



Instinct, intuition and surgical decision-making

When to go with your gut, and when to seek a second opinion.

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In the truest sense of the word, instinct is an innate behaviour not influenced by learning, experience, or knowledge. Darwin stated that 'the very essence of instinct is that it is followed independently of reason'. However, this has been repeatedly challenged by modern-day neuropsychologists who believe our instincts are constantly being honed. Instinct is shared with other members of the animal kingdom, but it is only our ability to deny or ignore it and think rationally that separates us from them. These primitive instincts fall into three categories: fear, sexual competition and the desire to cooperate, all of which are – in some form or another – ubiquitous in surgery!

Understanding how to channel and use fear, compete for success and cooperate for mutual gain are all traits held in high regard among our surgical colleagues.

Surgeons must know when to trust in what they know, and when to follow what they feel. What we must remember, however, is that instinct is a vehicle of self-preservation. Atul Gawande's identification of the involvement of sentimentalism in surgeons' instincts highlights the importance of recognising when an emotional unwillingness may affect decisions.¹ Examples include over-investigating a patient just to satisfy a curiosity or reassure a surgeon after a run of complications, or conversely to ignore the

subtle clinical and behavioural signs that tell us that one of our postoperative patients 'isn't quite right'. Human tendency is to try and recover a loss by overfitting the available data and disregarding what doesn't fit. This is frequently referred to as the 'cognitive error trap' or 'confirmation bias'.

As surgeons grapple with the increasingly complex balancing act of managing risk, patient expectations, evolving technologies, stringent reporting statistics and medicolegal scrutiny, they may restrict themselves to adopting a prescribed surgical practice devoid of this critical human element. Within these confines, instinct still somehow needs to be a source of innovation and creation. We need to allow space for instinct in research so that seemingly unlikely avenues can develop. A great many discoveries have been made by serendipity, and the likelihood of them occurring in the future is diminished if the surgeon's approach is straight-jacketed by fear of the bold or unusual.

Generally speaking, our instinctive ability to predict risk is questionable, with many studies attesting to our tendency to over-predict morbidity in elective surgery but underestimate it in the emergency setting.² Examples do exist, however, of individual surgeons who have been able to predict the outcome of their patients with an improbable degree of accuracy. One example was reported by Hyman *et al* in 1960.³ At the time this paper was written, evidence-based medicine had not even been conceived. Or had it? In fact, the subject of this paper did use evidence – his own personal experience accrued throughout his career. Accepting this evidence was the subject of significant bias and a complete absence of statistical validity, personal experience allows us to gather more data than would ever be feasible in a clinical trial or could be conferred in a research paper. The use of heuristics is a fundamental skill to scaffold this experience such that it is ready to deploy. However, this experience is inherently subject to both prejudice and recall bias.

Arguably as clinical practice is increasingly dictated by evidence-based guidelines, instinct has little role to play. Instincts are specific to a situation, have no evidence base beyond the individual, are not definable (and therefore not defensible) and are difficult to qualify as good or bad. Conversely, it is widely accepted that protocols exist for the guidance of the wise and the blind obedience of idiots. The condition for which a guideline exists is likely to be as varied as the myriad of people it afflicts. By necessity, any algorithm or guideline devised will be a simplification of a clinical situation, thus mandating the use of appropriate experience and relevant expertise

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to oversee its use. The same argument can be made for clinical checklists, and the increasing incorporation of technology into clinical practice. The apparent risk here is that having ticked all the boxes and turned on the right machines, the otherwise-astute senses of the surgeon are suddenly off-guard. As such, surgeons should probably trust their instincts more than the systems in which they work would incline them to. There is another view that, far from stifling clinical decision-making, these instincts give confidence that essential items have been covered (allergies, postoperative support, etc) and hence allow the surgeon to concentrate even more on the task in hand.

One of the most challenging problems faced by surgeons is the need to act in uncertain situations, particularly in times of incomplete and/or conflicting information. The Tooke review redefined the doctor (in contrast to other members of the multidisciplinary team) as 'the diagnostician... and handler of uncertainty'.⁴ Indeed, it is only with hindsight that we can evaluate whether decisions based on instinct were risks worth taking. In this context, instinct can be regarded as a synonym for memory, reflection, power of inference and experience.

In situations of uncertainty, simplifying the problem is often the most difficult task, and it is instinct in this situation that helps us unravel complexity by prompting a return to simple, logical thinking. This is often referred to as clinical *gestalt*, and entails the active organisation of clinical perceptions into coherent constructs.⁵ We need to be aware of the thought processes that lead to our instincts, and learn to master them before making critical decisions.

