**Supplement/Appendix**

**Table S1: Search strategies and their results**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | **Search date** | **Search terms** | **Number of hits** |
| Medline (PubMed) | 6th March 2023 | (WB-EMS[TIAB] OR "whole-body electromyostimulation"[TIAB] OR "whole body electromyostimulation"[TIAB] OR "whole-body electrostimulation"[TIAB] OR "whole body electrostimulation"[TIAB] OR electromyostimulation[TIAB] OR "EMS training"[TIAB] OR "EMS intervention"[TIAB] OR "EMS suit\*"[TIAB] OR "EMS belt\*"[TIAB] OR "B-SES"[TIAB] OR "belt electrode"[TIAB]) | 421 |
| CENTRAL | 6th March 2023 | (WB-EMS OR "whole-body electromyostimulation" OR "whole body electromyostimulation" OR "whole-body electrostimulation" OR "whole body electrostimulation" OR electromyostimulation OR "EMS training" OR "EMS intervention" OR "EMS suit\*" OR "EMS belt\*" OR "B-SES" OR "belt electrode"):ti,ab,kw | 248 |
| CINAHL | 6th March 2023 | 1. TI (WB-EMS OR "whole-body electromyostimulation" OR "whole body electromyostimulation" OR "whole-body electrostimulation" OR "whole body) electrostimulation" OR electromyostimulation OR "EMS training" OR "EMS intervention" OR "EMS suit\*" OR "EMS belt\*" OR "B-SES" OR "belt electrode"2. AB (WB-EMS OR "whole-body electromyostimulation" OR "whole body electromyostimulation" OR "whole-body electrostimulation" OR "whole body) electrostimulation" OR electromyostimulation OR "EMS training" OR "EMS intervention" OR "EMS suit\*" OR "EMS belt\*" OR "B-SES" OR "belt electrode"3. S1 OR S2 | 104 |
| SPORTDiscus | 6th March 2023 | 1. TI (WB-EMS OR "whole-body electromyostimulation" OR "whole body electromyostimulation" OR "whole-body electrostimulation" OR "whole body) electrostimulation" OR electromyostimulation OR "EMS training" OR "EMS intervention" OR "EMS suit\*" OR "EMS belt\*" OR "B-SES" OR "belt electrode"2. AB (WB-EMS OR "whole-body electromyostimulation" OR "whole body electromyostimulation" OR "whole-body electrostimulation" OR "whole body) electrostimulation" OR electromyostimulation OR "EMS training" OR "EMS intervention" OR "EMS suit\*" OR "EMS belt\*" OR "B-SES" OR "belt electrode"3. S1 OR S2 | 185 |
| PEDro | 6th March 2023 | Abstract & Title: "whole-body electromyostimulation"Method: clinical trial | 34 |
| Clinicaltrials.gov | 6th March 2023 | other terms: WB-EMS OR "whole-body electromyostimulation" OR "whole body electromyostimulation" OR "whole-body electrostimulation" OR "whole body electrostimulation" OR electromyostimulation OR "EMS suit\*" OR "EMS belt\*" OR "belt electrode\*" | 39 |
| ICTRP | 6th March 2023 | Search: WB-EMS OR "whole-body electromyostimulation" OR "whole body electromyostimulation" OR "whole-body electrostimulation" OR "whole body electrostimulation" OR electromyostimulation OR "EMS suit\*" OR "EMS belt\*" OR "belt electrode\*" | 72 |
