ACL Functional Knee Bracing
CLINICAL RESEARCH

4 POINTS-OF-LEVERAGE

FOURCE POINT TECHNOLOGY

= CLINICALLY-PROVEN
ACL PROTECTION & INJURY PREVENTION

PREVENTION (NON-CONTACT)

KEEPS KNEE OUT OF "AT RISK" POSITION

0° - 30°
**ACL INJURY: FACTS & FIGURES**

### 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

### PROTECTION

**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
- Significantly reduces tibial rotation vs. unbraced and sleeved groups
- May improve both proprioception and postural control
- Increases patient confidence after ACL reconstruction

**4-POINTS-OF-LEVERAGE STUDY**

### Supporting Studies
PROTECTION

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° vs. a standard braced knee and a non-braced knee1, 3
• Significantly decreases PPGRF during stop jump task landing and side-cutting activities
• No significant performance limitations were associated with the knee brace with FourcePoint hinge technology1

Supporting Studies

FOURCEPOINT STUDY:
FLEXION ANGLE AT LANDING

The anterior shear force applied on the tibia was reduced by 9% for females & 13% for males.5
The decrease in anterior shear force on the tibia should substantially reduce the load on the ACL.1, 4

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 blow3
• Reduces injury rates among college football players, linemen, linebackers and tight ends when worn in both practices and games vs. unbraced players1, 5
• 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 players1
• Of the 12 knee surgeries of the season, only one occurred in a player who was wearing a brace at the time of injury2
• 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 year7

Off-road Motorcycling

Prophylactic brace use:
• Reduces ACL injury rates by 50% with a 7-fold decrease in MCL injury rates4

Skiing

Prophylactic brace use:
• Reduces ACL reinjury by 3-times6

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
- > 50% after training in brace with FourcePoint hinge
- Training effects (increased flexion angles) retained by > 50% while not wearing the brace
- 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
- Inertial sensor-based feedback system used in training during jump landings showed reduced key risk metrics for ACL injury

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.