themselves before the preparation and sterilisation procedures begin. Each team (radiology and surgery) has its own table with instruments and material. I observed a strict division of labour between the teams. One of the radiologists shows up right after the surgeons have prepared Anna's blood vessels, where the prosthesis (in two parts) is accurately placed later. His colleague joins after another hour.

Through procedures of staging and positioning the *patient* in the operating theatre of radioscopy, the body is being signified as an opaque container. The personal skin of patients and personnel almost vanishes under sterile clothes and gowns and is hardly visible during the radiological intervention. Observation studies of surgical operations offer insights into further framing processes. They show how the skin is being made up anew. Pearl Katz elaborates in *The Culture of Surgeons* (1999) the distinction between a clean skin and a dirty one and clean blood from dirty body fluids. She writes:

Identification and separation of cleanliness and dirt into sterile and non-sterile categories are the most important concepts in the operating room. These concepts govern the organization of the activities in surgery, the spatial organization of rooms and objects, and the costumes worn (p. 182).

In the radiological operating rooms the procedures of sterilisation function in ways similar to those in surgical practice. Before the first cut with the scalpel cleaning procedures take place, organising the working together of bodies, staging the whole scene inside the diagnostic and therapeutic theatre. An essential part of the sterilisation modalities and the particular hierarchy, which is created within these practices, forms a small sector of skin, where the physician later cuts into the body surface, before inserting contrast media and material components through a catheter directly into the blood system under examination. The operating field and the wound form the cleanest core in the hygiene hierarchy.

Stefan Hirschauer analyses the patient's skin as a "Grenze, der man nicht ohne weiteres nahe treten darf. ... Sie außerhalb einer intimen Beziehung aus Versehen zu berühren, macht Entschuldigungen notwendig" (1996: 111). It is an intimate organ which touches and is being touched, a surface of personal integrity. Through its highly sensitive texture *I* am limited in *my* curious "Dünnhäutigkeit für fremde sinnliche

Wahrnehmung”, as Barbara Duden reflects upon herself in her book *Der Frauenleib als öffentlicher Ort* (1991: 51). In its ontological meaning the skin becomes a “diffuse zone” (Hirschauer 1996: 111) during the operations in interventional radiology and in other medical disciplines. This personal skin is transformed and almost made to disappear. Procedures of sterilisation render bodies anonymous. The skin as a marker of identity is *abstracted*<sup>4</sup> and displaced by an artificial film, a kind of roadmap of blood vessels and inner body structures.

Uncomfortable bodily experiences of the patient can be treated with painkillers and sedatives. With the help of technical devices, which transform the sensitive flesh *beneath the skin* by making it numb, bodies defined as *patient* are artificially made eloquent. “With a sterile scalpel the surgeon [the radiologist] makes the first incision through the layers of the patient’s skin” (Katz 1999: 191). In interventional radiology (most of) the patients are fully conscious during the operation. “You will feel a little stitch now”: the radiologist introduces the procedures. With the stitch of the injection needle in the small quarter of skin, which forms the last visible rest of the patient’s body, the choreography of manifold human and nonhuman “actants” (Latour 1999) in the operating room continues. For describing and analysing the procedures in the radioscopy theatre I borrow the notion of an *Ontological Choreography*, which Charis Cussins has developed in her ethnographic study on *Agency for Women Patients in an Infertility Clinic* (1998: 166-201). She investigates and shows in a convincing way, how one’s subject position is negotiated within the clinical settings and the power of technologies. Cussins uses the term “agency” to refer to actions through which persons make themselves up and are being made up in their daily lives. This includes the notion that patients in the clinic are not only being objectified through procedures of examination, but objectify themselves in the hope that a *good* diagnosis offers possibilities of treatment.

