Knee extension force, with and without Q-Technology

Instrumented pilot study (subject Stéphane) — when the force gain goes first to the weak side

Level of evidence : Observed in-house — pilot study (n = 1), confirmed by an internal robustness check (mean of 3 trials)

Study type	Exploratory pilot, within-subject, paired comparison without Q vs with Q
Participant	One adult subject (Stéphane), one session
Device	Kinvent Physio dynamometer (ref. M124240), 500 Hz sampling
Movement	Knee extension at 90° flexion, seated
Task	Maximal voluntary isometric contraction — 3 trials/condition, best of 3 + mean of 3
Conditions	Without Q circuit (5:31 p.m.), then with Q circuit (6:30 p.m.) — fixed order, ~1 h apart
Primary outcomes	Peak force per side · left/right asymmetry

Summary

Third measurement in the Kinvent series. In this subject, knee extension force rises on both sides on the dynamometer, but mostly on the WEAK side: +49% on the right (the lagging side), +20% on the left (the strong side). Left/right asymmetry is cut by a factor of 3 to 4 (mean force: 17.5% → 5.5%). Notably, here the weak side is the right — and it is the one that responds most, suggesting an effect that targets the weak link whichever side it is. The result holds on the mean of the three trials, not only on the best trial: it is not a selection artifact. Exploratory result on a single subject, to be replicated.

1. Background and objective

The first measurements in the series had shown a dynamometer force increase, with asymmetry behaving differently from one subject to the next. This third case asks two sharper questions: when force rises, does it go preferentially to the weak side? And does the gain survive a robustness check, or is it just a lucky “best trial”?

Both answers are clear here: the effect favors the lagging side, and it holds on the mean of the three trials.

2. Method

Standardized protocol, instrument-read measurements:

- Participant: one adult subject (Stéphane), a single session.
- Device: Kinvent Physio dynamometer (ref. M124240), 500 Hz.
- Movement: knee extension at 90° flexion, seated.
- Task: maximal voluntary isometric contraction (MVC) against the dynamometer.
- Repetitions: 3 per condition; best of 3 retained, AND mean of 3 computed as a control.
- Conditions: without Q circuit (5:31 p.m.), then with Q circuit (6:30 p.m.) — fixed order, ~1 h apart (an interval allowing recovery between the two).

- Measures: peak force (L, R), peak and mean asymmetry, rate of force development (RFD), time to peak.
- Note: the exact Q circuit was not recorded on the export (to be documented systematically).

3. Results

OBSERVATION Force increase and asymmetry reduction, measured on the instrument.

Measure (Kinvent, best of 3)	Without Q	With Q	Reading
Peak force — left (strong side)	36.3 kg	43.7 kg	+20%
Peak force — right (weak side)	30.5 kg	**45.6 kg**	+49%
Peak-force asymmetry	15.9%	**4.1%**	~4× lower
Mean-force asymmetry	17.5%	**5.5%**	~3× lower
RFD (rise rate) — L / R	12.9 / 13.6 kg/s	15.8 / 9.1 kg/s	mixed
Time to peak — L / R	3.8 / 3.8 s	4.4 / 5.0 s	longer rise

Peak force rises on both sides, but very unevenly: +49% on the right (the weak side, 30.5 → 45.6 kg) versus +20% on the left (the strong side, 36.3 → 43.7 kg). The lagging side catches up and even edges slightly ahead.

Direct consequence: the left/right asymmetry, clear at baseline, becomes near-zero — cut ~4× on peak (15.9 → 4.1%) and ~3× on the mean (17.5 → 5.5%).

4. The effect targets the weak side

The detail that matters: in this subject, the weak side is not the left but the RIGHT — and it is precisely the one that responds most. The observed effect therefore does not favor a fixed side of the body: it seems to go after the weak link, whichever it is.

This is also a methodological safeguard. A simple warm-up effect would raise both sides comparably — it has no reason to preferentially target the lagging side. The fact that the gain is concentrated on the weak side, plus the roughly one-hour interval between conditions (enough to recover), make the “warm-up” explanation less likely — without ruling it out formally.

5. Robustness check

The Kinvent summary keeps only the best of the three trials. To check this is not a lucky trial, we recomputed on the mean of the three:

Side	Best of 3	Mean of 3
Right (weak side)	+49%	+41%
Left (strong side)	+20%	+24%
Mean-force asymmetry	17.5 → 5.5%	~17 → ~5%

Same story: the weak side rises most and asymmetry falls, whether one takes the best trial or the mean of three. The result is therefore not a best-trial selection artifact.

6. Interpretation

Not everything increases. Time to peak lengthens (3.8 → 4.4–5.0 s) and the rate of force development (RFD) is mixed (up on the left, down on the right). Fair reading: “stronger, more

balanced, more gradual rise” — not “more explosive.” The solid message stays force and symmetry, not rise speed.

This asymmetry reduction, concentrated on the weak side, echoes in measured force the normalization already observed elsewhere in the series.

7. Limitations

- n = 1, one session; best of 3 corroborated by the mean of 3.
- Fixed order (without then with), same day ~1 h apart; non-blinded condition, no sham circuit.
- Q circuit not recorded on the export — to be documented so circuits can be compared across subjects.
- A single joint (knee extension); to be confirmed on other movements.

8. Next steps

- Repeat with alternating order and a sham circuit placed by a third party (blinded).
- Systematically record the circuit used (Alpha / Theta / Omega) for each test.
- Prioritize subjects with a clear baseline asymmetry — that is where the effect is most legible.
- Extend to several subjects and several joints.

9. Conclusion

For this third instrumented case, the signal is clear and consistent: peak force rises, the effect goes first to the weak side, and asymmetry collapses — all confirmed on the mean of the three trials, not only on the best one. The concentration of the gain on the weak link is also a partial safeguard against a mere warm-up effect. It remains to be confirmed blinded and across several subjects. Framing: an exploratory pilot study, to be replicated, with no medical claim.

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Source: Kinvent Physio report (M124240, 500 Hz), knee extension 90°, best of 3 trials (corroborated by the mean of 3). Unaudited internal data. Not a medical claim.