Editorial: Multiple waveforms and spinal cord stimulation – A new era?

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Abstract

Back pain is a highly prevalent adverse health condition in adults. Almost 20% of the population suffers either from severe or disabling back pain (1). Failed back surgery syndrome (FBSS) is associated with the persistence of pain following surgical treatment of these patients (2) with an incidence ranging between 10% and 40% (3).

Spinal cord stimulation (SCS) is recommended as a treatment option when the conventional medical management has failed (4). In this context the patients can choose among various waveforms (tonic, BURST, high frequency) (5). However, up until now (with the exception of the USA), the patients should choose only one type of stimulation. It was not possible for them to combine at the same time 2 different waveforms, for example a tonic stimulation for the leg pain and a BURST-stimulation for the back pain.

As of September 24th, a new neurostimulator (Spectra WaveWriterTM, Boston Scientific) (Fig. 1) is available for the patients living outside the USA (6). On the same day, we performed the first implantation in Europe (Fig. 2). This device is a milestone for the field of neuromodulation. For the very first time the physicians can offer a really personalized therapy with combined waveforms. The individual nature of pain can now be better addressed.

This Editorial is not supposed to be an advertisement for the specific product or for the specific company. The Editor and the whole Department where the author works adopt a critical perspective on all products and on all companies. The aim of this Editorial is simply to raise the awareness about what the chronic pain patients need and how close we are at satisfying these needs. The direction is surely the right one. The patients and the whole neuromodulation society can benefit from the three features which are integrated in the new neurostimulator:

a) Combination therapy – the ability to layer more than one therapy at the same time and deliver multiple therapies over time. This means a longer lasting pain relief and a rarer habituation to stimulation.

b) Subperception algorithms – with newly developed field shaping algorithms (for example ContourTM) the physicians can apply various subperception modi over multiple vertebral levels. In this way, each patient´s special anatomy is individually considered.

c) Waveform automation – automatic rotation through waveforms to deliver the most effective therapies with the minimum energy requirements. Thus, changes of pain over time can be treated more efficiently.

The novel waveforms could be considered as the epidural version of the bolus dosing strategies which many pain physicians already implement in their everyday practice (7). Providing multiple waveforms during SCS-trials could overcome the limitations of providing only one stimulation-modus and, thus, achieve better pain relief (8). The availability of a neurostimulator which can support at the same time more than one stimulation types marks the dawn of a new era. As always a new era is associated with hope and great expectations and as Charles Kettering, an American inventor, once said: “high achievement always takes place in the framework of high expectation”.

Figure 1

The new neurostimulator.

Figure 2

The whole team.

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