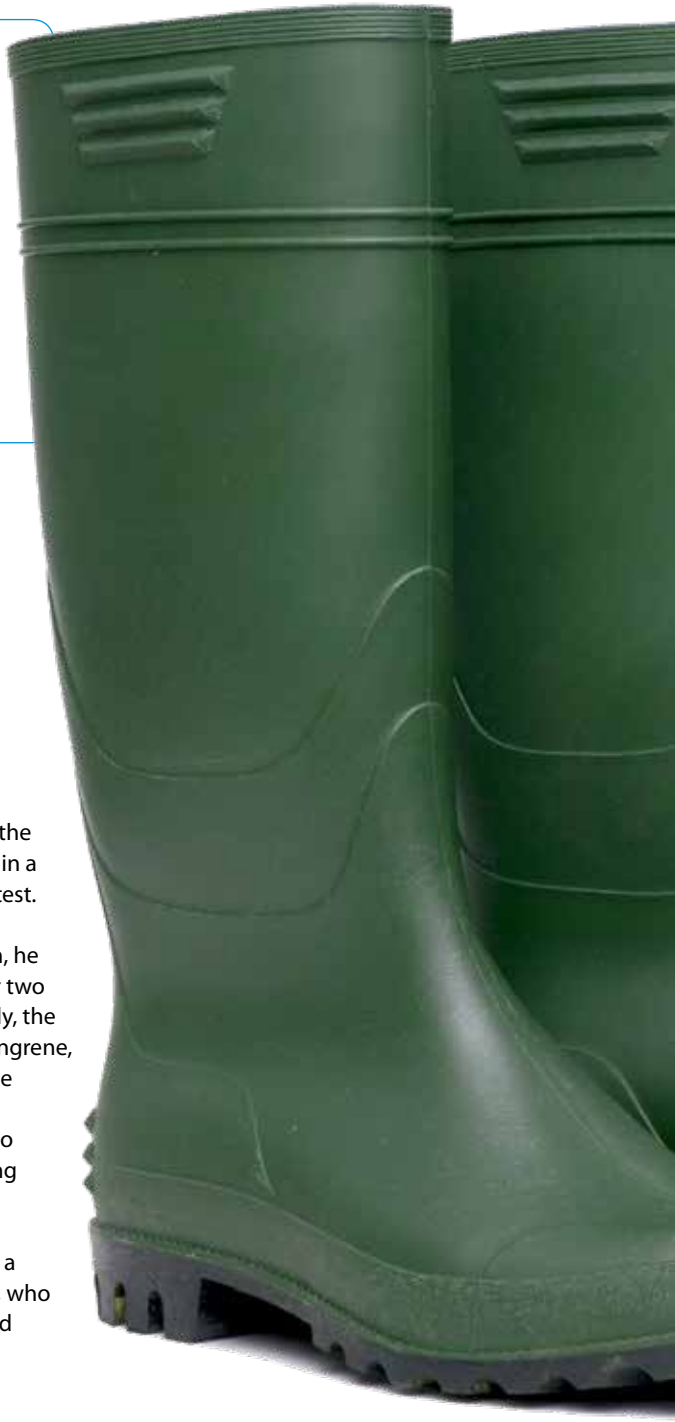
COMPETENCE IN SURGERY: FROM ME TO US

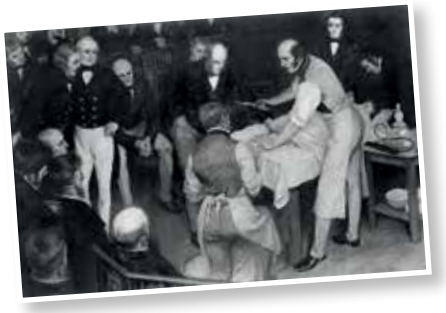
Surgery is a job that is unlike any other. As patients, we probably think only of operating skill, but surgeon competency affects patients from the first meeting before the operation, through to the monitoring of recovery. In this article, **Craig McIlhenny** goes further to consider team competency, including other surgeons, anaesthetists, junior doctors, technicians, nurses, and administrators, working together to ensure the best possible outcome for the patient.

KEY POINTS

- **Competence is not a set construct and can change with time and the situation.**
- **The competence of surgical trainees in the UK is assessed in the workplace performing actual work.**
- **Competence assessment is performed by multiple assessors, over many observations, with different tools, to build a valid and reliable representation of performance.**
- **Our concept of competence in surgery is very much based on the individual surgeon, and we should look to assess the competence of both the surgical team and the system in the future.**



"He was six foot two, and operated in a bottle-green coat with wellington boots. He sprung across the blood-stained boards upon his swooning, sweating, strapped-down patient like a duellist, calling, 'Time me gentleman, time me!' to students craning with pocket watches from the iron-railinged galleries. Everyone swore that the first flash of his knife was followed so swiftly by the rasp of the saw on bone that sight and sound seemed simultaneous. To free both hands, he would clasp the bloody knife between his teeth."

