The Scissors

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The scissors are the most commonly used and owned household tool second only to the knife. The same might be said for the operating theatre but certainly the scissors are ubiquitously used around the rest of the hospital.

It is interesting that in modern English the term scissors do not have a singular form and we refer to this single object as a pair of scissors and ask for scissors that ARE on the table and not IS on the table. This is the peculiarity of the English language and is an example of a 'plurale tantum'. The other objects that share this oddity in~~s~~ naming are the forceps. We also refer to a pair of trousers – two legs but one pair of pants.

History

A pair of scissors consisting of two bronze blades joined together by a ribbon of metal – similar to the shears that my grandfather used for gardening – has been found in the Middle East and dating back four thousand years. The Egyptians used something similar by joining a pair of scythes.

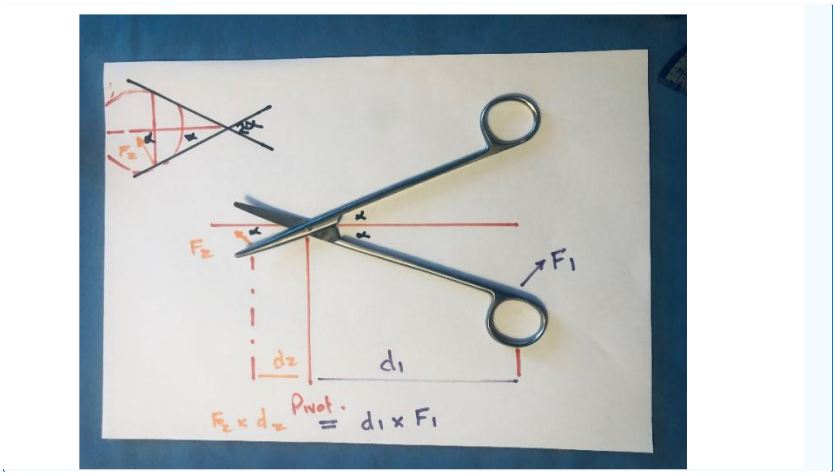
It was the Romans who put the pivot in the pair of blades around 100 C.E. ~~-~~Of course, they were one of the people~~s~~ who became masters in metallurgy, but similar forms have been found in China, Japan, and Korea.

Leonardo da Vinci has been attributed as the inventor of the modern-day scissors, but this is not correct. The modern scissors were developed two hundred years later by Robert Hinchcliffe of Sheffield, UK in 1761. He dedicated his business to producing 'fine scissors' and then moved on to selling mass produced durable, easy to use scissors that we know today. The first scissors had~~e~~ very ornate handles, some even taken on the form of birds with the beaks fashioned into blades, but after the industrial revolution they became purely functional.

Physics of the blades

The French claim to be the undisputed leaders in the physics of the scissors ever since they used blades in the guillotines that took the heads of many aristocracy in the French revolution. Two scientists observed the working of the scissors under the electron microscope and observed that the two sharpened edges do not actually engage the paper and concluded in their article that the 'paper sections itself'. Of course, the more established French institute of science reported that they felt these scientists had asparagus for brains!

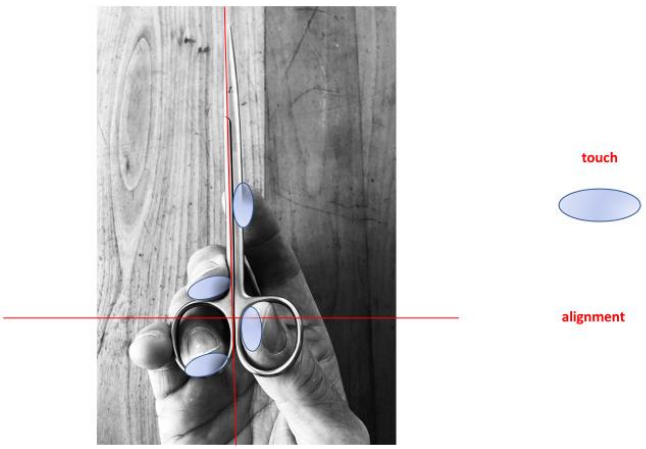
Physics, however, does apply to the design of the surgical scissors. If you think about GCSE (General Certificate of Secondary Education in the UK) physics and moments, a moment **M** (Newton metre) is equal to the force **F** (Newtons) multiplied by the perpendicular distance **d** (metres) from the pivot i.e. **M=Fd**. Translating this to two people of unequal weight sitting in balance on a seesaw – the heavier person is sitting nearer the pivot and the lighter person further away. The dissecting scissors are designed with this in in mind i.e., a longer shaft to blade ratio. In increasing length are, McIndoe, Metzenbaum and Metzenbaum~~--~~Nelson scissors that are 23 cm in length for use in the thoraci~~cs~~ cavity.



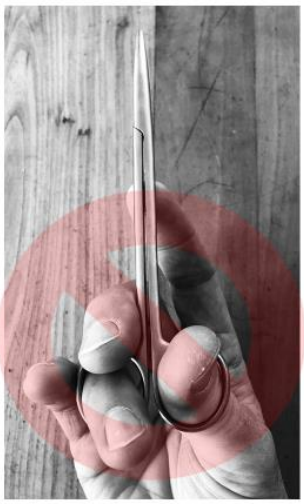
When you consider that the shaft in the dissecting scissors are longer than the blades, you will then understand the very little force is required to cut tissue or sutures for that matter. The movement and the force can be generated by the intrinsic muscle of the hands – especially the thenar muscles, the interossei and the lumbricals. The palmar interossei arise from the ulnar aspect of the second to fourth metacarpals and inserted into the medial aspect of the proximal phalanx and the dorsal interossei arise from the lateral aspect of the four finger metacarpals and are inserted into the lateral aspect of the proximal phalanx. The former adducts and the latter abducts. Both are supplied by the ulnar nerve.

