

The clinical usefulness of muscle mass and strength measures in older people: a systematic review

APPENDIX 1: Full reference list

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APPENDIX 2: Systematic review search strategy

Example search strategy used for CINAHL database, searched 05/02/2020, using a combination of MESH headings and keywords.

1. (MH "Acute Care") or (MH "Subacute Care") or (MH "Outpatients") or (MH "Inpatients") or (MH "Hospitals") or (MH "Hospitalization") or (MH "Rehabilitation Centers") or "hospitalisation" or (MH "Nursing Home Patients") or (MH "Nursing Homes") or (MH "Residential Care") or (MH "Hip Fractures")
2. (MH "Muscle Weakness") or (MH "Muscle, Skeletal") or (MH "Muscle Strength") or (MH "Muscular Atrophy") or (MH "Body Composition") or (MH "Sarcopenia") or "muscle thickness" or "Muscle mass" or (MH "Grip Strength") or "handgrip strength" or "quadriceps strength" or "upper extremity strength" or "upper limb strength" or "lower limb strength" or "lower extremity strength" or "muscle volume"
3. "bone fractures" or (MH "Accidental Falls") or "walking speed" or (MH "Gait") or (MH "Balance, Postural") or (MH "Physical mobility") or (MH "Activities of Daily Living") or "timed up and go test" or (MH "Physical Performance") or "physical function" or "motor function" or "muscle function"
4. 1 and 2 and 3

APPENDIX 3: Table of Study Characteristics

Table 4 Characteristics of included studies listed alphabetically. Abbreviations: HGS – handgrip strength, KES – knee extension strength, LLS – lower limb strength, ULS – upper limb strength, BIA – bioelectrical impedance analysis, Anthro – anthropometry, USS – ultrasound, DXA – dual energy x-ray absorptiometry, CT – computed tomography, MRI – magnetic resonance imaging, ADL – activities of daily living, SPPB – short physical performance battery, TUG – timed up and go, 5STS – 5 sit to stand test, aLM – appendicular lean mass, BMI – body mass index, ht – height, wt – weight.

First Author and Publication year	Country of study	Study Design	Healthcare setting or clinical group	Sample size (both genders unless specified)	Average age (years)	Muscle mass or strength technique	Motor Outcome	Follow up time	Effect size (ES) (given as Standard mean difference)
Aarden 2019	Netherlands	Prospective	Inpatient	391	79	HGS	Mobility	3 months post discharge	HGS & Mobility: medium effect with mobility at 3 months post discharge (0.71)
Alqahtani 2017	USA	Cross-sectional	Care home	29	87	KES LLS	Mobility	n/a	KES & Mobility: strong (1.12) LLS & mobility: mixed results, dependent on which muscle group tested, strong effects with knee flexion and hip abduction but no effect with hip flexion or ankle plantarflexion.
Neira Alvarez 2016	Spain	Prospective	Hip fracture	127	85	HGS	ADL	3 months	HGS & ADL: strong effect with ADL ability at 3 months (1.12)
Aubertin-Leheudre 2019	France	Cross-sectional	Rehabilitation	44	82	HGS BIA USS	Mobility	n/a	HGS & mobility: moderate (0.71) BIA & mobility: no effect USS & mobility: strong effect (6.95)
Bachrach-Lindstrom 2000	Sweden	Cross-sectional	Hip fracture	142	84	BIA Anthro.	ADL	n/a	BIA & ADL: lower lean mass associated with pre-fracture ADL dependence, medium effect (0.51) Triceps skinfold thickness and arm circumference with ADL: no effect
Bahat 2010	Turkey	Cross-sectional	Care home	157 M	73	BIA	ADL	n/a	BIA & ADL: no effect
Bastone 2004	Brazil	Trials	Care home	37	78	KES	Mobility	Data from baseline	KES & mobility: strong effect for SPPB (0.90) and gait speed (1.20)

