Handling yourself

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In the medieval period surgeons, unlike physicians, did not study at a university but were ranked as craftsmen, learning as apprentices from masters. As in other trades, surgeons use tools or instruments to facilitate controlling their materials but recognize that they are intermediates between their hands and the object of their skill. Your awareness of this should impress on you the need to use every practical task you perform as a means of improving the skills required in surgery – all day, every day, not just in the operating theatre.

2. Individual components of operative skill can be listed but do not define the way in which they are put together to create a successful surgeon. Few of us are fully equipped mentally and physically, but by putting in the extra effort to overcome our weaknesses, we hope to compensate for them. In contrast, some who are fortunate enough to be born with natural aptitudes fail to put in the extra effort.

3. In this chapter I hope to demonstrate how to identify in yourself some of the qualities you need to utilize and develop in order to become a skillful surgeon. You can recognize the presence or lack of them in your everyday life and initiate your training even before you step into the operating theatre. Continue this process when you watch operations, become an assistant and are eventually allowed to perform part or all of an operation.

4. It is not necessary to see someone operating to identify the presence or absence of desirable qualities. Watch others performing everyday
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1. Common sense encompasses being aware at all times of what is going on around you and reacting to it in a logical and rational manner. It is eroded if you are distracted or lose your composure and temper, so your anticipation of impending danger is blunted, as is your ability to react sensibly and perform effectively. If you encounter a difficulty, do not rush wildly into ‘doing something’. Respond to changed circumstances; errors often result from dogged and blind continuation with the intended procedure; this is sometimes (but not by me) entitled ‘situational awareness’.

2. Competence. Make it a habit in your everyday life to carry out your duties in a relaxed atmosphere of expertise and calm. List your intentions in descending order of priority and ensure you are able to carry them out proficiently and professionally. Take each step in its correct order, complete it, check it and continue with the next one – but react to new input and if necessary respond to it.

3. Commitment. Keep in mind your prime purpose. Unless circumstances change, concentrate on this and do not be deflected from it without good reason. Be willing to defer or cancel other duties in order to fulfil the most important one. Except in an emergency, complete every task.

4. Compassion. How privileged you are to be a physician, able to treat patients who are in pain or anxious. Now you wish to add to your skills and offer another means of treatment. Operating on people can be dramatically successful – and also disastrous. Expect to have occasional sleepless nights from anxiety and guilt as you retrospectively consider your recent actions.

5. Communication. You are in a professional relationship with your patients, their relatives and your colleagues. Technical skill in the operating theatre is not sufficient on its own to make you a successful surgeon. It is a vital add-on but it is one component among many others. You must communicate and be open to communication – listen, as well as talk.

Key points

- ‘Get it right first time’ incorporates the recognition that faults occur and that they must be anticipated and avoided.
- Do not hope for the best. If an error is likely, build into your routine a check or corrective.
- Correcting errors is more time consuming than avoiding them.

Key point

- You will carry these attitudes that you strive to develop from your everyday life to the operating theatre.

ATTITUDES – THE FIVE Cs

PHYSICAL ATTRIBUTES

Hands

1. There is no ideal surgeon’s hand. The shape of your hand has little or no bearing on your manipulative skill. However, identify the peculiarities of your own hands and fingers in order to exploit the benefits and make the best use of them. For example, the terminal phalanx, nail shape and extent of nail bed towards the tips of your fingers affect your preference for fingertip pressure or pulp pressure.

2. Your hands are important assessors of tissues. Their sensitivity is affected by wearing gloves. When clinical circumstances require you to
wear gloves, consciously note the changes. Make sure you wear the correct size of gloves and wear them correctly. Do not allow the glove fingertips to project beyond yours – pull the glove fingers on fully, if necessary creating concertina’d wrinkles near the base of your fingers.

3. There are many outstanding left-handed surgeons, so this is no disability, even though many instruments are designed for right-handed people. Some instruments are also available for left-handed users.

**Stability**

1. Surgeons do not usually have extraordinarily steady hands. Our ability to perform finely controlled movements diminishes as we age.

