

Slow Medicine-Slow and Sustainable Surgery: The New Paradigms

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*There is no point in running, you have to leave in time.
Slow but steady wins the race.*

The Hare and the Tortoise. (Aesop. 5th century BCE)

In 1986, at Piazza de Spagna in Rome, the Italian Carlo Petrini organized a protest against the opening of a McDonald's fast-food restaurant, leading to the creation of the *Slow-food movement*. Over time, this Slow-movement developed into other social and cultural fields, like the *Citta-slow* (slow cities), *Slow-art*, *Slow-fashion*, *Slow-education*, *Slow-ageing*, *Slow-gaming*, *Slow-gardening*, *Slow-living*, *Slow-technology*, *Slow-writing*, like the present article, all of them aiming at reflection and moments of mental rest rather than efficiency in performance. As stated by Carlo Petrini: "There is no need to force the rhythms of our existence. The art of living consists in learning how to dedicate time to each thing."

In 1999, the Norwegian Geir Berthelsen created *The World Institute of Slowness*, calling for an entire *Slow-planet* and stating that "SLOW is not an apologia for laziness, it's a question of reason, playfulness, and balance. It's about time mastery, game strategy, strategy implementation, organization and responsibility, and a good life." Other authors, like Gutorm Fløistad, summarize the philosophy of the movement: "It is a cultural revolution against the notion that faster is always better. The Slow philosophy is not about doing everything at a snail's pace, it's about seeking to do everything at the right speed". In a way, this philosophy of life was already pronounced in 2 or 3 words by the Greek poet and sage Cleobolus of Lindos (6th century BC): "μέτρον ἀρίστον" or "παν μέτρον ἀρίστον", moderation is the best thing, or: In everything a good measure.

SLOW MEDICINE

The adepts of the Slow Movement could not omit the field of medicine. Several books and a number of articles have already tackled this subject.^{1,2} In 2002, the Italian cardiologist Alberto Dolara was the first to publish an article using the words "Slow-medicine", meaning an approach to medicine which would allow practitioners sufficient time to evaluate the patient and his or her wider social context, to reduce anxiety, to evaluate new methods and technologies, to prevent premature release from the hospital and also to provide adequate emotional support. "In clinical practice, hyperactivity is often unnecessary. Adopting a strategy of 'Slow-medicine' may be more rewarding in many situations." For their promoters, Slow-medicine is to the healthcare industry

what Slow-food is to the restaurant industry: Against the backdrop of an assembly-line model of medical care, in which the patient receives cookie-cutter prescriptions for complex health matters, Slow-medicine provides the necessary time and asks for the relevant questions for optimizing general wellness and healing. In the Slow-medicine paradigm, the individual patient is recognized as the supreme authority on his own body, and doctors serve as guides. As a consequence, and as it becomes more and more frequent in several countries, palliative treatments in case of terminal diseases are encouraged, and the patient's will to require euthanasia or an assisted suicide should be respected. Italy's Slow-medicine was founded in 2011, as a movement of physicians, health professionals, patients, and citizens aimed to promote processes of care based on appropriateness, in relation to listening, dialogue, and decision sharing with the patient.

The Time Factor in Surgery

If time is a key factor in Slow-medicine, it is evident that such an approach of patient's care concerns mainly chronic diseases and is certainly more difficult to apply and rarely recommended in an intensive care unit. So, what about Slow Surgery? Historically, associating slowness and surgery would appear as a paradox or a nonsense. Before the advent of general anesthesia, surgeons attempted to work as fast as possible to alleviate the length of the painful operations. For example, the British Robert Liston (1794 to 1847) was known as the fastest knife in the West End. He could amputate a leg in 2 to 3 minutes. He is said to have performed the removal of a limb in 28 seconds, accidentally amputating his assistant surgeon's fingers, causing the patient and assistant to die of sepsis, and a witness reportedly dying of shock, making this surgery the deadliest in history. The French Baron Jean-Dominique Larrey (1766 to 1842), Napoleon's war surgeon, was also known for his dexterity and speed. In a battle during the Russian campaign, it was reported that he performed some 200 amputations in 24 hours. Even today, speed is so ingrained in the surgeon's mind that many surgical teachers continue to praise this outdated pace as a surgical virtue, although today, patients can bear any length of operating time, safely, allowing the surgeons to practice at his desired speed in scheduled procedures. Craniofacial operations for severe congenital malformations or face transplantation are certainly the longest operations performed nowadays, and may last over 24 hours, even if the surgical teams are well organized and work fast. In 2017, Altair da Silva Costa made an assessment of operative times of multiple surgical specialties in a public university hospital in Sao Paulo to provide information for the management and planning of operating rooms and reduce delays.³ It identified duration patterns for 12 surgical specialties and their variations in the stages: operative time, anesthetic time, and operating room stay. The study measured 8,337 operations of 12 surgical specialties performed within one year. The overall mean duration of anesthesia of all specialties was 178 minutes, and the mean operative time was 130 minutes. On a scale of time duration, head and neck surgeries

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corresponded to the longest operations, followed by cardiovascular and plastic surgery in third position. These indicators offer a tool and an opportunity to improve the efficiency of operating room time management and scheduling. For the hospital managers, reduced operative time signifies reduced expenses but does not necessarily correlate with better results for the patients.

