In this collaborative supplement published by *Anaesthesia* and the *British Journal of Surgery*, there are reviews of enhanced recovery after surgery in both the elective [1] and the emergency patient [2] by Kehlet, a surgeon from Denmark. These are complimented by reviews on the quality of recovery by Myles [3], and on patient-centred outcomes by Ladaha and Wijeysundera [4], anaesthetists from Australia and Canada, respectively.

As the originator of the concept of enhanced recovery after surgery (ERAS)/fast track surgery, Kehlet describes the challenges of introducing ERAS programmes [1]. These challenges persist despite the well-documented success of ERAS programmes in improving surgical outcomes as defined by reduced length of stay, re-admission rates, medical complications and healthcare costs. He also articulates the pathophysiological challenges of surgery, and the recurring theme is promoting return of normal function. In fact, Kehlet first identified the importance of promoting restoration of function in 1994, when he was devising the concept of multimodal analgesia, and he discussed the triple aim of postoperative pain relief in providing subjective comfort, attenuation of the stress response and to “enhance restoration of function by allowing the patient to breathe, cough and move more easily”[5]. This remarkable insight from 25 years ago is only now beginning to be fully appreciated. Crucially, despite an absence of evidence of efficacy [6] or safety [7], many centres continue to administer postoperative opioid analgesia in response to unidimensional pain intensity scores [4, 8], rather than function. This is despite a paucity of evidence to support the discredited “Pain as the Fifth Vital Sign” campaign [8]. In fact, in 1994, Kehlet proposed the concept that pain should be managed to promote function [5]. Only recently has the necessity to titrate additional opioid analgesia to promote restoration of function been more widely recognised [8–12]. Titration of additional opioid to improve function should consider the balance between the beneficial effects of analgesia in relieving pain and promoting restoration of function, and the well-recognised adverse effects of excessive opioids including sedation; opioid-induced ventilatory impairment, dependence and delayed return of gastro-intestinal function after surgery to be achieved more safely [8–13]. This concept has now been endorsed by several organisations including the Joint Commission, the health services regulatory body of the United States [9] and the Australian and New Zealand College of Anaesthetists [10]. The Functional Activity Score is a simple but effective measurement tool that is beginning to gain traction to promote this goal [8, 10–12].
In the past 25 years, patient baseline characteristics have evolved, as have patient expectations. Thus, the proportion of elderly patients with multiple comorbidities and polypharmacy presenting for both elective and emergency surgery has increased and will continue to do so [4]. This presents particular challenges and Kehlet discusses the evolving field of optimisation of function (pre-optimisation) before surgery [1]. While prehabilitation encompasses the concept of pre-optimisation of the patient's physical and psychological state [14], comorbidity management describes the optimisation of care for pre-existing medical conditions (e.g. diabetes and anaemia). It is now being increasingly appreciated that one of the major current challenges facing both anaesthetists and surgeons is the identification of the group of patients that will not achieve restoration of function/return of independence and do not have either the physiological or psychological reserve to benefit from pre-optimisation or surgery [4, 15]. Thus, all patients now require a thorough pre-operative assessment [4], which is often and increasingly being supplemented by cardiopulmonary exercise stress testing [13]. As well as the physical conditions including frailty that may preclude or delay return of function [4], there is growing awareness that pre-existing psychological states, including, for example, chronic pain states, patients on pre-existing opioids and pain catastrophisers may also preclude restoration of function [1]. Moreover, there is a realisation that many patients may prioritise restoration of function including preservation of independence over longevity, and for them, an acceptable outcome entails improvement in health, rather than simply avoidance of death or an overt complication [4]. Shared decision-making allows these dilemmas to be articulated [16] and involves a detailed and individualised discussion with the patient concerning the likelihood of potential harms, including non-return to base line function and independence, while discussing the benefits of surgery and any alternatives to the proposed surgical procedure. Critical to enabling these processes is the reconfiguration of pre-operative pathways to allow sufficient time for assessment and discussion; pathway redesign is becoming an important theme in peri-operative care [17].

In the narrative on optimising recovery after emergency laparotomy, Foss and Kehlet discuss the challenges facing the peri-operative team to improve the outcome of the patient requiring emergency laparotomy, and lament the lack of robust scientific data to guide practice [2]. However, they emphasise the importance of promoting restoration of function through early nutrition and mobilisation to minimise postoperative complications.