2. If you hold long-handled instruments at arm’s length, the tips magnify the tremor – and anxiety exaggerates this. Do not feel embarrassed. The farther the distance from a firm base to the point of action, the less steady are your hands.

3. Stand upright with feet apart, arms and fingers outstretched. You will detect a slight tremor at your outspread fingertips. Now press your elbows into your sides and you should find your hands are steadier. Sit or brace your hips against a fixture to become even steadier. Rest your elbows on a table; also rest the heel of your hand or your little finger on the table (Fig. 1.1).

4. If you cannot use a base close to the active fingers, use the other hand to steady the dominant hand by grasping the wrist. If you need to reach to make an action – for example, when you are cutting ligatures as an assistant – use the fingers of the inactive hand on which to rest the scissors (Fig. 1.2). If no other base exists, place the ‘heels’ of your hands together when carrying out a manoeuvre such as the nowadays rare need to thread a needle (Fig. 1.3).

5. If you need to carry out a smooth movement, try practising it in the air first, as a golfer does before making a stroke.

**WHAT IS SKILL?**

1. The Old Norse word ‘skil’ signified distinction (from skilja = to separate, discriminate). In everyday use it commonly signifies expertise and dexterity in performing a practical procedure as opposed to facility in a theoretical or abstract accomplishment.

2. As an example, a tennis beginner must learn to control the racket to strike a ball. Initially
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3. This ability to ‘download’ the means of accomplishing something, so freeing the performer to focus attention on the prime object of the procedure, is a skill. It is a fundamental achievement that has to be acquired by assiduous, intelligent practice. It frees the player to see the game as a whole, able to plan, anticipate and be correctly positioned for the next shot.

4. It is remarkable that having acquired a skill and then trying to add further ones, the first skill is initially lost. When you learn to drive a car, having learned to control the accelerator and brake, if you now look at the other traffic, as you wish to signal your desire to move off and steer into the road, your control of the accelerator and brake pedals often regresses.

5. When you have acquired a skill, however simple, you will find that if you concentrate on it, you become clumsy. If you are familiar with a QWERTY keyboard on a computer or typewriter, ask yourself if you can continue the line of letters after the ‘Y’ or list the next line. Why do you have difficulty? Your fingers go to them automatically because you have relegated them to a subsidiary awareness. Your focal awareness is directed at what you are writing.

6. You will appreciate that if you attempt to hurry, you are moving your primary focus from the accomplishment of the skilful performance to the individual movements, and you make mistakes. Take the example once again of the keyboard. Try typing at speed. Your focal awareness shifts to the keys, not to the content, and you make mistakes.

7. In order to acquire a skill you must practise it assiduously until you can perform it repeatedly and reliably. Just going through movements does not demonstrate a skill. You need to perform it perfectly every time.

8. Watch and copy experts. Of course, they cannot bestow skill. Differentiate between trainers and masters. A trainer or coach can tell you what to do, assess you and identify ways to improve but does not necessarily have the personal skill to do it at a high level. A craft master (L. magister) is one who is expert at performing the craft – and can show you. Watch and remember how they achieve their success. Trainers may not be masters and masters may not be good trainers.

EXERCISES VERSUS PRACTICE

1. Since you need to carry out the task repeatedly to acquire skill, differentiate between exercise and practice. It is a distinction recognized more by instrumental musicians and those pursuing a career in sports than by surgeons.

2. Exercise. If you wish to become accomplished at a particular procedure you have been shown, you may repeat it until it becomes second nature and you can carry it out without the need to concentrate on the component actions. Each repetition is the same as the previous one. The Suzuki method of teaching young violinists uses this method.

3. Practice. You may instead perform the manoeuvre, identify a difficulty or a means of facilitating it and adjust the next trial to judge its success in eliminating the difficulty and making the procedure easier, better controlled and feeling more natural. Continue until you cannot improve it further and only then do you convert it into an exercise.

4. Ask for feedback from trainers and colleagues. Undertake work-based assessments as a formative process throughout training and do not leave their use until the end as purely summative assessments. The more feedback you receive, the more you have to reflect upon and base your development upon.

