

Appendix 1. Search terms

Pubmed (Title, Abstract)

(child [MeSH] OR child* [TIAB] OR adolescent [MeSH] OR AYA [TIAB] OR pediater* [TIAB] OR paediatric* [TIAB] OR pediatrics [MeSH] OR juvenil* [TIAB] OR infancy [TIAB]) AND (neoplasms [MeSH] OR cancer* [TIAB] OR oncolog* [TIAB] OR tumor* [TIAB] OR tumour* [TIAB] OR leukemia* [TIAB] OR leukemia [MeSH] OR lymphoma [MeSH] OR Hodgkin [TIAB] OR sarcoma [MeSH] OR osteosarcoma [TIAB] OR wilms tumor [MeSH] OR neuroblastoma [TIAB] OR rhabdomyosarcoma [TIAB] OR fibrosarcoma [TIAB] OR hepatoblastoma [TIAB] OR PNET [TIAB] OR medulloblastoma [TIAB] OR retinoblastoma [TIAB] OR glioma [TIAB] OR teratom* [TIAB] OR myeloproliferative disease [TIAB] OR myelodysplastic syndrome [TIAB] OR Ependymoma [TIAB] OR Carcinoma [TIAB] OR Germinom* [TIAB] OR Dysgerminom* [TIAB] OR bone marrow transplant* [TIAB] OR stem cell transplant* [TIAB]) AND (cardiorespiratory fitness [MeSH] OR cardiorespiratory [TIAB] OR cardiopulmonary [TIAB] OR physical endurance [MeSH] OR physical fitness [MeSH] OR exercise test [MeSH] OR exercise tolerance [MeSH] OR spiroergometry [TIAB] OR walk test [MeSH] OR fitness [TIAB] OR endurance [TIAB] OR physical performance [TIAB] OR aerobic performance [TIAB] OR anaerobic performance [TIAB] OR VO2max [TIAB] OR physical capacity [TIAB] OR exercise capacity [TIAB] OR aerobic capacity [TIAB] OR anaerobic capacity [TIAB] OR cycle ergomet* [TIAB] OR treadmill test [TIAB] OR muscle strength [MeSH] muscular strength [TIAB] OR muscle power [TIAB] OR muscular power [TIAB] OR Hand strength [MeSH] OR strength dynamometer [TIAB] OR upper body strength [TIAB] OR leg strength [TIAB] OR sit to stand [TIAB] OR one repetition maximum [TIAB] OR flexibility [TIAB] OR range of motion, articular [MeSH] OR ROM [TIAB] OR flexion [TIAB] OR motor skills [MeSH] OR motor performance [TIAB] OR motor function [TIAB] OR motor coordination [TIAB] OR psychomotor performance [MeSH] OR motor skill* [TIAB] OR coordination test [TIAB] OR Walking speed [MeSH] OR running speed [TIAB] OR Running performance [TIAB] OR reaction time [MeSH] OR agility [TIAB] OR walking velocity [TIAB] OR running velocity [TIAB] OR functional mobility [TIAB] OR motor competence [TIAB] OR motor ability [TIAB] OR functional movement [TIAB] OR gait [MeSH] OR gait pattern* [TIAB] OR gait analysis [TIAB] OR postural balance [MeSH] OR walking efficiency [TIAB] OR postural sway [TIAB] OR stride variability [TIAB] OR step variability [TIAB] OR kinematics [TIAB])

Cochrane (Title, Abstract, Keywords)

(mh child OR child* OR mh adolescent OR AYA OR pediater* OR paediatric* OR mh pediatrics OR juvenil* OR infancy) AND (mh neoplasms OR cancer* OR oncolog* OR tumor* OR tumour* OR leukemia* OR mh leukemia OR mh lymphoma OR Hodgkin OR mh sarcoma OR osteosarcoma OR mh wilms tumor OR neuroblastoma OR rhabdomyosarcoma OR fibrosarcoma OR hepatoblastoma OR PNET OR medulloblastoma OR retinoblastoma OR glioma OR teratom* OR myeloproliferative disease OR myelodysplastic syndrome OR Ependymoma OR Carcinoma OR Germinom* OR Dysgerminom* OR bone marrow transplant* OR stem cell transplant*) AND (mh cardiorespiratory fitness OR cardiorespiratory OR cardiopulmonary OR mh physical endurance OR mh physical fitness OR mh exercise test OR mh exercise tolerance OR spiroergometry OR mh walk test OR fitness OR endurance OR physical performance OR aerobic performance OR anaerobic performance OR VO2max OR physical capacity OR exercise capacity OR aerobic capacity OR anaerobic capacity OR cycle ergomet* OR treadmill test OR mh muscle strength muscular strength OR muscle power OR muscular power OR mh Hand strength OR strength dynamometer OR upper body strength OR leg strength OR sit to stand OR one repetition maximum OR flexibility OR mh range of motion, articular OR ROM OR flexion OR mh motor skills OR motor performance OR motor function OR motor

coordination OR mh psychomotor performance OR motor skill* OR coordination test OR mh Walking speed OR running speed OR Running performance OR mh reaction time OR agility OR walking velocity OR running velocity OR functional mobility OR motor competence OR motor ability OR functional movement OR mh gait OR gait pattern* OR gait analysis OR mh postural balance OR walking efficiency OR postural sway OR stride variability OR step variability OR kinematics)

SportDiscus (Title, Abstract)

AB ((child* OR adolescen* OR AYA OR pediatri* OR paediatr* OR pediatrics OR juvenil* OR infancy) AND AB (neoplasm* OR cancer* OR oncolog* OR tumor* OR tumour* OR leukemia* OR lymphoma OR Hodgkin OR sarcoma OR osteosarcoma OR wilms tumor OR neuroblastoma OR rhabdomyosarcoma OR fibrosarcoma OR hepatoblastoma OR PNET OR medulloblastoma OR retinoblastoma OR glioma OR teratom* OR myeloproliferative disease OR myelodysplastic syndrome OR Ependymoma OR Carcinoma OR Germinom* OR Dysgerminom* OR bone marrow transplant* OR stem cell transplant*) AND AB (cardiorespiratory OR cardiopulmonary OR physical endurance OR physical OR exercise test* OR exercise tolerance OR spiroergometr* OR walk* test* OR fitness OR endurance OR physical performance OR aerobic performance OR anaerobic performance OR VO2max OR physical capacity OR exercise capacity OR aerobic capacity OR anaerobic capacity OR cycle ergomet* OR treadmill test* OR muscle strength OR muscular strength OR muscle power OR muscular power OR Hand strength OR strength dynamometer OR upper body strength OR leg strength OR sit to stand OR one repetition maximum OR flexibility OR range of motion OR ROM OR flexion OR motor skills OR motor performance OR motor function OR motor coordination OR psychomotor performance OR motor skill* OR coordination test* OR Walking speed OR running speed OR Running performance OR reaction time OR agility OR walking velocity OR running velocity OR functional mobility OR motor competence OR motor ability OR functional movement OR gait OR postural balance OR walking efficiency OR postural sway OR stride variability OR step variability OR kinematics)) OR TI ((child* OR adolescen* OR AYA OR pediatri* OR paediatr* OR pediatrics OR juvenil* OR infancy) AND TI (neoplasm* OR cancer* OR oncolog* OR tumor* OR tumour* OR leukemia* OR lymphoma OR Hodgkin OR sarcoma OR osteosarcoma OR wilms tumor OR neuroblastoma OR rhabdomyosarcoma OR fibrosarcoma OR hepatoblastoma OR PNET OR medulloblastoma OR retinoblastoma OR glioma OR teratom* OR myeloproliferative disease OR myelodysplastic syndrome OR Ependymoma OR Carcinoma OR Germinom* OR Dysgerminom* OR bone marrow transplant* OR stem cell transplant*) AND TI (cardiorespiratory OR cardiopulmonary OR physical endurance OR physical OR exercise test* OR exercise tolerance OR spiroergometr* OR walk* test* OR fitness OR endurance OR physical performance OR aerobic performance OR anaerobic performance OR VO2max OR physical capacity OR exercise capacity OR aerobic capacity OR anaerobic capacity OR cycle ergomet* OR treadmill test* OR muscle strength OR muscular strength OR muscle power OR muscular power OR Hand strength OR strength dynamometer OR upper body strength OR leg strength OR sit to stand OR one repetition maximum OR flexibility OR range of motion OR ROM OR flexion OR motor skills OR motor performance OR motor function OR motor coordination OR psychomotor performance OR motor skill* OR coordination test* OR Walking speed OR running speed OR Running performance OR reaction time OR agility OR walking velocity OR running velocity OR functional mobility OR motor competence OR motor ability OR functional movement OR gait OR postural balance OR walking efficiency OR postural sway OR stride variability OR step variability OR kinematics))

Appendix 2: Description of studies included in the systematic review.

