Dynamic Bracing for ACLD and ACLR Knees

The problem:

- The quadriceps muscle causes the tibia to translate anteriorly in the last 30 degrees.  
- The Hamstrings reflex is twice as slow in ACLD knees.  
- The four difficult maneuvers for ACLD knees (stopping, running downhill, landing from a jump, and lateral maneuvers) all involve an open kinetic chain phase in which the knee is more extended and the tibia is subluxed at foot strike. 
- The Hamstrings cannot control the tibia in the last 15 degrees of extension.

The solution:

- Dynamic braces use quadriceps power to place an increasingly higher force posteriorly against the tibia as the knee extends into the last 30°. 
- This force stops the tibia from translating anteriorly prior to foot strike. 
- The hamstrings respond sooner to tibial movement in a brace. 
- Symptomatic ACLD Patients using dynamic braces are able to do maximal effort isokinetic extension with no quadriceps inhibition or anterior translation and the symptoms are therefore reduced or eliminated. 
- The same subluxing forces seen in ACLD knees place high forces on ACLR ligament grafts with no protective reflexes eventually resulting in a high percentage of stretched grafts which could have otherwise been further protected by dynamic bracing.

6 Aciero etal, Orthopedics 1995;18:1101–7 