### **Choreographing diagnosis and therapy**

Finally the surgeons are finished with the preparation of the blood vessels around the aneurysm of Anna’s abdominal aorta. One of the radiologist’s can begin with the imaging processes and with the introduction of contrast media through a catheter, which is inserted into the blood system. During these procedures – the liquid contrast enhancement already flows through the vessel – he gives breathing commands in the direction of Anna’s face, which he cannot see from his position: “breathe in”, “breathe out”, “breathe in” and “don’t breathe”, “don’t breathe”, “don’t breathe” ... “and breathe further”, he says several times. He pushes the button for the production of fluoroscopy images with one of his legs. Although I am still in the operating room, observing the scenery partly with my own eyes and partly through the tiny screen of my video cam, I can hardly speak with Anna. Her head disappears behind a curtain of sterile clothes and her mouth is covered with an oxygen mask.

During the intervention, the operating field (the small area of skin) is central to the choreography of bodies and imaging devices – not only in the sense of giving an optical



register its shape, but more in informing tactile ways of perception and treatment. Skin as a living sensual organ, according to Horst Ruthrof (2000), implies bodily experiences and a non-verbal language. In interventional radiology the non-verbal vocabulary between radiologist and patient is crucial. The physician moves material through millimeter-thin vessels. His or her tactile skills are of enormous importance for the success of the operation. In this respect, skin and flesh – touching and being touched – function as mediators between client and doctor.

A half-centimeter cut is the core of this opaque as well as invasive radiological *black box*, which contains hands, plastic gloves, masked faces, green sheets and gowns, lead aprons, wires, thin tubes, bottles, instruments, X-ray devices and several monitors, tables and stools and active handling by costumed persons. I experienced the play of hands and eyes, of bodily (human) and technical (nonhuman) parts as highly uncanny. At first sight it was not clear to me as a layperson what was happening during these interventions. The eyes of radiologists rest on screens above their heads and their hands work as close as necessary at the artificial but nevertheless bloody body opening. With sensible movements metre-long wires and catheters are being inserted and pulled out of the blood vessel again and again. Fingers on the (usually only) locally anaesthetised wound search through the inner body with the help of video images, which enable navigation, verifying problematic zones on monitors. Anna is not able to follow what is going on. She cannot see the operating field, because her position on the table and surgery clothes above her head make this impossible. She cannot see the abstract images of the own inner body on one of the video screens. Her bodily reactions are being controlled by the operating team on monitors. Only such audible impressions as vague noises, the radiologist and assistants talking with each other, and visual impressions of parts of the equipment in the room, can be perceived during the intervention. The invasive radiological *black box* constitutes the control over what is happening *beneath the skin*, hardly any verbal communication taking place between doctor and client.

In the choreography the face of the patient is on the non-sterile side, relatively far from the sterile core – the quarter of naked skin including the artificial body opening – around which the operation is organised. Masked mouths and noses of the personnel are defined as sterile. Pearl Katz has observed that the “patient’s blood is considered sterile once the operation has begun. ... The rituals reinforce the segregation of sterile and non-sterile objects while the initial incisions are being made.” (Katz 1999: 191) Criteria of keeping the core of the operating field – the artificial body opening – sterile can be observed in terms of distance. Even the X-ray tube is covered with a transparent plastic membrane to make sure that it is clean enough. The closer one gets to the open wound the more costumed, masked and cleaned one has to be. “Die Mitglieder des Operationsteams belagern das Operationsfeld und haben ihre eigenen Domänen” (Hirschauer 1996: 100). During the intervention all the members of the radiological team have to wear heavy lead aprons under their sterile green garments. Their bodies are put in the right position, objectified, disciplined and exhausted in manifold ways. For radiological routines, the actors are trained in the necessary bodily skills. The cut connects the hands of the operating radiologist with material components, which are introduced into the blood vessels. An assistant supports the efforts of the treating phy-

sician, handing instruments and material. Used bloody wires, catheters and balloons, which are pulled out of the body, land in a garbage can. Another member of the team is responsible for the imaging devices, for recording film pictures and for framing and unveiling the body's inside. In addition, s/he reframes and edits the taped images after the actual procedures are finished. The division of labour draws a sharp line between hands and eyes, between tactile and optical perceptions, between operating field and moving video pictures.