| Google Scholar | 6th March 2023 | Advanced search: "whole body electromyostimulation" OR "WB EMS" OR "EMS suit" OR "belt electrode" with at least one of the words, anywhere in the article | 1293 |

**Table S2 Exercise and stimulation characteristics of the included studies.**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Author** | **EMS-System** | **Isolated EMS ?** | **Active mode ?** | **Intervention length (months)** | **Sessions /week (n)** | **Session length (min)** | **Impulse freque-ncy (Hz)** | **Impulse width (µs)** | **Impulse length (s)** | **Impulse break (s)** |
| 1 | Afsharnezhad et al [17] | WB-EMS | yes | yes | 2 | 3 | 90 | 30 to 85 | n.g. | 6 | 6 |
| 2 | Akcay et al [18] | WB-EMS | yes | yes | 1 | 2 | 20 | 85, | 350 | 30 | 10 |
| 3 | Almada et al [19] | WB-EMS | no | yes | 1 | 2 | 20 | n.g. | n.g. | n.g. | n.g. |
| 4 | Amaro-Gahete et al [21] | WB-EMS | no | yes | 1.5 | 1 | 12 - 20 | 12 to 90 | 350 | 4 - 30 | 4 - 30 |
| 5 | Amaro-Gahete et al [20] | WB-EMS | no | yes | 3 | 2 | 20 or 32,5 | 15-20 and 35-75 | 200 - 400 | 6 | 4 |
| 6 | Andre et al [22] | WB-EMS | yes | yes | 1.5 | 5 | 25 | 30 and 85 | 350 | 6 | 4 |
| 7 | Bellia et al [23] | WB-EMS | yes | yes | 6 | 2 | 20 | 15 or 85 | 400 | 42 | 4 |
| 8 | Berger et al [24] | WB-EMS | yes | yes | 2.5 | 1.50 | 20 | 20 or 85 | 350 | 4 | 4 |
| 9 | Blöckl et al [25] | WB-EMS | yes | yes | 2 | 1-1.5 | 20 | 85 | 350 | 6 | 4 |
| 10 | Bostan et al [26] | WB-EMS | yes | yes | 1 | 2 | 25 | 85 | 350 | 4 | 4 |
| 11 | Bouty-Regard et al [27] | B-SES | yes | n.g. | 3 | 2 | 20 | 20 | 250 | 5 | 2 |
| 12 | Cetin et al [28] | WB-EMS | yes  | Yes | 2 | 2 | 25 | 85 | 350 | 4 | 4 |
| 13 | DiCagno et al [29] | WB-EMS | yes | yes | 3 | 2 | 20 | 7 or 85 | 350 | 4 | 4 |
| 14 | Dyaksa et al [30] | WB-EMS | yes | yes | 1.5 | 2 | 25 | n.g. | n.g. | n.g. | n.g. |
| 15 | Ethem et al [31] | WB-EMS | yes | yes | 1.5 | 2 | 25 | 7 and 85 | 350 | variable | variable |
| 16 | Evangelista et al [33] | WB-EMS | no | yes | 2 | 2 | 20 | 85 | 350 | 1200 | 0 |
| 17 | Evangelista et al [32] | WB-EMS | no | yes | 1.5 | 2 | 20 | 85 | 350 | 4 | 2 |
| 18 | Fritzsche et al [34] | WB-EMS | yes | yes | 6 | 2 | 20 | 80 | 300 | 4 | 4 |
| 19 | Ghannadi et al [35] | WB-EMS | no | yes | 1.5 | 2 | 20 | 85 | 350 | 6 | 4 |
| 20 | Hamada et al [36] | B-SES | yes | yes | 1 | 7(?) | 20 | 20 | 250 | 5 | 2 |
| 21 | Homma et al [37] | B-SES | yes | no | 3 | 3 | 40 | 20 | 250 | 5 | 2 |
| 22 | Houdjijk et al [38] | WB-EMS | yes | yes | 4 | 2 | 20 | 85 | 350 | 4 | 4 |
| 23 | Imaoka et al [39] | B-SES | yes | no | 0.5 | 5 | 20 | 20 | 250 | 5 | 2 |
| 24 | Jee et al [40] | WB-EMS | yes | yes | 1.5 | 3 | 20 | 85 | 350 | 6 | 4 |
| 25 | Junger et al [41] | WB-EMS | yes | yes | 1 | 2 | 20 | 85 | 40 | 4 | 4 |