Handling

All dissecting scissors have a long shaft and are best held on the tips of the fingers thereby maximising the 'feel' of the instrument. The forces that are being applied to the tissue and vice versa are best appreciated by the pulps of the fingers that harbour the Meissner corpuscles and Merkel cells that give you feel. If your fingers are small, this can still be achieved by applying the pulps of the respective fingers obliquely across the rings.

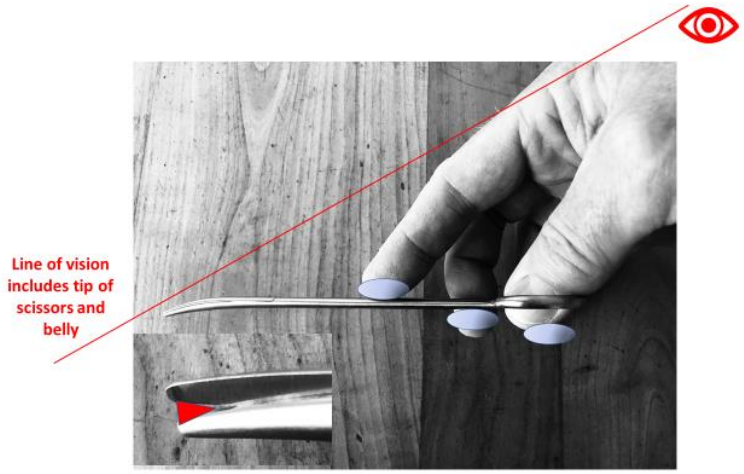


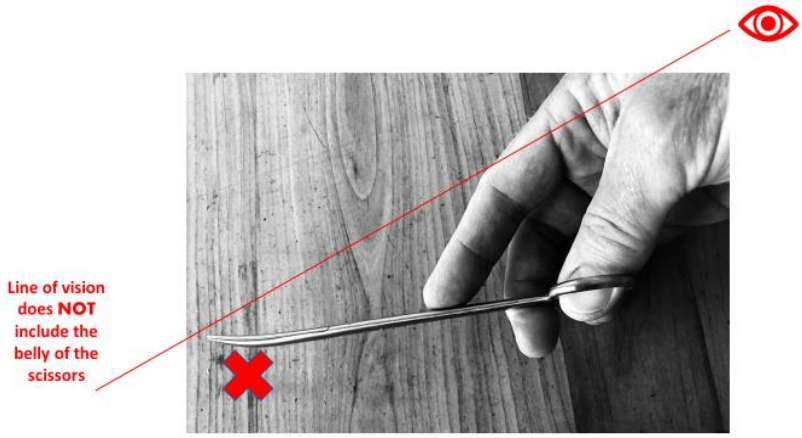
We would recommend that the distal interphalangeal joint is **NOT** passed through ring; indeed, this is impossible if you have large hands, but it will make the passing and receiving of the scissors to other members of the team difficult if not dangerous.



The index finger is extended along the shaft of the scissors to give you direction and proprioception – the index finger is commonly used to point and is very adept for this function.

It is important to keep the belly of the scissors and the tip in the line of sight. If the scissors are held upside down, the belly is obscured from view. This is problematic when dissecting solid organs like the lung and liver – for example, as a cut is made with the tips the belly may be slicing the pulmonary artery.





Open the blade just enough to do the job – this is usually a few millimetres! It is in this position and this position only that the scissors can be used to 'scrape' or 'pair' tissue away. Recall how you use regular scissors to cut lengths of paper e.g. wrapping paper for presents.

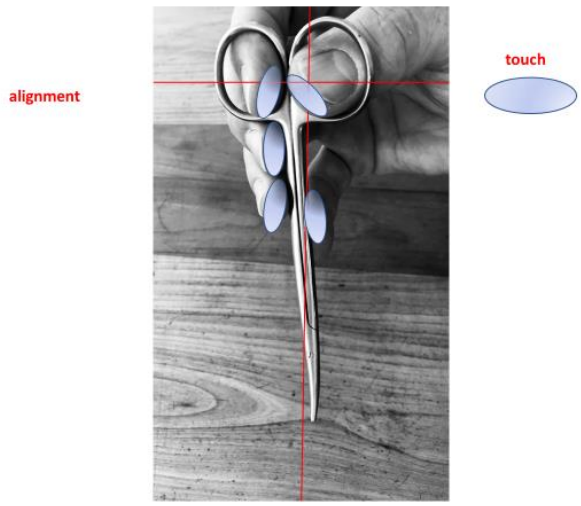
The scissors are used to develop planes – here are basic principles:

- Insinuate the scissors gently into a plane.
- NEVER stab or push as this will perforate.
- Gently open the scissors and withdraw~~n~~
- NEVER close the tips if you cannot see the tip

The scissors can be gently placed into tissue plane to help delineate and describe vessels and nerves to aid dissection. The expert surgeon can use this technique to hold a ligature between the blades to 'lasso' the vessels obviating the need for another instrument like a Lahey.

Operating at depth

Many of the dissecting scissors were developed by plastic surgeons or otolaryngologists who specialised in facial and nose reconstruction (McIndoe and Metzenbaum). As the surgeon is operating at depth the scissors can be held in the inverse form. The same principles of handling apply and all the pulps of all the fingers the fingers are applied to the scissors. The fifth finger is extended down the shaft to give stability and direction.



The necessary angles required for dissection are realised with a flexion and extension of the wrist.