I consider incisions in radiology in two ways. First as processes of cutting or stitching into the patient's body. Second, as visual operations of cut and paste through technological eyes of X-ray and particular imaging devices. With this, more questions come to mind: What have living bodies in operating theatres of radiology in common with abstract moving video pictures through which they are being objectified, framed, examined, diagnosed, treated and even cured if they are lucky enough? How are bodily symptoms mirrored on those fabricated screenings? It is hardly possible to embody the film in front of one's eyes, to identify with these images, to *un-black-box* the body's inside. "Medical technologies such as X-rays, ultrasound, CAT scans, and colonoscopy render our viscera visible. They offer not an embodied visuality, but a visuality that makes our bodies objects to us" (Marks 2000: 190). Objectifying one's own body and being objectified in the clinical routines of treatment is crucial for bringing about desired changes in the patient's identity – in terms of health and illness. In order to do this, examined organs are represented "on the monitor, floating apart from the context of the rest of the body and the whole person" (Cussins 1998: 184). The person under examination identifies and is being identified with his or her illuminated body part on the screen.

Rendered visible, organs and inner structures replace the whole body including its personhood. Radioscopic pictures (at least for laypersons) are almost void of recognizable signs of the bodily interior of the person. However patients rely on the monitored diagnosis, which builds a main element of the finding report as well as of the resulting treatment. During the clinical procedures of diagnosis and therapy Anna *is* a monitored aneurysm, though this identity remains invisible to her. "Optical dissections" generate moving pictures of "life", as Lisa Cartwright points out in her book *Screening the Body* (1995). Patients symbolically embody the role of *Pandora*, because of the desired change of their physical condition.

Anna's operation lasts for almost four hours. During this period she partly falls asleep. The radiologists continually wake her up with breathing commands and with asking how she feels. They also inform her how long the proceedings will continue. We exchange a few sentences before the (male) nurse transports her back to where she has to stay for a few more days under the permanent supervision of machines and clinical personnel. She did not feel very well right after the intervention, although from a medical perspective everything went fine. She is "glad that it is over" and wants to get some sleep. Two days later: I visit Anna at her bedside at the hospital. She is happy to see me and speaks about how painful her days have been after the intervention. Doctors would keep her at the clinic over the weekend (it is Thursday morning). I know from one of the radiologists that these operations are particularly dangerous especially for

older people. Without his explanations I would not have been aware of the nuances of danger and risk in interventional radiology caused by different (more or less) invasive treatment modes. The patients cannot consciously grasp how dangerous the procedures are. Anna takes my hand and I can feel that she is quite feverish. Her hand is glowing and sweaty. We talk for another hour. She speaks a lot about her family, how she first met her husband during World War II and about her children. Anna invites me to visit her at her apartment. We will meet again next month (in June).

### **Cinematic body landscapes**

In the following and last part of my article I will focus on body images in interventional radiology: first on video and photo material, which I have produced during fieldwork and second on moving fluoroscopy pictures, which are permanently fabricated from the patients' interior in this radiological field.

#### *Doing fieldwork with a digital video camera*

To tell about my own work with a digital video camera, I will introduce Barbara and Carina, two younger patients, who allowed me to film their operations with my camera. Like Anna, I meet both women one day before their interventions. They are curious about my research aims and question why I need to videotape them in such uneasy situations. I extensively describe my ideas, what happens with data and recorded pictures and offer to let them view the video of their own operation if they so desire. They agree. Then they start talking about their histories, why they are here and why they decided to undergo this particular therapy. After a while it turns out that the young women are rather nervous and anxious. Carina says: "I am glad that you are going through this with me." Barbara nods. In this moment the responsible radiologist joins us, introducing himself and questioning me as to whether I have already mentioned my request. Of course he is informed about my research as we discuss details on a regular basis.

