



What's the Scoop on Creatine? Effects on strength

CLINICAL QUESTION

How does creatine supplementation affect strength in adults?

BOTTOM LINE

Evidence supporting creatine is unreliable due to small, short trials, lack of blinding, and few intention-to-treat analyses. At best, over ~5 weeks, creatine may improve bench press (~1kg) and squat (~6kg) strength, but not leg press or hand-grip strength. In the largest and longest trials, no consistent improvements were observed. Adverse effects appear similar to placebo.

EVIDENCE

- Results statistically different unless indicated. Creatine versus placebo. Focusing on systematic reviews from last ten years.¹⁻³ Sport-specific reviews excluded: Limited generalizability.
- Systematic review: 69 randomized controlled trials (RCTs), 1937 participants (range 8-237), mean ages 18-74. 60% RCTs with resistance training, 30% without.¹ At ~5 weeks:
 - Bench press: +1.4kg over placebo.
 - Squat: +5.6kg over placebo.
 - Hand grip, leg press: No difference.
 - Without resistance training: Inconsistent effects.
- Systematic review: 23 RCTs, 509 participants, age ≤50. Creatine with resistance training (2-5 times/week).² At ~8 weeks:

- Strength (one-rep max):
 - “Upper-body”: +4.4kg over placebo.
 - “Lower-body”: +11.3kg over placebo.
 - Limitation: Strength exercises undefined.
- Other systematic review: Inconsistent reporting, unclear methods.³
- RCTs (from systematic reviews above) with ≥6 month follow up:
 - 6 RCTs, 33-237 adults; >90% post-menopausal women.⁴⁻⁹
 - Largest RCTs (200-237 patients, 24 months follow-up):⁴⁻⁵ No benefit on squat strength, or leg press with⁴/without⁵ resistance training.
 - Limitations: Strength outcomes were secondary endpoints;^{4-6,9} low adherence (56%).⁴
- Adverse events: Three systematic reviews, infrequently reported.¹⁰⁻¹³
 - No differences.¹⁰⁻¹¹
 - Serum creatinine or glomerular filtration rate: No clinically meaningful differences.¹⁰
- Limitations:
 - Over 80% of RCTs ≤3 months duration, over 90% had ≤50 participants; absence of blinding and intention-to-treat analysis.¹
 - Author conflicts: Board advisors for creatine manufacturers.¹⁻²

CONTEXT

- Most studied formulation: Creatine monohydrate.^{1,2}
- Dosing: 5-10g/day; up to 20-25g/day if no loading dose.
- Lean body mass may increase by ~1kg over placebo at 4 days-1 year, but no differences observed in largest and longest RCTs.⁴⁻⁵
- Impurities found during commercial product testing. Consider products with third-party purity testing.¹⁴⁻¹⁶
- Creatine on cognition: Largest RCT – no benefit.¹⁷

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