

SUPPLEMENTARY DIGITAL MATERIAL 3

Supplementary Table II.—Characteristics of the selected studies.

| Articles | Type of NMD | Study design | Sample size | Age of participants | Healthy group presence (N/No) | Walking capacities test | Type of measures assessment | Walking assessments tools | Physical examination (Yes/No) | Lower limbs physical examination | Impairment scale |
|--|-------------|--|-------------|---------------------|-------------------------------|---|--|---|-------------------------------|---|------------------|
| Solari <i>et al.</i>, 2007⁴⁶ | CMT | cross-sectional study monocentric | 40 | 42.4 (12.6) | No | 10MWT | 10MWT time | Stop watch | Yes | Lower limbs maximal voluntary isometric contraction | ONLS |
| Ferrarin <i>et al.</i>, 2011⁴⁷ | | cross-sectional study monocentric | 20 | 24.6 (17.1) | No | NA | kinematics, EMG and SPT measures | motion analysis system | Yes | NA | CMTES |
| Guillebastre <i>et al.</i>, 2013⁴⁸ | | prospective monocentric study | 26 | 50.7 (16.0) | 19 | 12-m distance at a self-selected velocity | SPT measures | GAITRite electronic walkway of 8.3m active area | Yes | dorsal and plantar-flexor muscles with MRC | NA |
| Padua <i>et al.</i>, 2016⁴⁹ | | prospective multicenter study | 168 | 44.4 (13.7) | No | 6MWT and 10MWT | 6MWD | Activity Monitoring Watch | Yes | NA | CMTNS |
| Lencioni <i>et al.</i>, 2017⁵⁰ | | prospective unicentric study | 71 | 31.5 (17.6) | No | NA | kinematics and SPT measures | motion analysis system | Yes | NA | CMTES |
| Coghe <i>et al.</i>, 2020⁵¹ | | cross sectional study | 20 | 48.9 (15.5) | 20 | 10MWT | SPT and kinematics measures | motion analysis system | Yes | NA | CMTNS (v2) |
| Mori <i>et al.</i>, 2018⁵² | | multicentric longitudinal prospective study | 53 | 52.1 (11.9) | No | 6MWT and 10MWT | 6MWD and 10MWT time | Stop watch | Yes | dorsal and plantar-flexor muscles strength with dynamometer | CMTNS |
| Pazzaglia <i>et al.</i>, 2019⁵³ | | longitudinal and prospective multicenter study | 149 | 42.5 (12.5) | No | 6MWT, 10MWT and monitoring during 5 days | 6MWD, 10MWT time and several outputs during the five days monitoring (as activity index) | Stop watch and accelerometer (StepWatch Activity Monitor) | Yes | NA | CMTNS (v2) |
| Hammaren <i>et al.</i>, 2012⁵⁹ | DM1 | cross-sectional study monocentric | 10 | 42.7 (10.7) | No | 10mWT, Fo8, ST and TUG | 10MWT and TUG times (and number of steps of ST and Fo8) | Stop watch | No | NA | NA |
| Galli <i>et al.</i>, 2012⁵⁵ | | cross-sectional study monocentric | 10 | 1.5 (7.6) | 20 | NA | kinematics, EMG and SPT measures | motion analysis system | Yes | MRC lower limbs | NA |
| Hammaren <i>et al.</i>, 2014⁶⁰ | | cross-sectional study monocentric | 51 | 41.3 (9.7) | No | 10MWT, TUG and ST | 10MWT and TUG times, | Stop watch | Yes | Lower limb isometric muscle force (with a | NA |