Barbara and Carina both have a large myoma (thirteen and seventeen centimetres) in the uterus, a benign growth (tumour), which will be therapeutically removed the next morning. With a new technique the blood vessels, which nurture the myoma, are artificially filled with tiny silicon pearls. A successful therapy can eliminate parts of the tumour, and alleviate inconvenient symptoms of the patient only a few months after the procedures. Both women are well informed about this method. They question the radiologist about concrete details of the operation, about risks, how long the actual proceedings can take and how painful this would be for them. He patiently explains everything using easily understandable vocabulary. Carina and Barbara's questions are mostly practical. For how long do we have to stay at the hospital? What kind of medical treatment will be provided? Both women show their anxieties. After ten minutes there are no more questions. The doctor offers to go through the video recordings of the fluoroscopy pictures together with the patients. The reactions are positive and curious. We make an appointment for the day after the interventions.

The following morning I expect Carina in the waiting zone of the department. She arrives several minutes later in her hospital bed and is happy to see me. Her cheeks are red with anticipation. There is no time left to talk because the (male) nurse is already there to prepare Carina for the operation. I accompany both into the operating room before I leave to costume myself. Two radiological assistants introduce themselves. I videotape the different stages of preparation and sterilisation, and the organisation of the table with material and instruments like injection needles. The (male) nurse asks me to pass him a sterile cloth from a case. "Do you know how to do it," he questions in my direction. I carefully take out the package with its sterile content and open it with both hands, remembering that I should not touch the cloths. Accidentally, I was about to take a tissue from the already prepared table with catheters, wires and other material. The nurse stops me from doing so at the last moment. Carina is injected with a pain-killer and an antibiotic before the radiologist can begin. She feels like she has had a glass of wine. One of the assistants explains how she should use the pain pump and puts Carina's finger on the button she has to push when things become too painful. Then the apparatus would immediately induce more of the liquid pain reliever.

Now the radiologist enters, greeting everyone in the room in a friendly manner. He asks Carina how she is feeling. "Not so bad," she responds, and he starts with the procedures. "You will feel a stitch now." I can see the expression of pain on her face. Her position on the operating table allows Carina to see one of the monitors. I put the screen a bit closer in her direction so that she can watch the same abstract moving X-ray pictures that the radiological personnel are looking at. Because she cannot see the operating field, she questions me from time to time as to what is being done. I try to describe what is happening, but sometimes I cannot find the right words. Then the radiologist would continue my sentence, explaining accurately and in a simple way what he is doing. This interaction and my particular function as a mediator between doctor and patient are crucial, because they show that there is something missing in their exchanges. After a short while Carina feels a little bit drunk, but at least she is not in pain. She is talking a lot and I feel responsible for calming her down, because I am afraid that the radiologist's concentration might be disturbed. The operation lasts only for one hour and the woman feels very happy that it went well and that she is done.

Back in the wake-up zone, Barbara is already there, nervously waiting in her bed. We try to cheer her up, although this is quite difficult in such a situation. She is very quiet this morning. In the operating room she starts crying. Together with the (male) nurse I bring a small smile on her face, but she hardly gains control over her tears. Pain relievers make her rather tired. Barbara is curious about the pictures on the monitor. When the radiologist welcomes her she is completely calm. The injection of the local anaesthesia is painful for her and it turns out that her body is reacting more sensitively than Carina's. She senses where in her vessels material components are being inserted, where the contrast media is and where the tiny silicon pearls plug the blood flow. These are bearable feelings for her. Fascinated, she watches the moving pictures on the screen. Occasionally she falls asleep. Her operation lasts twice as long as Carina's and there is twice as much silicon material being injected into her vessels. She is relieved when the procedures finally are finished. She had imagined the intervention would

be more painful. Before she is brought back to the convalescent room Barbara questions whether she could see the videotape. I do not hesitate to pass her my camera. Seeing the recorded material she gets even more interested in these pictures of her own operation.