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								measures extracted	
Batista 2012	Brazil	Cross-sectional	Outpatient	150	77% of patients >70	HGS	Mobility	n/a	HGS & mobility: Low HGS, adjusted for BMI and gender, associated with longer chair stand time, medium ES (0.62)
Beloosesky 2010	Israel	Retrospective data analysis	Hip fracture	105	81	HGS	ADL	6 months	HGS & ADL: strong effect with ADL ability at 6 months (1.46)
Bergland 2010	Sweden, Norway and Denmark	Cross-sectional	Care home	322	85	HGS	Mobility Balance	n/a	HGS & Mobility: weak to medium (dominant side 5STS 0.41, gait speed 0.47; non-dominant side 5STS 0.56) HGS & balance: medium (dominant side 0.50; non-dominant side 0.53)
Bianchi 2017	Italy	Cross-sectional	Inpatient	655	81	BIA	Mobility	n/a	BIA & mobility: weak (0.34)
Bijlsma 2013	Netherlands	Cross-sectional	Outpatient	207	82	HGS KES BIA	Balance	n/a	HGS & balance: medium (0.57) KES & balance: medium (0.74) BIA & balance: no association
Bjorkman 2012	Finland	Prospective	Care home	106	84	BIA Anthro.	ADL	6 months	BIA & ADL: weak effect (0.49) with ADL ability at 6 months Calf circumference & ADL: no effect
Bodilsen 2016	Denmark	Prospective	Inpatient	369	78	HGS	Mobility	30 days after discharge	Low HGS on admission predicted low mobility 30 days after discharge. Medium effect (0.72)
Bruyneel 2018	Switzerland	Cross-sectional	Outpatient	32	83	LLS	Falls	n/a	LLS & falls in previous 1 year, moderate effect (0.73)
Buckinx 2018	Belgium	Prospective	Care home	565	83	HGS KES LLS Anthro.	Falls	1 year	HGS & falls: weak effect (0.33) for occurrence of falls in 1 year after adjustment for all variables associated with falls. KES and LLS with falls: association lost after adjustment for variables associated with falls Calf circumference & falls: weak effect (0.26) with falls in 1 year
Caballer 2015	Spain	Cross-sectional	Care home	71	84	HGS USS (rectus femoris CSA)	Mobility Balance	n/a	HGS & Mobility: strong (SPPB 0.94, gait speed 0.99, TUG 1.04) HGS & Balance: strong (0.82)

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									USS & mobility: mixed, medium for gait speed (0.54), SPPB (0.68) and TUG (0.64), no effect with chair rises. USS & balance: no effect
Cardon-Verbecq 2017	France	Cross-sectional	Inpatient	157	84	HGS	Falls	n/a	HGS & falls: Low HGS associated with history of falls in previous year, weak ES (0.35)
Chang 2013	Taiwan	Cross-sectional	Outpatient	308	75	BIA	Mobility	n/a	BIA & mobility: no effect
Chen 2012	Taiwan	Cross-sectional	Care home	558	82	HGS	Mobility	n/a	HGS & mobility: Strong (0.92)
Chen 2015	Taiwan	Prospective	Outpatient	95	78	KES	Mobility	3 years	KES & mobility: over 3 years change in TUG score associated with change in KES, weak effect (0.47)
Cuesta 2015	Spain	Cross-sectional	Outpatient	298	83	HGS BIA	Mobility	n/a	HGS & mobility: Strong for men (0.96), medium for women (0.56) BIA & mobility: no effect
Curcio 2016	Italy	Cross-sectional	Inpatient	337	77	HGS BIA	Mobility	n/a	Low HGS, adjusted for BMI and gender correlates with mobility: Medium ES (0.56) BIA & mobility: medium (0.52)
Di Monaco 2006	Italy	Prospective	Hip fracture	200 F	80	DXA	ADL	At discharge	DXA & ADL: no effect between muscle mass on admission and ADL ability at discharge.
Di Monaco 2007	Italy	Prospective	Hip fracture	27 M	82	DXA	ADL	At discharge	DXA & ADL: strong effect with ADL ability at discharge (1.73)
Di Monaco 2011	Italy	Prospective	Hip fracture	280 F	80	DXA	ADL	At discharge	DXA & ADL: No effect on discharge or with change in ADL ability during admission.
Di Monaco 2014	Italy	Prospective	Hip fracture	123 F	79	HGS DXA	Mobility ADL	At discharge	HGS & mobility: HGS on admission strong effect size (0.8) with mobility on discharge. DXA & mobility: no effect between DXA on admission and mobility at discharge DXA & ADL: no effect between DXA on admission and ADL ability on discharge.
Di Monaco 2015	Italy	Prospective	Hip fracture	193 F	80	HGS	ADL	On discharge and 6 months	HGS & ADL: HGS on admission moderate association with ADL ability on discharge (0.51) and at 6 months (0.58).
Di Monaco 2017	Italy	Prospective	Hip fracture	138 F	79	DXA	ADL	On discharge	DXA & ADL: no effect between low muscle mass on admission and ADL ability on discharge