Author	Publication year	Sample size	Assessments	Type of cancer	Phase of treatment
Akyay et al.	2014	33	Muscular strength: Grip strength Functional mobility: TUG 3m	Leukemia	Mixed
Bastian et al.	1998	5	Gait: Video recording	CNS	No information
Bell et al.	2006	35	Cardiorespiratory fitness: Maximal CPET	Leukemia	Off treatment
Benedetti et al.	2016	16	Gait: Video-recording and force platforms	Bone tumor	Off treatment
Beulertz et al.	2013	24	Motor performance test battery: MOT, DMT	Mixed	Mixed
Beulertz et al.	2016a	13	Cardiorespiratory fitness: 6MWT Flexibility: Goniometry Gait: Microgate Optogait Motor performance test battery: DMT	Mixed	Off treatment
Beulertz et al.	2016b	33	Motor performance test battery: MOT, DMT	Mixed	Mixed
Bianco et al.	2014	18	Muscular strength: Sit-up test, Standing broad Jump, Grip strength Speed: Shuttle Run Motor performance test battery: Physical fitness battery	Hematologic malignancies	Off treatment
Black et al.	1998	56	Cardiorespiratory fitness: Maximal CPET	Leukemia	Off treatment
Braam et al.	2016	60	Cardiorespiratory fitness: Maximal CPET Muscular strength: Hand Held Dynamometry	Mixed	Mixed
Braam et al.	2018	68	Cardiorespiratory fitness: Maximal CPET Muscular strength: Hand Held Dynamometry, Grip strength	Mixed	Mixed
Braam et al.	2015	61	Cardiorespiratory fitness: Maximal CPET	Mixed	Mixed
Brinkman et al.	2018	306	Cardiorespiratory fitness: 6MWT Muscular strength: Isokinetic Dynamometry, Grip strength Balance: SOT Flexibility: Sit and reach Functional mobility: TUG 3m	CNS	Off treatment
Carty et al.	2009a	20	Gait: Video-recording and force platforms	Bone tumor	No information
Carty et al.	2009b	20	Muscular strength: Manual Muscle Test Flexibility: Goniometry	Bone tumor	Off treatment
Corr et al.	2017	14	Muscular strength: Hand Held Dynamometry Flexibility: Goniometry Motor performance test battery: FMA	Lower extremity sarcoma	Active treatment
Cortés-Reyes et al.	2013	7	Cardiorespiratory fitness: 6MWT Muscular strength: Sit up test Flexibility: Sit and reach Motor performance test battery: GMFM	Leukemia	Mixed
Cox et al.	2018	107	Cardiorespiratory fitness: 6MWT Muscular strength: Hand Held Dynamometry, Grip strength Flexibility: Goniometry Motor performance test battery: BOT 2SF	Leukemia	Active treatment
Däggelmann et al.	2017	22	Motor performance test battery: MOT, DMT	Mixed	Off treatment
Davis et al.	2010	15	Motor performance test battery: BOT 2	CNS	Active treatment
De Caro et al.	2006	84	Cardiorespiratory fitness: Maximal CPET	Mixed	Off treatment
DeFeo et al.	2020	1695	Cardiorespiratory fitness: 6MWT Muscular strength: Isokinetic dynamometry, Grip strength Flexibility: Sit and reach, Goniometry Functional mobility: TUG 3m	Mixed	Off treatment
Deisenroth et al.	2016	40	Muscular strength: Hand Held Dynamometry	Mixed	Active treatment
Dubnov-Raz et al.	2015	20	Cardiorespiratory fitness: Maximal CPET	Mixed	Off treatment

Ehrhardt et al.	2017	200	Cardiorespiratory fitness: 6MWT Muscular strength: Isokinetic dynamometry, Grip strength Balance: SOT Flexibility: Goniometry, Sit and reach Functional mobility: TUG 3m	Lymphoma	Off treatment
Esbenshade et al.	2014	17	Cardiorespiratory fitness: 6MWT Muscular strength: Hand Held Dynamometry, Grip strength Flexibility: Goniometry, Sit and reach Motor performance test battery: BOT 2SF	Leukemia	Maintenance
Fiorillo et al.	2010	16	Gait: Video recording	CNS	Off treatment
Fiuza-Luces et al.	2017	49	Cardiorespiratory fitness: Maximal CPET Muscular strength: Repetition Maximum Functional mobility: TUG 3m, TUDS	Mixed	Mixed
Fuchs et al.	2003	6	Gait: Video-recording and force platforms	Bone tumor	Off treatment
Galea et al.	2004	79	Balance: Balance test on force platform	Leukemia	Off treatment
Gerber et al.	2006	32	Cardiorespiratory fitness: 6MWT Muscular strength: Manual Muscle Test, Grip strength Flexibility: Goniometry Motor performance test battery: BOT 2	Mixed	Off treatment
Gilchrist et al.	2016	52	Cardiorespiratory fitness: 6MWT Flexibility: Goniometry Gait: GAITRite	Mixed	Active treatment
Gilchrist & Tanner	2018	65	Motor performance test battery: BOT 2	Mixed	Active treatment
Gilliam et al.	2011	12	Cardiorespiratory fitness: PACER Muscular strength: Hand Held Dynamometry, Chair-Stand Test, Lateral Step Test	Mixed	Off treatment
Ginsberg et al.	2007	91	Motor performance test battery: FMA	Bone tumor	Off treatment
Gohar et al.	2011	9	Motor performance test battery: GMFM	Leukemia	Active treatment
Götte & Kesting et al.	2013	33	Motor performance test battery: MOON	Mixed	mixed
Götte et al.	2015	47	Motor performance test battery: MOON	Mixed	Active treatment
Götte & Kesting et al.	2018	40	Motor performance test battery: MOON	Mixed	Active treatment
Hamari et al.	2019	36	Motor performance test battery: mABC 2	Mixed	Active treatment
Harten et al.	1984	45	Motor performance test battery: Lincoln-Oseretzky Motor Development Scale	Mixed	Off treatment
Hartman et al.	2009	51	Flexibility: Goniometry Motor performance test battery: mABC	Leukemia	Active treatment
Hartman et al.	2010	34	Motor performance test battery: mABC	Leukemia	Off treatment
Hartman et al.	2013	34	Cardiorespiratory fitness: 6MWT Flexibility: Goniometry Motor performance test battery: mABC 2	Leukemia	Off treatment
Hartman et al.	2018	71	Cardiorespiratory fitness: 6MWT Muscular strength: Sit up test, Back extension test, Push-up test, Vertical jump, Grip strength Flexibility: Sit and reach, Side-bending	Mixed	Off treatment
Hartman et al.	2006	128	Motor performance test battery: mABC	Mixed	Off treatment
Hartman et al.	2008	92	Muscular strength: Hand held dynamometry Flexibility: Goniometry	Mixed	Off treatment
Hauser et al.	2001	38	Cardiorespiratory fitness: Maximal CPET	Leukemia	Off treatment
Henderson et al.	2012	38	Flexibility: Goniometry	Bone tumor	Off treatment
Hillmann et al.	2001	7	Gait: Video-recording, force plates and EMG	Mixed	Off treatment
Hillmann et al.	2000	43	Gait: Video-recording, force plates and EMG	Mixed	Off treatment

Hoff treatmentman et al.	2013	183	Cardiorespiratory fitness: 6MWT Muscular strength: Isokinetic dynamometry, Grip strength Functional mobility: TUG 3m	Mixed	Off treatment
Hogarty et al.	2000	31	Cardiorespiratory fitness: Maximal CPET	Mixed	Off treatment
Hovi et al.	1993	43	Muscular strength: Isometric dynamometry, Sit up test, Push-up test	Leukemia	Off treatment
Hovi et al.	2010	83	Muscular strength: Sit up test, Repeated Squatting, Back extension, Leg lift Speed: Shuttle run Flexibility: Sit and reach	Mixed	Off treatment
Howell et al.	2018	78	Muscular strength: Sit up test, Push up test, Grip strength	Mixed	Off treatment
Hung et al.	2017	13	Cardiorespiratory fitness: 6MWT Motor performance test battery: BOT 2SF	Leukemia	Off treatment
Järvelä et al.	2010	21	Cardiorespiratory fitness: Maximal CPET Muscular strength: Sit up test, Repeated Squatting, Back extension, Vertical jump, Shoulder lift, Grip strength	Leukemia	Off treatment
Jenney et al.	1995	70	Cardiorespiratory fitness: Maximal CPET	Leukemia	Off treatment
Johnson et al.	1997	13	Cardiorespiratory fitness: Submaximal CPET, Maximal CPET	No information	Off treatment
Joyce et al.	2011	493	Muscular strength: Isometric dynamometry, Grip strength	Leukemia	Off treatment
Kabak et al.	2016	13	Cardiorespiratory fitness: 6MWT Muscular strength: Chair-stand test, Grip strength Functional mobility: TUG 3m, TUDS, Stand up from bed rest	Mixed	Active treatment
Kandula et al.	2018	65	Motor performance test battery: mABC	No information	Off treatment
Keats & Culos-Reed	2008	10	Motor performance test battery: FITNESSGRAMM	Mixed	Mixed
Kesting et al.	2015	21	Motor performance test battery: MOON	Bone tumor	Off treatment
Konczak et al.	2005	22	Balance: SOT	CNS	Off treatment
Lam et al.	2018	70	Muscular strength: Grip strength	Mixed	Off treatment
Leone et al.	2014	20	Motor performance test battery: UQAC-UQAM	Leukemia	Off treatment
Long et al.	2017	20	Cardiorespiratory fitness: Maximal CPET Muscular strength: Repetition maximum, Sit up test, Repeated squatting, Push-up test	Mixed	Off treatment
Long et al.	2018	13	Cardiorespiratory fitness: Maximal CPET, Submaximal CPET Muscular strength: Repetition maximum, Sit up test, Repeated squatting, Push-up test	Mixed	Off treatment
Luca De et al.	2013	37	Motor performance test battery: BOT 2SF, mABC 2	Leukemia	Off treatment
Malicka et al.	2020	34	Speed: 60m run	Leukemia	Off treatment
Malicka et al.	2019	71	Speed: 60m run	Mixed	Off treatment
Manchola-González et al.	2019	19	Cardiorespiratory fitness: Maximal CPET Muscular strength: Grip strength Flexibility: Sit and reach Functional mobility: TUG 3m, TUDS	Leukemia	Off treatment
Marchese, Chiarello et al.	2004a	28	Cardiorespiratory fitness: 9MWT Muscular strength: Hand held dynamometry Flexibility: Goniometry Functional mobility: TUDS	Leukemia	Maintenance
Marchese, Ogle et al.	2004b	18	Cardiorespiratory fitness: 9MWT Functional mobility: TUG 3m, TUDS	Bone tumor	Off treatment
Marchese et al.	2007	94	Motor performance test battery: FMA	Mixed	Off treatment
Marchese et al.	2006	68	Cardiorespiratory fitness: 9MWT Flexibility: Goniometry Functional mobility: TUG 3m, TUDS	Lower extremity sarcoma	Off treatment