The morning after Barbara and Carina's interventions I visit them. An interesting detail is that I find both women in a section of the "bed tower"<sup>5</sup> where cancer patients are hospitalised and for whom radiotherapy is employed. They share the room with a woman who has tongue cancer and can hardly speak because of the pain caused by her illness. Only Carina is there because Barbara has a control magnetic resonance (MR) examination in another department of the clinic. Her fellow patient Carina – they met the first time at the hospital two days ago – has already had the MR in the morning. I ask her how she has been doing in the last couple of hours. It was bearable, but she experienced the time after the operation as more inconvenient and painful than the interventional procedures. "Now I am fine and looking forward to go home," she says. I have my camera with me and she asks me whether I could show her the recordings of her intervention. Barbara had already told her that she had seen some scenes of her own operation the day before. I warn Carina that some details and frames show blood. Nevertheless she would like to see them. Concentrating her attention on the tiny monitor, she is not shocked, but she admits that she could not imagine the scene at all, though she was lively there, talking with the radiologist and with me, watching fluoroscopy pictures on the monitor in front of her. Carina can hardly recognise herself on the screen of my camera.

Then Barbara enters with a smiling face and in a good mood. She is already starving, she says, although it will take another hour until lunch is served. She was rather hungry as well right after the proceedings were finished. Both women are wondering whether they can go home this day. I remind Barbara and Carina of our appointment with the radiologist to discuss the videos, which should take place at the interventional radiology department several minutes later. Downstairs the physician is already waiting for us. "How are you today," he asks his patients. They respond that they are fine and ask whether they could go home this afternoon. "Yes" – from his perspective this would not be a problem. I put the videotape from Carina's operation into the recorder, push the start button and the expert explains in detail what we are seeing and what he was doing. He describes anatomical structures and talks a little bit about how these particular technologies function. Afterwards we are watching Barbara's tape and we can hardly believe how different her interior looks compared to Carina's. Her blood vessels are like tiny curls. The questions the two women pose are not so much about the video material than about dangerous side effects of interventions in radiology. What about radiation? What about the employees who work there on a daily basis? Then they continue talking about their own case histories. We talk for about fifty minutes. Then I accompany Barbara and Carina back to their room.

Barbara asks me whether I could send her the videocassette with her fluoroscopy pictures and Carina would like to have a still photograph from her intervention. Of course I am happy to send them the material as a souvenir. Lunch is being served and I leave, but it is clear (though unsaid) that we will keep in touch.

### *Moving fluoroscopy images of the body's inside*

How do processes of staging, unveiling<sup>6</sup> and framing the body's interior work in interventional radiology? The technical background is that optical devices are all equipped with a digital subtraction angiography. This technique lays an X-ray picture of the body region under examination behind the image after the insertion of contrast media through a catheter. In addition, the developed frames are transformed into a digital matrix and the computer subtracts the picture without contrast media from the contrast enhanced one. The final screenings in the operating theatre are the result of further image transformation: pictures particularly contain this kind of information, which was not available before the injection. It is a complex system of blood vessels. Through this method computed photos can be looked at during the intervention and also afterwards in the form of animated film sequences. An orientation inside and navigating through the patient's body are made possible. Blood vessels can be explored on monitors like roads on a map. Narrow parts are opened through small balloons and prostheses can be inserted. Decisions about immediate therapeutic interventions are informed by digital moving images on the screens in front of the operating radiologist and his or her assistants. Produced radioscopy film scenes are not spectacular, but highly abstract. Without any explanation of experts, laypersons would not be able to recognise anything.

Observing daily routines in radiology offers insights into the webs of signification, into the manifold practices of image production and into optical procedures of unveiling the body in its intimate details [fig. 2]. The diagnostic *black box* includes different narrative and visual levels. To describe the settings one has also to think in cinematic terms, although I suggest a more body-centred approach in which "haptic images can give the impression of seeing for the first time, gradually discovering what is in the image rather than coming to the image already knowing what it is" (Marks 2000: 178). Touching and being touched by radioscopy pictures function in similar ways. The eyes drop into the flow on the screen's surface where the existence of objects is hardly attested.

According to Bill Nichols, who has analysed the practice of documentary filmmaking: "Documentary offers access to a shared, historical construct" (1991: 109). I use his argument for analysing procedures of image production in radiology. I transcend genre boundaries usually drawn between documentary (reality) and fiction (film).

