# Cervical rotation, posture and EEG under a Q-Omega insole — multimodal study (n = 1)

*Within-subject pilot, single session, three conditions — and a deliberate exercise in honesty*

**Level of evidence :** Observed in-house (multimodal: range of motion, posture, EEG) — exploratory study n = 1, single session, fixed non-counterbalanced order, non-blinded, conflict of interest declared; generates hypotheses, establishes no effect

| | |
|---|---|
| **Study type** | Within-subject pilot (n = 1), single session, three conditions — exploratory, descriptive, non-blinded |
| **Subject** | One adult man — also the inventor of the technology (conflict of interest declared) |
| **Examiner** | Barbara Merlette |
| **Conditions** | No circuit · Placebo (copper, non-neutral) · Q-Omega (active circuit) — fixed order |
| **Measures** | Cervical range of motion (Kinvent K-Move) · stabilometry (K-Plates) · EEG (Muse S) |
| **Place / date** | Maffliers, France — 03/09/2025 |
| **Status** | Generates hypotheses — establishes no effect; no health claim |


## Summary

Multimodal pilot study (n = 1, single session) on an episode of acute left-predominant neck stiffness, measured under three Q-BigFoot insole conditions: no circuit, placebo (copper — non-neutral) and Q-Omega (active circuit). Three planes followed in parallel: cervical range of motion (Kinvent K-Move), postural sway (K-Plates force plates) and EEG (Muse S). Under Q-Omega, the devices recorded a lower rotation asymmetry (29.0% vs 34.5%), lower postural sway, and a lower EEG Alpha/Beta ratio. But these observations are fully confounded by the fixed order, fatigue, a non-neutral placebo and possible EMG artifacts — and the asymmetry tightening comes mostly from a drop on the right side (likely fatigue), not a gain on the left. Two readings hold (real effect vs order artifact): that is why we do not decide. Generates hypotheses, establishes no effect. Conflict of interest declared: the subject is the inventor.


## 1. Transparency — conflict of interest and correction of a prior version

**Conflict of interest declared.** The single subject of this study is also the inventor of the technology evaluated and the founder of the entity that markets it. The study is exploratory, descriptive and non-blinded: it generates hypotheses, it does not confirm them, and constitutes neither proof of efficacy nor a health claim.

**Correction of a prior version.** This report replaces a first version generated by an AI, in which several key figures of the Q-Omega condition were fabricated. The present version uses only the values actually present in the source files (Kinvent, Mind Monitor), re-read and reproducible.

| Item | Prior AI version | Real source value |
|---|---|---|
| Q-Omega rotation L / R | 42.7° / 63.3° | 37.7° / 53.1° |
| Q-Omega right speed | 112.9 °/s | 79.6 °/s |
| “Gain” Q-Omega vs none | +5.7° L / +6.8° R | +0.7° L / −3.4° R |
| Affiliation | “University of Ottawa” (fabricated) | Academia NeuEra |

Showing this correction is part of the method: a study that does not publish its errors is not a study. The EEG ratios, for their part, were already correct in the prior version — and remain reproducible from the raw files.

## 2. Background and objective

A painful limitation of cervical rotation is often accompanied by postural compensations and a change in attentional engagement during effort. Following three planes together — mobility, stability, cortical activity — describes the same episode from several complementary angles.

On the test day, the subject had acute left-predominant neck stiffness (on waking from a night spent prone). The objective was not to demonstrate an effect, but to verify the feasibility of a synchronous multimodal measurement and to describe, without over-interpretation, what the devices recorded.

## 3. Method

Protocol, read without indulgence:

- Subject: one adult man (the author, inventor of the technology — conflict of interest declared). Examiner: Barbara Merlette.
- Conditions: three, run in a fixed non-counterbalanced order — no circuit, placebo (copper), Q-Omega (active).
- Cervical ROM: Kinvent K-Move (inertial goniometry), left/right rotation, 3 trials per condition.
- Stabilometry: Kinvent force plates (K-Plates), standing, eyes open.
- EEG: Muse S + Mind Monitor, frontal AF7/AF8 (most reliable) and temporal TP9/TP10; Alpha/Beta ratio computed after linearizing the powers.
- Synchronization: no time markers placed → “calm / movement” windows approximated post hoc by gyroscope percentiles (acknowledged limitation).
- Not measured: no isometric force, no numeric pain scale, no interhemispheric coherence — absent from the report, not reconstructed.

**The placebo is not a neutral sham.** The placebo condition contained copper components, which other internal work suggests do not behave as a strictly null value. The placebo is therefore a third, potentially weakly active condition — not an inert control. Any “Q-Omega vs placebo” contrast therefore cannot be read as active/inactive.

## 4. Results — cervical rotation

**OBSERVATION** Maximal amplitude and initial speed (0–200 ms) of cervical rotation — Kinvent K-Move, 3 trials/condition.

| Condition | Left (°) | Right (°) | Asym. | Sp. L (°/s) | Sp. R (°/s) |
|---|---|---|---|---|---|
| No circuit | 37.0 | 56.5 | 34.5% | 62.4 | 79.1 |
| Placebo | 35.2 | 53.3 | 34.0% | 64.8 | 59.6 |
| Q-Omega | 37.7 | 53.1 | 29.0% | 83.3 | 79.6 |

Right rotation stays greater than left in all three conditions. The lowest asymmetry is under Q-Omega (29.0% vs 34.5% without circuit) — but where does this tightening come from? The right side falls steadily at each block (56.5° → 53.3° → 53.1°), while the left barely moves (37.0° → 35.2°

→ 37.7°). A monotonic decline on the right across the session looks more like accumulated fatigue than an insole effect.

