The Art of Reconstruction is not simply a training course where known information is provided to achieve predictable outcomes, but rather a series of basic principles in drawing and modelling designed to inform and challenge working practice. It is about perception rather than merely observation, establishing strategies for making judgement and using drawing as the evidence of inquiry. For both surgeon and artist the research is embedded within the course where a dialogue exists adjusting course content aiming at developing appropriate methodologies and ultimately enhancing surgical practice.

Drawing is the core of these courses, and although the surgeon usually feels more comfortable with the modelling projects, it is drawing sessions where the basic principles are established. Even the notion of the ‘tactile’ which we will return to later, is first engaged through the drawing process.

It is always a collaborative process where a mutual respect is established through shared knowledge, integrity and trust.

There is a long history of collaboration between artist and medical science, where representing the body, illustrating anatomical information, documenting procedures, all combine to educate and enhance our understanding of the human condition. In terms of drawing the most immediate and visible form of this are the anatomical texts produced as volumes for both medical men and artists.

These books were not simply ‘work manuals’ as indeed the anatomical information illustrated was far in advance of the physicians or surgeons’ ability to intervene at the levels of refinement that the images delivered. Indeed, they were as much philosophical treatise on the notion of ‘man is the measure of all things’ popular in the Renaissance, but originating with the Greek philosopher Protagoras. The beautiful anatomical plates made these ‘books’ commercially attractive and would enhance the status of the collectors and those who were the enlightened patrons of their time. The modest physician, or barber surgeon would certainly not be likely to be able to afford such a major investment.

It is difficult to estimate the contribution of the artist compared to that of the ‘anatomist’, but clearly there was an acknowledgement of the adage ‘a picture is worth a thousand words’.

The collaboration on ‘De Humani Corporis Fabrica’ (1543) between Andreas Vesalius (anatomist) and Jan Stefan van Calkar (artist) is arguably the most seminal volume of its kind. The drawings are visual representations of the dissection descriptions of Vesalius, and as such, overnight changed how we see the body and how we see ourselves. Most of the images are attributed to Jan Stefan van Calkar, but it is likely that a number of artists may have contributed due to the perceived variations in graphic style. Vesalius himself was silent on the matter but was known to say that he found his artists troublesome. Not a unique observation. He did however give precedence to the illustrations, informing his publisher: “Neglect nowhere the matter of the picture, even if you do occasionally omit the text on which the illustrations are based".
Vesalius was therefore very aware of the value of the images and collaboration with artists. The significance of *De Fabrica* was in that previous published ‘anatomies’ were based upon the writings of Greek physician Claudius Galen (AD 131-192) and remained largely unchallenged until Vesalius (1514 – 1564). The work of Magnus Hundt (1449 - 1519) is a good example of schematic drawings based on the teachings of Galen. He was a direct contemporary of Leonardo da Vinci (1452 -1519). Hundt's highly stylised diagramatic images, which for their time were the most complete representation of internal organs published, are in strong contrast to the empirical studies of Leonardo. Hundt used various graphic techniques to differentiate the character of organs, for example the ‘crazy paving’ of the lungs, but it was Leonardo who extended the graphic language in relation to describing the interior of the body. Leonardo employed a range of graphic devices to understand and represent aspects of the anatomy; the cross-section both vertical and horizontal, the multi-viewpoints demonstrating how muscle groups looked in different positions, and the diagrammatic drawings establishing links with mechanical engineering. Although he referred to the body as ‘terrestrial machine’ it is a machine firmly rooted in the natural world. We can see the ‘thread’ diagrams illustrating the dynamic structure of the leg, but also the drawing where he likens the heart to a seed. Leonardo's contribution to medicine was immense as it was to other fields of scientific exploration, and although many of Leonardo's drawings have anatomical inaccuracies, they convey, more than any other, the ‘feel’ of human anatomy. To what extent was this achieved through ‘touch’ and the direct personal experience of dissecting more than ten human bodies? Along with his anatomical studies Leonardo explored the notion of physiognomy, observing variants in human proportion and distortions of the features. Drawing was used to characterise the ideal and caricature that which differs from the norm.

So how is drawing relevant to, or capable of, contributing to the discipline of plastic surgery?

