

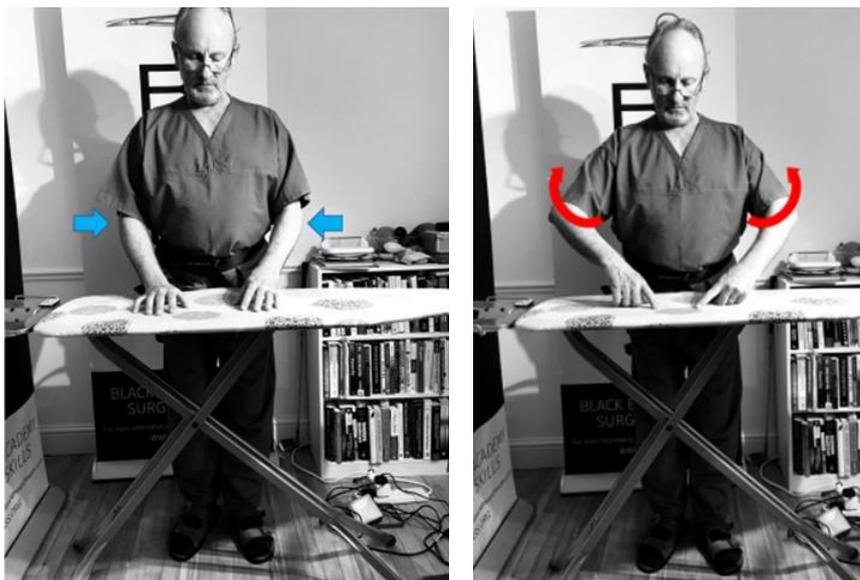
Posture

David J. O'Regan

The way we stand at the table determines how the upper limb functions and has a major impact on the health of our musculoskeletal system. As the height of the table is lowered as seen on the right, the kyphosis of the thoracic spine increases, and the natural cervical lordosis is lost with protuberance of the chin.



If the table is too high, then the elbows leave the side of the body and the shoulder girdle is fixed thus curtailing full pronation and supination that is necessary to rotate the needle through the tissue.



Have you ever wondered why kitchen counter tops are the height they are? Well, it reflects the median height of the population. It is important that the functional position of the upper limb is optimised and maintained i.e., the shoulders are relaxed, the elbows slightly extended and by the sides and the hands are palmar flexed. I liken it to the position of the 'Thunderbirds puppet'. The functional movement of the upper limb is compromised if the elbow is abducted or the shoulders fixed. You naturally adjust the height of an ironing board to establish a comfortable position. It was with this in mind that I introduced an adaptation of the 'Ironing Board' for surgical training that has been acknowledged by WetLab.co.uk as the 'O'Regan Table'.



Many surgeons are remiss at addressing the height of the operating table and very often it is forgotten especially if there is a disparity between the height of the surgeon and the assistant. A recent trainee of mine stood at six foot four inches. I was the first surgeon to stand on a step to enable him to assist me comfortably. Both the surgeon and the assistant need to maximise the functional anatomy of the upper limb. Remember that the table can go up and down to improve access and most can tilt which enables you to look 'over the back' of the operative field.

Posture is the first domain on my scoring system for surgical trainees on the 'Diagonal Operating Matrix' that we have previously published in our paper 'From Amateur golfer to Professional Pilot' (1,2,3)

...from golfer to pilot...

Level 1	Posture	Address	Relax
Level 2	Pick Up	Air Time	Rotator
Level 3	Placing	Angles	Rhythm
Level 4	Precision	Adaptability	Reliability
Level 5	Pace	Awareness	Relations
Level 6	Plan	Announce	Review

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Level 1 of this matrix looks at posture, the address and whether the trainee is relaxed. The PAR metaphor that I have adopted is deliberate because the golf professional will spend a long time addressing the principles of GASP – Grip, Address Stance and Position. They have long recognised that to realise the perfect swing of the golf club, the body and the shoulder girdle have to be properly aligned and then the club is addressed to the ball. I have taught those principles of alignment of my international critically acclaimed PAR Excellence and Par Aorta course that I have had the pleasure of running of twenty years. It is all about alignment of the needle to the tissue and then adopting the appropriate address for a forehand or backhand stitch. – Ninety degrees is the perfect angle, and this applies to all three planes (4).

There is, however, another more important reason to stand at the table correctly. It is well recognised that poor posture not only impairs motor movement but also increases fatigue. There is also a documented increase in wear and tear, especially in the cervical spine. An informal study carried out by a colleague in Manchester found that up to seventy percent of UK surgeons complained of cervical spine strain and a good number, including me, have has surgery.



This is my Xray immediately post op, but it is alarming that the normal cervical curvature is lost.