Meanwhile, Myles [3] reviews the tools that are used to assess the quality of recovery after surgery. He describes how these have moved on from traditional indices such as length of stay, and rate of major and minor complications to a greater emphasis on patient-reported outcome measures (PROMs). He also emphasises that global measures of a patient’s quality of recovery, avoidance of postoperative morbidities, early hospital discharge to home (without readmission) and longer term disability-free survival can define postoperative recovery better. But what do we mean by recovery? Previously, it could have been considered to have occurred by the time of discharge from the recovery unit. This is an outmoded perspective and explains why a more useful and precise term for the ‘recovery ward’ is now post-anaesthesia care unit (PACU), which is now the standard term in Anaesthesia. Others may define recovery as being equivalent to readiness for hospital discharge, which explains why length of stay has been considered an important indicator for surgical outcomes. In reality, full recovery only occurs once normal baseline function has been restored/superseded and adverse symptoms have resolved. Thus, there are at least three stages to recovery (discharge from recovery, discharge from hospital and return to baseline), and each stage needs to be satisfactorily achieved for complete recovery to occur [18]. The quality of recovery (QoR) scores tools developed by Myles are powerful research tools and facilitate robust comparisons between different techniques and different institutions and are mainly designed to evaluate the effectiveness of the second and third stages of recovery. They provide a valid and useful measure of recovery that facilitates evaluation of surgical and anaesthetic techniques that either need to be promoted or discarded.

As well as discussing the tools that are available to record the quality of recovery, and noting that some are now being used to facilitate shared decision-making, Myles [3] emphasises that one of the most important functions of analysing recovery data is to promote continuous quality improvement. Internationally, the Multicenter Perioperative Outcomes Group (MPOG) is conducting such work, primarily in North America. In the UK, the National Institute of Academic Anaesthesia’s (NIAA) Health Services Research Centre, working on behalf of the Royal College of Anaesthetists and the Royal College of Surgeons of England in collaboration with a number of other societies and professional bodies, established the Peri-operative Quality Improvement Programme (PQIP). This is the UK’s peri-operative continuous quality improvement project and its aim is to examine the peri-operative care of patients undergoing major non-cardiac surgery and measure
complication rates, failure to rescue and patient-reported outcomes, with the aim of improving patient outcomes by reducing variation in processes of care and supporting implementation of best practice. Data are collected at five distinct time-points (pre-op, day 1 and 3 postoperatively, and then at 6 and 12 months postoperatively). To date, over 124 hospitals are involved and over 21,800 patients have been recruited. Clearly acknowledging that restoration of function is a key component of recovery, one of the five prioritised PQIP national quality improvement opportunities is measuring and promoting the return of drinking, eating and mobilising (DREAMing). The attraction of comparing DREAMing rates is that its components are binary. In addition, it implies adequate pain control; an absence of postoperative ileus; an absence of orthostatic hypotension; and adequate fluid balance, haemoglobin, cardiac output and respiratory function [19]. Furthermore, as immobilisation is a recognised risk factor for thrombo-embolic events, promoting mobilisation has clear preventative advantages. Moreover, once patients are eating and drinking, they are no longer generally dependant on either intravenous fluids or intravenous drugs, which is vital to prevent iatrogenic complications from intravenous fluid administration. Finally, patients with a variety of pre-existing medical conditions including diabetes and Parkinson’s disease can revert to their usual medication faster, with less potential for harm.

Despite the attractiveness of using DREAMing as a surrogate measure of quality of peri-operative care and restoration of function, it still needs to be validated in this role; if early DREAMing is shown to be beneficial, intra-operative techniques can be adjusted to promote restoration of major organ function further [20]. This may include increased reliance on regional anaesthesia techniques as a part of procedure-specific postoperative pain management (PROSPect) [21, 22]. However, although DREAMing is a binary measure summarising return of intestinal, cardio-respiratory and muscular function, it does not record return of cognitive function. It is increasingly being recognised that peri-operative neurocognitive disorders (PNCD) are a major cause of morbidity [23], and unlike the QoR scores, DREAMing does not incorporate it. Thus, despite its simplicity, it cannot replace currently validated scoring systems.

In conclusion, over the past quarter of a century there has been a gradual recognition that promotion of restoration of function is vital to a full recovery and is an important outcome that matters both to patients and health services. The challenges for the next 25 years will include improvements in collaborative working between surgeons, anaesthetists and other health professionals to promote restoration of function further. This must be coupled with the continuous evolution of scoring systems so that surgical patients at risk of not achieving restoration of normal homeostatic, physical and psychological function, including independence, can be identified earlier. This evolution of practice will enable the individualisation of care to facilitate restoration of function and full recovery through shared decision making, prehabilitation, peri-operative comorbidity management and rehabilitation to achieve the best outcomes for our patients. This is the goal of peri-operative care.

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