Slow and Steady or Quick and Slick?⁴

Slow down and still be good in surgery, otherwise ask William Halsted⁵ is a 2005 editorial for the Journal of Investigative Surgery written by Luis H. Toledo-Pereyra, to encourage young surgeons to prefer slow careful gesture and operate calmly and without the nagging pressure of haste, taking example from Dr Halsted (1852 to 1922) who was not considered as a brilliant operator, in the sense in which the term is most commonly used: brilliancy as a quality whose chief characteristics are speed, quickness and dexterity with which an operator executes and accomplishes the operative act. “Happily, for us and for humanity, the time has long passed when surgical brilliancy and ability could be gauged by the clock” wrote Rudolf Matas in 1925 in a book dedicated to Halsted, to excuse the slowness and to praise the great American Surgeon, for his cleanliness and carefulness in handling the tissues during long operative hours.

During a surgical training, residents assist different surgeons and can compare the time they spend for similar procedures. A face lift may take 1 and half hour in the hands of a surgeon and 3 hours for another, but it is impossible to judge and compare the final long term results. Recent statistics have shown that the duration of the operations might be correlated with infection rate or other complication. In 2014, Krista L. Hardy and coll. studied the impact of operative time on complications after plastic surgery in 1,753 cases.⁶ They reported that operative duration significantly influences morbidity only after 3 hours, with progressively increasing odds of developing a complication after this critical period. This trend was not due to any single type of complication: wound infection, dehiscence, erythema, necrosis, seroma, hematoma, and delayed healing were all individually associated with prolonged surgery. In 2017, Venkat Boddapati and coll. reviewing 33,000 shoulder arthroscopies in a multiple centers study, found that operative times of longer than 45 minutes were associated with higher rates of infection and overnight admission.⁷ This may be because longer operating time is a proxy for surgical difficulty or complexity, but it may also be that operative time is itself a causative factor and reducing operative times may not only reduce costs but also improve quality, improving value in both the numerator and denominator. In view of these statistical results, the battle is on between the advocates of the slow and steady operations and those of the quick and slick one. No winner may probably emerge from these 2 tendencies. But how do we stand on with the concept of Slow-medicine and Slow-surgery?

Is Time an Illusion?⁸

The bonds between time and surgery are not limited to the fastness and speed of the surgeon or the duration of operations. In war surgery, or in case of massive accident, *time to surgery*, meaning the delay between the injuries and the surgical treatment, plays an important role in the overall recoveries.⁹ However, when speaking about Slow-surgery, we introduce a time factor that may not necessarily mean duration of surgery. In fact, for the initiators of the slow-medicine's concept, *time* is considered in a much broader sense than the duration of a particular therapeutic act. The passing of time has always been

a preoccupation of mankind. We owe to a number of philosophers and scientists throughout the ages a wide palette of thoughts and interrogations on the definition and meaning of what is called *the time*, summarized by the famous enquiry of St Augustine of Hippo (4th century AD), which begins by asking: “What then is time? Provided that no one asks me, I know. If I want to explain it to an inquirer, I do not know”, suggesting that this is because it's only within our own minds that we perceive the presence of time. Undoubtedly, the conception of time is not the same for the physicists, the philosophers, the psychologists, and the biologists, although they all more or less consider a degree of relativity, a difference between the chronological time and its perception. As Albert Einstein humorously said, “Put your hand on a stove for a minute and it feels like an hour. Sit next to a pretty girl for an hour and it feels like a minute. That's relativity.” But either way, the minute on the stove stays a minute and the hour sitting next to the pretty girl stays an hour.

