4 Points-of-Leverage + FourcePoint Technology = Clinically-Proven ACL Protection & Injury Prevention

\[ 0^\circ - 30^\circ \] keeps knee out of "at risk" position

Prevention (contact)

Prevention (non-contact)
### Contributing Factors
- Decreased knee flexion angle
- Anterior tibial shear forces
- Combined valgus and knee internal rotation moments
- Combined valgus and knee external rotation

### Incidence
- Approximately **200,000** ACL injuries per year occur in the U.S.
- **50%** of ACL injuries occur in 15-25 year olds
- **60-80%** of ACL injuries are **non-contact** related
- **Women** are **2-10x** more likely to injure ACL

### Re-injury
- The **re-injury** rate for the ACL reconstructed knee is **5%-10%**
- Risk of ACL injury to the **contralateral knee** is double that of the reconstructed knee
- Only 1/3 of reconstructed athletes attempt to play competitive sports at their **pre-injury level** within one year following reconstruction
- **1 in 5** active reconstructive athletes develop new injuries
- Fear of **re-injury** prevented competitive college and high school football players from returning to play

### References
7. Ardern CL, Webster KE, Taylor NF, Feller JA. Return to pre-injury level of competitive sports after anterior cruciate ligament reconstruction surgery: Two-thirds of patients have not returned by post-op weeks 6-12.
Reducing the risk of ACL reinjury to the reconstructed knee

Wearing a 4-Points-of-Leverage brace:

- Decreases ACL strain by 50% for anteriorly directed loads during weight bearing and non-weight bearing activities\(^1\), \(^2\), \(^3\)
- Significantly reduces tibial rotation vs. unbraced and sleeved groups\(^5\)
- May improve both proprioception and postural control\(^6\)
- Increases patient confidence after ACL reconstruction\(^7\)

Supporting Studies

Reducing the risk of ACL reinjury to the reconstructed knee

Using a brace with FourcePoint hinge technology in conjunction with a 4-Points-of-Leverage frame design:

- Significantly increases knee flexion angle at peak posterior ground reaction force (PPGRF) by $9^\circ$ vs. a standard braced knee and a non-braced knee
- No significant performance limitations were associated with the knee brace with FourcePoint hinge technology

The anterior shear force applied on the tibia was reduced by 9% for females & 13% for males.

The decrease in anterior shear force on the tibia should substantially reduce the load on the ACL.

Supporting Studies

PREVENTION (CONTACT)

Reducing the risk of contact/high impact knee ligament injuries

Football
Prophylactic brace use:
- May be effective in reducing the risk of incurring an MCL sprain in football, and generally provide 20-30% greater MCL resistance to a lateral blow
- Reduces injury rates among college football players, linemen, linebackers and tight ends when worn in both practices and games vs. unbraced players
- During one season at a Division I University, football players who wore braces missed only 43 practices and 3 games vs. 258 and 43 respectively for unbraced players
- Of the 12 knee surgeries of the season, only one occurred in a player who was wearing a brace at the time of injury
- In a 2 year study at a major Division I university football program, the number of days lost due to knee injury (and related associated healthcare costs) was reduced by 99% from year 1 to year 2 through the use of a custom fitted prophylactic knee brace in the 2nd year

Off-road Motorcycling
Prophylactic brace use:
- Reduces ACL injury rates by 50% with a 7-fold decrease in MCL injury rates

Skiing
Prophylactic brace use:
- Reduces ACL reinjury by 3-times

Supporting Studies
PREVENTION (NON-CONTACT)

Reducing the risk of injury to the contralateral knee

Wearing NO brace or a knee brace without FourcePoint hinge technology (results at 6-12 months post-op):

- 30% deficit in joint mechanics
- Asymmetry of mechanics in both knees

Wearing a knee brace with FourcePoint hinge technology:

- Improved joint mechanics on BOTH the surgical and non-surgical knees for enhanced symmetry
- Improved mechanics caused BOTH knees to act more symmetrical
- Increased peak knee flexion velocity of BOTH knees
- Helped keep BOTH knees out of the “at risk” position (0°- 30° flexion)

Supporting Studies


PREVENTION (NON-CONTACT)

Reducing the risk of non-contact ACL Injury

Significant reduction in ACL injury rate
• > 80% while wearing brace with FourcePoint hinge\(^1\)
• > 50% after training in brace with FourcePoint hinge\(^1\)
• Training effects (increased flexion angles) retained by > 50% while not wearing the brace\(^1\)
• Training in a SINGLE (one leg brace) with FourcePoint technology results in a 6-fold decrease in non-contact ACL injury rate in both knees\(^1\)
• Inertial sensor-based feedback system used in training during jump landings showed reduced key risk metrics for ACL injury\(^2\)

Training Effects – Group A
Estimated Non-contact ACL Injury Rate in Stop-Jump Task\(^*\)

Retention of Training Effects – Group B
Estimated Non-contact ACL Injury Rate in Stop-Jump Task\(^*\)

Subjects wore brace a minimum of one (1) hour 3x per week for 4 weeks

Supporting Studies
PRESCRIBE CONFIDENCE

Clinical Biomechanics Review

- Training **WITH** FourcePoint hinge will encourage the knee to stay out of the “at risk” position (0°-30° of flexion)
- Training effect **WITH** FourcePoint hinge will be retained despite intermittent brace wear
- Rehab training after ACL reconstruction **WITHOUT** a FourcePoint hinged brace leads to abnormal joint mechanics of **BOTH** knees
- Rehab training after ACL reconstruction **WITH** a FourcePoint hinged brace improves joint mechanics in **BOTH** knees

CLINICAL PERFORMANCE OVERVIEW

A brace equipped with 4-Points-of-Leverage plus FourcePoint is the most powerful, clinically-proven combination to protect and prevent injury to the ACL.

- **ACL Strain Reduction**
- **Improved Joint Mechanics** (S) & (NS) knees
- **Increased flexion angles** (both knees)
- **Significant Reduction in ACL Injury Rate** (both knees)