Locking Knee Joint Selection Matrix

Discretion in choosing a joint size and designing an appropriate orthosis should be used by the orthotist in all cases. We would reference and support the approach described by Lunsford[1] and agree that successful orthotic management requires a clear understanding of the condition being treated and a realistic plan to address the biomechanical deficits presented. For optimal orthotic management, the mechanical demands to be placed upon the orthosis for any given treatment must be understood prior to material selection.

The selection of the correct materials is often the difference between success and failure and we believe that the orthotist is trained and the best qualified to match the characteristics of the material to the biomechanical and functional needs of the patient.

[1]Atlas of Orthotics and Assistive Devices, 3rd Edition, Editors Goldberg B., HSU J. Mosby, pages 15-62

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Discretion in choosing a joint size, selecting the **Side Bar Material**, and designing an appropriate orthosis should be used by the orthotist in all cases. The following factors are commonly used by orthotists to help determine the level of **Biochemical Deficit**. Practical issues including compliance, occupation, environment and socail factors should also be taken into consideration.

Biomechanical Deficit Factors

- Single or multiple plane involvement
- Single multiple segment involvement
- Muscle strenghth/weakness
- Range-of-motion
- Skeletal and/or joint alignment - malalignment
- Mobile or fixed deformity
- Presence and magnitude of joint contracture
- Presence/extent of spasticity
- Proprioceptive and cognitive skills
- Progressive or non progressive condition

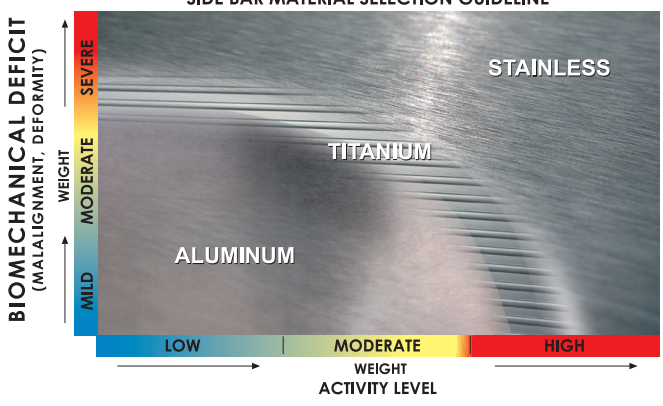
Biomechanical Deficit	Mild									Moderate									Severe								
Activity Level	Low			Moderate			High			Low			Moderate			High			Low			Moderate			High		
Knee Joints	Patients Weight LBS (kg)	80-140 (36-64)	140-210 (64-95)	210-320 (95-145)	80-140 (36-64)	140-210 (64-95)	210-320 (95-145)	80-140 (36-64)	140-210 (64-95)	210-320 (95-145)	80-140 (36-64)	140-210 (64-95)	210-320 (95-145)	80-140 (36-64)	140-210 (64-95)	210-320 (95-145)	80-140 (36-64)	140-210 (64-95)	210-320 (95-145)	80-140 (36-64)	140-210 (64-95)	210-320 (95-145)	80-140 (36-64)	140-210 (64-95)	210-320 (95-145)	80-140 (36-64)	140-210 (64-95)	210-320 (95-145)
	1001	B	A	-	B	A	-	B/A	A	-	B	A	-	B	A	-	B/A	A	-	B/A	A	A	B/A	A	-	B/A	A	-
	1002	B	A	-	B	A	-	B/A	A	-	B	A	-	B	A	-	B/A	A	-	B/A	A	A**	B/A	A	A**	B/A	A**	-
	1003	B	A	-	B	A	-	B/A	A	-	B	A	-	B	A	-	B/A	A	-	B/A	A	-	A	-	-	A	-	-
	1004	B	A	-	B	A	-	B/A	A	-	B	A	-	B	A	-	B/A	A	-	B/A	A	-	A	A	-	A	-	-
	1006*	B	A	-	B	A	-	B/A	A	-	B	A	-	B	A	-	B/A	A	-	B/A	A	-	A	A	-	-	-	-
	1007*	B	A	-	B	A	-	B/A	A	-	B	A	-	B	A	-	B/A	A	-	B/A	A	-	A	-	-	-	-	-
	1010*	B	A	-	B	A	-	B/A	A	-	B	A	-	B	A	-	B/A	A	-	B/A	A	-	A	-	-	-	-	-
	1012	B	A	-	B	A	-	B/A	A	-	B	A	-	B	A	-	B/A	A	-	B/A	A	-	B/A	A	-	A	-	-
	1013*	-	A	-	-	A	-	A	A	-	-	A	-	-	A	-	A	A	-	A	A	-	A	-	-	-	-	-
	1015	B	A	-	B	A	-	B/A	A	-	B	A	-	B	A	-	B/A	A	-	B/A	A	A	A	A	-	-	-	-
	1017	B	A	-	B	A	-	B/A	A	-	B	A	-	B	A	-	B/A	A	-	B/A	A	-	B/A	A	-	A	A	-
	1017-A38*	-	-	A	-	-	A	-	-	A	-	-	A	-	-	A	-	-	A	A	A	A	A	A	A	A	A	A	A
	2004*	B	B	-	B	B	-	-	-	-	B	B	-	B	B	-	-	-	-	B	-	-	-	-	-	-	-	-
	2009*	B	A	-	B	A	-	B/A	A	-	B	A	-	B	A	-	B/A	A	-	B/A	A	-	A	A	-	A	-	-
	S2001*	B	A	-	B	A	-	B/A	A	-	B	A	-	B	A	-	B/A	A	-	B/A	A	-	A	A	-	A	-	-
	S2003*	B	A	-	B	A	-	B/A	A	-	B	A	-	B	A	-	B/A	A	-	B/A	A	-	A	A	-	A	-	-

* Not available with titanium uprights.
** Consider ordering with Heavy Duty Rings, Model 1002-A#4HD.
NOTE: Model 1017-A38 is available with aluminium uprights only.

Steel and Aluminum Alloys:
Steel is stronger and stiffer than aluminum alloy; aluminum alloy has a lower density making it lighter. Steel is fatigue resistant and combines high strength with high rigidity, or ductility depending on the alloy. The main disadvantage of steel is its weight. The major benefit of aluminum in orthotics is its high strength to weight ratio. Aluminum does however have a lower endurance limit under repeated dynamic loading conditions than does steel. A common clinical question relates to the upright of a lower extremity orthosis in which deformation under bending stresses is very important. In general terms, if loading conditions are known to be great or highly repetitive, steel is superior to aluminum.

Considerations for preventing failure:
- Fatigue
- Bend Radii
- Stress Concentration
- Design
- Finishing

SIDE BAR MATERIAL SELECTION GUIDELINE



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