Hippocrates and the KAIROS

In English, as in French and many other languages, we have only one word to speak about time, but the astronomers, the philosophers, and the physicians of Ancient Greece used several terms and notions to express temporality, like *chronos*, *aion*, *aidion*, *kairos*, *horai*.¹⁰ Aristotle established a scientific conception of time: *Chronos* was the physical and numeric time, the time that we measure chronologically. The *kairos* was on the side of human activity and action, in the sense of “propitious time”. It appears clearly that in Slow medicine and particularly in Slow surgery, the term *Slow* does not refer to the chronological time, but essentially to the *kairos*, the qualitative time, as opposed to the quantitative *Chronos*. Numerous interpretations have been given to this term. In Greek mythology, the God *Καῖρός*, (*Kairos*) was the personification of opportunity, luck, and favorable moments. It was the due measure that achieved the aim. This god brings about what is convenient, fit, and comes in the right moment. Sometimes it could be the critical or dangerous moment, but more often *Kairos* represents the advantageous, or favorable occasion. Like a surgeon, he is represented with a razor blade. *Kairos* is both slow and measured in its essence and fast in its action. In archery, *Kairos* also denotes the moment in which an arrow may be fired with sufficient force to penetrate a target.

In Hippocrates' (460–357 BC) major theoretical treatises on the nature of medical science and methodology, the Greek *kairos* is used within the first lines. It most often refers to “the right time, with the implicit sense of the right and proportional measure. Hippocrates most famous quote about *kairos* was: *Every Kairos is a Chronos* (for every opportune moment happens in time) *but not every Chronos is a Kairos* (because not every “time” is a moment of experience of value). Hellenic philologists tell us that, throughout the centuries, the term *Kairos* came to connote various significations, linking time and space, qualitative and quantitative elements: the right operation, at the right time, for the right patient. The *Hippocratic kairos* in medical treatment is particularly relevant in the timing and the planning of operations to be performed in the best condition with the right procedure. Slow surgery and the Hippocratic *Kairos* are also incentives to drive the surgeons to spend more time in personal contact with the patient and her family, establishing a true dialogue to understand their expectations. Based on the recently developed field of *decision sciences*, which includes decision analysis, risk analysis, cost-benefit and cost-effectiveness analysis, and simulation modeling, the surgeon should spend more time to assess the social, financial,



FIGURE 1. The 5 axes of sustainability in surgery. (Redrawn and translated from: Piotet LM, Mantziari S, Uldry E, et al.¹⁴ Sustainability in surgical practice: the “green surgery” concept and its innovations. *Rev Med Suisse*. 2022;18:152–155).

psychological situation and living environment of each patient, how to adapt the new technologies to each particular case, and chose the favorable “Kairos” for the operation.

SUSTAINABLE SURGICAL CARE

In direct line with the concept of Slow medicine and Slow surgery, as for many other human activities, ecological sustainability of health care and surgical practice has been recently questioned in several countries. The Royal College of Surgeons of England committed itself to “embedding financial, environmental and social sustainability with ethical purchasing into everything we do”. A *Sustainability in Surgery Group* was created to develop position statements, education, guidance and tools to support surgeons and dental surgeons in developing and maintaining sustainability in surgical practice: The benefit of medical interventions is not always present, and is often overestimated or misinterpreted. The usefulness of existing and new therapies must be justified in relation to the needs of the patient. The Green Surgery Challenge 2021 was an opportunity for the UK’s surgical community to recognize the value of sustainable healthcare for surgical conditions: to share and promote ways of practicing that are less harmful to the environment and our planet and build social sustainability: to continue to transform surgery for the future. To the triple moto of Slow Medicine (Simplicity, Respectfulness, Equity), Sustainable medicine and surgery introduce the concept of triple E (Evidence, Ethics, Economy), which includes legal and social aspects, such as equal access to medical services.^{11–13}

A similar approach was promoted by a group of Swiss physicians, noting that the healthcare system is nowadays responsible for a fair amount of global greenhouse gases emissions, and that most of them comes from hospital activity.¹⁴ The operating room is one of the greatest contributors of the overall energetic cost and generates a large amount of hospital waste. The healthcare system produces 4.6% of the carbon dioxide

emissions in developed countries, mainly from hospital facilities. Raising awareness among all staff working in the operating room is essential for the development of sustainable surgical practices. It is the duty of all healthcare professionals to limit the ecological impact of care practices, without diminishing the quality of our services. The following measures can help to achieve this: eliminating unnecessary and superfluous activities, studying the life cycle of used instruments, generating recycling loops and raising awareness of sustainable practices among all employees. The Swiss panel recommends that sustainable development measures to be implemented in the operating room are based on the principles of the “5 R”: reduce - reuse - recycle - rethink – research (Fig. 1).

CONCLUSION

While the concept of *personalized medicine* is being widely promoted in the field of diagnosis and pharmaceutical treatments, thanks to the progress in genomics and artificial intelligence, new paradigms are also arising in surgical care to address more respect to a personal therapeutic approach in the planning of surgeries on the one hand (Slow surgery—the right time, the Hippocratic kairos) and more respect to the environment of our planet and for the future generations in the context of climate change: Sustainable surgery.

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