Marchese et al.	2003	8	Muscular strength: Hand held dynamometry Functional mobility: TUG 3m	Leukemia	Active treatment
Marchese et al.	2008	33	Flexibility: Goniometry Functional mobility: TUDS	Leukemia	Mixed
Matthys et al.	1993	35	Cardiorespiratory fitness: Maximal CPET	Mixed	Off treatment
McKenzie et al.	2000	34	Cardiorespiratory fitness: Maximal CPET, Wingate anaerobic test	Solid tumor	Off treatment
Mitchell et al.	2002	17	Motor performance test battery: BOTMP	Neuroblastoma	Maintenance
Varedi et al.	2018	365	Cardiorespiratory fitness: 6MWT Functional mobility: TUG 3m	Leukemia	Off treatment
Moyer-Mileur et al.	2009	14	Cardiorespiratory fitness: PACER Muscular strength: Push up test Flexibility: Sit and reach Functional mobility: TUG 3m, TUDS	Leukemia	Maintenance
Müller et al.	2017	84	Balance: Balance test on force platform Gait: Video recording	Mixed	N/A
Muratt et al.	2011	10	Muscular strength: Isokinetic dynamometry	Leukemia	Maintenance
Nama et al.	2020	72	Muscular strength: Manual muscle test Functional mobility: TUG 3m Motor performance test battery: BOT 2	Mixed	Active treatment
Naumann et al.	2015	26	Motor performance test battery: FMS	Mixed	Off treatment
Ness et al.	2007	75	Cardiorespiratory fitness: 2MWT Muscular strength: Hand held dynamometry, Grip strength Functional mobility: TUG 3m	Leukemia	Off treatment
Ness et al.	2015a	365	Cardiorespiratory fitness: submaximal CPET Muscular strength: Isokinetic dynamometry, Grip strength Balance: SOT Flexibility: Goniometry, Sit and reach	Leukemia	Off treatment
Ness et al.	2012	415	Cardiorespiratory fitness: 6MWT Muscular strength: Isokinetic dynamometry Balance: SOT Flexibility: Goniometry Functional mobility: TUG 3m	Leukemia	Off treatment
Ness et al.	2013	475	Cardiorespiratory fitness: 6MWT Balance: SOT Functional mobility: TUG 3m	Extracranial solid tumor	Off treatment
Ness et al.	2015b	109	Cardiorespiratory fitness: 6MWT Muscular strength: Hand held dynamometry, Grip strength Flexibility: Goniometry Motor performance test battery: BOT 2SF	Leukemia	Active treatment
Ness et al.	2010	156	Muscular strength: Hand held dynamometry, Grip strength Balance: Berg balance test	CNS	Off treatment
Ness et al.	2014	42	Flexibility: Goniometry Motor performance test battery: FMA	Bone tumor	Off treatment
Nielsen et al.	2018	75	Cardiorespiratory fitness: Maximal CPET Muscular strength: Chair-Stand test, Grip strength Balance: Flamingo balance test Functional mobility: TUG 3m	Mixed	Active treatment
Oswald et al.	2019	16	Cardiorespiratory fitness: 2MWT Muscular strength: Hand held dynamometry Flexibility: Goniometry Functional mobility: TUG 3m Gait: 10m Walk test	Mixed	Mixed
Oswald & Bo	2020	13	Motor performance test battery: mABC 2	Leukemia	Off treatment
Ovans et al.	2018	15	Cardiorespiratory fitness: 6MWT	CNS	Off treatment
Papalia et al.	2020	10	Cardiorespiratory fitness: Submaximal CPET	CNS	Off treatment

Pesenti et al.	2018	15	Gait: Video-recording and force platforms	Bone tumor	Off treatment
Pihkala et al.	1995	30	Cardiorespiratory fitness: Maximal CPET	Mixed	Off treatment
Piscione et al.	2017	28	Cardiorespiratory fitness: Maximal CPET Motor performance test battery: BOT 2	CNS	Off treatment
Piscione et al.	2014	30	Motor performance test battery: BOT 2	CNS	Off treatment
Ramchandren et al.	2009	37	Motor performance test battery: BOT 2	Leukemia	Off treatment
Reindres-Messelink et al.	1999	17	Motor performance test battery: mABC	Leukemia	Active treatment
Riggs et al.	2017	28	Cardiorespiratory fitness: 6MWT	CNS	Off treatment
Rosenhagen et al.	2011	23	Muscular strength: Grip strength	Mixed	Active treatment
Sabel et al.	2016	13	Motor performance test battery: BOT 2	CNS	Off treatment
San Juan et al.	2008a	15	Cardiorespiratory fitness: Maximal CPET Flexibility: Goniometry Functional mobility: TUDS	Leukemia	Maintenance
San Juan et al.	2008b	8	Cardiorespiratory fitness: Maximal CPET Muscular strength: Repetition maximum Flexibility: Goniometry Functional mobility: TUG 3m, TUG 10m, TUDS	Leukemia	Off treatment
San Juan et al.	2007a	7	Cardiorespiratory fitness: Maximal CPET Muscular strength: Repetition maximum Flexibility: Goniometry Functional mobility: TUG 3m, TUG 10m, TUDS	Leukemia	Maintenance
San Juan et al.	2007b	7	Muscular strength: Repetition maximum Functional mobility: TUG 3m, TUG 10m, TUDS	Leukemia	Maintenance
Schoch et al.	2006	22	Balance: SOT	CNS	Off treatment
Schoch et al.	2010	22	Balance: Ultrasound-based motion analysis	CNS	Off treatment
Schoenmakers et al.	2006	18	Muscular strength: Manual muscle test Motor performance test battery: mABC 2	Mixed	Mixed
Segerer et al.	2017	74	Cardiorespiratory fitness: Maximal CPET	Solid tumor	Off treatment
Senn-Malashonak et al.	2019	60	Cardiorespiratory fitness: 6MWT, Maximal CPET Muscular strength: Isometric dynamometry, Grip strength	Mixed	Active treatment
Shore & Shepard	1999	6	Cardiorespiratory fitness: Maximal CPET	N/A	Mixed
Slater et al.	2015	119	Cardiorespiratory fitness: 6MWT Muscular strength: Grip strength Functional mobility: TUG 3m	Mixed	Off treatment
Smith et al.	2014	1778	Cardiorespiratory fitness: 6MWT	Mixed	Off treatment
Smith et al.	2013	5	Cardiorespiratory fitness: Maximal CPET Muscular strength: Isokinetic dynamometry	Bone tumor	Off treatment
Steenhoff treatment et al.	1993	8	Gait: EMG analysis	Bone tumor	Off treatment
Su et al.	2018	18	Cardiorespiratory fitness: 6MWT	Mixed	Off treatment
Syczewska et al.	2008	88	Balance: Balance test on force platform	CNS	Off treatment
Syczewska et al.	2006	41	Balance: Balance test on force platform Gait: Video-recording and force platform	CNS	Off treatment
Syczewska et al.	2010	105	Gait: Video-recording	CNS	Off treatment
Takken et al.	2009	9	Cardiorespiratory fitness: Maximal CPET Muscular strength: Hand held dynamometry, Grip strength Functional mobility: TUG 3m, TUDS	Leukemia	Off treatment
Talvensaari et al.	1995	46	Cardiorespiratory fitness: Maximal CPET Muscular strength: Isokinetic dynamometry	Mixed	Off treatment

Tanir & Kuguoglu	2013	40	Cardiorespiratory fitness: 9MWT Muscular strength: Isometric dynamometry Flexibility: Goniometry Functional mobility: TUG 3m, TUDS	Leukemia	Off treatment
Tanner et al.	2017	62	Balance: Single leg stance Flexibility: Goniometry Functional mobility: Floor to stand performance Gait: Visual observation Motor performance test battery: BOTMP, BOT 2	Leukemia	Active treatment
Tanner & Hooke	2019	30	Flexibility: Goniometry Motor performance test battery: BOT 2	Leukemia	Off treatment
Tanner et al.	2015	6	Cardiorespiratory fitness: 6MWT Muscular strength: Manual muscle test, Hand held dynamometry Flexibility: Goniometry Gait: GAITRite	Mixed	Active treatment
Taskinen et al.	2013	45	Muscular strength: Sit-up test, Repeated squatting, Back extension test, Leg lift test Speed: Shuttle run Flexibility: Sit and reach	Leukemia	Off treatment
Tay et al.	2017	101	Motor performance test battery: BOT 2SF	Leukemia	Off treatment
Turner-Gomes et al.	1996	11	Cardiorespiratory fitness: Wingate anaerobic test, Maximal CPET	Leukemia	Off treatment
van Brussel et al.	2006	13	Cardiorespiratory fitness: Wingate anaerobic test, Maximal CPET Muscular strength: Hand held dynamometry	Leukemia	Off treatment
Wallek et al.	2018	49	Cardiorespiratory fitness: 6MWT	Mixed	Active treatment
Warner et al.	1997	56	Cardiorespiratory fitness: Submaximal CPET, Maximal CPET	Mixed	Off treatment
Wiernikowski et al.	2005	10	Motor performance test battery: BOTMP, GMFM	Mixed	Maintenance
Wright et al.	2003	40	Flexibility: Goniometry	Leukemia	Mixed
Wright et al.	2017	17	Muscular strength: Manual muscle test Flexibility: Goniometry Gait: Video-recording, force plates and EMG	Leukemia	Mixed
Wright & Fairfield	2007	20	Motor performance test battery: GMFM ALL	Leukemia	Mixed
Wright et al.	2005	99	Motor performance test battery: BOTMP	Leukemia	Off treatment
Wright et al.	1999	54	Flexibility: Goniometry	Leukemia	Off treatment
Wright et al.	1998	36	Muscular strength: Grip strength Flexibility: Goniometry Motor performance test battery: BOTMP, GMFM	Leukemia	Off treatment
Wurz et al.	2014	8	Flexibility: Goniometry, Sit and reach Functional mobility: TUG 3m	Mixed	Off treatment
Zaccara et al.	2004	13	Gait: Video-recording and force platform	Germ cell tumor	Off treatment

