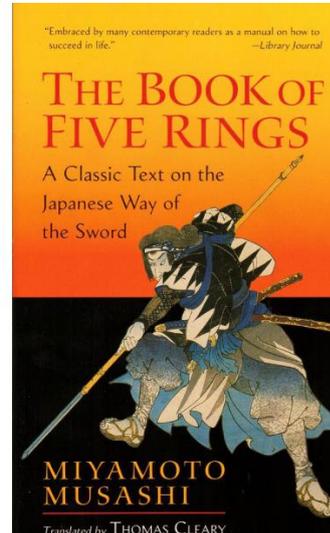


## Clean dissection is sharp dissection

### Philosophy

#### The Way of the Samurai - keep Martial arts in your mind

- Think of what is right and true
- Practice and cultivate the science
- Become acquainted with the arts
- Know the principles' of the crafts
- Understand the harm and benefit in everything
- Learn to see everything accurately
- Become aware of what is not obvious
- Be careful even in small matter
- Do not do anything useless



The katana must be one of the most elegant and functionally designed weapons of war ever developed. The history of Japanese sword making dates back 2000 years and the katana (a two-handed single blade sword) was developed in the fifteenth and sixteenth century. The metal smiths of the 1600 were chastised by the ruling shogun for having poor weapons and challenged to produce an unbreakable sword. The process of making the sword involves harnessing the power of the elements – the earth for the ore, the fire for forging and water for the quenching. The ore is hand-picked, the fire requires the right logs and is attended by the masters for days. The best water was found in particular streams and at the right temperature in the spring. The folding and hammering are done with precision and rhythm. The polishing is again done by a specialist with whetstones. The skills required take a lifetime to master and imbued with ritual and the practice of Shintoism and Buddhism. Sword making takes several months. The finest katana are priceless, and each master is left a signature or *MEI* on the handle or *NKAGO* or tang. The care and dedication are reflected in unique and individually defined file marks and the temper line *HAMON* along the edge or *HA*.

The art of a surprise attack and counterattack is called *IAIDO* and is a meditative type of combat that is fought with an imaginary opponent. The word that describes Iaido is *serenity*, without which your movements will lack purpose and precision – applicable to surgery? Many eminent Japanese surgeons have ancestors who were Samurai!

### History

Sharp tools for cutting flesh and scraping hides have been required from the times of early Mesolithic man using flints. There is evidence of scalpels going back to Mesopotamia and the ancient Egyptians. The Romans refined the blade with their knowledge of metallurgy and perhaps the need to shape and fashion hair. It comes as no surprise therefore that the first surgical instrument to be designed was the scalpel – Hippocrates described the “macairion” which is essential a blade with a sharp end and cutting edge with a handle. The word scalpel derives from the Roman word “*scallpellus*”.

The need to release the 'evil' vapours through incision of boils and venesection was commonplace. Amputation of dead, dangerous, and useless parts of the body also prevailed in the middle ages – the principles for amputation today! Rituals of circumcision, venesection and lancing all required blades. It was with the advent of the industrial revolution that metallurgy enabled the further development of the knife and cutlery.

The Bard-Parker Company patented the scalpel in 1915. It featured a specialized handle with an interchangeable blade made from modern stainless-steel alloys, a concept that was inspired by the disposable shaving blades developed by King Gillette in the early 1900's. Swann Morton was founded in 1932 by Walter R. Swann, J. A. Morton and D. Fairweather to make and sell razor blades. It was in the 1930's that they started to make surgical blades. Their company is based in Sheffield that is at the heart of industrial Britain and famous for the stainless steel of most of our cutlery. In the 1960s demand for sterilized surgical blades increased and Swann-Morton developed, with the expertise of the Atomic energy agency a Cobalt-19 sterilisation unit. This was the first of its kind and people from around the world came to Sheffield to see the work of Swann and Morton. This unit enabled Swann-Morton to be completely self-sufficient for all its sterilisation requirements.

