



ACL8 Concept Narrative

The Problem: ACL injuries are among the most damaging and career altering injuries in competitive sports. In the United States, an estimated 200,000 to 250,000

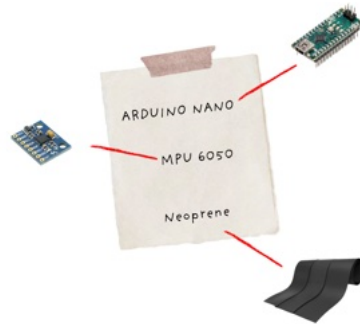
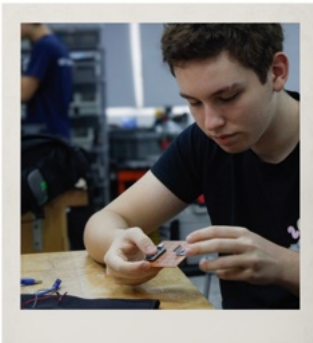
ACL injuries occur every year. Around 70 to 80 percent of ACL tears happen without physical contact, usually during movements such as cutting, pivoting, or landing from a jump. Most ACL injuries develop as athletes repeat high risk movement patterns that the human eye cannot consistently detect. Without real-time biomechanical monitoring, athletes and coaches rely on delayed physiotherapy evaluations or slow video review. By the time warning signs become visible, the athlete may already be heading toward surgery.

The Consequences: Recovery after ACL reconstruction typically requires six to twelve months and often costs athletes an entire season. Up to 30 percent never return to their previous level of performance due to fear of reinjury, instability, or loss of confidence. Reinjury is also common, with 15 to 30 percent sustaining a second ACL injury, especially within the first year of return to sport. Financial costs are high as well, with treatment and rehabilitation averaging \$17,000 to \$25,000 per athlete, not including scholarship or contract losses.

Why Prevention Fails Today: From a biomechanical perspective, most ACL injuries are considered preventable. Excessive knee valgus, poor landing mechanics, uncontrolled rotation, and abrupt deceleration are key contributors, and athletes showing these patterns may face a 4 to 6 times higher risk of injury.

Prevention programs help, but only when performed consistently and under supervision. In real world competitive seasons, compliance drops. Lab systems such as motion capture and force plates are expensive and cannot be used during live play, meaning risky mechanics often go undetected until injury occurs.

How does ACL8 work?



Our Solution: ACL8 (pronounced “accelerate”) is a smart knee sleeve that provides real time insight into how athletes move. Embedded sensors (Arduino nano, MPU 6050) measure acceleration, rotation, landing mechanics, and knee valgus

angle during every action. Data is sent to the ACL8 app, where an AI algorithm identifies patterns linked with ACL risk, such as valgus collapse, poor landing control, rotational loading, and fatigue trends.

Athletes and coaches receive immediate movement reports rather than waiting for evaluations. Over time, ACL8 builds a personalized movement profile that reports what it observes, which coaches interpret for training, recovery, and technique decisions. Team dashboards support workload management and performance monitoring.

What Makes ACL8 Unique: Knee braces provide stability but no information. Prevention apps provide guidance but cannot analyze movement in real time. Labs are accurate but expensive and not usable on the field. GPS trackers measure speed and distance but not knee mechanics. ACL8 focuses directly on movement patterns linked with ACL risk and translates sports science into daily, accessible information. The sleeve is flexible, breathable, lightweight, and practical, designed by athletes who understand high performance environments.

Target Audience: ACL8 primarily serves athletes aged eighteen to thirty-five in high-risk sports such as soccer and basketball, which rank among the highest for ACL injury rates. Female athletes experience ACL injuries at two to eight times higher rates than males, influenced by alignment, hormones, and landing mechanics. Coaches, physiotherapists, and athletic trainers also benefit through objective, data driven insights to support safer training decisions.

Understanding the Market: Current options include GPS trackers, knee braces, training apps, and clinical labs. However, none provide real time, knee specific movement analysis during live play. Training programs often fail because athletes do not receive immediate feedback. ACL8 bridges clinical biomechanics and everyday performance by providing real time movement monitoring in a portable and team friendly system.

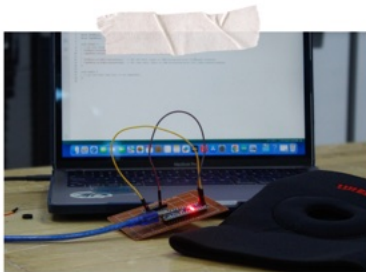
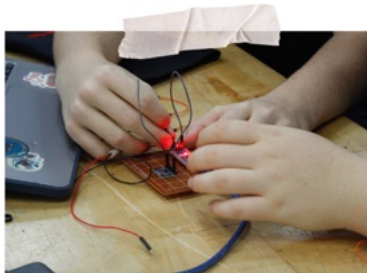
Revenue and Sustainability: Revenue will come from device sales and subscription to our pro analytics in the ACL8 app. Partnerships will include universities, clubs, academies, and rehabilitation centers. The platform can later expand to other joints and international markets.

Impact Potential: ACL8 increases athlete awareness, helps coaches detect early warning signs, and supports career longevity. As more data is collected, the machine learning model becomes increasingly accurate and helpful in the team's daily training schedule.

The Team: The founding team combines firsthand athletic experience with technical knowledge and entrepreneurial training. They have experience in sensor integration, coding, hardware prototyping, and research collaboration with industry professionals.

Next Steps: The team will refine the prototype, test with local athletes, train the AI model, and run pilot programs with local clubs and academies. They are also connecting with physiotherapists and universities and researching manufacturing options for larger scale

production. The long term vision is a compact smart knee band evolving from the current sensor equipped knee sleeve.



Sources

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