**Supplemental Digital Content 1.** Anamnestic and clinical data of the participant at inclusion V0.

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| Inclusion criteria: >12 months of lesional duration, complete spinal cord injury, stimulable sub-lesional muscles and stable medical condition. Exclusion criteria: an overall T-score <-2.5, thrombophlebitis, body mass index ≥30, pressure ulcer, neurogenic paraosteoarthroplathy, a lower-limb fracture less than 12 months old, competitive sports practice. |
| The participant |
| **Age** | At inclusion: 40 years; At the onset of the SCI: 31 years; Time since SCI: 9 years |
| **Medical status** | BMI 24 kg/m2 - Arterial blood pressure Systolic: 156mm Hg/ Diastolic 102mm Hg Heart frequency: 60/min - Electrocardiogram: Normal Venous Doppler ultrasound of lower limbs: Normal Initial total T-score with DXA: -2.0 |
| **Spinal cord injury** | Etiology: traumatic SNL: T4 AIS A without any ZPP Spasm frequency in lower limbs =3 (Penn scale); Spasm severity = 2/5 (MAS) |
| **Mapping of sublesional targeted muscles for electrical stimulation** | Stimulation threshold (mA) | 4/5 MRC\* Contraction threshold (mA) |
| Right Gluteus maximus | 19 | 95 |
| Left Gluteus maximus | 21 | 120 (<4 MRC) |
| Right Vastus lateralis | 14 | 70 |
| Left Vastus lateralis | 28 | 86 |
| Right Vastus medialis | 21 | 82 |
| Left Vastus medialis | 12 | 57 |
| Right rectus femori | 28 | 97 |
| Left rectus femori | 13 | 102 |
| Right biceps femori | 26 | 67 |
| Left biceps femori | 34 | 73 |
| Right internal hamstrings | 17 | 61 |
|  Left internal hamstrings | 20 | 65 |

SCI = Spinal Cord Injury; BMI = Body Mass Index; DXA = Dual-Energy X-Ray absorptiometry; SNL = Single Neurological Level; AIS = Asia Impairment Scale; ZPP = Zone of Partial Preservation; mA = milliAmperes; MAS = Modified Aschworth Scale

\*4/5 MRC\* corresponds to a reduced muscle strength with a contraction which can still move joint against resistance.