2MWT: 2-minute walk test, 6MWT: 6-minute walk test, 9MRWT: 9-minute run-walk test, CNS: central nervous system, CPET: cardio pulmonary exercise test, EMG: electromyography, SOT: sensory organization test, BOT: Bruininks-Oseretsky Test, SF: short form; m-ABC: Movement Assessment Battery for Children, BOTMP: Bruininks-Oseretsky Test of Motor Proficiency, FMA: Functional Mobility Assessment, MOON: Motor Performance in Pediatric Oncology, DMT: Deutscher Motorik Test, GMFM: Gross motor function measure, MOT: Motoriktest für Kinder, FMS: fundamental movement skills test battery, UQAC-UQAM: University of Québec in Chicoutimi-University of Québec in Montréal

Appendix 3: Description of study methods assessing cardiorespiratory fitness in pediatric cancer patients and survivors

Assessment	No. of studies/ total sample size ¹	Type of Cancer (No. participants)	Age range/ mean±SD [y]	Phases of treatment (No. studies)	Validity ²	Reliability ²	References
Maximal CPET <i>Measurement of maximum aerobic capacity</i>	33/1170	Leukemia (621) Lymphoma (130) CNS tumor (84) Neuroblastoma (19) Retinoblastoma (1) Renal tumor (28) Hepatoblastoma (3) Bone tumor (45) Soft tissue sarcoma (26) Germ cell (1) Mixed (207) <i>[solid tumor (207)]</i> Other (5)	3.5-41	Active treatment (2) Maintenance (2) Off treatment (24) Mixed (5) <i>[all phases (4), maint./off treatment (1)]</i>	No information	No information	Bell et al. 2006; Black et al. 1998; Braam et al. 2015; Braam et al. 2016; Braam et al. 2018; Caro et al. 2006; Dubnov-Raz et al. 2015; Fiuza-Luces et al. 2017; Hauser et al. 2001; Hogarty et al. 2000; Järvelä et al. 2010; Jenney et al. 1995; Johnson et al. 1997; Long et al. 2017; Long et al. 2018; Manchola-González et al. 2019; Matthys et al. 1993; McKenzie et al. 2000; Nielsen et al. 2018; Pihkala et al. 1995; Piscione et al. 2017; San Juan et al. 2007; San Juan, Chamorro-Viña, Maté-Muñoz et al. 2008; San Juan, Chamorro-Viña, Moral et al. 2008; Segerer et al. 2017; Senn-Malashonak et al. 2019; Shore & Shepard 1999; Smith et al. 2013; Takken et al. 2009; Talvensaar et al. 1995; Turner-Gomes et al. 1996; van Brussel et al. 2006; Warner et al. 1997)
6-Minute Walk Test <i>Measurement of functional submaximal aerobic capacity via timed walk test (subject walks as fast as possible on a defined straight and flat corridor for 6 min)</i>	26/6180	Leukemia (3231) Lymphoma (1139) CNS tumor (525) Neuroblastoma (33) Renal tumor (30) Bone tumor (152) Soft tissue sarcoma (10) Germ cell tumor (1) Mixed (1054) <i>[sarcoma (2), mixed solid (427), non-CNS solid tumor (11), extracranial solid tumor (475), ALL/Wilms tumor/other (6), leukemia/lymphoma (59), bone/soft tissue sarcoma (13), neuroblastoma/Wilms tumor (49), other (12)]</i>	3.5-63.8	Active treatment (7) Maintenance (1) Off treatment (17) Mixed (1)	No information	No information	Beulertz et al. 2016; Brinkman et al. 2018; Cortés-Reyes et al. 2013; Cox et al. 2018; DeFeo et al. 2020; Ehrhardt et al. 2017; Esbenschade et al. 2014; Gerber et al. 2006; Gilchrist & Tanner 2016; Hartman et al. 2013; Hartman et al. 2018; Hoffman et al. 2013; Hung et al. 2017; Ness et al. 2012; Ness et al. 2013; Ness, Kaste et al. 2015; Ovans et al. 2018; Riggs et al. 2017; Senn-Malashonak et al. 2019; Slater et al. 2015; Smith et al. 2014; Su et al. 2018; Tanner et al. 2015; Varedi et al. 2017; Wallek et al. 2018; Yildiz Kabak et al. 2016)

		Other (5) [Nasopharynx-CA (1), neuroectodermal tumor (3), N/A (1)]					
Submaximal CPET <i>Measurement of submaximal aerobic capacity</i>	5/457	Leukemia (409) Lymphoma (4) CNS tumor (19) Neuroblastoma (2) Renal tumor (6) Soft tissue sarcoma (1) Mixed (15) Other (1) [Undifferentiated rhabdomyosarcoma of the right petrous temporal bone]	7-44.6	Off treatment (5)	No information	No information	Johnson et al. 1997; Long et al. 2018; Ness, DeLany et al. 2015; Papalia et al. 2020; Warner et al. 1997
9MWT/9MRWT <i>Measurement of aerobic capacity via timed walk test, subject runs or walks as fast as possible on a defined straight and flat corridor for 9 min</i>	4/154	Leukemia (68) Bone tumor (18) Mixed (68) [lower-extremity sarcoma (68)]	4-27	Maintenance (1) Off treatment (3)	<u>Concurrent and construct validity:</u> Spearman rho = 0.63 and 0.50 between 9 min run-walk distance and MSTs and TESS (lower extremity version) scores, resp. in 94 CCS with lower extremity sarcoma aged 10-42years; Longitudinal data at 6, 12 and 18	<u>Intra- and inter-rater reliability:</u> $r \geq 0.85$ (CCP during maintenance therapy for ALL) (Marchese, Chiarello, & Lange, 2004) <u>Intra- and inter-rater reliability:</u> ICC ≥ 0.97 (23 CCS with lower extremity sarcoma 10-42y) (Marchese et al., 2007)	Marchese et al. 2006; Marchese, Chiarello, & Lange 2004; Marchese, Ogle et al. 2004; Tanir & Kuguoglu 2013

					months after limb sparing surgery indicated an increase in distance walked over time ($p = 0.04$) in 6 CCS with lower extremity sarcoma aged 11-22years (Marchese et al., 2007)		
Wingate anaerobic test (and similar 30s-all-out protocols) <i>Measurement of anaerobic capacity via cycle ergometer, maximum effort for 30s following a short warm-up period</i>	3/58	Leukemia (24) Mixed (34) <i>[Solid tumor (34)]</i>	7.7-23.8	Off treatment (3)	No information	No information	McKenzie et al. 2000; Turner-Gomes et al. 1996; van Brussel et al. 2006
2MWT <i>Measurement of submaximal aerobic capacity via timed walk test, subject walks as fast as possible on a defined straight</i>	2/91	Leukemia (79) Lymphoma (3) CNS tumor (1) Neuroblastoma (2) Soft tissue sarcoma (2) Germ cell tumor (1) Other (3) [juvenile granulosa cell tumor) (1), malignant peripheral nerve sheath tumor (1),	6-45	Off treatment (1) Mixed (1) <i>[maint./off treatment (1)]</i>	No information	No information	Ness et al. 2007; Oschwald et al. 2019

<i>and flat corridor for 2 min</i>		undifferentiated sarcoma of the liver (1)]					
PACER Shuttle Run Test <i>Measurement of maximum aerobic capacity, subject runs back and forth across a 20m space at a specified pace that gets faster each minute as long as possible</i>	2/26	Leukemia (21) CNS tumor (5)	4-18	Maintenance (1) Off treatment (1)	No information	No information	Gilliam et al. 2011; Moyer-Mileur et al. 2009

ALL: acute lymphoblastic leukemia, CCP: childhood cancer patients, CCS: childhood cancer survivors, MSTs: Musculoskeletal Tumor Society Rating Scale, TESS: Toronto Extremity Salvage Scale, 2MWT: 2-minute walk test, 6MWT: 6-minute walk test, 9MRWT: 9-minute run-walk test, CNS: central nervous system, CPET: cardio pulmonary exercise test, HR: heart rate, ECG: echocardiography, bpm: beats per minute, min: minute, km/h: kilometer per hour, PACER: progressive aerobic cardiovascular endurance run, s: second, W: watt, ¹only study participants who performed the assessments were counted, ²if evaluated in a childhood cancer population

Appendix 4: Description of study methods assessing muscle strength in pediatric cancer patients and survivors