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Di Monaco 2018	Italy	Prospective	Hip fracture	80 M	81	DXA	ADL	On discharge	Muscle mass by DXA as aLM predicted recovery in ADLs but muscle mass by aLM/BMI or aLM/ht ² did not.
Ertan 2014	Turkey	Cross-sectional	Outpatient	22	75	HGS	Falls	n/a	HGS & falls: no association with falls in previous year.
Ertan 2015	Turkey	Cross-sectional	Inpatient	23	75	HGS KES	Mobility Falls	n/a	HGS & mobility: no effect KES had no association with mobility or falls.
Garia-Pena 2013	Mexico	Cross-sectional	Inpatient	223	73	HGS	ADL	n/a	HGS & ADL: moderate (0.53)
Gariballa 2017	UK	Prospective	Inpatient	432	79	HGS	ADL	6 weeks 6 months	HGS & ADL: Low HGS at admission, weakly predicted ADL disability at 6 weeks (0.43) and 6 months (0.46)
Giua 2014	Italy	Cross-sectional	Inpatient	68	78	LLS BIA	Mobility	n/a	LLS (hip flexion) & mobility: strong effect (0.80) BIA & mobility: no effect
Golder 2012	Canada	Cross-sectional	Rehabilitation	19	80	KES LLS	Mobility Balance	n/a	KES had no association with mobility or balance LLS had no association with mobility or balance
Guerreiro 2017	Brazil	Prospective	Inpatient	100	79	USS	Mobility ADL	3 months after discharge for ADL	USS quadriceps thickness & mobility at baseline: medium effect with gait speed (0.66) and TUG (0.62) USS quadriceps thickness & ADL decline after 3 months: no association
Hasselgren 2011	Sweden	Cross-sectional	Rehabilitation	50	80	LLS	Balance	n/a	LLS & balance: strong (1.15)
Herskovitz 2019	Israel	Prospective	Hip fracture	373	83	HGS	ADL	On discharge	HGS & ADL: strong effect with ADL ability at discharge (0.80)
Ikezoe 2009	Japan	Cross-sectional	Care home	44 F	82	HGS KES	Falls	n/a	HGS & falls: falls in previous year, effect lost when adjusted for KES, and no effect with low HGS. KES & falls: Low KES predicted occurrence of falls in previous year, medium effect (0.76)
Ishiyama 2018	Japan	Cross-sectional	Inpatient	167	83	HGS KES	Mobility	n/a	HGS & mobility: Strong (1.07) KES & mobility: Strong (1.70)

