

Author Year Country Research Design Score Total Sample Size	Methods	Outcome
Lorach et al. 2023 Switzerland Case Report Level 5 N = 1	Population: One male with incomplete and chronic SCI and able to step with the help of a front-wheel walker; 38 years old of age; injury level C5/C6; and time since injury 10 years. Treatment: The communication between the brain and the region of the spinal cord that produces walking has been restored with a digital bridge between the brain and the spinal cord. This brain–spine interface (BSI) consists of fully implanted recording and stimulation systems that establish a direct link between cortical signals and the analogue modulation of ESCS targeting the spinal cord regions involved in the production of walking. The participant completed 40 sessions of neurorehabilitation, which involved walking, single-joint movements, and standard physiotherapy (with a focus on the control of hip flexor muscles). Outcome Measures: Immediate recovery of natural walking (walking capacity); navigation over complex terrain (climbing up and down a steep ramp with ease capacity, climbing over a succession of stairs, negotiate obstacles and traverse changing terrains capacity); long-term stability of the BSI; neurological recovery (volitional control of hip flexor muscles and associated hip flexion movements without stimulation, motor scores, WISCI II, clinical assessment [6MWT, weight-bearing capacities, BBS, and walking quality assessed using the observational gait analysis scale], and quality of life); and integration of the BSI in daily life.	1. The BSI was calibrated within a few minutes with high reliability. This reliability has remained stable over one year, including during independent use at home. 2. The BSI enabled natural control over the movements of the participant's legs to stand, walk, climb stairs and traverse complex terrains. 3. The participant regained the ability to walk overground independently with crutches, even when the BSI was switched off. 4. Neurorehabilitation supported by the BSI improved neurological recovery: a. An improvement in the volitional control of hip flexor muscles and associated hip flexion movements without stimulation was shown. b. Gains in motor scores, and in walking ability (WISCI II). Concretely, the participant exhibited improvements in 6MWT, weight-bearing capacities, BBS and walking quality without stimulation.