

before, the first voluntary movements of the connected muscles were noted after 17 months. Now, 2 1/2 years after reconstruction, the lady walks up to 30 min with help of a walker and can climb steps in the water, still improving with physiotherapy. **Conclusion** Following Brunelli's paradigm partial restoration of voluntary locomotion in complete paraplegics seems promising and has to be confirmed in a prospective multiple centre study.

### SS3-5

#### Sexual dysfunction in spinal cord injured (SCI)

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A healthy person and a SCI-patient have the same sexual desires, the only difference is the partly or completely broken connection between genital organs and the centres controlling sexuality in the brain. Some 80% of male SCI experience erections. The problem is usually the duration of the erection. Phosphodiesterase inhibitors (PDEI) given orally are extremely efficient in SCI. Those who do not respond to PDEI-medication or need an erection that is not easily disturbed can use self-injection into corpora cavernosa of alpha-adrenergic blocking drugs. Application of other types of drugs and surgical treatment with penile prosthesis might be necessary. Lubrication problems are for the time being best solved by the application of an inert gel with a low pH-value. Orgasms are experienced only by some 15% of the SCI men. It is extremely difficult to educate males to use parts of their body above the lesion as erogenous zones that can be stimulated to obtain orgasm. Some 30–40% of the female SCI can be educated in this way. Ejaculations take place only in 10–15% of the SCI males. Artificial ejaculations can be brought about in different ways, and sperm cells can also be obtained by needle extraction from epididymis or testicles. The fertility of female SCI is nearly like healthy women of their age. Male fertility is slightly reduced. Sperm quality will usually tend to normalize after repeated artificial ejaculations. Present techniques covering artificial ejaculation and *in vitro* fertilization enables most SCI couples to have children.

### SS3-6

#### Locomotor movements in complete paraplegic subjects evoked by spinal cord stimulation

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It has been previously demonstrated that sustained nonpatterned electric stimulation of the posterior lumbar spinal cord – with a frequency of 25–60 Hz and an amplitude of 5–9 V – can induce stepping-like electromyographic (EMG) activity in

subjects with longstanding complete spinal cord injury (SCI). In the present paper, we explore the nature of single, pairs and trains of electrical stimuli in order to find out which neural structures are stimulated. To identify the nerve structures recruited by epidural stimulation, we analysed the EMG data of 15 patients with SCI retrospectively. We found that single electric stimuli predominantly elicited afferent volleys via the lowest-threshold fibers in the dorsal roots and secured monosynaptic reflex discharges. The induced single muscle twitches were therefore equivalent to H-reflexes but involved shorter afferent arcs. Trains of stimuli delivered to the same cord structures induced either sustained tonic or rhythmical EMG activity depending on the pulse frequency. The latencies of single responses involved in the rhythmical activity were about 10 ms longer than those seen during the tonic activity. In conclusion, repeated volleys delivered to the cord via the dorsal roots can modify the central state of spinal circuits in such a way that simple muscle reflex responses are reshaped to become part of the lumbar network motor command. Thus, spinal cord stimulation is an effective method to activate and drive the lumbar cord neuronal networks, including locomotor pattern generators. The effects of applying specific stimulation parameters to the posterior lumbar cord are immediately apparent.

### History of neurology

#### SS4-1

#### Sergey Prokofiev died of stroke – a patography on the 50th anniversary of his death

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Sergey Prokofiev is considered one of the most prominent Russian composers of the twentieth century, but he was also an accomplished conductor and pianist. He was born in 1891 in Sontsovska, Ukraine, in the former Russian Empire. In 1904 he began his formal education at St. Petersburg Conservatory, where he won the Anton Rubinstein prize for best student pianist in 1914. The years from 1911 to 1917 are considered to be his most productive, composing modern and innovating music. In 1918 he left Russia to go to the USA, London and Paris. In 1929 his hand was injured in a car accident so he was not able to play piano for a long period. In 1936, famous and celebrated worldwide, but disputed as well, he returned permanently to the USSR. From 1941 he suffered from occasional heart disturbances and in 1945 in Moscow he fell and got brain concussion. After 1945 his health deteriorated but he continued composing. In 1948 he became another victim of the so called Zhidanov's terror – cultural repression by the Soviet regime. It had a demoralizing effect on him, already weakened by illness. So, as a result of that general political repression his health failed rapidly. In the last years of his life he suffered from episodes of nausea and dizziness, sometimes headache. At the age of 61, on 5th March 1953, he died of stroke, probably cerebral hemorrhage, the very same day as Stalin – he did not escape the tragic irony of coincidence.

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