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|--|-------------|---|--|------------------------------|----|-------------------------|--|--|-----|---|---------------|
| Kierkegaard et al., 2017 ⁵⁶ | | prospective unicentric study | 70 | 45(13) | No | 10mW/RT, 6MWT and TUG | number of steps of ST 6MWD; 10mW/RT and TUG times | Stop watch | Yes | handheld dynamometer) NA | MIRS |
| Solbakken et al., 2016 ⁶¹ | | cross sectional study | 38 | 39 (12.4) | No | 6MWT, TUG | 6MWD and TUG time | corridor of 20m, stopwatch | Yes | MMT of upper, lower limbs and anterior flexors/back extensors trunk | NA |
| Kierkegaard et al., 2018 ⁶² | | cross-sectional study monocentric | 11 | 52 (range 29–85) | No | TUG | TUG time | Stop watch | Yes | NA | MIRS |
| Kierkegaard et al., 2007 ⁵⁴ | | cross-sectional study monocentric | 12 for test retest reliability (i) part and 64 for the feasibility part (ii) | (i) 44 (12) and (ii) 43 (13) | No | 6MWT | 6MWT distance | Stop watch | Yes | NA | MIRS |
| Jimenez-Moreno et al., 2019 ⁵⁷ | | from observational natural history PHENODM1 study | 30 | 48 (25–72) | 14 | 10MWT, 10mW/RT and 6MWT | Mean acceleration units during the 6MWD, 10MWT and 10mW/RT | Accelerometer | Yes | Lower limb isometric muscle force (with a myometer): ankle dorsiflexors, knee extensors and hip flexors | No |
| Jimenez-Moreno et al., 2019 ⁶³ | | from observational natural history PHENODM1 study | 213 | 45.2 (14.5) | No | 10MWT, 10mW/RT and 6MWT | 6MWD, 10MWT, 10mW/RT times | Stop watch | Yes | QMT | SARA and MIRS |
| Knak et al., 2020 ⁵⁸ | | prospective study and bicentric | 78 | 40 (10) | No | 10MWT, TUG | 10MWT and TUG times | Stop watch | Yes | hip extensor, knee extensor, ankle plantar and dorsal flexor muscles strength with dynamometer | MIRS |
| Knak et al., 2020 ⁶⁴ | | bicentric longitudinal prospective study | 63 | 41 (10) | No | 6MWT, 10MWT, TUG and ST | 6MWD, 10MWT and TUG times, number of steps of ST | Stop watch | Yes | Lower limbs muscle strength with dynamometer | MIRS |
| Radovanovic et al., 2016 ⁶⁵ | DM1 and DM2 | prospective monocentric study | 37 (20 DM1 and 17 DM2) | 38.6 (10.9) | 48 | NA | SPT measures | GAITRite electronic walkway of 5.5 m active area | Yes | Lower limbs muscle strength with MRC | NA |
| Montagnese et al., 2020 ⁶⁶ | DM2 | monocentric longitudinal prospective study | 66 | 54.8 (12.4) | No | 6MWT | 6MWD | Stop watch | Yes | MMT lower limbs | NA |