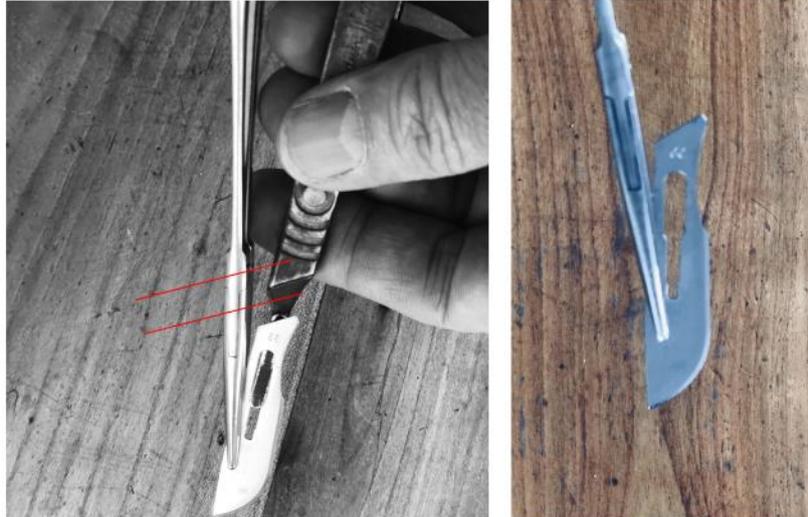
### Safety

Scalpel blades are very sharp and must be handled with care. This starts with mounting the blade. Please handle the blade with a haemostat on the edge opposite to the blade. Ensure that you have a good grip i.e. the haemostat covers a large area. Hold the blade in the haemostat with the point of the blade directed into a safe surface. Align the blade and handle – notch and bevel. Slide the handle onto the blade – the blade is steadied and not pulled onto the handle.

Reverse the process removing the blade – the blade is lifted off the diagonal bevel of the handle with a haemostat. The haemostat is repositioned to securely hold the blade opposite the sharp edge. The handle is pulled off the blade that must be pointing into a safe surface - not the patient.

Scalpel blades must be passed between the surgeon and scrub nurse in a kidney dish as all times. If it is passed by hand, please do so with the handle first and the blade pointing away from the palm of the hand. Never snatch.

Any graduate in the Black Belt Academy of Surgical Skills who fails to demonstrate safe handling of the blade and disposal of sharps, will not be allowed to progress to the next belt.



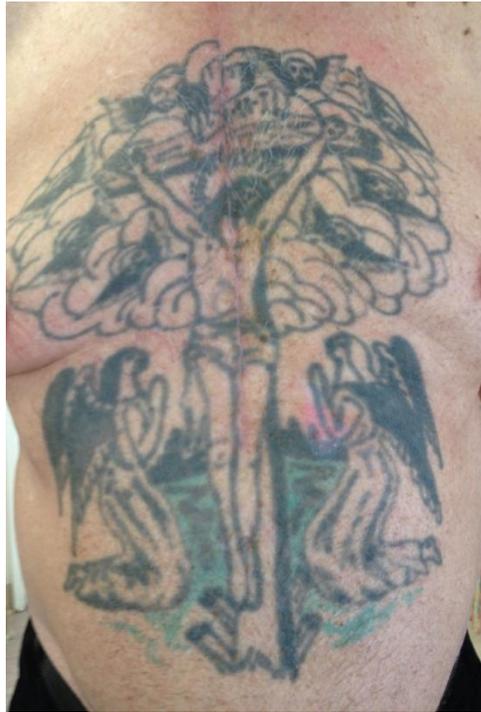
## Principles

We are covered in a thick-biological-water-and-germ-proof-integument that protects us from the hostile environment. Surgeons breach this protection with incisions as precursor to all operations. It is therefore important to respect the skin and cut through it with accuracy as you are breaching defences. The blade is always held at ninety degrees to the skin, even if the incision is curved. There is a tendency to 'bacon slice' the skin on bends and turn at the waist with long incisions.

The epidermis of thick skin has five layers: **stratum basale**, **stratum spinosum**, **stratum granulosum**, **stratum lucidum**, and **stratum corneum**. The **stratum basale** is a single layer of cells primarily made of basal cells. A basal cell is a cuboidal-shaped stem cell that is a precursor of the keratinocytes of the epidermis – the sixth layer is the dermis and the seventh the muscle. Learn to cut cleanly through the first five without damage to dermis and muscle. Understand the amount of pressure required to make an incision is little more than the weight of the forearm - the most prized katana is called a 'five body sword' as it can slice through five bodies in one stroke.

Respecting the tissue opening and closing will reduce wound infection. Primary healing is best achieved with two clean and fresh edge that are gently apposed when closing. Drain can help close dead space and removes exudate. Cutting diathermy fulgurates the surrounding tissue - it not recommended. Moreover, it contributes to the itching of the wound post op and may encourage the patient to scratch – this is the commonest cause of late wound infection.