Plastic surgery encompasses a range of procedures including reconstructive and cosmetic, or as it is often referred to - aesthetic surgery. In this regard, the ‘diseases’ for which patients seek cures, are aging, ugliness, poor self esteem, and fuelled by a philosophy of self improvement, an optimistic enhancement, a wish to transform themselves. Perhaps today it lays somewhere between medicine and consumer culture. However, plastic surgery plays an important medical and physiological role in reconstruction of congenital deformities, disfigurement due to disease, burns, traumatic injuries, or of course mutilation as the results of war. War, or at least the results of war, together with the advances in anaesthetics has seen perhaps the most significant innovations in plastic surgery. We will return to this later.
We are told that reconstructive techniques in plastic surgery were being carried out in India by 600 BC by Sushruta, known as the father of surgery. The Egyptians and Romans also performed plastic cosmetic surgery, but most plastic surgeons today recognise Gasparo Tagliacozzi (1546 – 1599) as the father of ‘modern’ plastic surgery.

To quote Tagliacozzi, the surgeon’s task is to “restore, repair, and make whole those parts of the face which nature has given but which fortune has taken away, not so much that they might delight the eye but that they may buoy up the spirits and help the mind of the afflicted …..We do this …. as becomes good physicians and disciples of the great Hippocrates”. He makes the claim and justification for the physiological aspects of plastic surgery that is still enthusiastically debated today. Tagliacozzi’s innovations promised much since it was an attempt to restore the syphilitic nose, but due to the religious zeal of the Counterreformation who believed the sunken nose was a justifiable punishment from god for venereal and moral disease, Tagliacozzi’s skills and techniques largely disappeared. The nose – or rhinoplasty was, and still is the most common procedure, and its revival was triggered by a letter in the non-scientific Gentleman’s Magazine, published in England, 1794.

Therefore, in Europe, throughout the 19th century, advancement continued to be made in a range of plastic surgical techniques by surgeons like Carpue, Von Graefe, Delpech, and Dieffenbach. The artists at this time still largely remained anonymous and one suspects were not direct witnesses to surgery but were brought in to illustrate the ‘before’ and ‘after’ and to document the ‘look’ of the recovery process. The often delicate representations reveal little of the trauma or the severity of the operation, but how do they compare to the ‘before’ and “after” photographic marketing images of today?

Drawings remained a way of documenting or illustrating procedures, until the First World War (1914-18) when artists started to work directly with surgeons. Of course by this time photography was in regular use as part of medical documentation, the drawback being, black and white, and more importantly the inability to select, filter or emphasize. It is not my aim to compare the relative value of various types of medical representation, as there is no doubt that photography plays an important role. In fact it may be all the more unsettling in that it proclaims ‘this is real’. Unless we see the photograph perhaps we might think that the etching by Otto Dix (1891-1969), ‘Skingraft’ is an artist’s interpretation intended to highlight the disasters of war. Indeed it is, nevertheless it’s brutal impact challenging notions of portraiture, (the heroic soldier) combined with the etching needle’s scalpel-like incisions on the plate and on the face, make it a truly memorable and chilling image of it’s time.
In England in the early 20th century New Zealand born Harold Delf Gilles (1882-1960) was to become one of the most important surgeons of his time. He referred to modern plastic surgery as being the ‘unplanned child of modern medicine and modern war’ – a war that was predominantly trench warfare resulting in the terrible facial injuries of ‘broken soldiers’.

Gillies was credited as setting up the first plastic surgery medical unit and was hugely influential in developing and extending a wide range of surgical procedures. He thought that the French and German surgeons were more interested in the practical aspects of reconstructive surgery and less concerned with the aesthetic. He was an amateur artist having done some drawing courses by correspondence, so he was quick to recognise the talents of Henry Tonks (1862–1937) a Professor at the Slade School of Art, London and formerly a Fellow of the Royal College of Surgeons. Initially Tonks made the vitally important diagram drawings for the case study records, but continued working with Gillies even after the war. These case study diagrams have more in common with dress patterns than portraits, as their purpose was to be instructive as well as documentary. They have none of the intimacy or sensitivity of the later portraits, although even here there is an attempt to humanise these working drawings by subtle observations of the tousled hair, or the expression of the eyes. Tonks went on to produce a remarkable set of 69 pastel drawings.

