

Danu - a 'Conveyor Belt' of athlete care

Use Case 1: Athlete A- Professional Rugby– Complete right knee reconstruction (osteochondral injury)

The journey back from injury is often stalled by a disconnect between controlled lab exercises and real-world athletic movement. A recent case study confirms that Danu Smart Socks are filling this critical gap, operating as an essential functional monitoring tool to optimise the final stages of athlete rehabilitation, a stage that while often is the most critical, holds the least available objective data points in an athletes RTP.

The strength of the smart socks lies in their ability to maintain continuity across the entire technological ecosystem what's been described as a "conveyor belt" for athlete care. The technology fits seamlessly with the workflow of physios, rehab staff, strength and conditioning (SNC) coaches, and even main coaches.

Crucially, the socks are one of the few products that can be worn constantly throughout the rehabilitation process, incorporating in-lab testing such as load managed treadmill running, plyometric testing through to return to play protocols on-field including straight-line running up to a full team session. This functional monitoring application avoids the "break in that chain" that often occurs when an athlete transitions from a restrictive lab setting to the field.

While most teams rely on powerful tools, the Smart Socks complement these systems to provide unique mechanical insight that the others may miss:

- **Force Plates** focus on neuromuscular fatigue and asymmetries during jumps, assessing power and explosiveness.
- **GPS Devices** measure pure physical outputs like acceleration, sprinting, and load management.
- **Danu Smart Socks** measure movement mechanics: how the athlete is actually running, where compensation may have developed, providing a real-world evaluation of natural movement.

The Case for Mechanical Monitoring with Danu

Danu Smart Socks were used in the rehabilitation protocol for Athlete A who had suffered from an Osteochondral knee injury on the right leg which had required a complete knee reconstruction. The Smart Socks were used in all gait sessions to assess a variety of metrics with a focus on the Eccentric Loading patterns of Athlete A. As rehab progressed, data from all three tools showed clear asymmetries. Eventually the Force Plates and GPS data reached a plateau. Asymmetries in jumps and a left torso tilt (GPS) remained, and were simply deemed "normal for the athlete," offering little guidance for mechanical correction.

The Smart Socks were then deployed to answer a specific question at this point his rehab:
After rehab & neuromuscular activation, how is he actually running?

The socks revealed a tendency for the athlete to compensate his running mechanics by trying to swing his right foot quickly into an early heel strike to protect the injured right leg during early return-to-run sessions, a feature that was not clear during the in-lab testing, indicating a gap between gym/lab work and real-world running.

Here, the plateau identified by complementary systems was broken by a key metric imbalance: Peak Tibial Acceleration. This stark difference indicated a lack of **intent** to drive forward with the injured right leg, a mechanical issue not apparent in the other data. This can be seen as compensation and may lead to further injuries down the performance line.

The Danu Sock information informed a **Running Mechanics** block that focused on improving intent in that right limb with the SNC team. This included the use of cones as visual aids to retrain the injured limb, cueing with intent in moving the limb in a gait cycle being the primary focus.

Following the gait retraining block, the tibial acceleration imbalance immediately improved, ground contact times started to shift despite variability, and flight time began improving. Hence, confirming that the gait retraining protocol with the detailed feedback from the socks had positively impacted the athlete and their movement mechanics. The use of the socks revealed mechanical differences that were not apparent in the other tools, proving the value of continuously monitoring an athlete's running behaviour in their natural world, especially in late stage rehab.