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Janssen 2004	Netherlands	Cross-sectional	Outpatient	70 F	81	KES	Mobility Falls	n/a	KES & mobility: strong effect with gait speed (2.6) and TUG (2.26), adjusted for BMI KES & falls: increased falls occurrence in previous 6 months with lower KES, medium effect (0.79)
Jeon 2019	Korea	Cross-sectional	Hip fracture	59	79	KES LLS	Mobility	n/a	KES & mobility: dependent on side tested, moderate effect (0.75) with fractured leg, strong effect (0.87) with non-fractured leg. LLS & mobility: dependent on muscle group tested, strong effect for knee flexion (0.90), moderate effect with hip abductor (0.52).
Kamo 2018	Japan	Cross-sectional	Care home	250	86	HGS Anthro.	ADL	n/a	HGS & ADL: strong (1.61) Calf circumference & ADL: strong (0.93)
Keevil 2013		Cross-sectional	Inpatient	80	81 M 78 F	HGS	Falls ADL	n/a	HGS & falls: No association with falls in previous year HGS & ADL: Strong (0.97)
Kristensen 2009	Denmark	Cross-sectional	Hip fracture	20	77	KES	Mobility	n/a	KES & mobility: strong effect with gait speed but no effect with TUG (all measures performed on day of discharge).
Laurentani 2018	Italy	Cross-sectional	Outpatient	263	81	HGS	Balance	n/a	HGS & balance: strong (0.73)
Lloyd 2009	Australia	Prospective	Hip fracture	193	81	HGS	Falls	1 year	HGS & falls: moderate effect (0.51) with >1 falls in 1 year.
Maeda 2017	Japan	Cross-sectional	Inpatient	778	83	HGS BIA	ADL	n/a	HGS & ADL: low HGS associated with ADL disability, strong effect (0.90) BIA & ADL: medium (0.55)
Mangione 2008	USA	Trial – publication of baseline data	Hip fracture	42	79	LLS	Mobility	Baseline data only in paper	LLS & mobility: Sum of LLS normalised to body weight associated with mobility, strong effect (2.1)
Martien 2015	Belgium	Cross-sectional	Care home	73	84	HGS KES	Mobility	n/a	HGS & mobility: Strong (1.46), adjusted for body weight. KES & mobility: Strong (1.54) adjusted for body weight
Martinikorena 2016	Spain	Cross-sectional	Care home	22	93	LLS CT	Mobility	n/a	LLS & mobility: no association CT thigh cross sectional area & mobility: no association

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Meskers 2019	Netherlands	Prospective	Inpatients	378	80	HGS BIA	ADL	3 months post discharge	HGS & ADL: HGS associated with admission ADL ability in both sexes, moderate effect (0.50) but not with ADL ability at 3 months post discharge in men or women. BIA & ADL: SMI associated with admission ADL ability in men only, weak effect (0.33), but no association with ADL ability at 3 months in men or women.
Moen 2018	Norway	Prospective	Inpatients	115	86	HGS	ADL	3 weeks	HGS & ADL: no association at 3 weeks on multivariate analysis.
Moyer 2017	USA	Cross-sectional	Care home	17	84	KES LLS	Falls	n/a	Neither KES nor LLS associated with falls occurrence in previous 6 months
Nakamura 2006	Japan	Prospective	Care home	16	83	Anthro. MRI	ADL	3 years	Anthro & ADL: no association with anthropometric measures and low ADL ability at baseline or after 3 years. MRI & ADL: no association with low baseline ADL and low thigh muscle volume at baseline or with change in muscle volume over 3 years.
Rossi 2014	Italy	Cross-sectional	Inpatient	119	80	BIA	Mobility ADL	n/a	BIA & mobility: weak effect (0.44) BIA & ADL: no association
Sabol 2011	USA	Cross-sectional	Care home	108	84	HGS	Mobility	n/a	HGS & mobility: weak effect (0.4)
Savino 2013	Italy	Prospective study but only cross-sectional data used.	Hip fracture	504	85	HGS	ADL	Only baseline ADL data analysed in study.	HGS & ADL: Strong association with ADL ability 2 weeks before hip fracture (0.84).
Selakovic 2019	Serbia	Prospective	Hip fracture	191	80	HGS	ADL	3 months 6 months	HGS & ADL: HGS had moderate association with ADL ability at baseline (0.50), weak association at 3 (0.38) and 6 months (0.43).
Sipers 2016	Netherlands	Cross-sectional	Inpatient	96	85	HGS	Mobility ADL	n/a	HGS & mobility: medium (0.70) HGS & ADL: medium (0.75)
Soares 2017	Brazil	Cross-sectional	Care home	26	82	HGS LLS ULS	Mobility	n/a	HGS & mobility: Medium (0.70) LLS & mobility: strong (1.8) ULS & mobility: strong (1.35)
Soke 2018	Turkey	Cross-sectional	Care home	105	77	HGS	Balance	n/a	HGS & balance: Strong (0.94)
Stasi 2018	Greece	Cross-sectional	Hip fracture	96	76	LLS	Mobility		LLS & mobility: strong (0.88)