5. Remain willing to modify it again if you find a better routine. One of the benefits of
instruments. Do not be misled into feeling that skill in manipulating them alone confers surgical skill. However, many surgical procedures are now performed without the operator touching the tissues. In order to reduce the exposure, minimal access procedures have been widely developed. When using instruments, whether handheld or mechanically or electronically linked, the sense of touch is reduced or lost. You may have the opportunity to experience on a simulator the use of minimal access instruments, often with relatively long handles and the need to move your hand in the opposite direction to the intended tip movement. In robotic surgery the hand and target tissue are decoupled, being driven through electronic systems. Much research is directed at providing force feedback to the operator to help in the estimation of the tissues held within graspers.

5. Force and torque. In other occupations artificially produced haptic feedback systems are in use to provide operators with, as yet limited, sensation of feel and measure of applied force and torque. These are being introduced into surgical applications. When you watch an expert tighten a ligature it is impossible to know, and accurately replicate, the tension. Again, in the case of handheld or electronically controlled robotic instruments, appreciation of the force transmitted is reduced or not sensed. It is now possible to measure the force exerted through some instruments. An important finding is that novices tend to exert up to 130% more force or torque than is required by experts to perform the same procedure. You do not need elaborate equipment to recognize the potential damage you can inadvertently create by pinching tissues with instruments. If the handles of hinged forceps are twice as long as the blades, your squeezing force is doubled at the tips. You may exert very high compression per unit area through fine forceps with tip surfaces as fine as 2 to 3 mm². Use too much force and when you release your pressure the crushed tissue soon looks normal – but it will die or at best be partially replaced with scar. When you look at some old wounds, you see scarred lines crossing the healed wound – they result from too tightly tied sutures.

Whenever you encounter resistance, of any type, make it a habit to apply the minimum force to overcome it. Often this means changing your approach or method or removing

HAPTICS

1. Do not be distracted by the word ‘haptics’ (G haptein = to fasten). It is well known in industry but relatively new in medicine and surgery. It becomes increasingly important as we introduce methods of ‘handling’ tissues by instruments that reduce or remove our ability to feel them; to assess their surface, texture or temperature; and to appreciate the force we are applying to them and their resistance to that force. It is the science of touch (possibly related to L tangere = to touch), creating an interface mainly between us and technological apparatus and instruments.

2. During clinical examination of our patients we recognize and identify many structures by touch, assessing the surface, texture and temperature. We employ our kinaesthetic sense (G kinein = to move + aisthesis = perception) to explore them for homogeneity, strength, friability, flexibility and attachments. We may receive force feedback from resistance or vibrations. We rely heavily on our knowledge of the texture of structures, and when we wear gloves, even thin surgical gloves, our appreciation of touch is impaired.

3. When you interpose an instrument between your hand and the target structure your tactile input is drastically reduced. Rigid instruments such as dissecting forceps transmit more than do soft or flexible ones; when you pass a soft urinary catheter into the bladder you need to move it extremely delicately to appreciate the progress through the urethra. The more complex the link between hand and target structure, the greater the loss of touch.

4. You will find, as you embark on your surgical career, that much of your training will be using instruments. Do not be misled into feeling that skill in manipulating them alone confers surgical skill. However, many surgical procedures are now performed without the operator touching the tissues. In order to reduce the exposure, minimal access procedures have been widely developed. When using instruments, whether handheld or mechanically or electronically linked, the sense of touch is reduced or lost. You may have the opportunity to experience on a simulator the use of minimal access instruments, often with relatively long handles and the need to move your hand in the opposite direction to the intended tip movement. In robotic surgery the hand and target tissue are decoupled, being driven through electronic systems. Much research is directed at providing force feedback to the operator to help in the estimation of the tissues held within graspers.

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Whenever you encounter resistance, of any type, make it a habit to apply the minimum force to overcome it. Often this means changing your approach or method or removing
an obstacle that adds to the difficulty. When you watch or assist an expert surgeon you will be surprised how little force is used. Magically the tissues seem to behave well out of respect for the surgeon. It is not magic. It is the result of intimate familiarity in guiding the tissues to conform to the operator’s wishes. This is the essence of craftsmanship.