| 26 | Kataoka et al [42] | B-SES | yes | No | 3 | 3 | 20 | 4 | 250 | 1200 |  |
| 27 | Kemmler et al [44] | WB-EMS | yes | Yes | 3.5 | 2 | 20 | 7 and 85 | 350 | 4 | 4 |
| 28 | Kemmler et al [43] | WB-EMS | yes | Yes | 3.5 | 1.50 | 30 | 85 | 350 | 4 | 4 |
| 29 | Kemmler et al [47] | WB-EMS | yes | Yes | 12 | 1.50 | 20 | 85 | 350 | 6 | 4 |
| 30 | Kemmler et al [45] | WB-EMS | yes | Yes | 4 | 1.50 | 20 | 85 | 350 | 6 | 4 |
| 31 | Kemmler et al [46] | WB-EMS | yes | Yes | 6 | 1 | 20 | 85 | 350 | 4 | 4 |
| 32 | Kemmler et al [11] | WB-EMS | yes | Yes | 4 | 1.50 | 20 | 85 | 350 | 4 | 4 |
| 33 | Kim et al [48] | WB-EMS | no | Yes | 2 | 3 | 40 | 85 | 350 | 6 | 4 |
| 34 | Kim et al [49] | WB-EMS | yes | Yes | 3 | 3 | 20 | 85 | 350 | 6 | 4 |
| 35 | Kiriscioglu et al [50] | WB-EMS | yes | Yes | 2 | 2 | 25 | 85 | 350 | 4 | 4 |
| 36 | Konrad et al [51] | WB-EMS | yes | Yes | 1.5 | 1 | 20 | 85 | 350 | 4 | 4 |
| 37 | Ludwig et al [52] | WB-EMS | yes | Yes | 2.5 | 1.50 | 20 | 20 or 85 | 350 | 4 | 4 |
| 38 | Lukashevich et al [53] | WB-EMS | no | Yes | 0.66 | 4 | 20 | Up to 25000 | Up to 5000 | n.g. | n.g. |
| 39 | Matsumoto et al [54] | B-SES | yes | no | 1 | 5 | 20 | 20 | 250 | 5 | 2 |
| 40 | Matsuo et al [55] | B-SES | yes | n.g. | 0.5 | 5 | 20 | 20 | 250 | 5 | 2 |
| 41 | Micke et al [56] | WB-EMS | yes | Yes | 3 | 1 | 20 | 85 | 350 | 6 | 4 |
| 42 | Miyamoto et al [57] | B-SES | yes | n.g. | 1 | 4 | 30 | 4 | 250 | 1200 |  |
| 43 | Mori et al [58] | B-SES | yes | n.g. | 1.5 | 2 | 30 | 20 | 250 | 5 | 2 |
| 44 | Müllerova et al [59] | WB-EMS | yes | yes | 2.5 | 1 | 20 | 85 | 350 | 4 | 4 |
| 45 | Nakamura et al [60] | B-SES | yes | n.g. | 0.5 | 7 | 20 | 20 | 250 | 5 | 2 |
| 46 | Nakamura et al [61] | B-SES | yes | n.g. | 0.5 | 7 | 20 | 20 | 250 | 5 | 2 |
| 47 | Nejad et al [62] | WB-EMS | no | yes | 3 | 3 | 20 | 15-33 and 35-75 | 200 and 400 | 6 | 4 |
| 48 | Noguchi et al [63] | B-SES | yes | n.g. | 3 | 3 | 20 | 20 | 250 | 5 | 2 |
| 49 | Nonoyama et al [64] | B-SES | yes | n.g. | 1.30 | 5 | 30 | 20 | 250 | 5 | 2 |
| 50 | Ochiai et al [65] | B-SES | yes | n.g. | 1.10 | 7 | 20 | 20 | 250 | 5 | 2 |
| 51 | Özdal et al [67] | WB-EMS | yes | no | 2 | 3 | 25 | 80 | 350 | 4 | 4 |
| 52 | Öktem et al. [66] | WB-EMS | yes | yes | 1.5 | 3 | 20 | 85 | 250 | 6 | 2 |
| 53 | Pano-Rodriguez et al [68] | WB-EMS | no | yes | 2.5 | 2 | 40 | 7 and 55 | 150 to 350 | 6 | 4 |
| 54 | Park et al [71] | WB-EMS | no | yes | 1.5 | 3 | 40 | 80 | n.g. | 5 | 3 |
| 55 | Park et al [70] | WB-EMS | no | yes | 2 | 3 | 20 | 85 | 350 | 6 | 4 |
| 56 | Park et al [69] | WB-EMS | yes | yes | 1.5 | 3 | 20 | 80 | n.g. | 5 | 3 |
| 57 | Park et al. [72] | WB-EMS | no | yes | 2 | 3 | 45 | 4 | n.g. | 2 | 2 |
| 58 | Qin et al [73] | WB-EMS | no | yes | 1.5 | 3 | 20 | 85 | 350 | 6 | 4 |