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| Iosa et al., 2007 ⁶⁷ | FSHD | cross-sectional study monocentric | 12 | 40,4 (10.8) | 12 | NA | kinematics and SPT measures | motion analysis system | Yes | MMT lower limb | FCS |
| Aprile et al., 2013 ²⁴ | | cross-sectional study monocentric | 16 | 46.5 (16.4) | 16 | 10mWT, 2MWT and walking on baropodometric platform | 2MWD, 10MWT time and SPT measures | Stop watch and baropodometric platform | Yes | MMT with MRC of lower limbs | CSS |
| Eichinger et al., 2017 ⁶⁸ | | cross sectional study bicentric | 86 | 49.1 (15.2) | No | 6MWT, TUG, 30 foot Go and 10MWT | 6MWD and TUG, 30 foot Go, 10MWT times | corridor of 40 m in one center and a corridor of 50m in the other, stopwatch | Yes | MMT of upper and lower limbs | FCS |
| Huisinga et al., 2018 ⁶⁹ | | prospective cohort unicentric study | 17 | 53.7 [32-67] | No | TUG | SPT parameters during TUG | wearable magneto-inertial sensors | Yes | MMT of lower limbs | FCS |
| Statland et al., 2019 ⁷⁰ | | prospective cohort study | 10 | 54 (8.2) | No | iTUG | SPT parameters during TUG | wireless inertial sensors (at each wrist, 1 at the sternum, 1 at the lumbar area, and 1 at each ankle) | Yes | NA | FCS |
| Gidaro et al., 2022 ⁷¹ | FSHD and LGMD2 | exploratory endpoint in multicenter phase 1 trial | 10 | aged 18 to 75 years | No | NA | SPT parameters in real life conditions | wearable magneto-inertial sensors | Yes | MMT of lower limbs | NA |
| Martino et al., 2019 ⁷² | HSP | cross sectional study | 21 | 48.4 (10.9) | 20 | 15x7 m walkway | kinematics, SPT parameters and EMG measures | motion analysis system and wireless EMG | Yes | NA | SPRS |
| Claeys et al., 2022 ⁷⁴ | LOPD | cross sectional study | 12 | 51.3 (range 22-67) | 12 | 6MWT, 10MWT and TUG | 6MWD, 10MWT and TUG times | Stop watch | Yes | MRC sum score and lower limb isometric muscle force (with Biodex dynamometer) | NA |
| Vanherpe et al., 2020 ⁷³ | | retrospective multicentric study | 52 | 47.9 (15.2) | No | 6MWT | 6MWD | Stop watch | Yes | MRC sum score | NA |
| Jacques et al., 2018 ⁷⁵ | Muscular Dystrophies | cross sectional study | 24 (only ambulant people out of 60 included with NMD) | BMD: 42.4 (13.5) LGMD: 43.1 (12.4) FSHD: 47.7 (11.1) | 16 | 10MWT | 10MWT time | Stop watch | Yes | Isometric and KEMVC force | PFMVC NA |
| Prahn et al., 2014 ⁷⁶ | Several NMD | cross sectional study monocentric | 16 | 47.4 (14.4) | 12 | 6MWT | 6MWD | Stop watch and pulse watch for HR measurement | Yes | MRC Hip,knee and Anfle (F/E) | NA |
| Andersen et al., 2016 ⁴⁵ | | prospective monocentric study | 115 | 52.6 (22-83) | 38 | 2MWT and 6MWT | 2MWD and 6MWD and velocity during 2MWT and at 1st | Stop watch | Yes | Lower limbs muscle strength with MRC | NA |