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Steihaug 2018	Norway	Prospective	Hip fracture	282	79	HGS Anthro.	ADL	1 year	HGS & ADL: no effect with change in ADL score at 1 year. Baseline calf circumference and triceps skinfold thickness no association of either with change in ADL 1 year after hip fracture.
Strasser 2018	Austria	Trial	Care home	54	82	DXA	Mobility	Baseline data extracted	DXA & Mobility: no association of DXA with gait speed, chair rise test or 6 min walking test.
Suzuki 2009	Japan	Cross-sectional	Care home	60	87	KES	Mobility	n/a	KES & mobility: strong (1.28)
Suzuki 2012	Japan	Cross-sectional	Care home	54	87	KES	ADL	n/a	KES & ADL: strong (1.20)
Tarsuslu-Simsek 2017	Turkey	Cross-sectional	Care home	111	77	LLS ULS	ADL	n/a	LLS & ADL: no effect ULS & ADL: medium (0.65)
Thingstad 2015	Norway	Cross-sectional	Hip fracture	249	83	HGS	Mobility	n/a	HGS & mobility: Strong (0.8)
Uehara 2018	Japan	Prospective	Rehabilitation	137	82	KES	Mobility	On discharge from rehab	KES & mobility: baseline KES not associated with mobility at discharge after adjustment for balance and functional ability.
Van Ancum 2018	Netherlands	Prospective	Inpatient	297	80	HGS BIA	Falls	3 months	HGS & falls: Combined men and women, weak effect (0.39) with history of falls 6 months pre-admission, but no effect 3 months post-discharge. BIA & falls: lower muscle mass weak effect (0.47) with falls over 3 months post-discharge but no effect with history of falls 6 months pre-admission.
Van Puyenbroeck 2012	Belgium	Prospective	Care home	276	83	BIA	Mobility Falls	“duration of study” for falls but study duration not specified	Baseline BIA & baseline mobility: weak (0.30) Baseline BIA & Incident falls: no effect with falls
Visser 2000	Netherlands	Prospective	Hip fracture	90	80	HGS LLS DXA	ADL	1 year	HGS & ADL: Over 1 year, loss of HGS associated with decline in ADL, weak effect (0.49) LLS & ADL: over 1 year, no effect

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									DXA & ADL: over 1 year, decline in ADL ability at 6 and 12 months, no association with muscle mass changes by DXA.
Wilson 2011	Australia	Prospective	Care home	602	86	HGS	Falls	1 year	HGS & falls: no association with occurrence of falls over 1 year.
Wisniowska-Szurlej 2019	Poland	Cross-sectional	Care home	209	74	HGS	Mobility Balance	n/a	HGS & mobility: weak effect (0.36-0.49) HGS & balance: weak effect (0.30)
Yamanouchi 2016	Japan	Cross-sectional	Inpatient	79	81	HGS BIA	ADL	n/a	HGS & ADL: medium (0.53) BIA & ADL: no effect
Yardimci 2016	Turkey	Prospective	Care home	89	76	HGS BIA Anthro.	Falls	1 year	HGS & Falls: no association with number of falls over 1 year. BIA & falls: no effect Triceps skinfold thickness and arm circumference with falls: no association
Yau 2013	Hong Kong	Prospective	Hip fracture	69	81	KES LLS	Falls	6 months	KES & falls: falls over 6 months after fracture associated with baseline KES, strong effect (0.92) LLS & falls: not associated with falls over 6 months.
Yeh 2017	Taiwan	Prospective	Hip fracture	171	78	KES	Falls	2 years	KES & falls: baseline KES associated with single fall in first year after fracture, medium effect (0.56), but no association in second year, or with number of falls over the 2 years.
Yeung 2018	Netherlands	Cross-sectional	Outpatient	163	82	HGS KES	Mobility Falls ADL	n/a	HGS with mobility, falls and ADL: no effect, any association lost when adjusted for KES. KES with mobility: weak effect with SPPB (0.26), no association with TUG. KES & ADL: weak effect (0.38)
Yoshimura 2017	Japan	Cross-sectional	Rehabilitation	637	74	HGS BIA	ADL	n/a	HGS & ADL: strong (0.90) BIA & ADL: weak (0.21)
Zarzczyzny 2017	Poland	Cross-sectional	Care home	26	86	KES	Mobility	n/a	KES & mobility: no effect

