

FINGER AND HAND EXTENSION & ABDUCTION

Finger and Hand Extension & Abduction Strength — Reference Values

A quick-reference for interpreting Splayometer measurements. Values come from biomechanics and rheumatology literature, not Splayometer-specific norms.

PRELIMINARY

Published normative data for finger extension and abduction is limited. Ranges below come from biomechanics literature, not clinical norming comparable to Mathiowetz grip and pinch. Prefer **within-patient serial tracking** over direct comparison.

Individual Finger Extension

Approximate adult ranges, mixed sex; standardized hand position, force-transducer measurement.

Index (D2)	~4.0–6.3 lb
Approximate mean, healthy adults	~1.8–2.9 kg
Middle (D3)	~3.6–5.8 lb
Approximate mean, healthy adults	~1.6–2.7 kg
Ring (D4)	~2.2–4.0 lb
Approximate mean, healthy adults	~1.0–1.8 kg
Little (D5)	~1.8–3.1 lb
Approximate mean, healthy adults	~0.8–1.4 kg

Synthesized from Li et al. (1998) and related biomechanics literature. Consult primary sources for SDs and methods.

Finger Abduction (Dorsal Interosseous)

Isolated finger abduction force; ranges drawn from biomechanics and rheumatology contexts.

D2 abduction (index from middle)	~5.6–10.1 lb
Healthy adults	~2.5–4.6 kg
D3 abduction (middle from ring)	~4.5–8.5 lb
Healthy adults	~2.0–3.9 kg
D4 abduction (ring from little)	~3.4–6.3 lb
Healthy adults	~1.5–2.9 kg
Reduction in RA	~30–50% lower
Estimated, vs. healthy adults	

Brorsson et al. (2009); Nordenskiöld & Grimby (1993). Ranges vary by method and population.

Whole-Hand Spread (Multifinger Abduction)

Cumulative four-finger abduction and adduction force — applicable to hand-loop measurement.

Total abduction (4-finger spread)	~7.3 lb	Total adduction (4-finger squeeze)	~9.5 lb	Sex effect	M > F
Mean, healthy adults	~3.3 kg	Mean, healthy adults	~4.3 kg	Sex-stratified means not reported	

Pataky, Latash & Zatsiorsky (2008), n = 21 (12 F / 9 M). Used four independent transducers; hand-loop biomechanics differ — treat as orientation, not threshold.

Evidence-based context

- **Extension is a fraction of grip:** individual finger extension is ~10–30% of total grip force (Li 1998).
- **Index and middle are strongest:** D2 and D3 produce greater extension force than D4 and D5 (Li 1998).
- **Inter-finger dependence ("enslaving"):** activating one finger produces force in adjacent fingers (Zatsiorsky 2000).
- **Sensitive to intrinsic muscle pathology:** abduction declines with ulnar nerve palsy and early RA (Brorsson 2009).
- **Whole-hand spread is its own metric:** multifinger ab/adduction force is not predictable from single-finger strengths (Pataky 2008).
- **Sex and age effects:** pattern parallels grip — peak in late 20s–30s, progressive decline thereafter (Li 1998).

Recommended clinical application

Baseline at session 1, replicate test conditions at each follow-up, track change over time. No Splayometer-specific minimal detectable change (MDC) is published; interpret session-to-session variation against your own setup repeatability, not a fixed threshold. For context, grip MDC is ~3–5 kg (Mathiowetz 1984).

SOURCES

Li, Latash & Zatsiorsky (1998). *Exp Brain Res* 119(3): 276–286.
Brorsson et al. (2009). *Disabil Rehabil* 31(22): 1879–1885.
Pataky, Latash & Zatsiorsky (2008). *J Hand Ther* 21(4): 377–385.
Mathiowetz et al. (1984). *J Hand Surg* 9(2): 222–226.

Zatsiorsky, Li & Latash (2000). *Exp Brain Res* 131(2): 187–195.
Nordenskiöld & Grimby (1993). *Scand J Rheumatol* 22(1): 14–19.
Mathiowetz et al. (1985). *Arch Phys Med Rehabil* 66(2): 69–74.