Instead of *a* world, we are offered access to *the* world. The world is where, at the extreme, issues of life and death are always at hand. History kills. Though our entry to the world is through webs of signification like language, cultural practices, social rituals, political and economic systems, our relation to this world can also be direct and immediate. Here, "strychnine poisoning" [like providing contrast media] is not just a signifier lying inertly on a page in all its polysyllabic density, but a life-threatening experience. (109)

How is the blood flow being mapped in radioscopy labs? On the screens of the diagnostic and therapeutic operating theatre of interventional radiology the skin shines forth as a thin transparent layer. Inner body structures and vessels are being illuminated as cinematic moving surfaces on several monitors in the room. Arteries and veins look like

roads in a landscape and are mapped in various image qualities. At the fringes of the film map a fine veil is rendered visible, a transparent skin, which can be faded in and out, depending on what kind of optical information is needed. During the intervention pictures are fabricated and manipulated continually. Fabric, organs, bones and blood vessels are optically brought to the fore- or background. The flow of the inner body is transformed into picture frames, which are independently read from the patient and his or her bodily experiences. The treated body informs those framing processes and functions as a crucial part of the opaque invasive *black box* in the radiology laboratory.

According to imaginations, which are created through fiction films like *Fantastic Voyage* (director: Richard Fleischer, 1966), Kim Sawchuk writes about “the spatialization of the inner body and its transformation into landscape” (Sawchuk 2000: 13). In the movie a research team becomes miniaturised and is being sent into the blood system of another scientist through an injection needle.

Throughout the film the relationship between the inside space of the body and the outside space of the control room, which is of course connected to the security of the nation, is maintained through the use of maps and charts depicting different parts of the scientist’s body. ... The maps transform the body as space into a series of known places that are interconnected and can be charted in the same way that a geographic atlas maps land, or in the way that anatomical atlases originally marked the skeletal, muscular and organic system. (13 f)

Body landscapes in interventional radiology are not only *icons*. They simultaneously mirror *indicators* in terms of a standardised radiological vocabulary (Peirce 2000: 197). In addition to the X-ray signs in the upper left corner of the screen the name of the patient is registered and in the right corner the date of the intervention appears. According to Charles Peirce *indicators* are tightly connected with “the experience within the world [in which] we live” (197). Radiologists literally embody the cinematic information they get from the images. It is a way of gaining non-verbal knowledge. The vocabulary they have to use changes very quickly because of the development and invention of new imaging technologies. Radiological atlases offer possibilities to distinguish *normal* bodily fabrics from *pathological* structures. For the patient on the operating table, and for non-specialists like me, the monitored maps are mainly abstract. Nevertheless I am fascinated and touched by these particular cinematic impressions in radiology. I will never forget the uncanny cross-fades. I have incorporated them and will continue to do so in my fieldwork in the radiology department on a daily basis.

## Epilogue

I consider notions like *non-* or *minimal-invasive* and how they are used in interventional radiology between patients and medical personnel as highly problematic. The term *invasive* is deeply informed by a conventional clinical vocabulary, which refers to more traditional surgical interventions and does not take into account that the invention of new technologies in surgery as well as in radiology necessarily leads to a

fundamental transformation of 'invasiveness' and its actual meaning for clients and physicians. I have analysed how in the operating theatres of interventional radiology surgical and digital X-ray (and other imaging) proceedings melt into one another, and transform the integrity of the patient's body through particular ways of staging and through a specific choreography of hands and eyes.

I observed and investigated various forms of 'invasiveness' and 'bodily integrity': what patients experience as *invasive*, how surgeons define *invasive*, how they look inside the body, how radiologists get along with the term and form abstract pictures of the body's inside. The cultural and social meanings of 'invasiveness' are mirrored in the division of labour in this specific field, which draws a sharp line between tactile and optical perceptions, between operating area and moving video pictures. Processes of cutting or stitching into bodies and visual operations of cut and paste permanently form new 'outfits'. What about the patients' feelings? What about their identities? Will they ever be the same after undergoing interventions defined as *minimal-invasive*? I understand the continual invention of new technologies in surgery as well as in radiology – like computer programmes which can simulate the body's interior or robotic limbs which are able to operate inside a living individual – as a *cultural and epistemic turn* in medicine, which is already far advanced. Thus I am particularly interested in the effects this has on patients, who are widely excluded from these technological developments.