APPENDIX 4: Risk of bias assessment

Table 5 Summary of study appraisal using the AXIS appraisal tool for Cross-sectional Studies. Studies are listed with year of publication and sample size. The scores are given for the number of missing items in the study which might confer a risk of bias. Score of 0 – no items missing in that category, -1 – one item missing etc. Overall percentage is calculated from total score of items (usually 20, but in some there was uncertainty around items and they were excluded from the total). AXIS rating ≥75% was considered good quality, low risk of bias; 50-74% moderate quality and moderate risk of bias; <50% poor quality and high risk of bias.

First Author and Publication year	Sample size (both genders unless specified)	Aims of study	Selection of participants	Measurement of variables	Attrition bias	Reporting bias & statistics	Conclusions and limitations	Funding and ethics	Overall percentage
Aarden 2019	391	0	-1	0	0	0	0	0	95%
Alqahtani 2017	29	-1	-2	-1	-3	-1	0	0	60%
Alvarez 2016	127	0	0	0	-3	0	0	0	85%
Aubertin-Lehardre 2019	44	0	-1	0	-2	0	0	0	80%
Bachrach-Lindstrom 2000	142	0	-2	0	-2	0	0	0	75%
Bahat 2010	157 M	0	-2	-1	-3	0	-1	-1	61%
Bastone 2004	37	-1	-2	-1	-3	0	-1	0	55%
Batista 2012	150	0	-1	0	-3	0	0	0	80%
Beloosesky 2010	105	0	0	0	-3	-1	0	0	75%
Bergland 2010	322	0	0	0	0	0	0	0	95%
Bianchi 2017	655	0	0	0	0	-1	0	0	90%
Bijlsma 2013	207	-2	-1	0	-2	0	0	-1	65%
Bjorkman 2012	106	0	-3	-1	-3	-1	0	0	50%
Bodilsen 2016	369	0	0	0	0	0	0	-1	95%
Bruyneel 2018	32	-1	-2	0	-1	0	-1	0	65%
Buckinx 2018	565	0	-2	0	-2	0	0	-1	70%
Caballer 2015	71	-1	-1	0	-2	0	0	0	75%
Cardon-Verbecq 2017	157	0	0	-1	-2	0	-1	-1	70%
Chang 2013	308	0	-2	0	-3	-1	0	-1	60%
Chen 2012	558	0	0	0	-1	0	0	-1	79%
Chen 2015	95	-1	-1	0	-3	-1	-2	0	conference abstract
Cuesta 2015	298	0	-2	0	-3	-3	-1	0	58%
Curcio 2016	337	0	-2	0	-3	-1	0	0	72%
Di Monaco 2006	200 F	0	-2	0	-2	-1	0	-2	65%
Di Monaco 2007	27 M	-1	-1	0	-2	-1	0	-2	65%
Di Monaco 2011	280 F	0	-2	0	0	-1	0	-2	70%
Di Monaco 2014	123 F	0	-1	0	-1	-1	0	-2	70%
Di Monaco 2015	193 F	0	0	0	-3	-1	0	-2	66%
Di Monaco 2017	138 F	0	-1	0	-3	-1	0	-2	67%
Di Monaco 2018	80 M	-1	0	0	0	-1	0	-1	80%
Ertan 2014	23	-2	-3	-2	-3	-3	-2	-2	conference abstract
Ertan 2015	22	-2	-3	-1	-3	-3	-2	-2	conference abstract
Garia-Pena 2013	223	0	0	0	-3	-1	0	0	87%
Gariballa 2017	432	0	-1	0	-3	0	0	0	83%
Giua 2014	68	-1	0	-1	-3	-1	0	-1	61%
Golder 2012	19	-1	-1	0	-3	0	-1	-1	55%
Guerreiro 2017	100	0	-2	0	-1	0	0	0	75%
Hasselgren 2011	50	-1	-1	0	0	0	0	0	85%
Hershkovitz 2019	373	0	-2	0	-2	-1	0	-1	65%
Ikezoe 2009	44 F	-1	-2	-1	-2	0	0	-1	58%
Ishiyama 2018	167	0	-2	0	-3	0	0	-1	65%
Janssen 2004	70 F	-1	0	-1	-1	0	-1	0	75%
Jeon 2019	59	0	-1	0	-2	0	0	-1	75%
Kamo 2018	250	0	-1	0	-3	0	0	0	80%

