Exposing the Myths of ACL Reconstruction

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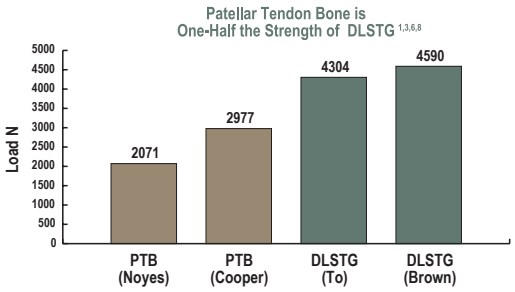
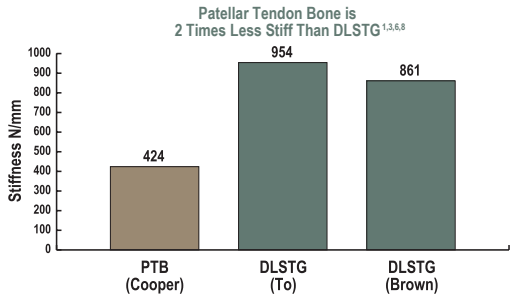
Biomechanical Myths

Myth #1 Bone-patellar tendon-bone is the strongest and stiffest graft.

Fact: Bone-patellar tendon-bone (BPTB) is one-half the strength of double-looped semitendinosus and gracilis (DLSTG).[1,3,6,8]



Fact: BPTB is half as stiff as DLSTG.[1,3,6,8]



Conclusion: The literature concludes that the double-looped semitendinosus and gracilis is the strongest and stiffest graft.[1,3,6,8]

Myth #2 Interference screw fixation of a bone patellar tendon-bone (BPTB) graft is the "gold standard" for ACL reconstruction.

Fact: The strength of BPTB fixed with interference screws is 416N.[1]

Fact: The stiffness of BPTB fixed with interference screws is 51N/mm.[1]

Fact: Slippage of BPTB graft fixed with interference screws is an excessive 3.8mm at 500N.[2]

Bone Mulch Screw vs. Interference Screw for Femoral Fixation[5,7]

Type of Fixation	Yield Load	Stiffness
BPTB w/Interference Screw	416N	51N/mm
DLSTG w/Bone Mulch Screw	1125N	225N/mm

Fact: DLSTG fixed with Bone Mulch™ Screw and WasherLoc™ strength is 903N.[7]

Fact: DLSTG fixed with Bone Mulch™ Screw and WasherLoc™ stiffness is 208N/mm.

Fact: DLSTG fixed with Bone Mulch™ Screw and WasherLoc™ slippage is .8mm in porcine bone. DLSTG fixed with Bone Mulch™ Screw and WasherLoc™ slippage is 1.8mm in human bone.[3]

WasherLoc vs. Interference Screw for Tibial Fixation[3]

Type of Fixation	Yield Load	Stiffness
BPTB w/Interference Screw	340N	248N/mm
DLSTG w/WasherLoc	905N	273N/mm

Conclusion: The literature concludes that interference screw fixation is not the gold standard for ACL reconstructions.

Rehabilitation Myths

Myth #3

Aggressive rehabilitation can be applied with all fixation methods.

Fact: Graft load can be as high as 560N with a 1500N quadriceps contraction.[2]

Fact: Endobutton femoral suspended from a tape fails at 430N.[8]

Fact: Endobutton femoral stiffness is 23N/mm.[8]

Fact: Interference screws in the tibia fails at 340N.[4]

Fact: The stiffness of an interference screw in the tibia is 248N/mm.[6]

Fact: Interference screws in the tibia slip 3.7mm at 500N.[6]

Fact: Tibial fixation with a 20mm Washer fails at 724N.[6]

Fact: Tibial fixation with a 20mm Washer stiffness is 126N/mm.[6]

Fact: Tibial fixation with a 20mm Washer slips 3.5mm at 500N.[6]

Fact: Belt-buckle/staples slips 3.3mm at 500N.[6]

Fact: Belt-buckle/staples on the tibia stiffness is 118N/mm.[6]

Fact: Belt-buckle/staples slips 3.3mm at 500N.[6]

Conclusion: The literature concludes that aggressive rehabilitation of BTB cannot be applied with all fixation methods.

Myth #4

Aggressive rehabilitation should not be used with hamstring grafts.

Fact: The DLSTG is two times stronger than BPTB grafts.[1,3,6,8]

Fact: DLSTG is stiffer than BPTB grafts.[1,3,6,8]

Fact: The Bone Mulch™ Screw/WasherLoc™ graft fixation complex meets all criteria to aggressively rehabilitate.

Fact: Extension exercises can induce loads in ACL greater than strength of most fixation methods.

Conclusion: The literature concludes that aggressive rehabilitation of hamstrings can be effective following the use of Bone Mulch™ Screw and WasherLoc™ fixation of the DLSTG.

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Bone Mulch® Screw and WasherLoc™ were developed in conjunction with Stephen M. Howell, M.D., Sacramento, California.

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