Only one of my trainers in fifteen years of training highlighted the importance of posture at the table. He did this in rather an unforgettable manner. He took a sterile bandage and wrapped me to a drip stand and insisted my elbows did not leave my side! The incidence of cervical spine problems has been published at 97% amongst attending and plastic surgeons with all the respondents experiencing musculoskeletal pain. It is interesting to note that 83% reported a lack of education in posture and ergonomics (5)

The ideal posture can be defined plumblines from the top of the head through the tip of the ear and middle of the shoulder, the hip and ankle.

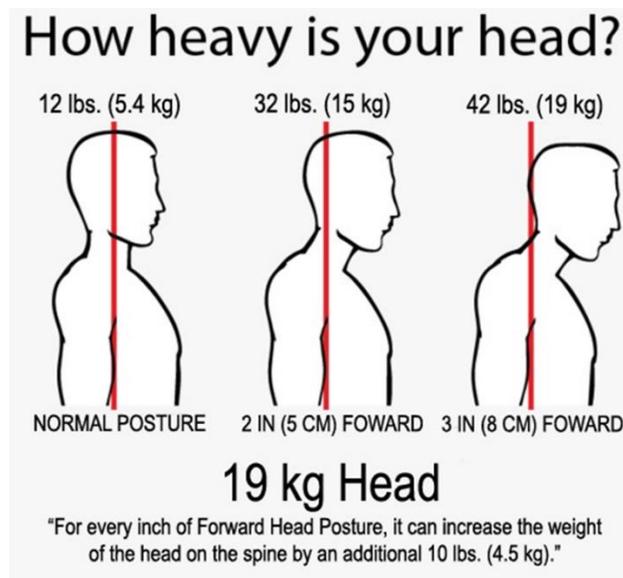


Operating is very physical and it is only recently gaining the attention of the mainstream surgical body. There are common problems that arise

- 1) Inclining the head with protuberance of the chin
- 2) Hunching of the shoulders with inward rotation
- 3) Elevation of the elbows and fixing of the shoulders
- 4) Forward tilt of the pelvis with shortening of the hamstrings



The weight of the head is significantly increased for for every 2.5 cm of deviation as shown in the diagram. This results in an shortening of the sernocleidomastoids, suboccipital muscles and a protrubence of the chin.



This is accompanied by pain in the posterior cervical muscles and will result in tension headaches, and over time osteophyte formation at the facet joints of the cervical vertebrae or disc protrusion with subsequent root symptoms of anaesthesia, tingling and eventually crippling neuropathic pain.

It is interesting to note that Formula One drivers spend a long time conditioning their neck and upper torso muscles as their head together with the helmet, at the '3-5 g' centrifugal forces going round corners, can weigh as much as 70 kg. I understand that most race tracks run in a clockwise direction, with only one anticlockwise, and this adds to the forces on the neck.

The head movement is often associated with hunching of the thoracic spine, rounding of the shoulders and internal rotation of the shoulders. This again has a profound effect on the thoracic vertebrae, the trapezius, the muscles of the scapula with concomitant shortening of the pectoral muscles.

To compensate for these changes the pelvis ends up tilted forward with loss of the lumbar lordosis and tightening of the hamstrings. I see this as the posture akin to a crane on a building site!

It is especially important to keep fit. Athletes stretch before and after action – simply standing up against a wall with elbows at your side and drawing the shoulders back with the head resting on the wall, with the chin pulled in and horizontal with the floor, will correct the position. In order to stretch the muscles described, walk slightly away from the wall but maintain the ear alignment with shoulder and hold for a minute. If this causes any discomfort or exacerbation of numbness or tingling or pain it is worth consulting a physiotherapist. It is also worth approaching a fitness coach, or a physiotherapist to ensure that you maintain postural health. This is a good investment in your future as a surgeon.

References

- 1) [Surgical ergonomics. Analysis of technical skills, simulation models and assessment methods.](#) Papaspyros SC, Kar A, O'Regan D. *Int J Surg.* 2015 Jun;18:83-7
- 2) [Surgical training in the 48-h week: a novel simulation and educational tool. From amateur golfer to professional pilot.](#) Papaspyros SC, Javangula KC, O'Regan DJ. *Eur J Cardiothorac Surg.* 2009 Sep;36(3):511-5.
- 3) [Objective surgical skill assessment: the diagonal operating matrix.](#) Al-Ruzzeh S, Karthik S, O'Regan D. *Interact Cardiovasc Thorac Surg.* 2007 Apr;6(2):188-91.
- 4) [How to stitch? 90 degrees: The perfect angle - ScienceDirect](#)
- 5) **Stretching and Strength Training to Improve Postural Ergonomics and Endurance in the Operating Room (with video)** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7572150/>