Feedback Intuitive
A muscle-aware recovery wearable for high-performance sports

In a nutshell

Elite sport has become increasingly data-driven. Athletes and teams carefully optimize training load and competition using detailed performance metrics. Yet while performance is highly instrumented, recovery remains comparatively under-measured, despite being equally critical for injury prevention, physiological adaptation, and long-term development.

This gap is particularly visible in soft-tissue injuries, which account for approximately 30–40% of all injuries and carry significant competitive and financial consequences for professional teams. Despite this exposure, athletes still lack a reliable and practical way to quantify how their working muscles are truly recovering between training sessions. For a professional squad of 25 elite athletes, soft-tissue injuries translate into roughly 1.2 injuries per player per season, or around 30 injuries per team each year, with 15–25 days downtime for players. This drives an estimated ~0.8-1M CHF per season in direct and opportunity costs from muscle-related injuries alone at the elite level.

At the same time, ***muscle oxygenation (SmO_2)*** provides direct insight into local muscle metabolic state and recovery kinetics, but today it is confined to bulky laboratory systems and disconnected from everyday training workflows. This separation leads to fragmented and insufficiently personalized insights — particularly in sports where fatigue is muscle-specific, such as sprinting, climbing, and endurance disciplines.

Feedback Intuitive develops FI-Tile, a compact wearable that directly measures localized muscle oxygenation (SmO_2) contextualised with systemic physiological signals. By translating lab-grade muscle physiology into field-ready deployment, the system enables muscle-specific recovery assessment while continuously building the first structured longitudinal dataset for muscle-specific recovery intelligence in elite sport. FI-Tile currently is the only muscle-aware recovery wearable that combines localized SmO_2 and systemic vitals in a field-ready form factor for elite decision-making.

Why is our technology important?

Modern sports science recognizes that adaptation and fatigue emerge at the level of the working muscle. However:

- Recovery decisions are still based on indirect systemic metrics.
- Lab-grade muscle oxygenation systems (NIRS) remain bulky and disconnected from daily training workflows.
- Coaches lack objective muscle-specific readiness indicators.
- Overuse and overload injuries represent ~30-40% of recorded athletic injuries, creating both performance and financial burden.

Feedback Intuitive introduces a new class of recovery-oriented wearables by ***unifying localized muscle physiology contextualised with systemic vitals*** within a single compact form factor. This directly addresses the current fragmentation between consumer wearables offering indirect recovery metrics based on PPG, and laboratory-grade NIRS systems measuring muscle oxygenation in isolation, enabling:

- Direct measurement of muscle metabolic recovery kinetics.
- Continuous integration into real training workflows.
- Contextualized interpretation of muscle oxygenation alongside heart rate and motion data.
- A transition from lab-confined assessment to scalable, real-world deployment.

This shift transforms recovery from a subjective or proxy-based concept into a measurable physiological parameter.

The benefits of our solution

Unlike consumer wearables focused solely on systemic vitals, or laboratory NIRS systems limited to isolated muscle assessment, FI-Tile unifies both domains into a scalable wearable designed for real-world high-performance environments.

- Direct muscle-level insight beyond HRV-based estimation
- Unified optical engine integrating PPG and SmO_2 sensing (patent filed)
- 6–8× more compact than laboratory NIRS systems, enabling use directly on the field and in daily training
- High-rate synchronized physiological and inertial acquisition
- Designed to reduce soft-tissue injury burden by flagging muscle-specific under-recovery *before* it becomes costly downtime.
- Foundation for proprietary recovery analytics models and dataset-driven insights

Keywords

Wearables, Muscle Oxygenation (SmO_2), Near InfraRed Spectroscopy (NIRS), Sports Recovery, Photoplethysmography (PPG), Deeptech, Applied physiology

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