One surgical instinct that should never be ignored is that of asking for help. Insight is important and, with increasing subspecialisation, the likelihood of meeting a situation that falls outside our knowledge base is going to increase. Caution is needed here, because when this occurs our instincts may lead us to a familiar diagnosis and course of action, but one that is not necessarily correct. The danger comes when intellect fails and instinct does not recognise this, or when bravado and ego are loosely disguised as instinct. Anything else affecting an individual's ability to think coherently is also a reason to mistrust instinct, and surgeons are particularly at risk of excessive tiredness or high levels of stress. A sensible course of action would probably be to acknowledge instinct, question it, and act with as much certainty as the situation affords.

From an early stage we are misled into thinking that the quality of a decision is the product of the quantity of information considered and the time spent deliberating over it ('more haste, less speed'). In fact, the

conscious appreciation of facts can sometimes be misleading, when decisions made in an instant can be as good or better. This so-called 'thin-slicing' of information is our subconscious rapidly appraising the situation, discarding the irrelevant information and triggering an emotion or action. The concept of love at first sight, firefighters knowing when they need to evacuate a burning building, and art experts spotting a fake painting are all stories we hear about time and time again.⁶ Similarly, that feeling of the need to defunction, or perform a fasciotomy, are instincts we should not ignore. As trainees spend less time in the operating theatre, we need to instill in them the ability to develop instinct.⁷

Synthesising sufficient evidence to account for every intra-operative decision would not be feasible. When quick decisions need to be made, with dire consequences for delay, acting on instinct may be better than inaction resulting from pontification on the merits of the evidence base. Flin *et al* describe nicely the complex cognitive components of intra-operative decision-making.⁸ A surgeon with good situational awareness will first define the full extent of the problem, the potential for risk and a workable timescale. From this, a decision-making strategy is selected:

- Intuitive/recognition-primed – decisions are made with reference to a series of stored precompiled options based on knowledge and prior experience, eg the decision to perform a fasciotomy following reperfusion of an acutely ischaemic limb
- Rule-based – these decisions are based on values held absolutely by the surgeon, eg failure to confidently identify the anatomy of Calot's triangle at laparoscopic cholecystectomy equates to open conversion
- Analytical – this is a comparison of different options, eg splenorrhaphy or splenectomy in trauma
- Creative – this is the design of a new option for a less familiar situation, eg how

to precisely fashion the omental plug for repair of a perforated duodenal ulcer.

In contrast to instinct, these analytical actions require a conscious, deliberate and logical thought process requiring time for completion. Many authors have noted that the most difficult challenge is in matching the appropriate cognitive activity to the particular task, and that some form of fusion of these models may also be needed depending on context. There is currently little opportunity for reflection, and perhaps the time has come for more careful scrutiny of surgeons' cognition. Several things may affect this, including confidence, self-belief, the function and degree of stress, task complexity, cognitive resources (intelligence, experience and technical expertise), human factors (situational awareness) and team support. These factors determine the type of decision strategy the surgeon is likely to adopt.

Although this system seems perfectly plausible, many have described decision-making in a much more subjective manner; one that involves intuitive feelings, which help us filter possibilities quickly at a subconscious level, guiding decision-making to the point where our conscious mind can make a good choice. Surgeons' decision-making is a key area of clinical practice, but has received little attention in the literature. Given the ever-shortening nature of surgical training, which is simultaneously becoming more obscured with other tasks, an understanding of how decisions are made just might provide trainees with a framework to help them make better sense of their experiences and learn exactly when to – and when not to – trust their instinct.

What we must also remember is that most errors are made as a result of misidentifying the situation and following an appropriate course of action, rather than identifying the correct situation but then taking the wrong action.⁹ In other words, learning good situational awareness is probably more important than decision-making.

Surgical instinct is a product of experience collected both consciously and subconsciously by the surgeon. It captures something that cannot be written or taught. Good instinct is the privilege of the expert, fundamental to which is an intricate knowledge of the problem they are looking to solve. Yet at all stages instinct should be regarded as a trigger that sparks an analytical process and informs and enhances logical thought. We must not forget that instinct is a product of the greatest source of error in surgery – human factors.

We should strive to build the knowledge, expertise and experience such that our instinct can be trusted in times of uncertainty. Instinct is one method of decision-making available to the surgeon, and because methods of decision-making vary depending on the situation, trusting or ignoring one's instinct is inherently related to context. In summary, *instinct*: trust it always, ignore it sometimes.

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