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|--|------|---|----|--------------|----|------------------------------|--|--|-----|---|-------|
| Knak et al., 2017 ⁷⁷ | | monocentric prospective study | 93 | 53 (17) | No | 2MWT and 6MWT | and 2MWD and 6MWD | Stop watch | Yes | MRC lower limbs | NA |
| Takeuchi et al., 2008 ⁷⁹ | SBMA | cross-sectional study monocentric | 35 | 55.8 (11.2) | 29 | 6MWT | 6MWT distance | Stop watch | Yes | Limb Norris Score | NA |
| Montes et al., 2010 ⁸⁸ | SMA | cross-sectional study monocentric | 9 | 22 [4-49] | 9 | 6MWT | SPT measures and 6MWD | Stop watch and GAITRite electronic walkway of 4.6m active area | No | NA | NA |
| Montes et al., 2014 ⁸⁷ | | cross-sectional study monocentric | 10 | 31.2 (9-49) | No | 6MWT | 6MWD | Stop watch | Yes | Total leg strength measured by MMT | NA |
| Dunaway et al., 2014 ⁸⁶ | | monocentric longitudinal prospective study | 15 | 28.73 (4.17) | No | 6MWT, TUG, 10 meter walk/run | 6MWD, TUG time, 10 meter walk/run time | Stop watch | Yes | MMT lower limbs | HFMSE |
| Dunaway et al., 2016 ⁸³ | | Retrospective study | 30 | 23.7 (16.4) | No | 6MWT, TUG, 10 meter walk/run | 6MWD, TUG time, 10 meter walk/run time | GAITRite electronic walkway of 4.25m active area for SPT measures and instrumented footwear (SoleSound) and stop watch | Yes | MMT lower limbs | NA |
| Rodriguez-Torres et al., 2020 ⁸⁴ | | sub study from 2 clinical trial studies | 23 | 28.0 (16.5) | No | 6MWT | 6MWD | Stop watch | Yes | MRC lower limbs | NA |
| Bartels et al., 2019 ⁸² | | Cross sectional monocentric study (Pilot test sample) | 4 | 26.2 (10-37) | No | ESWT | ESWT time | Stop Watch | No | NA | NA |
| Bartels et al., 2020 ⁸¹ | | monocentric longitudinal prospective study | 15 | 28.4 (12.4) | 25 | ESWT | ESWT time | Stop Watch | Yes | Lower limbs MRC | NA |
| Elsheikh et al., 2020 ⁸⁵ | | inside a monocentric double-blind, placebo-controlled, cross-over trial | 33 | 37.2 (9.1) | No | 6MWT | 6MWD | Stop watch | Yes | Lower limbs maximal voluntary isometric contraction | NA |
| Stolte et al., 2020 ⁸⁰ | | monocentric longitudinal prospective study | 51 | 35.8 (12.7) | No | 6MWT | 6MWD | Stop watch | Yes | NA | HFMSE |

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|---|--------------------------------|--|-----|------------------------|----|----------------|--|--------------|----|----|----|
| Montes et al., 2017 ⁸⁹ | | cross-sectional monocentric study | 9 | 27.9 (range 11.0–51.8) | No | 6MWT and 10MWT | and (i) initial velocity support (ii) double footwear (SoleSound) and GaitRite | Instrumented | No | NA | NA |
| Montano et al., 2022 ⁷⁸ | Primary mitochondrial myopathy | monocentric longitudinal prospective study | 117 | NA | No | 6MWT and TUG | 6MWD and TUG time | Stop watch | No | NA | NA |

ALS-FRS-R: amyotrophic lateral sclerosis functional rating scale; BMD: Becker Muscular Dystrophy; CMT: Charcot Marie Tooth; CMTES: CMT Examination Score; CMTNS: CMT Neuropathy Score ; CSS: Clinical Severity Score; DM1: Dystrophy myotonic type 1; DM2: Dystrophy Myotonic type 2;DMD: Duchenne Muscular Dystrophy; FCS: FSHD Clinical Score; FSHD: facioscapulohumeral muscular dystrophy; F/E: Flexion/Extension; Neuropathy Score; CS: Comfortable speed; EMG: Electromyographic; ESWT: Endurance Shuttle Walk Test; HFMSE: Hammersmith Functional Motor Scale Expanded; HR: Heart Rate; HSP: Hereditary Spastic Paraplegia; KEMVC: Knee Extensor Muscular; Voluntary Contraction; LGMD: Limb Girdle Muscle Dystrophy; LOPD: Late onset Pompe; NA: Non Applicable; NMD: Neuromuscular diseases; MMT: Manual Muscle Testing; MIRS: Muscular Impairment Rating Scale; MRC: Medical Research Council Scale; ONLS: Overall Neuropathy Limitations Scale; PFMVC: Plantar Flexor Muscular Voluntary Contraction; SARA: Scale for the Assessment and Rating of Ataxia; SPT: spatiotemporal; SRPS: Spastic Paraplegia Rating Scale; TUG: Times up and Go test; 2MWD: 2-minute walking distance; 2MWT: 2-minute walking Test; 6MWD: 6- minute walking distance; 6MWT: 6-minute walk test; 10MWT: 10-minute walk test; 10MW/RT: 10-meter walk/run test; ST: step test; Fo8, Walking in a Figure of eight.