



# Technological innovation and neurosurgery

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Innovation is part and parcel of neurosurgery, and inquisitive/innovative mind is certainly a common trait of many neurosurgeons.

Hundreds of new products are introduced into the neurosurgical marketplace, including Spine, every year. The goal of the manufacturers is that of making a profit by selling as many as possible of these new products at the highest price the market can bear. Many of these gadgets do not subtend a paradigm shift, although from a market standpoint a paradigm shift is the most desirable outcome the manufacturer may hope for.

When a paradigm shift is proposed such as going from microscope to endoscope or from endoscope to exoscope, then the first and foremost question to be addressed should be “what is the clinical problem the *innovation* is poised to address?”. If that is not strongly addressed upfront, then the innovation risks to become an answer in search of a problem. That is where the IDEAL recommendations or similar frameworks are helpful [2].

In reality, many neurosurgical *innovations* do not subtend a paradigm shift and are presented to the market, once cleared by the appropriate regulatory board, as an option or to use a commonly referred to phrase as “another tool in the neurosurgeon’s armamentarium”.

Even then, the *safety* claim of technical innovations/new procedures needs to be critically assessed [1].

Cooperation with industry is fundamental; however, the risks of such cooperation need to be first acknowledged and then properly managed.

We appreciate all the points made by Drs. Roethe and colleagues, and we agree in principle with all of them. We also recognize the rigor/exactness of her work.

We all want and wish for the right innovation, that is the one that responds to a clinical need and that has been properly tested/verified, to disrupt established neurosurgical procedures/techniques; we should all want all other *innovations* to be recognized for what they are, often purely marketing exercises.

## References

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