My research includes my own observing body and its experiences during fieldwork. I develop a more body-centred style of writing, in which incorporation of memories and the embodiment of knowledge are crucial. With my analysis I unfold non-verbal skills and interactions between radiological personnel, patients and technical devices. The boundaries between objectifying and being objectified, making up and being made up, touching and being touched, unveiling and being unveiled, framing and being cinematically framed on monitors tend to melt into one another in the diagnostic operating theatres. Drawing up the contours of the *ontological choreography* within the clinical settings of radiology enables me to bring the visual power regime to the fore, which unfolds in diagnostic practices. During my fieldwork I realised after a while that my notion of pain can be distinguished from that of doctors, assistants and persons under examination. At first I could not make sense of this. Then I recognised that diagnostic interventions are literally going *under my skin* because I am not directly involved. Although my face and my body are masked and costumed during the procedures I am not necessarily tightly bound to the pulsating heart of this invasive body. I can keep my eyes open to perceive everything that is happening inside the *black box*.

I choose my own standpoints, circle around the operating field, exchange some words with the patient on the table and follow fine-moving hands and eyes. It is partly painful to express bodily memories in words, to externalise them so as to give a verbal narrative in the form of an essay. This included manifold translation processes to get on with the job.



## Notes

Christina Lammer (e-mail: puppe@nextra.at) studied sociology and communication science at the University of Vienna. She received her doctorate in 1998 with her thesis *Die Puppe. Eine Anatomie des Blicks* (Lammer 1999). She works at the *Institut für Wissenschaftstheorie und Wissenschaftsforschung* of the University of Vienna. She published *Puppe. Monster. Tod.* (Wenen: Turia & Kant, 1999), *Schneewittchen. Ein Eiskristallbuch* (Tübingen: Konkursbuch, 1999), *Digital Anatomy* (Wenen: Turia & Kant, 2001) and *doKU. Die Inszenierung von Wirklichkeit im Dokumentarfilm* (Wenen: Turia & Kant, 2002). Her research focuses on cultural representations of the body, medical visual techniques, visual ethnography and documentary film.

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- 1 I started with my research one and a half years ago and have, to date, spent four and a half months in different areas of the radiology department. Last year I conducted thirty narrative interviews with radiologists and medical technical assistants. The interview results are used as the basic information for my fieldwork among patients and radiological personnel. They are not presented as verbal testimonies, but inform my body-centred methodologies and my work with a digital video camera, which I use as a research tool. My observations will last until the beginning of 2003.
- 2 Etymologically the word 'patient' includes 'to bear', 'to endure', 'to permit', 'to put up with', 'to tolerate' and 'to suffer'. There is a lot of 'passion' in the play. In German the word for 'passion' is 'Leidenschaft', which stands for powerful emotions and literally for the creation of grief or pain.
- 3 Anna is not the real name of the patient. I made it up so as to maintain her anonymity. This woman, in her eighties, was the first patient with whom I worked intensively in interventional radiology (last April). So far I used my video camera in this department for only three female patients during their operations. Anna was one of them. At the time of writing this article, I have spent about one month in interventional radiology, observing highly complex procedures of diagnosis and therapy.
- 4 *Abstrahere*: 'strip away'.
- 5 Being 'unveiled' is a poor translation of M. Heidegger's notion of '*Entbergen*': "Das Wesen der modernen Technik bringt den Menschen auf den Weg jenes Entbergens, wodurch das Wirkliche überall, mehr oder weniger vernehmlich, zum Bestand wird" (1950: 24).
- 6 The convalescent rooms where the hospitalized patients are, are called red and green 'bed towers' / 'Bettentürme' at the *General Hospital* in Vienna.

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