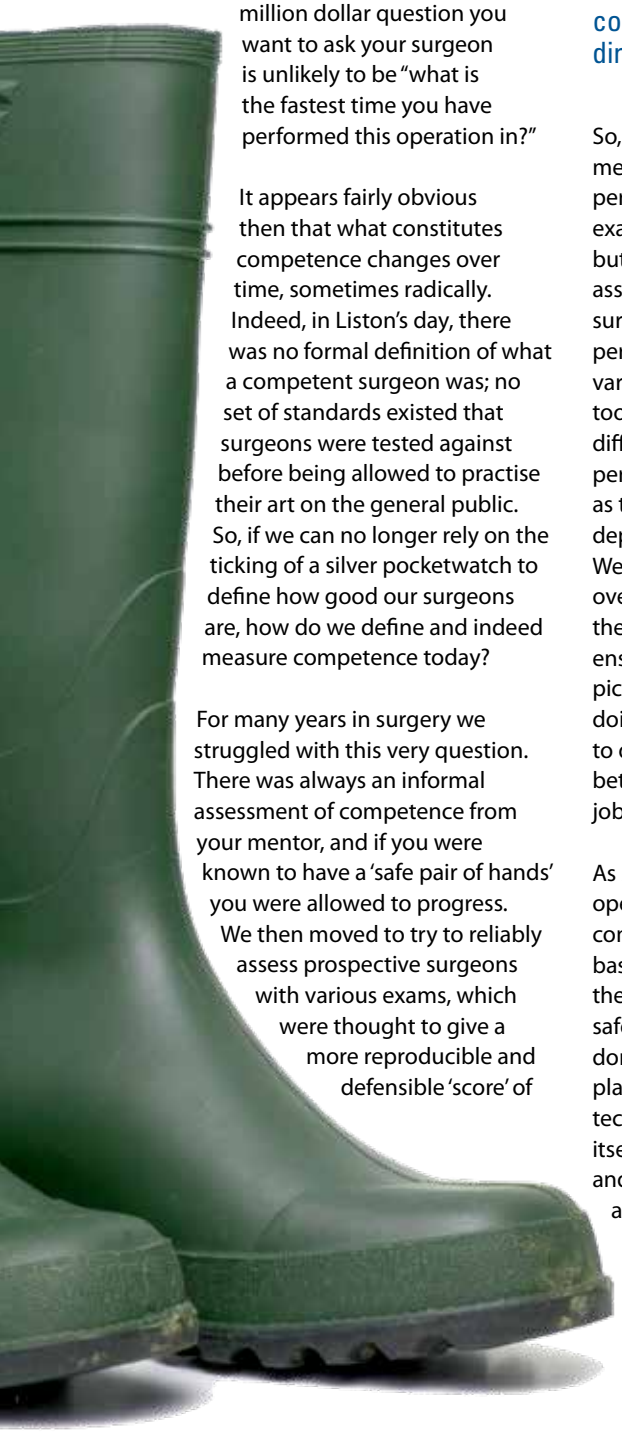


This vivid and visceral description is of Sir Robert Liston, a pioneering Scottish surgeon, performing an amputation in the late 19th century. Liston was widely lauded for being amongst the best surgeons of his day. He operated in a time before anaesthesia and antisepsis, when swifter surgery meant less risk of infection and death, and so sheer speed was seen as the main barometer of competence in a surgeon. And Liston was the fastest.

In his most (in)famous operation, he removed a patient's leg in under two and a half minutes. Unfortunately, the patient died afterwards from gangrene, which was very common in those days before antibiotics. During the operation, Liston managed to amputate the fingers of his young assistant, who died afterwards from infection as well. He also slashed through the coat tails of a distinguished surgical spectator, who was so terrified that the knife had

pierced his genitals that he dropped dead on the spot from fright. This remains the only surgical operation in history with a three-hundred percent mortality rate.

If, heaven forbid, you required a surgical procedure today, you would want this to be performed by a competent surgeon, in the same way that when I fly as a passenger I want, and indeed expect, to be flown by competent flight crew aided by competent controllers. However, when you find yourself in the hospital, more than a little nervous, trying to protect your modesty in one of those awkward backless gowns, the million dollar question you want to ask your surgeon is unlikely to be "what is the fastest time you have performed this operation in?"



It appears fairly obvious then that what constitutes competence changes over time, sometimes radically. Indeed, in Liston's day, there was no formal definition of what a competent surgeon was; no set of standards existed that surgeons were tested against before being allowed to practise their art on the general public. So, if we can no longer rely on the ticking of a silver pocketwatch to define how good our surgeons are, how do we define and indeed measure competence today?