**Key points**

- Make it a habit, in everyday activities, to achieve manipulations with minimal force.
- Consider trying several methods and choose the gentlest.

**TRANSFERABLE SKILLS**

1. Even before you enter the operating theatre you can start to develop or improve the manipulative facility and sensitivity that you will require as a surgeon. Adapt every possible normal routine to hone your skills. Watch skilled workers in other vocations and you will see common traits, some of which you can incorporate into your training. It is a joy to see someone carefully assessing a problem, unhurriedly preparing the materials and tools, doing the preparatory work to facilitate the task, now seemingly effortlessly carrying out the needed procedure, reassembling, testing and approving the result. This is a demonstration of seamless assessment, decision, preparation, accomplishment, final assessment without haste or the need to correct imperfections.

2. The French surgeon Alexis Carrel (1873–1944) developed his suturing technique after watching an expert embroiderer in Lyon. He practised by inserting up to 500 stitches in a cigarette paper without once tearing it, becoming a founder of vascular surgery, for which he received the Nobel Prize in 1912. The British surgeon Lord Moynihan (1865–1936), who was famously skilled, was reported to carry a piece of string with which he practised tying knots whenever he had a spare moment.

3. As examples, when you peel a fruit or open a sealed envelope, you can practise separating tissues without damaging them, while keeping in the correct plane. You achieve this by keeping the distance between the adherent surfaces and the distracting force to a minimum. Every time you open a sealed envelope, raise an edge of the flap and extend the parting. Grasp each edge between thumb and index finger. While keeping your index fingers pressed together, evert your hands so that the edges are separated. Limit the extent of the cleaving tension by compressing the still sealed section just ahead of the split between your middle fingers (Fig. 1.4). You are remarkably sensitive to incipient tearing. Unless you readjust your grip every few millimetres, your hands move apart, the extent of paper at risk is lengthened and you may not detect a tear starting anywhere along it.

4. Use your ingenuity to find other practice opportunities. Try to perform every action gently, neatly and with minimum disturbance.

**Speed**

The examples of focal awareness demonstrate the importance of allowing your hard-won skill to be applied naturally. Do not compromise the benefits of this by hurrying.

**Sequence (L sequi = to follow)**

If you need to take apart, adjust and repair any structure or equipment, determine to attempt it without misplacing or dropping any part, and carry out the dismantling and reassembly in the correct sequence. The value of the habit will be evident when you watch or participate in a surgical operation. There is a well-tried procedural order.
SKILLS COURSES

1. In the past trainee surgeons watched, assisted and then operated on patients. Indeed there was an adage, ‘See one, do one, teach one’. It is preferable for you to be shown in a course, away from the potentially tense atmosphere of an operating theatre, how to perform the procedures and carry them out under supervision and guidance. Take every opportunity to attend such courses.

2. Practice operations on live but anaesthetized animals is strictly limited except for microsurgery. For many years dead animal tissue has been used but increasingly, because of public health fears of transmitting viral and other infections, simulated tissues are used. The available models may look like the real body parts but it is not yet possible to create simulations with the complex, varied structure and consistency that you will encounter in surgical practice. This is a serious deficiency. The ultimate purpose of these courses is to teach you to operate on living tissue, yet this is lacking.

3. You must become familiar with handling surgical instruments, and courses offer you this facility. You initially need to concentrate your attention on controlling them, rather than controlling what is at the other end of them. As you become more familiar with them they become natural extensions of your hand, and when you come to operate on living tissues you can focus your concentration on the tissues rather than on the instruments, with which you are now proficient (see later).

4. Minimal access surgical courses are particularly valuable because you need to become familiar with the opposite effects of hand movements on instrument tip movement through the pivoted access port (see Ch. 13).

5. Virtual reality instruments and courses based on them provide you with the opportunity to learn how to control complex instruments that further remove you from the target tissues. At present they mainly offer exercises that you control under visual guidance. They offer the promise of greater haptic and force/torque feedback, but this is still rather crude (see earlier).