Assessment	No. of studies/ total sample size ¹	Type of Cancer (No. participants)	Age range/ mean±SD [y]	Phases of treatment (No. studies)	Validity ²	Reliability ²	References
Grip Strength Test <i>measurement of maximum voluntary contraction of the hand using grip strength or hand dynamometer</i>	27/4451	Leukemia (2688) Lymphoma (831) CNS (538) Neuroblastoma (40) Retinoblastoma (11) Renal tumor (35) Bone tumor (29) Soft tissue sarcoma (14) Germ cell tumor (8) Mixed (249) <i>[sarcoma (2), hematologic malignancies (18), leukemia/lymphoma (59), bone/soft tissue sarcoma (13), neuroblastoma/Wilms tumor (49), other solid tumor (46), extracranial solid tumor (21), mixed malignancies (37)]</i> Other (8) <i>[Nasopharynx-CA (1), N/A (4), neuroectodermal tumor (3)]</i>	3.5-64	Active treatment (6) Maintenance (1) Off treatment (18) Mixed (2) <i>[active/off treatment (1), all phases (1)]</i>	No information	No information	Akyay et al. 2014; Bianco et al. 2014; Braam et al. 2018; Brinkman et al. 2018; Cox et al. 2018; DeFeo et al. 2020; Ehrhardt et al. 2017; Esbenshade et al. 2014; Gerber et al. 2006; Hartman et al. 2018; Hoffman et al. 2013; Howell et al. 2018; Järvelä et al. 2010; Joyce et al. 2011; Lam et al. 2018; Manchola-González et al. 2019; Ness et al. 2007; Ness et al. 2010; Ness DeLany et al. 2015; Ness, Kaste et al. 2015; Nielsen et al. 2018; Rosenhagen et al. 2011; Senn-Malashonak et al. 2019; Slater et al. 2015; Takken et al. 2009; Wright et al. 1998; Yildiz Kabak et al. 2016
Hand Held Dynamometry <i>measurement of maximum voluntary isometric muscle strength using hand dynamometer</i>	17/830	Leukemia (489) Lymphoma (29) CNS tumor (182) Neuroblastoma (2) Renal tumor (28) Bone tumor (17) Soft tissue sarcoma (15) Germ cell tumor (1) Mixed (64) <i>[ALL/Wilms tumor/other (6), solid tumor (16), mixed malignancies (25),</i>	4-58	Active treatment (6) Maintenance (2) Off treatment (6) Mixed (3) <i>[all phases (2), maint. /off treatment (1)]</i>	No information	<u>Intra- and inter-rater reliability:</u> <i>r = 0.85-0.99 for knee extension and ankle dorsiflexion in 28 children with ALL aged 4-18y (Marchese, Chiarello & Lange, 2004)</i>	Braam et al. 2016; Braam et al. 2018; Corr et al. 2017; Cox et al. 2018; Deisenroth et al. 2016; Esbenshade et al. 2014; Gilliam et al. 2011; Marchese et al. 2003; Hartman et al. 2008; Marchese, Chiarello & Lange 2004; Ness et al. 2007; Ness et al. 2010; Ness, Kaste et al. 2015; Oswald et al. 2019; Takken et al. 2009; Tanner et al. 2015; van Brussel et al. 2006

		<p><i>lower-extremity sarcoma (14), N/A (3)]</i> Other (3) <i>[juvenile granulosa cell tumor) (1), malignant peripheral nerve sheath tumor (1), undifferentiated sarcoma of the liver (1)]</i></p>				<p><u>Intra- and inter-rater reliability:</u> ICC = 0.87-0.95 for knee extension and ankle dorsiflexion in 8 children with ALL aged 4-15y (Marchese et al., 2003)</p>	
<p>Isokinetic Dynamometry <i>measurement of maximum voluntary isokinetic muscle strength</i></p>	10/3718	<p>Leukemia (2429) Lymphoma (783) CNS tumor (338) Neuroblastoma (3) Renal tumor (6) Bone tumor (5) Mixed (154) <i>[leukemia/lymphoma (59), bone/soft tissue sarcoma (13), neuroblastoma/Wilms tumor (49), other solid tumor (30), sarcoma (3)]</i></p>	10.5-64	<p>Maintenance (1) Off treatment (9)</p>	No information	<p><u>Test-retest reliability:</u> ICC = 0.86-0.99 in childhood cancer survivors and 0.71-0.97 in healthy controls for peak torque and total work done of trunk flexion and extension at 50°/s and 200°/s in 18 childhood cancer survivors and healthy controls aged 10-31y (Talvensaaari et al., 1995)</p>	<p>Brinkman et al. 2018; DeFeo et al. 2020; Ehrhardt et al. 2017; Hoffman et al. 2013; Joyce et al. 2011; Muratt et al. 2011; Ness et al. 2012; Ness, DeLany et al. 2015; Smith et al. 2013; Talvensaaari et al. 1995</p>
<p>Sit-Up Test <i>measurement of dynamic muscular endurance of trunk muscles</i></p>	10/399	<p>Leukemia (165) Lymphoma (8) CNS tumor (39) Neuroblastoma (32) Retinoblastoma (11) Renal tumor (34) Bone tumor (1) Soft tissue sarcoma (5)</p>	5-62.2	<p>Off treatment (9) Mixed (1) <i>[active/maint (1)]</i></p>	No information	No information	<p>Bianco et al. 2014; Cortés-Reyes et al. 2013; Hartman et al. 2018; Hovi et al. 1993; Hovi et al. 2010; Howell et al. 2018; Järvelä et al. 2010; Long et al. 2017; Long et al. 2018; Taskinen et al. 2013</p>

		Germ cell tumor (1) Mixed (97) <i>[hematologic malignancies (97)]</i> Other (6) [N/A]					
Push-Up Test <i>measurement of dynamic muscular endurance of upper extremity; max reps or reps per 30s, 40s, or 60s counted</i>	6/239	Leukemia (102) Lymphoma (8) CNS tumor (39) Neuroblastoma (32) Retinoblastoma (11) Renal tumor (34) Bone tumor (1) Soft tissue sarcoma (5) Germ cell tumor (1) Other (6)	4-62.2	Maintenance (1) Off treatment (5)	No information	No information	Hartman et al. 2018; Hovi et al. 1993; Howell et al. 2018; Long et al. 2017; Long et al. 2018; Moyer-Mileur et al. 2009
Manual Muscle Test <i>measurement of maximum voluntary isometric muscle strength using manual resistance and defined scales</i>	6/165	Leukemia (97) Lymphoma (10) Bone tumor (44) Soft tissue sarcoma (3) Mixed (8) <i>[sarcoma (2), ALL/wilms tumor/other (6)]</i> Other (3) <i>[neuroectodermal (3)]</i>	2-50+	Active treatment (2) Off treatment (2) Mixed (2) <i>[all phases (1); maint/off treatment(1)]</i>	No information	No information	Carty et al. 2009; Gerber et al. 2006; Nama et al. 2020; Schoenmakers et al. 2006; Tanner et al. 2015; Wright et al. 2017
Repetition Maximum (3RM/5RM/6RM) <i>measurement of muscular endurance; maximum voluntary muscle strength during one or more repetitions of individual maximum resistance</i>	6/104	Leukemia (31) Lymphoma (18) CNS tumor (22) Neuroblastoma (4) Renal tumor (2) Bone tumor (17) Soft tissue sarcoma (7) Germ cell tumor (1) Other (2) [N/A (2)]	4-23	Active treatment (1) Maintenance (2) Off treatment (3)	No information	<u>Test-retest reliability:</u> ICC \geq 0.977; ($p < 0.001$) for seated bench press, leg press and seated lateral row in children with ALL aged 4-7 y; ICC \geq 0.989 ($p < 0.001$) for same tests in children with mixed cancers, mean age 10 \pm 1 y) (San Juan, Fleck,	Fiuza-Luces et al. 2017; Long et al. 2017; Long et al. 2018; San Juan et al. 2008; San Juan, Fleck, Chamorro-Viña, Maté-Muñoz et al. 2007; San Juan, Fleck, Chamorro-Viña, Moral et al. 2007

						Chamorro-Viña, Moral et al., 2007)	
Repeated Squatting <i>measurement of dynamic lower extremity muscular endurance</i>	5/182	Leukemia (79) CNS tumor (22) Mixed (79) [Hematologic malignancy (79)] other (2) [N/A]	6-30	Off treatment (5)	No information	No information	Hovi et al. 2010; Järvelä et al. 2010; Long et al. 2017; Long et al. 2018; Taskinen et al. 2013
Back Extension Test <i>measurement of dynamic or static muscular endurance</i>	4/220	Leukemia (87) Neuroblastoma (26) Renal tumor (28) Mixed (79) [Hematologic malignancy (79)]	6-62.2	Off treatment (4)	No information	No information	Hartman et al. 2018; Hovi et al. 2010; Järvelä et al. 2010; Taskinen et al. 2013
Isometric Dynamometry <i>measurement of maximum voluntary isometric muscle strength, other than hand grip strength and hand-held dynamometry</i>	3/143	Leukemia (127) Lymphoma (5) Neuroblastoma (4) Renal tumor (1) Soft tissue sarcoma (5) Other (1) [Nasopharynxcarcinoma (1)]	5-30	Active treatment (1) Off treatment (2)	No information	No information	Hovi et al. 1993; Senn-Malashonak et al. 2019; Tanir & Kuguoglu 2013)
Chair-Stand Test <i>measurement of dynamic lower extremity muscular endurance</i>	3/100	Leukemia (47) Lymphoma (15) CNS tumor (14) Neuroblastoma (3) Mixed solid tumors (21) [extracranial solid tumor (21)]	3.5-18	Active treatment (2) Off treatment (1)	No information	No information	Gilliam et al. 2011; Nielsen et al. 2018; Yildiz Kabak et al. 2016
Leg Lift Test <i>measurement of dynamic muscular endurance of hip flexors</i>	2/128	Leukemia (49) Mixed (79) [Hematologic malignancy (79)]	6-30	Off treatment (2)	No information	No information	Hovi et al. 2010; Taskinen et al. 2013
Vertical Jump <i>measurement of explosive muscle power of lower extremity</i>	2/92	Leukemia (38) Neuroblastoma (26) Renal tumor (28)	16-62.2	Off treatment (2)	No information	No information	Hartman et al. 2018; Järvelä et al. 2010
Shoulder Lift Test	1/21	Leukemia (21)	16-30	Off treatment (1)	No information	No information	Järvelä et al. 2010

<i>measurement of dynamic muscular endurance of upper extremity; max reps/side counted</i>							
Standing Broad Jump <i>measurement of explosive muscle power of lower extremity</i>	1/18	Hematologic malignancy (18)	7.55±2.43	Off treatment (1)	No information	No information	Bianco et al. 2014
Lateral Step Test <i>measurement of dynamic lower extremity muscular endurance</i>	1/12	Leukemia (7) CNS tumor (5)	6-18	Off treatment (1)	No information	No information	Gilliam et al. 2011

CNS: central nervous system, HHD: hand held dynamometer, RM: Repetition Maximum, reps: repetition, maint: maintenance treatment, No: Number, SD: standard deviation, ¹only study participants who performed the assessments were counted, ² if evaluated in a childhood cancer population,

Appendix 5: Description of study methods assessing running speed in pediatric cancer patients and survivors

