



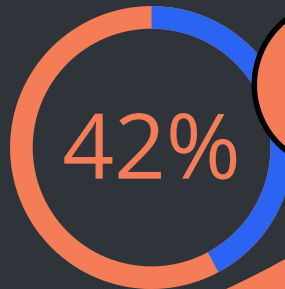
Torque to Bodyweight

Torque is defined as “a measure of force causing rotation around an axis” and more specifically, “the rate of change of angular momentum that would be imparted to an isolated body”. More than half of clinicians use *only* time from surgery as their metric for deciding when an athlete can return to sport (Burgi et al., 2019). For the small percentage that actually use objective measures for testing, the vast majority use limb symmetry as their primary metric for measuring strength.

THREE LOCATIONS TO SERVE OUR COMMUNITY



5255 Longley Lane (South Reno)
775.823.5350
1413 S. Virginia St (Midtown)
775.507.4210
2484 Wingfield Hills Rd.
775-993-3640



Percentage of ACL protocols using time as the sole RTS criteria. (Burghi et al., 2019)



Limb symmetry is, briefly, comparing the performance of one limb compared to the other (non-involved) limb with the goal of becoming symmetrical over time. For the minority of clinicians that are actually using objective strength testing to guide clinical practice, it should be stated that limb symmetry is likely not enough and may “overestimate knee function” (Wellsandt et al., 2017).

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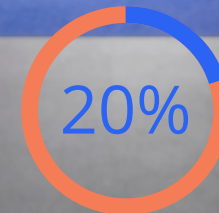
BEYOND LIMB SYMMETRY

Clinicians should be using not only limb symmetry but also aiming for strength standards based on bodyweight ratios. While the early phases may prioritize symmetry, this is defined as “relative strength” (i.e., how strong they are compared to their uninvolved side), and this metric should evolve thereafter into “absolute strength” or how strong they *should* be. In a recent study by Van Wyngaarden et al., they found that a 1.0 N·m/kg improvement in torque to bodyweight improved subjective knee reporting indexes by an average of 17 points! (2021). This is in support of additional research showing athletes who demonstrated ≥ 3.10 N·m·kg⁻¹ torque to bodyweight ratio had “over eight times higher odds of reporting an IKDC score $\geq 90\%$ ”. (Pietrosimone et al. 2016).

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Our goal is to be better and we believe holding ourselves to the *highest* of standards AND effective communication and collaboration with our surgeons is the way.

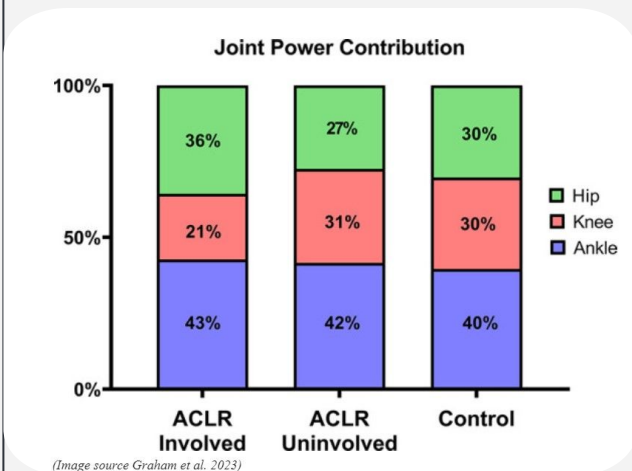
OUR MIDTOWN LOCATION



1 in 5 athletes is meeting quad symmetry of > 90% at time of RTS (Burghi et al. 2019)

Torque to Bodyweight (cont'd)

Aiming for a standard torque to body weight goal of 2.5-3.0 N·m/kg (converted to roughly 1.0 lb-ft/lb) for knee extension strength has not only been established to improve subjective knee reporting but we also see athletic performance reflect this measure. For example, knee extension weakness has been demonstrated to show poor single leg vertical jump height. (Fischer et al. 2017) Similarly, Graham et al. (2023) demonstrated notable alterations in jumping mechanics with those athletes who did not meet strength criteria.

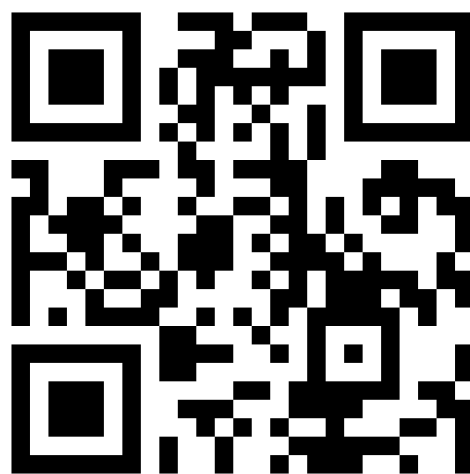


Their group found the surgical knee was consistently weaker (1.85 ± 0.53 N·m/kg) than both the uninvolved limb (2.95 ± 0.54 N·m/kg) and when compared to controls ($2.49-2.55 \pm 0.75-.77$ N·m/kg for left and right limbs) in athletes at 6 months post-ACL reconstruction. In fact, over 60% of their participants did not meet *minimum* torque ratios of 2.1N·m/kg a time of testing. →

Specifically, the surgical knee contributed, on average, 21% less joint power across all jumping tasks compared to the uninvolved knee and compared to controls.

Single leg vertical jump testing has been shown to be a superior metric for measuring knee function in ACLR patients compared to horizontal hop testing (Kotsifaki et al., 2021) and its relationship to knee torque is, at least in part, explained above. If our goal is to restore knee function, athletic performance and athlete confidence after ACL reconstruction, knee extension torque to body weight is an essential (and easy) metric that should be included in all evidence-based ACL rehab.

Scan the QR code to see the NPT Way!



At Nevada Physical Therapy, we begin knee extension isometric training early in the process, often before patients are even off their crutches. Early open-kinetic chain training has shown superior knee extension torque strength at both 3 and 6 months compared to classic closed-kinetic chain programming without increase in joint laxity (Forelli et al. 2023) and we test it often throughout the rehab process. If you are looking for the most up-to-date, evidence-based team in Reno to help your athletes get back to being their best, Nevada Physical Therapy is leading the charge when it comes to ACL rehab.