6. Create your own simulations. Courses offer you a limited experience of carrying out operations. You need to create opportunities for practising the routines and become familiar with them. Use your ingenuity to create an arrangement that allows you to repeatedly follow through part or all of an operation.

When you are offered the opportunity to carry out the same procedure in the operating theatre you will have the confidence to perform it competently. In the future, the surgeon, who is responsible to the patient, will be more willing to delegate a procedure to you if you have already demonstrated on a simulation that you can perform it safely.7,8

Key points

- Skills courses offer excellent introductions to operative procedures. They are adjuncts, not replacements, for training on living tissues.
- Skills courses do not transfer skills to you; they should reveal to you what skills you need to acquire by active practice.

THOUGHT PROCESSES

Kahneman describes two thought systems; system 1 is a fast, subconscious automatic system and system 2 a slow, conscious system.9 When we begin to learn surgery system 2 is at the forefront as we try and remember the sequence of the procedure and what we have been taught. As we become more proficient some of what we do uses system 1 – for instance, automatically tying a knot when we have placed a suture. The more that the processes come into system 1, the more proficient we become. However, we can also learn bad habits. Therefore it is important that you learn things correctly from the start, before they become actions that you no longer consciously make decisions on.

RATIONAL ASSESSMENT OF INFORMATION

1. Part of your complex development as a competent surgeon is how you discriminate the information you receive. You will be simultaneously trying to improve as a physician-scientist, a practical craftsman,
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1. Learning current accepted practice, yet being aware that this may be rapidly changing.

2. Be willing to follow the practice of your teachers. This often means that you have to change your methods as you pass through the rotating appointments. It is important that you do not become too rigid early in your career. Sometimes an unfamiliar method proves, with practice, to be an improvement on your current one.

3. Your trainers may claim that their success depends on some possibly unique change in their technique or material, yet they seem to get similar results to others who do not perform in the same manner. You will learn that it is not the method or the material that is the component of success but rather the care with which it is incorporated into the procedure. Your teacher is too modest in attributing success to one change, when it is the result of outstanding commitment to skill and competence.

4. Improvements in techniques, instruments and materials constantly appear. Welcome them, but assess them critically. Those who introduce them often unconsciously or consciously select the patients, and by committing to it greater effort and enthusiasm, obtain improved outcomes. Improvement in performance may also result from increased attention to it. This is often called the 'Hawthorne effect', named after a noted rise in productivity at a factory in Hawthorne near Chicago when the workers became aware that they were being assessed. It is only when uncommitted researchers detect improvement that you should embrace the claimed improvement.

COMMUNICATION

Throughout your surgical career you will communicate with patients, their relatives and colleagues from your own department and others. Be aware of the affect that your communication has on others. As a surgeon you hold a position of respect and authority for many around you and it sometimes helps to imagine yourself in their shoes when you communicate with them. This applies to verbal, nonverbal and written communication. Remember that lack of communication can also convey messages to others.

Do not bring your external worries and sorrows to work with you.

If you are physically or mentally unwell, consider taking a break to recover. You are human too.

PROCEDURAL PRACTICE

There are a number of general principles that you will always follow:

Conduct yourself with professionalism at all times. (It is worth reflecting on what this means.)

Ensure good communication.

Ensure good handwashing and infection control procedures.

Wear appropriate personal protective clothing (apron, gown, gloves, double glove, face mask).

Handle all tissues with care and respect.

Consider the whole patient and not just the small area that you are working on.

Remember that you are a doctor as well as a surgeon.

Do not practice beyond your capabilities.

Have insight into your own capabilities.

Do not be afraid to ask for advice and help.

Learn and practice constantly.

Ask for feedback and if necessary accept and act on it.

Reflect on your own performance.

Be responsible for your own actions.

You should aim to be the best possible surgeon that you can be. Of course, this is open to reflection; you may model yourself on one of your surgical heroes (or heroines). However, throughout your surgical career you will observe many good qualities in senior and junior colleagues. Learn from these and practice those that you can develop yourself for the better.
REFERENCES


FURTHER READING