In a letter to D.S. Maccoll, Tonks said ‘I am doing a number of heads of wounded soldiers who had their faces knocked about. It is a chamber of horrors, but I am quite content to draw them, as it is excellent practice……’ The challenge was that these studies defy the logic of the face. The strange juxtaposition of realism – that which we recognise as human, and the almost abstract configuration or rather disfiguration of flesh and bone that we recognise as wound. For anyone who knows anatomy this presents a new challenge in that the structures do not conform to that which is known, indeed where there should be a protrusion there is a cavity, where there is a mouth and nose there is a deformed gash. This forces a genuine investigation of the form – and a re-assessment of graphic conventions and methods of representation. The challenge to draw these fractured and unconventional heads clearly offered formal and aesthetic challenges, but what caused Tonks to treat this as ‘simple drawing exercise’. Perhaps he was dismissive because there was an almost embarrassed guilt. He thought those who wished to view them as morbid and expressed severe doubts as to their suitability for public consumption. Of course, at this time these works would have been damaging to public morale, however, they have become commentaries on the human condition and the horrors of war, but remain touching compassionate observations of fragments of humanity. One former Slade student who viewed the works of Tonks, and in particular a boy ‘with a deep hole in his jaw’ referred to them as ‘hauntingly beautiful’.
To quote Suzannah Biernoff who has written extensively on the work of Henry Tonks - "Tonks' drawings perform a kind of alchemy on the faces, and the flesh they depict. This is not aestheticised horror so much as a kind of perceptual discipline in which the object, the wounded face, is slowly and carefully examined rather than portrayed". They are, to borrow a turn of phrase from the Royal Academy's first professor of anatomy, the British obstetrician and surgeon William Hunter (1718 – 83), possessed of a kind of necessary inhumanity".

The Australian artist Daryl Lindsay who was also based in Sidcup with Tonks and Gilles, used the delicate medium of watercolour, however by comparison, Lindsay's drawings seem far more removed and dispassionate. They are refined illustrations drawn from photographs; there is little selection here, rather it is a 'hands off' translation of the photographic image.

Tonks blurred the line between art and science and he directly reflected this himself being both a significant professional artist and a surgeon. He wrote very little on drawing but one of his students at the Slade, John Fothergill wrote 'The Principles of Teaching Drawing at the Slade School' in which he introduced what he calls 'the ideas of touch'. 'Corporeality does not come from the eyes alone, it is learnt from infancy by touch. Sight is only the means by which our ideas of touch are stimulated, and it is through our ideas of touch and sight that we understand form'. Much is made of drawing as a means of learning to see but seldom is the notion of touch or feel mentioned other than 'feel' meaning the emotional aspect of expression. 'Tonk's drawings are palpably tactile but, of course, physically untouchable; they encode the sensation of touch – both the artists touch and the experience of touching skin'.

Collaboration between artists and medicine extended into areas where plastic surgery stopped. So for those whose face could not be fully restored, a group of artists led by Francis Derwent Wood (1871-1926) established a special Facial Disfigurement clinic which came to be known as the 'tin noses shop'. The patients faces were cast, and prosthetic masks were fashioned of galvanized and lightweight copper. The facial features were originally painted on with oils until artist Anna Coleman Ladd, who went on to head a similar facility in Paris, developed an enamel technique that was washable and had a highly realistic finish. She painted the mask while the man himself was wearing it, so as to match as closely as possible his own coloring. All skin hues and details were painstakingly done by hand and details such as eyebrows, eyelashes and mustaches were made from real hair.
But to return to drawing - how is drawing used today by plastic surgeons? They use drawing in variety of ways, and many of these concerns run parallel to how artists work. Drawing tests possibilities, it is both a topographical map and an operational plan, a tool of investigation, it is a way of thinking, of innovating. – it is thinking.

Drawing commences before surgery, in consultation with a patient as a means of explanation or clarification, and agreement is confirmed, similar to designer/architect drawings – Gillies said that the “architect would never dare build without a blueprint – and his bricks are cheaper than ours”. The drawings form an important practical function but today also serve as a legal record documenting the entire process.

It is always done in the upright position, and occurs immediately prior to the operation commencing. It is used as a means of communication with other members of the team, and is frequently done during surgery as one process is completed before an extension of the procedure takes place. Drawing for the surgeon is ‘4 dimensional’ in that it deals with ‘time’ - what will happen when gravity takes over or when swelling diminishes. Experience dictates the allowance made for the somewhat unpredictability of shrinkage, and apparent inaccuracies in symmetrical alignment.

Since there is no training in drawing or established conventions to adhere to the surgeons use a combination of verbal and visual language to plan a procedure. The process is one of mapping and identification, there is no standardisation of methodology as individual surgeons have devised their own ‘short hand’ drawing vocabulary. The solid and broken or ‘dotted’ line does not appear to have strict or absolute meaning and varies depending on the surgeon and his team, but generally the solid line defines what is ‘there’, what is concrete, perhaps identifying the location of an anatomical position whereas the broken line is more likely to be an indicator and suggests a general area to be worked. In accordance with the idea of a plan or map, measurements are made and located and direction is indicated. Finally drawing is done as a record of the procedure and is a visual reference in the case notes for future reference.

For the artist – we are the measure of our own work, whereas for the surgeon the patient is the measure of his or her skills and judgement. Risk is implicit in surgery as it is in drawing - perhaps a different type of risk. they are not comparable, yet the radical transformations which happen in art have ever more ramifications, in not only how we see ourselves but how we see the world. Perhaps how the world sees us?

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