For many years in surgery we struggled with this very question. There was always an informal assessment of competence from your mentor, and if you were known to have a 'safe pair of hands' you were allowed to progress. We then moved to try to reliably assess prospective surgeons with various exams, which were thought to give a more reproducible and defensible 'score' of competence measurement. Professor Ronald Harden, a distinguished professor of medical education, pointed out the fallacy inherent in this approach to competence assessment with reference to your humble footwear: *"In many places they would ask the students to write an essay on the origin of the word shoelace, or design multiple choice questions on the design of shoelaces, or even ask them to describe the steps involved in tying a shoelace. Whereas really the only way of doing it is showing you can tie an actual shoelace."*

"The main way we measure and assess the competence of our trainee surgeons is by directly observing their performance."

So, this is how we now define and measure competence, in terms of performance. Yes, we still do have examinations and tests of knowledge, but the main way we measure and assess the competence of our trainee surgeons is by directly observing their performance. We continuously use a variety of workplace-based assessment tools, each designed to assess a different aspect of performance, or performance in a specific setting, such as the hospital ward, or the emergency department or the outpatient clinic. We utilise multiple different observers over multiple observations to increase the validity of these observations and ensure that we construct an accurate picture of how that surgeon performs doing the actual job we want them to do. Typically, our trainees carry out between fifty and eighty of these 'on the job' assessments each year.

As surgeons, one of our main tasks is to operate on patients, and so the most commonly used tool is a procedure-based assessment. This looks at all the steps involved in performing a safe operation, and is divided into five domains. It starts from the pre-operative planning process, through the actual technical performance of the operation itself, to the post-operative instructions and care given. Each of the sections is assessed separately, with feedback given on performance in that section and whether that performance was competent. In addition, the trainer assigns a global score to the overall performance of the whole operation and benchmarks it against the level expected of a fully trained and independent surgeon. At the end of a training attachment all of these assessments are reviewed by a committee of trainers, including a senior trainer from outside the region, and a lay member of the public. This committee then decides if the trainee is competent to proceed to the next stage of training, or be awarded a certificate of completion of training if they have reached the end of their training programme.

So, as a surgeon who trains other surgeons, and who also supervises surgeons training other surgeons, I feel we have a good system – a safe system – for training and assessing competence. However, lately I must admit to a certain feeling of unease. At times I can almost hear the ticking of the pocket watches, and the ring of steel and rasp of saw on bone from when Robert Liston stood alone and measured his competence in terms of swiftness.

Although surgeons no longer operate wearing a blood encrusted 'bottle-green coat' (I do still wear wellington boots), my training, and that of all surgeons today, still has a faint echo of that manner in which Sir Robert Liston trained; the culture of training remains very much the training of an individual. We still view competence as a quality possessed by that single individual. Our entire surgical training pathway is rooted in this individualist paradigm; we select prospective medical students based on individual grades at school, we grade their medical school performance on individual academic achievements, and even in our current advanced competency-based training schemes, we largely assess our future surgeons on their individual knowledge and their individual technical ability to carry out an operation.

Surgical care in the 21st century, however, is not delivered by individuals but by multi-professional teams within complex systems. So, is our current, individualistic model of competence still fit for purpose? Civil aviation has clearly pronounced on this topic: *"The question should not be whether a particular pilot is performing well, but whether or not the*

system that is composed of the pilot, the co-pilot and the technology of the cockpit is performing well. It is the performance of that system, not the skills of the individual pilot, that determines whether you live or die" (Hutchins and Klausen, 1998, p.16).

If we translate this concept to the operating theatre, one surgeon's individual competence is insufficient for the optimal completion of a surgical operation. To achieve the highest levels of performance and safety, the whole operating theatre team need to have a shared body of knowledge about both the procedure and the system, a shared mental model of the plan, and a shared expectation that will come together to deliver a set of coordinated actions during the many tasks required to complete the operation. This co-ordination made possible by distributed cognition is a good representation of collective 'team' competence.

The concept of competence as an individual possession also deflects our attention from systems thinking in healthcare. Rene Amalberti and colleagues (2005) wrote that of the five main constraints to an ultra-safe healthcare system, three of them are related to medicine's culture of individualism. The other side of the coin of the individualistic view of competence is that incompetence is also the fault of an individual. Healthcare very much takes the view that patient harm can be blamed on individual incompetence and can be corrected by taking that 'faulty' individual out of the system, ignoring local rationality, degraded systems and unsafe working environments.

I now perform surgery using tiny instruments and a laser instead of a scalpel. Sir Robert Liston was of another era and would hardly recognise this as surgery. The concept of competence as the skill inherent in a single individual probably belongs more in his era than in this current age, and I hope that we surgeons can embrace the brave new world of competence in teams and systems.

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