



Training top surgeons – or anyone else

Roger Federer and Tiger Woods are good friends. They are also world champions in their respective sports, tennis and golf. What do their achievements have in common with the training of top surgeons? Why was Prof. John Terblanche an excellent surgeon but struggles at golf, which he took up in his retirement? A better understanding of what makes champions seems to indicate that there are more common denominators than are often appreciated.

In his presidential address in 1899 to the Griqualand West Branch (BMA), 'Dr. McKenzie concluded that division of labour and Specialism was a necessity, this state of affairs being aided by the rapid concentration of thought and experiment brought about by the spaceless and timeless energy of the telegraph and the much specialized journalism.'¹ The establishment of the Colleges of Medicine in South Africa in 1954 provided a strong impetus to the recognition, training and development of specialties. The explosion of knowledge, electronic publishing and the Internet has recently rapidly accelerated this process. It has resulted in doctors taking longer to specialise and being required to practise under supervision for much longer periods. Another change has been revision of the way in which surgical skills are acquired and measured. These new training techniques are based on established theories of ways in which motor skills are acquired and expertise is developed, often using simulations and skills laboratories.^{2,3} Motor skills acquisition goes through three stages. In the cognitive stage the learner intellectualises the task; performance is erratic, and the procedure is carried out in distinct steps. The integrative stage, in which knowledge is translated into appropriate motor behaviour, is reached with practice and feedback. In the autonomous stage the learner no longer needs to think about how to execute the particular task and can concentrate on other aspects of the procedure.

Recent findings show that natural, innate gifts for a certain job do not exist. Instead greatness is achieved only through an enormous amount of hard work over many years.⁴ Scientific findings show remarkably consistent results across a wide array of fields. We can make ourselves into anything we want and some of us can even make ourselves great. In most fields of endeavour most people learn quickly at first, but few go on to achieve greatness. Hard work is essential but insufficient. Deliberate practice of activities explicitly intended to improve performance is required, providing feedback and involving high levels of repetition. It is difficult and painful and only a few persist. There is vast evidence that it takes some 10 years of such dedication before one can become world-class. Peak

performance of a physical nature occurs in the 20s, whereas philosophers peak much later. Surgeons require wisdom and experience in addition to manual skills – perhaps this means they peak in their late 30s to early 40s?

Intriguing possibilities present themselves if we consider the implications of these educational insights. The educational basis for the introduction in South Africa of the 2-year internship and of supervised community service must be questioned. It is aimed at making graduates expert at the entire field of medical practice. This simply cannot be achieved in the time allotted, which would be much better spent by allowing young doctors more time to achieve genuine competence in fewer areas. Since surgical skills require so many years to achieve genuine world-class status, why do we start training surgeons only in their late 20s or 30s? Perhaps all surgical courses should be designed to start immediately after leaving school, rather than being preceded by the minimum of 9 years currently required before actual surgical training commences? The modern basic undergraduate training emphasises early exposure to patients. Should there also not be early acquisition of surgical skills, while students are young and before the inevitable age-related decline in dexterity?

In this issue of the *SAMJ* there are two examples of 'surgical sherpas' who acquired great expertise despite lacking formal university training.⁵ They helped train many surgeons of note and are striking examples of what hard work and dedication can achieve.

The take-home lessons are to start young, work hard with an explicit goal of getting better, continually build mental models of your position, and do these things regularly, not sporadically. Which all goes to show why John was such a good surgeon but will always be a duff golfer.

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