Assessment	No. of studies/ total sample size ¹	Type of Cancer (No. participants)	Age range/ mean±SD [y]	Phases of treatment (No. studies)	Validity ²	Reliability ²	References
Shuttle Run <i>Subject runs a shuttle run (10x5m or 4x 10m) as fast as possible; part of Eurofit Testing Battery</i>	3/146	Leukemia (49) Mixed (97) <i>[Hematologic malignancies (97)]</i>	6-30	Off treatment (3)	No information	No information	Hovi et al. 2010; Taskinen et al. 2013; Bianco et al. 2014
60m Run <i>Subjects runs 60m on a flat corridor/surface as fast as possible</i>	2/105	Leukemia (75) Lymphoma (11) CNS tumor (2) Renal tumors (2) Bone tumors (1) Mixed (10) <i>[Hematologic malignancies (10)]</i> Other (4) <i>[Nasopharynx-CA (1), Ovarian cancer (1), Evans syndrome (2)]</i>	11±3	Off treatment (2)	No information	No information	Malicka et al. 2019; Malicka et al. 2020

CNS: central nervous system, m: meter, maint: maintenance treatment, No: Number, SD: standard deviation, ¹only study participants who performed the assessments were counted, ²if evaluated in a childhood cancer population

Appendix 6: Description of study methods assessing balance in pediatric cancer patients and survivors

Assessment	No. of studies/ total sample size ¹	Type of Cancer (No. participants)	Age range/ mean±SD [y]	Phases of treatment (No. studies)	Validity ²	Reliability ²	References
Posturography							
Balance tests (various) on force platforms: <i>Ground reaction forces/center of pressure trajectory (COP sway) are recorded for 15s-60s at sampling frequencies of 50-60Hz. Measurements were performed under various conditions: i.e. quiet standing with eyes open/closed, Romberg test (heel-to-toe-stance) with eyes open/closed, standing on foam surface with eyes open/closed, single-leg stance (SLS)</i>	4/292	Leukemia (79) CNS tumor (184) Mixed (29) [Bone and soft tissue sarcoma (29)]	4-25.2	Off treatment (3) Mixed (1) [during inpatient rehabilitation/off treatment and probably receiving maint. treatment (1)]	No information	No information	Galea et al. 2004; Syczewska et al. 2008; Syczewska et al. 2006; Müller et al. 2017
Ultrasound-based motion analysis of postural sway (CM20, Zebris GmbH, Tübingen, Germany) during 10 different sensory conditions (sitting/standing on a regular surface eyes open/closed; sitting/standing on a cushion with eyes open/closed; standing in tandem position with eyes open/closed). An ultrasound receiver recorded pulses emitted by markers attached to the shoulders and trunk. Sampling frequency of the ultrasound system was 50 Hz. Testing of each condition was repeated four times. Each trial lasted 15 s.	1/22	CNS tumor (22)	11-39	Off treatment (1)	No information	No information	Schoch et al., 2010
SOT (Sensory Organization Test) on a computerized dynamic posturography system (various): <i>The SOT measures postural sway under six conditions: Conditions 1 to 3 have a fixed standing surface and are done with eyes open, eyes closed, and eyes open but sway referenced (visual surround moves in reference to anterior-posterior sway). Conditions 4 to 6 are the same but with a sway-referenced standing surface (the force plate moves in reference to</i>	7/1.805	Leukemia (780) Lymphoma (200) CNS tumor (350) Mixed (475) [Extracranial solid tumor (475)]	10-63.8	Off treatment (7)	No information	No information	Konczak et al. 2005; Schoch et al. 2006; Erhardt et al. 2017; Ness et al. 2013; Ness et al. 2012; Ness et al. 2015; Brinkmann et al. 2018

<i>anterior-posterior sway). Scores from the six conditions are used to derive an overall SOT score. Two or three trials (20 seconds long) are collected for each condition.</i>							
Non-Posturography							
The berg balance test: <i>measures the ability to maintain an upright position during typical movements; 14 conditions are rated on a scale</i>	1/156	CNS tumor (156)	18-58	Off treatment (1)	No information	No information	Ness et al. 2010
Flamingo balance test: The child is instructed to stand barefoot on one leg (preferred) for 60 sec. As the child loses balance, the timer is stopped and restarted once balance is regained. The number of restarts are recorded.	1/75	Leukemia (31) Lymphoma (14) CNS tumor (9) Mixed (21) <i>[extracranial solid tumor (21)]</i>	11.3 ± 3.1	Active treatment (1)	No information	No information	Nielsen et al. 2018
Single leg stance (SLS): Child maintains SLS with hands on hips and eyes open for as long as possible. Time is measured in seconds.	1/62	Leukemia (62)	1-22	Active treatment (1)	No information	No information	Tanner et al. 2017
CNS: central nervous system, maint: maintenance treatment, No: Number, SD: standard deviation, SOT: sensory organization test; SLS: single leg stance, ¹ only study participants who performed the assessments were counted, ² if evaluated in a childhood cancer population							

Appendix 7: Description of study methods assessing flexibility in pediatric cancer patients and survivors

Assessment	No. of studies/ total sample size ¹	Type of Cancer (No. participants)	Age range/ mean±SD [y]	Phases of treatment (No. studies)	Validity ²	Reliability ²	References
Goniometry: <i>measurement of maximum active or passive joint motion using a Goniometer</i>	33/3.749	Leukemia (2649) Lymphoma (811) CNS (6) Neuroblastoma (2) Renal tumors (29) Bone tumors (125) Soft tissue sarcoma (17) Germ cell tumor (2) Mixed (101) [sarcoma (2), solid non-CNS tumor (11), lower extremity sarcoma (82), no specific information (6)] Other (7) [neuroectodermal sarcoma (3), multiple diagnosis (1), juvenile granulosa cell tumor (1), malignant peripheral nerve sheath tumor (1), undifferentiated sarcoma of the liver (1)]	1-64	Active treatment (7) Maintenance (4) Off treatment (18) Mixed (4) [maint/off (3), all phases (1)]	No information	Intra-rater and inter-rater reliability for all measures ranged from r=0.85 to 0.99 in children with ALL aged 4-15y (Marchese et al. 2004) Intrarater reliability coefficients were 0.760 for active and 0.927 for passive DF-ROM in children with ALL (Wright et al. 2003)	Beulertz et al. 2016; Carty et al. 2009; Ehrhardt et al. 2017; Esbenshade et al. 2014; Gerber et al. 2006; Gilchrist et al. 2016; Hartman et al. 2013; Hartman et al. 2008; Hartman et al. 2009; Henders et al. 2012; Tanir & Kuguoglu 2013; Marchese et al. 2004; Marchese et al. 2008; Marchese et al. 2006; Ness et al. 2014; Ness et al. 2015; Ness et al. 2012; Ness et al. 2015; San Juan et al. 2008; San Juan et al. 2008; San Juan et al. 2007; Tanner et al. 2015; Wright et al. 1999; Wright et al. 1998; Wright et al. 2003; Wurz et al. 2014; Corr et al. 2017; Cox et al. 2018; DeFeo et al. 2020; Oschwald et al. 2019; Tanner et al. 2018; Tanner et al. 2017; Wright et al. 2017
Sit and reach test: <i>measurement of maximum hip flexion with legs extended while sitting using a sit and reach box</i>	12/2.830	Leukemia (1609) Lymphoma (778) CNS tumor (308) Neuroblastoma (26) Renal tumors (28) Bone tumor (1) Mixed (1) [multiple diagnoses (1)]	4-64	Maintenance (2) Off treatment (9) Mixed (1) [active/maint (1)]	No information	No information	Erhardt et al. 2017; Esbenshade et al. 2014; Moyer-Mileur et al. 2009; Ness et al. 2015; Taskinen et al. 2013; Wurz et al. 2014; Hovi et al. 2010; Brinkmann et al. 2018; DeFeo et al. 2020; Hartman et al. 2018; Manchola-Gonzales et al. 2019; Cortés-Reyes et al. 2013

		Other (79) [hematological malign. (79)]					
Side bending: <i>Flexibility of the trunk was tested by side bending toward right and left. The difference in position of the middle finger on the lateral thigh was measured in upright position leaning against the wall with feet 15 cm apart and when side bending and the difference were expressed in centimeters.</i>	1/71	Leukemia (17) Neuroblastoma (26) Renal tumors (28)	18.8-62.6	Off treatment (1)	No information	No information	Hartman et al. 2018

CNS: central nervous system, maint: maintenance treatment, No: Number, SD: standard deviation, ¹only study participants who performed the assessments were counted, ²if evaluated in a childhood cancer population

Appendix 8: Description of study methods assessing functional mobility in pediatric cancer patients and survivors