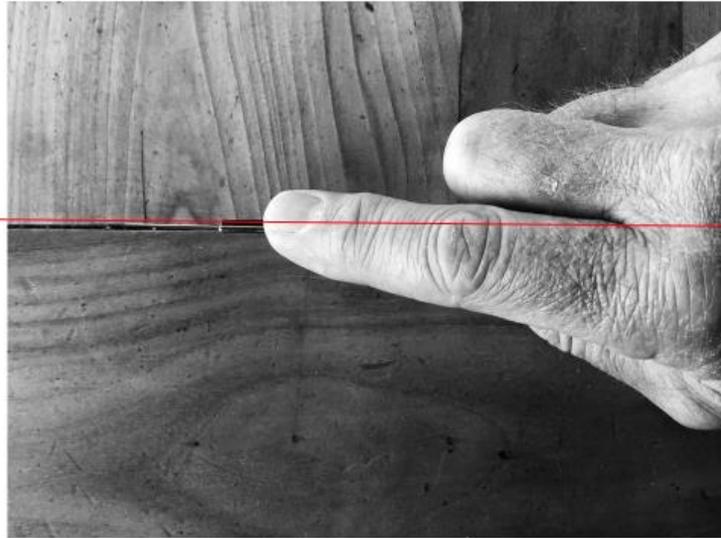
Do not ever forget that the patient will always remember you, your words and your actions looking at their scar – it is your indelible signature on them for their life. Make it the best it can be as it is your calling card - this does not happen on a wing and prayer! Be careful even in small matters was the philosophy of the Samurai



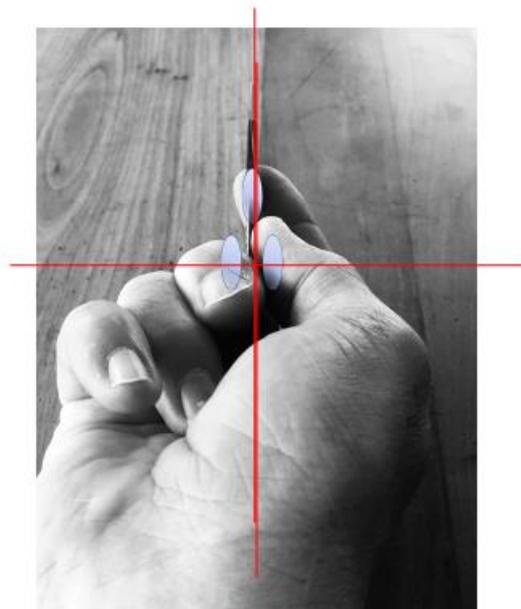
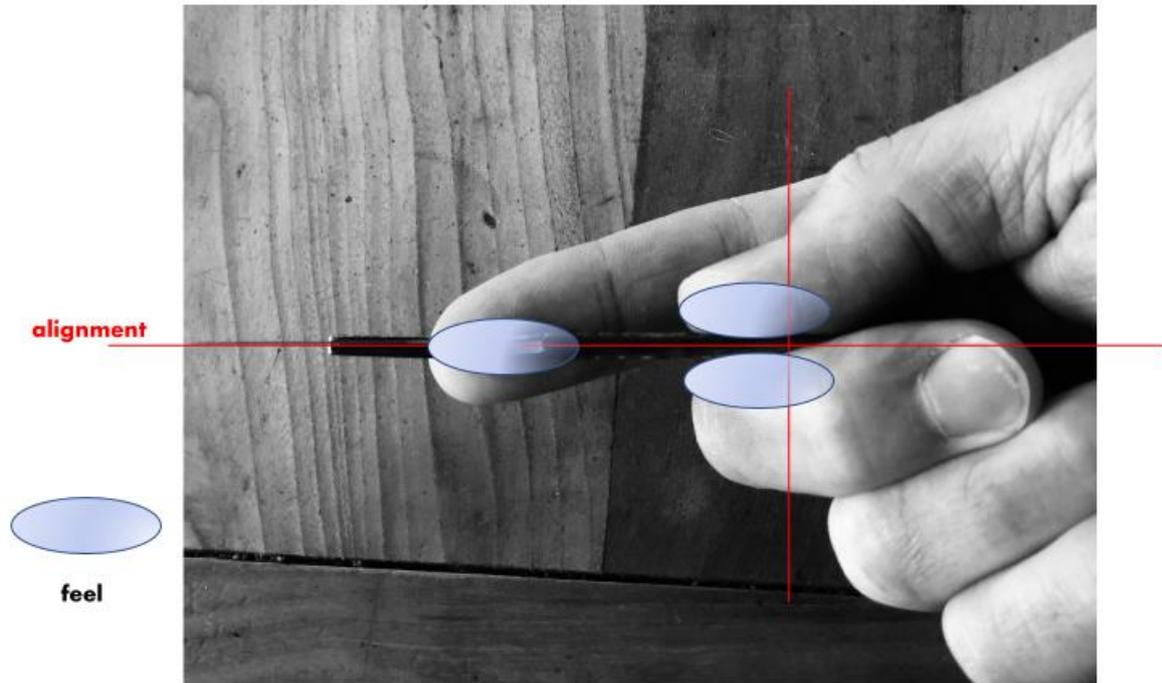
## Handling

Debrett's (a definitive guide to English etiquette) states that it is incorrect to hold a knife like a pen. It is the same for a scalpel! The handle lies within the palm of the hand. The pulp of the thumb and the edge of the terminal phalanx of the middle finger are applied either side of the handle. Outer tie rods and lower control arms of a car suspension keep the wheel of the car flat to the surface – the thumb and middle finger are doing the same as the blade makes the incision as it insures the blade is perpendicular to the skin at all times. The index finger is extended down to blade with the extension of the terminal phalanx. The whole pulp of the index finger is applied to the dorsal surface of the blade and held in place by the lumbrical optimising lightness of touch and proprioception. Think of the index finger as a 'cantilever-suspension arm' controlling the pressure of the incision. The pressure requires it little more that the weight of the forearm.

