

Identification of Frailty in the Gym: Part 1 – Hand Grip Strength (Draft 1)

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COMING SOON!

Part 2 – Knee Extension

Part 3 – Elbow Flexion

Part 4 – Hip Extension

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Identification of "Frailty" using a hand grip dynamometer. Grip strength standards below are scaled for body size and age. Color coded for strength status and suggested actions:

GREEN = Strong; continue training, playing sport, or other physical activities

BLUE = Compromised; add or increase the volume and intensity of weight training

YELLOW = Weak; add or increase the volume and intensity of weight training, add dietary intervention

RED = Frail; add or increase the volume and intensity of weight training, add dietary intervention, consider pharmacologic agents

MALE STANDARDS

57 kilogram bodyweight (125 pounds)

20	30	40	50	60	70	80
42	42	41	39	35	31	27
40	40	39	37	33	30	26
38	38	37	35	32	28	25
36	36	35	34	30	27	23
34	34	33	32	29	25	22
32	32	31	29	26	23	20
26	26	26	25	22	20	17
21	21	21	20	18	16	14
16	16	15	15	13	12	10
10	10	10	10	9	8	7

kilogram force

68 kilogram bodyweight (150 pounds)

20	30	40	50	60	70	80
59	59	58	54	49	43	37
56	56	55	52	47	41	36
54	54	52	49	45	39	34
51	51	50	47	43	37	32
48	48	47	44	40	35	30
44	44	44	41	37	33	28
37	37	36	34	31	27	24
30	30	29	27	24	22	19
22	22	22	20	18	16	14
15	15	14	13	12	11	9

79 kilogram bodyweight (175 pounds)

20	30	40	50	60	70	80
65	65	64	60	54	48	41
62	62	61	57	52	46	39
59	59	58	54	49	43	37
56	56	55	51	47	41	35
53	53	52	49	44	39	34
49	49	48	45	38	36	31
41	41	40	38	34	30	26
33	33	32	30	27	24	21
25	25	24	22	21	18	16
16	16	16	15	14	12	10

kilogram force

91 kilogram bodyweight (200 pounds)

20	30	40	50	60	70	80
70	70	69	64	59	51	44
67	67	66	61	56	49	42
64	64	63	58	54	46	40
60	60	59	55	51	44	38
57	57	56	52	48	42	36
53	53	52	48	44	38	33
44	44	44	40	37	32	28
35	35	35	32	30	26	22
26	26	26	24	22	19	17
17	17	17	16	15	13	11

102 kilogram bodyweight (225 pounds)

20	30	40	50	60	70	80
73	73	72	67	61	54	46
70	70	68	64	58	51	44
66	66	65	61	55	49	42
63	63	62	58	53	46	40
60	60	58	55	50	44	38
55	55	54	51	46	40	35
46	46	45	42	39	34	29
37	37	36	34	31	27	23
28	28	27	25	23	20	17
18	18	18	17	15	13	11

kilogram force

113 kilogram bodyweight (250 pounds)

20	30	40	50	60	70	80
76	76	74	69	62	51	39
72	72	71	67	61	53	46
69	69	68	63	58	51	44
65	65	64	60	55	48	41
62	62	61	57	52	46	39
57	57	56	53	48	42	36
48	48	47	44	40	35	30
38	38	37	35	32	28	24
29	29	28	26	24	21	18
19	19	19	17	16	14	12

NOTES: Clinically and experimentally, a grip strength of less than 26 kilograms (57 pounds) is indicative of clinically significant weakness (Alley et al, *J Gerontol A Biol Sci Med Sci*, 69(5):559-566, 2014). This approach does not address variation in body mass and dimensions that are normally seen within any human population. The standards presented here are specifically scaled to account for body dimensional variation, body mass variation, and the influence those factors have on performance advantage/disadvantage. These standards apply to any level of training status – sedentary through elite trainee – however, they do not present the values associated with the pinnacle of human athletic achievement (i.e., if your grip strength is above those at the top of the table, congratulations, you are well and truly strong ... in your forearms). While these standards are intended for fitness trainers and coaches, they are valid for clinical use.

Testing of average human populations does not require expensive equipment. There are a multitude of inexpensive testing devices available for this purpose. One example is a [Hand Grip Dynamometer with a 90kg \(198lb\) capacity](#) costing between \$19.99 and \$36.99.

Inexpensive dynamometers are not viable with strong populations as they will likely exceed their load capacity. For stronger and athletic populations there are a number of clinical and laboratory grade instruments that have much higher load capacities, such as [this one with a 136kg \(300lb\) range of measure](#) which costs between \$155.22 and \$199.99. If identification of frailty is the goal, and economy is important, this dynamometer is likely overkill.

Convert kilogram values in the tables into pounds by taking the kilogram value and multiplying times 2.2046 (kilograms x 2.2046 = pounds).

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