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**Title:**                    **Plasticity of spinal centers in spinal cord injury patients: new concepts for gait evaluation and training.(Review Article)(Disease/Disorder overview)(Clinical report).**

**Author(s):**            Giorgio Scivoletto, Yuri Ivanenko, Barbara Morganti, Renato Grasso, Mirka Zago, Francesco Lacquaniti, John Ditunno and Marco Molinari.

**Source:**                [Neurorehabilitation and Neural Repair](#) 21.4 (Dec 2007): p358(8). (5792 words)

**Document Type:**    Magazine/Journal

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Recent data on spinal cord plasticity after spinal cord injury (SCI) were reviewed to analyze the influence of training on the neurophysiological organization of locomotor spinal circuits in SCI patients. In particular, the authors studied the relationship between central pattern generators (CPGs) and motor neuron pool activation during gait. An analysis of the relations between locomotor recovery and compensatory mechanisms focuses on the hierarchical organization of gait parameters and allows characterizing kinematic parameters that are highly stable during different gait conditions and in recovered gait after SCI. The importance of training characteristics and the use of robotic/automated devices in gait recovery is analyzed and discussed. The role of CPG in defining kinematic gait parameters is summarized, and spatio-temporal maps of EMG activity during gait are used to clarify the role of CPG plasticity in sustaining gait recovery.

**Key Words:** Spinal cord injury -- Neuronal plasticity -- Central pattern generator -- Walking rehabilitation

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Spinal cord lesions are the cause of major clinical, social, and economic problems. Although their incidence, estimated as between 20 and 50 cases per million per year, (1) is lower than the incidence of other diseases and traumas, spinal cord injuries usually involve young patients (half of them are under 30 years of age), who are often wheelchair bound for the rest of their life.

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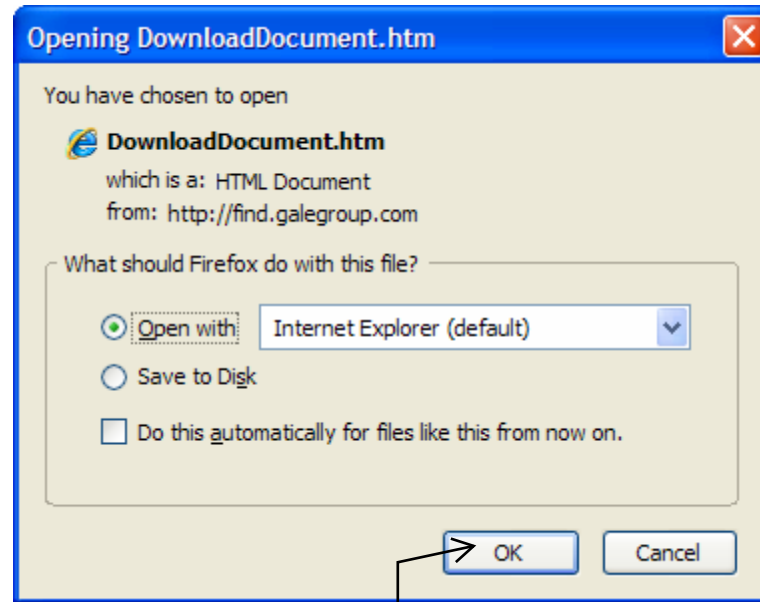
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