Use the belly of the blade and dray the blade away from you. Do not use the point– the 11 scalpel blade is pointed for lancing and the depth is controlled by the fingers held ether side of the blade.



**incison**



## Incisions

An incision is made with two hands. The non-dominant hand supports and spreads the skin between the thumb and fingers parallel to the blade and across the blade throughout the incision. The blade is 90 degrees to the skin throughout – any deviation results in slicing.

Incisions are made along Langer's lines or skin creases. They are frequently aligned or positioned to bony landmarks. It is important to remember these landmarks are obscure with obesity and that age may mean the dermis and skin have 'sagged'. For example, harvesting the long saphenous vein from the thigh will be problematic if that sagging thigh is not held up and the incision is not aligned

from two fingers below and lateral to the pubic tubercle to one hand breadth medial to the patella. Remember that self-adhesive drapes will distort anatomy and drag the skin and dermis from one side to another. It is better to put the drapes on from head to toe and not side to side.

Care must be taken with long incisions. Cardiac surgeons are often accused of being able to do one operation because there is one incision; it requires attention to detail to ensure a 22 cm sternotomy incision is perfectly down the middle like plumb line! The trick is to remember that we will unconsciously turn our hips as the incision continues laterally out from your midline – this will result in a curve and can be mitigated by adducting the shoulder and extending the elbow.

Be careful not to be distracted by the alignment of the drapes – they are not anatomical reference points!

It is important to use the full length of the wound and ensure that ends of the wound are full thickness. Indeed, access can be improved by undermining the ends of the wound – it is useful to increase the exposure by having a longer incision through the dermis and muscle layers. However, retraction on skin wound for prolonged periods will cause ischaemia of the skin at either end of the wound thereby increasing the chance of scarring and infections. Consider increasing the length of incision to improve access. It may be fashionable to have small incisions but remember wound heal from side to side and not end to end. Carefully aligned incisions with respect to the tissues will optimise primary healing, reduce scarring, and improve function.

The scalpel blade can be held in the fingertips of the thumb and index for fine work, usually with smaller blades e.g. a 10 but more effective with a 15 blade. It is important to ensure that elliptical incisions are made with blade at 90 degrees to the skin throughout the curve. The ellipse should be long enough to ensure the two edges come together without tension and along Langer's lines. Please make sure that the ellipse is long enough to enable the wound to come together without any tension.



## Dissection

The blade is used like the brush. The flat of the blade is stroked gently over the tissue that is being dissected away. This will enable you to see the neurovascular bundles that traverse tissue planes. Do not direct the blade into the separating tissue planes.

Most tissue planes are avascular the exception are those tissue planes that are found around exocrine glands. By their very nature, hormones need to get into the circulation, and this is by way of myriads of veins. Their distribution is very varied, and care needs to be taken. Remember that veins do not diathermy because they do not have a thick muscular wall. It is best to ligate each vein carefully.

Haemostasis happens at the beginning of the operation – care and attention at the beginning of the operation will reduce overall blood loss, remove any impairment to your vision by pooling blood and make your dissection more exact. Sharp dissection is clean dissection. Please avoid macerating tissue or as Lord Berkley Moynihan said, being a ‘hewer’ of flesh.

Diathermy should be confined to fulgurating arterial vessels that are less than 1mm in diameter. Diathermy fulgurates tissues and cutting diathermy does the same. Do you want to close a wound with a lot of dead and dying tissue because of your injudicious use of the diathermy?

## Drains

The drain is used to help oppose tissue and remove any exudate. It is especially useful if there is a large ‘raw’ area. Remember that the exudate can last a few days and that suction on a drain can help keep the tissue planes opposed.

## Wound infection

Any wound problem is a problem for the patient and costs as it needs intervention. Anything less than a perfect wound is a problem for the patient.

This requires attention throughout the operation – and it applies to theatre design, theatre traffic and all the staff. These are a few simple things that can make all the difference!

- 1) Skin prep – chlorhexidine
- 2) Clean dissection – knife only with little diathermy
- 3) Respect the skin edges throughout the length – avoid tension on the tissue at either end
- 4) Careful suturing – layered lines
- 5) Keep the patient warm
- 6) Dressing to keep a 30% humidity and stop the patient scratching