Assessment	No. of studies/ total sample size ¹	Type of Cancer (No. participants)	Age range/ mean±SD [y]	Phases of treatment (No. studies)	Validity ²	Reliability ²	References
TUG 3m: <i>The Timed Up & Go test measures the time in seconds required to rise from sitting position in a standard arm chair, walk 3m/10feet, turn, walk back to the chair, and sit down.</i>	25/4283	Leukemia (2313) Lymphoma (831) CNS tumor (350) Neuroblastoma (9) Renal tumors (2) Bone tumors (36) Soft tissue sarcoma (9) Germ cell tumor (2) Mixed (728) [without information (12), Leukemia or lymphoma (59), Bone or soft tissue sarcoma (13), Neuroblastoma or wilms tumor (49), extracranial solid tumor (496), other solid tumor (30), lower-extremity sarcoma (68) Multiple diagnosis (1)] Other (3) [(juvenile granulosa cell tumor) (1), malignant peripheral nerve sheath tumor (1), undifferentiated sarcoma of the liver (1)]	3.5 – 64	Active treatment (4) Maintenance (2) Off treatment (16) Mixed (3) [active/off (2), maint/off (1)]	ALL patients during treatment: Correlation of r= 0.794 with knee extension strength Correlation of r= - 0.204 with ankle DF strength [Marchese et al. 2003]	ALL patients during treatment: r=0.99 [intra- and interrater ICC] (Marchese et al. 2003) ALL patients during maintenance treatment: r=0.974 [Test-retest ICC] (San Juan et al. 2007)	Ness et al. 2013; Erhardt et al. 2017; Ness et al. 2007; San Juan et al. 2008; Akyay et al. 2014; San Juan et al. 2007; San Juan et al. 2007; Slater et al. 2015; Takken et al. 2009; Wurz et al. 2014; Kabak et al. 2016; Fiuza-Luces et al. 2016; Marchese et al. 2003; Hoffman et al. 2013; Marchese et al. 2004; Marchese et al. 2006; Ness et al. 2012; Brinkmann et al. 2018; DeFeo et al. 2020; Manchola-Gonzales et al., 2019; Nama et al. 2020; Nielsen et al. 2018; Oschwald et al. 2019; Varedi et al. 2019
TUDS: <i>The TUDS Test requires an individual to ascend and descend 12 stairs while the time (in seconds) is recorded with a stopwatch. Participants begin this test from a</i>	13/314	Leukemia (175) Lymphoma (19) Neuroblastoma (7) Renal tumors (2) Bone tumors (35) Soft tissue sarcoma (7) Germ cell tumor (1) Mixed (68) [Lower-extremity sarcoma (68)]	3.5 -27	Active treatment (1) Maintenance (4) Off treatment (6) Mixed (2) [all phases (2)]	No information	ALL patients during maintenance treatment: r=0.989 [Test-retest ICC] (San Juan et al. 2007)	San Juan et al. 2008; San Juan et al. 2008; San Juan et al. 2007; San Juan et al. 2007; Takken et al. 2009; Kabak et al. 2016; Fiuza-Luces et al. 2016; Marchese et al. 2004; Marchese et al. 2008; Marchese et al. 2004; Marchese et al. 2006; Manchola-Gonzales et al. 2019

<i>standing position, with feet together and are instructed to go up and down the stairs as fast as possible while being safe. For safety reasons, participants are allowed to use the railing if desired</i>							
TUG 10m: <i>The timed up and go test is also conducted with a distance of 10m.</i>	3/22	Leukemia (22)	4-16	Maintenance (2) Off treatment (1)	No information	ALL patients during maintenance treatment: r=0.997 [Test-retest ICC] (San Juan et al. 2007)	San Juan et al. 2008; San Juan et al. 2007; San Juan et al. 2007
Floor to stand performance: <i>Rated floor to stand as independent or needs assistance.</i>	1/62	Leukemia (62)	1-22	Active treatment (1)	No information	No information	Tanner et al. 2017
Time needed to stand up from bed rest exam: <i>subject instructed to stand up as quickly as possible from a lying position in bed to a standing position with hands at their sides using any independent method of their choice.</i>	1/11	Leukemia (7) Lymphoma (1) Neuroblastoma (3)	3.5 - 15	Active treatment (1)	No information	No information	Kabak et al. 2016

ALL: acute lymphoblastic leukemia, CNS: central nervous system, maint: maintenance treatment, No: Number, SD: standard deviation, TUDS: timed up and down stairs test, TUG: timed up and go test, ¹only study participants who performed the assessments were counted, ²if evaluated in a childhood cancer population,

Appendix 9: Description of study methods assessing gait in pediatric cancer patients and survivors

Assessment	No. of studies/ total sample size ¹	Type of Cancer (No. participants)	Age range/ mean±SD [y]	Phases of treatment (No. studies)	Validity ²	Reliability ²	References
Video-recording, force plates and EMG measurements: <i>Gait analysis was performed using 2-4 cameras (i.e. sampling at frequencies of 60Hz) and a set of reflective markers, as well as 2-3 force platforms and additional EMG-measurement (i.e. 14-16 channel surface EMG) in order to evaluate kinematic, kinetic and/or temporo-distal parameters. One study also calculated the Gait Deviation Index (GDI). Participants were asked to walk at self-selected speed on a defined walkway (8-12m) performing at least 6 trials.</i>	3/67	Leukemia (17) Bone tumors (47) Soft tissue sarcoma (2) other (1) [neuroectodermal tumor (1)]	5-68.3	Off treatment (2) Mixed (1) [maint/off treatment (1)]	No information	No information	Hillmann et al. 2001; Hillmann et al. 2000; Wright et al. 2017
Video-recording and force platforms: <i>Gait analysis was performed using 6-8 cameras (i.e. sampling at frequencies between 20-100Hz) and a set of reflective markers, as well as 2-3 force platforms in order to evaluate kinematic, kinetic and/or temporo-distal parameters. Some studies also calculated i.e. Gait Deviation Index (GDI), Gillette Gait Index (GGI). Participants were asked to walk at self-selected/preferred/comfortable speed on a defined walkway (i.e. 6-9m) performing multiple (i.e. at least 5-6) trials.</i>	6/111	CNS tumor (41) Bone tumors (57) Germ cell tumor (13)	3-35	Off treatment (5) Mixed (1) [inclusion criteria said: at least one year post-surgery and completed adjuvant treatment program (without radiotherapy) (1)]	No information	No information	Fuchs et al. 2003; Syczewska et al. 2006; Zaccara et al. 2004; Carty et al. 2009; Benedetti et al. 2016; Pesenti et al. 2018
Video-recording: <i>Gait analysis was performed using 2-8 cameras (i.e. sampling at frequencies between 50-100Hz) in order to evaluate kinematic and/or temporo-distal parameters. Some studies also calculated i.e. walk ratio, absolute symmetry index, Gillette Gait Index. Participants were asked to walk at self-selected speed (and in one study tandem</i>	4/ 210	CNS tumor (181) Mixed (29) [bone and soft tissue sarcoma (29)]	4-24	Off treatment (2) Mixed (2) [during inpatient rehabilitation (1), N/A (1-24 mon after surgery) (1)]	No information	No information	Bastian et al. 1998; Syczewska et al. 2010; Fiorillo et al. 2010; Müller et al. 2017

<i>gait in addition) on a defined walkway (i.e. 6-10m) performing multiple (i.e. at least 5-6) trials.</i>							
GaitRITE <i>14-ft portable GaitRITE electronic walkway, (rollup carpet containing electronic pressure sensors) (CIR Systems, Sparta, New Jersey)</i>	2/58	Leukemia (23) Lymphoma (18) Mixed (17) [non-CNS solid tumor (11), ALL/Wilms/other (6)]	5-22	Active treatment (2)	No information	No information	Gilchrist et al. 2016; Tanner et al. 2015
Microgate Optogait 2D Gait analysis system <i>This system of optical detection is based on a transmitting and receiving bar each containing 96 LEDs per meter that communicate on an infrared frequency</i>	1/13	Leukemia (4) Lymphoma (2) CNS tumor (3) Renal tumors (1) Soft tissue sarcoma (2) Germ cell tumor (1)	6-15.8	Off treatment (1)	No information	No information	Beulertz et al. 2016
Electromyographic analysis of gait <i>Walking on motor-driven treadmill, metal plates on shoe soles and conduction rubber of tread mill used to record gait ; 15minutes, speed of 0.83m/sec; mark was used for calculation of stride-time parameters and synchronisation of EMG and goniometric data; speed of 0.83-1.11m/sec for at least 3min for each speed</i>	1/8	Bone tumors (8)	N/A (<i>age at surgery: 5-19yrs and time since surgery 13-54 mo</i>)	Off treatment (1)	No information	No information	Steenhoff et al. 1993
10m Walk Test: <i>The 10-meter walk test is an accepted method for measuring walking speed in the clinical setting and has already been applied in children with chronic diseases. It measures the time individuals need to walk 10-meters in either their preferred or their maximum walking speed. A marked walkway and a stopwatch were used in the current study as these are clinically feasible methods. Moreover, the 10-meter walk test was conducted on a straight path protocol with acceleration and deceleration phases outside</i>	1/16	Leukemia (4) Lymphoma (3) CNS tumor (1) Neuroblastoma (2) Soft tissue sarcoma (2) Germ cell tumor (1) other (3) [(juvenile granulosa cell tumor) (1), malignant peripheral nerve sheath tumor (1), undifferentiated sarcoma of the liver (1)]	6-19	Mixed (1) [maint/off (1)]	No information	No information	Oschwald et al. 2019

<i>the timed portion in order to allow for a more precise measurement.</i>							
Visual Observation: <i>Observational analysis of one or more of the following descriptors as present or absent: normal, flatfoot strike, metatarsal strike, foot slap, toe drag, steppage gait, wide base, out-toeing, asymmetrical, and lateral lurch. These common gait abnormalities are assessed through visual observation</i>	1/62	Leukemia (62)	1-22	Active treatment (1)	No information	No information	Tanner et al. 2017
CNS: central nervous system, EMG: electromyography; m: meter, maint: maintenance treatment, No: Number, SD: standard deviation, ¹ only study participants who performed the assessments were counted, ² if evaluated in a childhood cancer population							

Appendix 10: Description of assessments measuring motor performance with combined tests in pediatric cancer patients and survivors