| 59 | Reljic et al [74] | WB-EMS | yes | yes | 3 | 2 | 20 | 85 | 350 | 6 | 4 |
| 60 | Ricci et al [75] | WB-EMS | yes | yes | 1.5 | 5 | 27 | 30 and 85 | 350 | 6 | 4 |
| 61 | Richter et al [76] | WB-EMS | Yes | Yes | 3 | 2 | 20 | 85 | 350 | 6 | 4 |
| 62 | Sadeghipour et al [78] | WB-EMS | yes | yes | 1.5 | 2 | 20 | 85 | 350 | 6 | 4 |
| 63 | Sadeghipour et al [77] | WB-EMS | yes | yes | 2 | 2 | 20 | 7-15 and 85 | 350 | 4 | 4 |
| 64 | Sanchez-Infante et al [79] | WB-EMS | no | yes | 2 | 1 | 20 | 10 and 852 | 350 | 8/cont. | 4/cont. |
| 65 | Schink et al [80] | WB-EMS | yes | yes | 3 | 2 | 20 | 85 | 350 | 6 | 4 |
| 66 | Schink et al [81] | WB-EMS | yes | yes | 3 | 2 | 20 | 85 | 350 | 6 | 4 |
| 67 | Schwappacher et al [82] | WB-EMS | yes | yes | 3 | 2 | 20 | 85 | 350 | 6 | 4 |
| 68 | Schwappacher et al [82] | WB-EMS | yes | yes | 3 | 2 | 20 | 85 | 350 | 6 | 4 |
| 69 | Schwappacher et al [83] | WB-EMS | yes | yes | 3 | 2 | 20 | 85 | 350 | 6 | 4 |
| 70 | Silvestri et al [84] | WB-EMS | yes | yes | 2 | 2 | 20 | 85 | 350 | 6 | 4 |
| 71 | Song et al et al [85] | WB-EMS | no | yes | 1 | 3 | 20 | 60 | n.g. | 5 | 5 |
| 72 | Stephan et al [86] | WB-EMS | yes | no | 1.5 | 1 | 20 | 85 | 350 | 4 | 4 |
| 73 | Struhar et al [87] | WB-EMS | yes | yes | 2.5 | 1.50 | 22 | 100 | 350 | 4 | 15 |
| 74 | Suzuki et al [88] | B-SES | yes | n.g. | 2 | 3 | 20 | 20 | 250 | 5 | 2 |
| 75 | Suzuki. et al [89] | B-SES | yes | no | 3 | 3 | 30 | 20 | 250 | 5 | 2 |
| 76 | Tanaka et al [90] | B-SES | yes | no | 0.30 | 5 | 35 | 20 | 250 | 5 | 2 |
| 77 | Teschler et al [92] | WB-EMS | yes | yes | 2.5 |  | 20 | 85 | 350 | 6 | 4 |
| 78 | Teschler et al [91] | WB-EMS | yes | yes | 1 | 1.50 | 20 | 85 | 350 | 4 | 4 |
| 79 | Tsurumi et al [93] | B-SES | yes | no | 3 | 3 | 30 | 4 | 250 | 1200 | 0 |
| 80 | Vacoulikova et al [95] | WB-EMS | yes | yes | 2.5 | 1 | 20 | 85 | 350 | 4 | 4 |
| 81 | Vacoulikova et al [94] | WB-EMS | yes | yes | 2.5 | 1 | 20 | 85 | 350 | 4 | 4 |
| 82 | van Buuren et al [97] | WB-EMS | yes | yes | 2.5 | 2 | 20 | 80 | 350 | 4 | 4 |
| 83 | van Buuren 2015 et al [96] | WB-EMS | yes | yes | 2.5 | 2 | 20 | 80 | 350 | 4 | 4 |
| 84 | von Stengel et al [98] | WB-EMS | yes | yes | 12 | 1.50 | 20 | 85 | 350 | 6 | 4 |
| 85 | Weissenfels et al [99] | WB-EMS | yes | yes | 3 | 1 | 20 | 85 | 350 | 6 | 4 |
| 86 | Willert et al [100] | WB-EMS | no | yes | 4 | 1.50 | 20 | 85 | 350 | 6 | 4 |
| 87 | Zink et al [101] | WB-EMS | yes | yes | 4 | 1 | 20 | 85 | 350 | 6 | 4 |

1 This study (Teschler et al. 2016}) intentionally applied a very intense WB-EMS protocol for novice applicants to determine the effects of WB-EMS on parameters related to rhabdomyolysis; 2 (Bellia et al. 2020) 15 min with intermitted impulse, 5 min with continuous impulse (15 Hz); 3 (Öktem et al 2022) 10 min with intermitted, 10 min with continuous impulse.