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Editorial

The Successful Evolution of Endoscopic Spine Surgery: Coincidence or Human Spirit?

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Endoscopic spinal surgery (ESS), an offshoot of minimally invasive spine surgery (MISS), is currently considered to be an equivalent or superior surgical modality to conventional open surgery.[1-4] The attitude of practitioners of conventional spine surgery toward MISS has changed to acceptance during the last several years.[5] This dramatic change in the reputation of MISS took place rapidly, due to strong support from accumulating evidence,[2,4,6,7] although high-quality evidence from prospective randomized trials is still needed. Furthermore, the principles of ESS (MISS) have become part of the mainstream of modern spinal surgery.

In the article selected as an important article in this 2019 special issue of *Neurospine* dedicated to ESS, Kim et al.[8] sought to organize the evolution of surgical techniques and instruments used in ESS according the progress of ESS and its chronological development. The evolution of ESS was driven by disparities between surgeons' demands and the supply of existing instruments and surgical techniques, which became the motivation for the development of new or improved instruments and technology.

The introduction of innovative surgical approaches and new or improved surgical instruments to surgeons and to the market presupposes the presence of strong and substantial demand. Consequently, it is necessary to identify the issues raised by spine surgeons and the implications thereof in order to understand the motivating issues that drove the evolution of ESS in such a short period of time. Three main challenges can be identified: first, the inevitable necessity of the function of direct discectomy, rather than indirect decompression, at an early stage; second, speculations regarding whether ESS could be used to endoscopically manage other spine pathologies; and third, the possibility of a technical upgrade for more complex surgical procedures. The first issue brought about the development of the transforaminal approach by which the direct removal of herniated discs could be performed; the second issue led to the expansion of the surgical indications of ESS to other pathologies (most representatively, spinal stenosis, including foraminal stenosis) through the development of new technologies and relevant instruments, and the third issue gave rise to the development of lumbar[9] and cervical[10] full endoscopic interbody fusion technology.

Endoscopic technology has now expanded from its original site (the lumbar spine) to the whole spine.[11] Initially, transforaminal and interlaminar approaches were used in the lumbar spine, while translaminar and paraspinal approaches are currently applied to all levels of the spine using the percutaneous stenoscopic lumbar decompression technique. This technique has been performed using a newly designed endoscope (Stenoscope) for decompression of spinal stenosis.[12] The process of the evolution of ESS is reminiscent of an 'ugly duckling,' since most surgeons could not have predicted that an ugly duckling (ESS) would

become a charming swan (an alternative to conventional spine surgery) so quickly. However, I am certain that this positive transformation ESS did not happen by chance, but instead was achieved by MISS surgeons' incessant and dedicated efforts.

In the future, for ESS to become a major therapeutic modality in spinal surgery, it will need to keep incorporating various innovative technologies to continue its advancement. The future of MISS is bright, although ESS has a steep learning curve.[11] Therefore, specific training programs are a solution to concerns about the higher rate of complications during a surgeon's early experience.[11] After all, the relevant spine surgeons should not forget that they are each responsible for the evolution of ESS, and the future of ESS should therefore be in their hands.

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Title: Girl Before a Mirror
Artist: Pablo Picasso
Year:1932
Girl before a Mirror is a painting by Pablo Picasso and considered to be one of his masterpieces, the painting has elicited varied interpretations of this portrait of Picasso's lover and her reflection.
More information: https://en.wikipedia.org/wiki/Girl_before_a_Mirror