The only clear “positive” signal on the constrained side is the left initial speed (0–200 ms), markedly higher under Q-Omega (83.3 vs 62.4 °/s). To be confirmed: on a single averaged trial, this window is noise-sensitive.

## 5. Results — stabilometry

**OBSERVATION** Standing postural sway, eyes open — Kinvent K-Plates force plates.

| Condition | Ellipse (mm²) | Load L / R | Trials | Validity |
|---|---|---|---|---|
| No circuit | 267 | 56.6 / 43.4% | 3 | Plausible |
| **Placebo** | 7,123 | 55.8 / 44.2% | 1 | Excluded (movement) |
| Q-Omega | 186 | 57.1 / 42.9% | 1 | Plausible |

Comparing only what is comparable (no circuit vs Q-Omega), the sway area is lower under Q-Omega (186 mm²) than without circuit (267 mm²). Two major caveats: the placebo trial is excluded (values physiologically impossible while standing still — 1,607 mm amplitude, a center-of-pressure path of nearly 10 m: voluntary movement or loss of balance), and the comparison is not matched (3 trials without circuit, only one under Q-Omega).

“186 < 267” is therefore an observation, not a demonstration. The load stays left-biased (~57%) across all conditions.

## 6. Results — EEG

**OBSERVATION** EEG Alpha/Beta ratio (Muse S, linearized powers) — frontal AF7/AF8 most reliable.

| State (Alpha/Beta ratio) | No circuit | Placebo | Q-Omega |
|---|---|---|---|
| Global (4 channels) | 1.09 | 1.01 | 0.70 |
| Frontal (AF7/AF8) | 0.67 | 1.12 | 0.43 |
| Calm (gyro ≤ P20) | 1.04 | 0.90 | 0.66 |
| Movement (gyro ≥ P90) | 0.84 | 1.04 | 0.71 |
| Heart rate (bpm) | 85.5 | 85.7 | 82.8 |

The global Alpha/Beta ratio falls across the session (1.09 → 1.01 → 0.70), lowest under Q-Omega; at the frontal level (most reliable channels), Q-Omega also shows the lowest ratio (0.43), i.e. the highest Beta share. Mean heart rate is slightly lower under Q-Omega (82.8 bpm). These values are reproducible from the raw files.

Important caveat: on a consumer headset, the high bands (Beta, especially Gamma) easily pick up muscular activity of the forehead and jaw. Yet the neck was tense and movements larger under Q-Omega: part of the Alpha/Beta drop may come from muscle, not brain. Without time markers, it is impossible to precisely tie these variations to the rotation phases.

## 7. Interpretation — hypotheses (unproven)

**HYPOTHESIS** Everything below is hypothesis-generating, not a conclusion. One subject, one session, a non-counterbalanced order: these are leads to test, not established results.

**Cervical asymmetry.** The tightening under Q-Omega could reflect a reorganization of cervical motor control — but the most parsimonious explanation remains a drop in right-side amplitude from fatigue/order (3rd consecutive block). Alternative hypothesis not excluded.

**Left initial speed.** The rise in 0–200 ms speed on the left under Q-Omega is the only clear positive signal on the constrained side; to be confirmed, the 0–200 ms window being noise-sensitive on an averaged trial.

**Postural sway.** Lower sway under Q-Omega is compatible with better stability, but also with trial-to-trial variability (only one Q-Omega trial) and task learning across the session.

**EEG (Alpha/Beta ↓).** A lower Alpha/Beta ratio reflects a higher Beta share, sometimes associated with vigilance / motor control — but EMG contamination (neck tension, larger movements) is a credible competing explanation.

## 8. Limitations

- n = 1, single session: descriptive, non-causal design; no relevant statistical inference.
- Fixed non-counterbalanced order (none → placebo → Q-Omega): time, fatigue and learning confounded with the condition (the monotonic decline of right rotation is the direct illustration).
- Non-neutral placebo (copper): not a sham.
- Stabilometry not matched (3 vs 1 trial) and placebo trial excluded (movement).
- EEG without markers: approximate calm/movement segmentation; plausible EMG contamination on Beta/Gamma; short recordings (~2 min).
- No blinding and conflict of interest (the subject is the inventor); no numeric pain scale.

## 9. Next iteration

- Double-blind replication, counterbalanced order (cross-over with washout).
- Mind Monitor time markers to align EEG ↔ ROM ↔ stabilometry.
- Repeated stabilometry trials while strictly still; per-trial pain scale.
- A strictly neutral sham (no copper).
- Several subjects.

## 10. Conclusion

In this single subject and during this session, the devices recorded under Q-Omega a lower cervical asymmetry (driven mainly by a drop on the right side), a higher left initial speed, lower postural sway, and a lower Alpha/Beta ratio. These observations are coherent with each other — and equally explainable by fatigue, test order, a non-neutral placebo and EMG artifacts. Both readings hold: that is precisely why we do not conclude. What the protocol demonstrates is its feasibility — following mobility, posture and EEG together on a painful neck yields measurable, reproducible signals. Proof, however, will require double-blinding, a counterbalanced order, synchronized markers and several subjects. Measurement over belief — including when the test does not give the hoped-for result.

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*Source: Kinvent K-Move (range of motion), K-Plates (stabilometry), Muse S + Mind Monitor (EEG, ratios recomputed from the raw CSV, reproducible). Study n = 1, single session, fixed order, non-blinded, conflict of interest declared. Unaudited internal data. No claim of diagnosis, treatment or cure. Not medical advice.*