Assessment	No. of studies/ total sample size ¹	Type of Cancer (No. participants)	Age range/ mean±SD [y]	Phases of treatment (No. studies)	Validity ²	Reliability ²	References
BOT-2 (Bruininks-Oseretsky Test of Motor Proficiency, 2nd edition, complete form): Test battery with 8 subtests and 53 items: Subscale Fine manual control, 15 items (subtest 1: fine motor precision, subtest 2: fine motor integration); Subscale Manual coordination, 12 items (subtest 3: manual dexterity, subtest 7: upper-limb coordination); Subscale body coordination, 16 items (subtest 4: bilateral coordination, subtest 5: balance); Subscale strength & agility, 10 items (subtest 6: running speed and agility, subtest 8: strength)	10/327	Leukemia (127) Lymphoma (43) Leukemia/Lymphoma (45) CNS tumor (86) Renal tumors (7) Bone tumors (2) Soft tissue sarcoma (2) Mixed (15) [other solid tumor (15)]	4-22	Active treatment (4) Off treatment (6)	No information	No information	Gilchrist et al. 2016*; Davis et al. 2010; Ramchandren et al. 2009; Piscione et al. 2014*; Sabel et al. 2015; Gilchrist & Tanner 2018*; Nama et al. 2019*; Piscione et al. 2017*; Tanner & Hooke 2019*; Tanner et al. 2017*
BOT-2 SF (Bruininks-Oseretsky Test of Motor Proficiency, 2nd Edition, short form): Test battery with 12 items consisting of at least one item from each BOT-2 subtest.	6/384	Leukemia (384)	4-18	Active treatment (1) Maintenance (1) Off treatment (3) Mixed (1) [active/maint. (1)]	No information	No information	Esbenshade et al. 2014; Ness et al. 2015; Hung et al. 2017; De Luca et al. 2013; Cox et al. 2018; Tay et al. 2017
m-ABC (Movement Assessment Battery for Children): Test battery with eight tasks divided in three subsections: hand function, ball skills and balance skills	5/283	Leukemia (147) Lymphoma (12) Renal tumors (43) Mixed (65) Other (16)	4.0-19.3	Active treatment (2) Off treatment (3)	No information	No information	Hartman et al. 2010; Hartman et al. 2009; Hartman et al., 2006; Reinders-Messelink et al. 1999; Kandula et al. 2018

<p>BOT-MP (Bruininks-Oseretsky Test of Motor Proficiency): Test battery with gross motor and fine motor composites; 8 subtests and 46 items</p> <p><u>Gross motor composite:</u> Subtest 1: running speed & agility (1 item) Subtest 2: balance (8 items) Subtest 3: bilateral control (8 items) Subtest 4: strength (3 items) Subtest 5: Upper-limb coordination (9 items); Fine motor composite Subtest 6: response speed (1 item) Subtest 7: visual-motor control (8 items) Subtest 8: upper limb speed and dexterity (8 items)</p>	5/164	Leukemia (145) Lymphoma (2) Neuroblastoma (17)	1.75-25.2	Active treatment (1) Maintenance (2) Off treatment (2)	No information	No information	Wiernikowski et al. 2005*; Wright et al. 1998*; Mitchell et al. 2002*; Wright et al. 2005*; Tanner et al. 2017*
<p>m-ABC 2 (Movement Assessment Battery 2): Test battery with 8 items in 3 dimensions: manual dexterity (3 items), aiming and catching (2 items) and balance (3 items)</p>	5/135	Leukemia (113) Lymphoma (14) Renal tumors (3) Bone tumors (1) Soft tissue sarcoma (3) Other solid tumor (1): [neoplasm of scrotum (1)]	3-18.7	Active treatment (1) Off treatment (4)	No information	No information	Hartman et al. 2013; De Luca et al. 2013; Schoenmakers et al. 2006; Hamari et al. 2018; Oswald & Bo 2019
<p>FMA (Functional Mobility Assessment): Test battery with 6 subcategories: 1) pain (1 item); 2) function (2 items: TUDS, TUG), 3) supports; 4)</p>	4/276	Bone tumors (274) Soft tissue sarcoma (2)	10.4-42.4	Active treatment (1) Off treatment (3)	No information	No information	Ness et al. 2014; Ginsberg et al. 2007; Corr et al. 2017; Marchese et al. 2007

satisfaction with walking quality; 5) participation in work, school, sports; 6) endurance (9min walk/run)							
MOON-test (test for motor performance in pediatric oncology): Test battery for children with cancer with 8 items for strength (hand grip strength, sit to stand, medicine ball shot), speed (reaction test), coordination (single leg stance, inserting pins, throwing at target), and flexibility (stand and reach)	4/141	Leukemia (44) Lymphoma (14) CNS tumor (4) Renal tumors (5) Bone tumors (62) Soft tissue sarcoma (6) Germ cell tumor (1) Mixed (5) [other solid tumor (5)]	4-23	Active treatment (2) Off treatment (1) Mixed (1) [all phases (1)]	No information	No information	Kesting et al. 2015; Götte et al. 2015; Götte & Kesting et al. 2013; Götte & Kesting et al. 2018
DMT 6-18 (motor performance test for 6-18 years olds): Test battery with 8 items, for endurance (6 min run), strength (20m sprint, push-up, sit-up, standing long jump), coordination under time pressure (sideways jumps), coordination under precision pressure (balancing backwards), and flexibility (forward bend)	4/70	Leukemia (25) Lymphoma (9) CNS tumor (13) Renal tumors (3) Bone tumors (2) Soft tissue sarcoma (8) Germ cell tumor (6) Other (4)	6-17	Off treatment (2) Mixed (2) [maint./off (2)]	No information	No information	Beulertz et al. 2016, Beulertz et al. 2016, Beulertz et al. 2013; Däggelmann et al. 2017
GMFM (Gross motor function measure): Test battery to measure change in gross motor function over time (cerebral palsy). Items span the spectrum of gross motor activities in five dimensions. A: Lying and Rolling, B: Sitting, C: Crawling and	4/62	Leukemia (60) Lymphoma (2)	2-14.6	Active treatment (2) Maintenance (1) Off treatment (1)	Construct validity: paired T-tests demonstrated significant, positive score changes during a period of	Inter-rater Rel: D: 0.99; E: 0.99 Test-retest Rel: D: 0.97; E: 0.96 (Wright et al. 2007)	Wiernikowski et al. 2005*; Wright et al., 1998*; Gohar et al., 2011; Cortes-Reyes et al. 2013*

Kneeling, D: Standing, and E: Walking, Running and Jumping.					clinically observed change: D: t=6.40, p<0.001 E: t=7.31, p<0.001 (Wright et al. 2007)		
MOT 4-6 (motor performance test for 4-6 years olds): Test battery with 18 items covering motor capabilities: agility and coordination, fine motor function, balance, ability to react, jumping power, motor speed, and motor control	3/22	Leukemia (7) Lymphoma (5) Neuroblastoma (2) Germ cell tumor (3) Other (5)	3.42-5.42	Off treatment (1) Mixed (2) [maint/off treatment (2)]	No information	No information	Beulertz et al. 2016; Beulertz et al. 2013; Däggelmann et al. 2017
Lincoln-Oseretzky Motor Development Scale: Test battery (Motor Development Scale) with 36 items involving a variety of motor skills such as finger dexterity, eye-hand coordination, and gross activity of hands, arms, legs, and trunk.	1/45	Leukemia (31) Mixed (14)	5-14	Off treatment (1)	No information	No information	Harten et al. 1984
FMS - fundamental movement skills test battery: Test battery with 7 physical movements: 4 locomotor skills: sprint run, vertical jump, side gallop and leaping; and 3 object control (or manipulative) skills: throwing, catching, and kicking	1/26	Leukemia (17) Lymphoma (1) CNS tumor (4) Renal tumors (3) Other (1) [Sarcoma (1)]	5-8	Off treatment (1)	No information	No information	Naumann et al. 2015
GMFM-ALL (Gross motor function measure ALL): Test	1/20	Leukemia (20)	2.8-15.9	Mixed (1) [active/ maint. treatment (1)]	Construct validity:	Inter-rater-Rel: D and E: 0.99	Wright et al. 2007

battery for children with leukemia (selection of significant items of GMFM dimensions D - standing (7 items) and E – walking, running, jumping (13 items)					paired T-tests demonstrated significant, positive score changes during a period of clinically observed change: D: t=6.86, p<0.001 E: t=6.85, p<0.001 (Wright et al. 2007)	Test-retest Rel: D: 0.95 and E: 0.94 (Wright et al. 2007)	
UQAC-UQAM Test Battery: Test battery with 5 main factors, which are composed of 11 different tests. 1) Agility tests; 2) Coordination; 3) Balance; 4) Simple reaction test; 5) Limb speed	1/20	Leukemia (20)	9-11	Off treatment (1)	Jackknife validation (correct classification cases): 88.4%	No information	Leone et al. 2014
Physical fitness battery test, adapted by the ALPHA-fitness test battery: Test battery with standing broad jump, hand grip test, the 4 x 10 m shuttle run test and sit-up test	1/18	Leukemia/Lymphoma (18)	7.55 ± 2.43	Off treatment (1)	No information	No information	Bianco et al. 2014
FITNESSGRAM®: Test battery for health related fitness; state, district, school, teacher, and individual reporting; student cognitive tests	1/10	Leukemia (4) Lymphoma (4) CNS tumor (1) Germ cell tumor (1)	14.0-18.0	Mixed (1) [active/off treatment (1)]	No information	No information	Keats et al. 2008*

BOT: Bruininks-Oseretsky Test, SF: short form; m-ABC: Movement Assessment Battery for Children, BOTMP: Bruininks-Oseretsky Test of Motor Proficiency, FMA: Functional Mobility Assessment, MOON: Motor Performance in Pediatric Oncology, DMT: Deutscher Motorik Test, GMFM: Gross motor function measure, MOT: Motoriktest für Kinder, FMS: fundamental movement skills test battery, ALL: acute lymphoblastic leukemia, UQAC-UQAM: University of Québec in Chicoutimi-University of Québec in Montréal, CNS: central nervous system, maint.: maintenance treatment, No: Number, SD: standard deviation
¹only study participants who performed the assessments were counted, ²if evaluated in a childhood cancer population, * Those studies only used subtests of the motor performance battery



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number. → Not registered because no direct health outcome was evaluated.	N/A
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	4-5
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix 1
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5-6
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5-6
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis. → Not applicable for assessment summary	N/A
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	4



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Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	N/A
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Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	N/A
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	N/A
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	6
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Appendix 2-10
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	N/A
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	N/A
Synthesis of results	21	Present the main results of the review. If meta-analyses are done, include for each, confidence intervals and measures of consistency.	7-11
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	N/A
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	N/A
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	11
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	13/14
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	12/13
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	1



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