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Keevil 2013	80	-1	0	-1	-2	0	0	0	79%
Kristensen 2009	20	-1	0	0	-3	-1	-1	0	68%
Laurentani 2018	263	0	-2	0	-3	0	0	0	83%
Lloyd 2009	193	0	0	0	0	0	0	0	95%
Maeda 2017	778	0	0	-1	-3	0	0	-1	83%
Mangione 2008	42	-1	-2	-1	-3	0	0	-1	61%
Martien 2015	73	-1	-1	0	-3	0	0	0	74%
Martinikorena 2016	22	-1	-1	-1	-3	-1	-1	0	67%
Meskers 2019	378	0	0	0	-3	0	0	0	80%
Moen 2018	115	0	0	0	0	0	0	-2	90%
Moyer 2017	17	-1	-2	-1	-3	-1	-1	0	50%
Nakamura 2006	16	-1	-2	0	-3	0	0	-1	60%
Rossi 2014	119	0	0	0	0	-1	0	-1	95%
Sabol 2011	108	0	-1	0	0	0	0	-1	85%
Savino 2013	504	0	0	-1	-3	0	0	0	75%
Selakovic 2019	191	0	0	-1	-2	-1	0	0	75%
Sipers 2016	96	-1	0	0	-3	-1	-1	0	65%
Soares 2017	26	-1	-1	0	-3	-1	-1	0	60%
Soke 2018	105	0	-1	0	-3	0	0	0	75%
Stasi 2018	96	0	-1	0	-3	0	0	-1	70%
Steihaug 2018	282	0	0	-1	0	-1	-1	0	85%
Strasser 2018	54	-1	-1	0	-1	0	0	-1	75%
Suzuki 2009	60	-1	-1	0	-3	0	0	-1	68%
Suzuki 2012	54	-1	-2	0	-3	0	0	0	65%
Tarsuslu-Simsek 2017	111	0	-2	0	-3	0	-1	0	65%
Thingstad 2015	249	0	0	0	-3	-1	0	0	75%
Uehara 2018	137	0	0	0	-3	0	-1	0	75%
Van Ancum 2018	297	0	-1	0	0	0	0	0	90%
Van Puyenbroeck 2012	276	0	-1	0	-3	0	0	0	79%
Visser 2000	90	-2	-1	0	0	-1	-1	-1	65%
Wilson 2011	602	0	-1	0	-3	0	0	0	75%
Wisniowska-Szurlej 2019	209	0	0	0	-2	0	-1	-1	75%
Yamanouchi 2016	79	-1	-1	-2	-3	0	0	-1	57%
Yardimci 2016	89	-1	-1	0	-2	0	-1	-1	65%
Yau 2013	69	0	0	-1	-3	-3	0	-1	53%
Yeh 2017	171	0	-1	0	-1	0	0	0	85%
Yeung 2018	163	0	-1	-1	-1	0	0	0	78%
Yoshimura 2017	637	0	0	-1	-3	0	0	-1	83%
Zarzeczny 2017	26	-1	-1	0	-3	0	0	-1	68%