

Reference

Fantini Pagani CH, Böhle C, Potthast W, Brüggemann G-P.

Institute of Biomechanics and Orthopedics, German Sport University Cologne, Germany.

Short-Term Effects of a Dedicated Knee Orthosis on Knee Adduction Moment, Pain, and Function in Patients With Osteoarthritis

Arch Phys Med Rehabil 2010; 91:1936-41.

Products

Genu Arthro

Major Findings

With Genu Arthro:

→ Net knee adduction moment is decreased (second peak of gait cycle)

With 4° valgus adjustment: 29% lower

With neutral adjustment: 15% lower

→ Stair climbing is faster

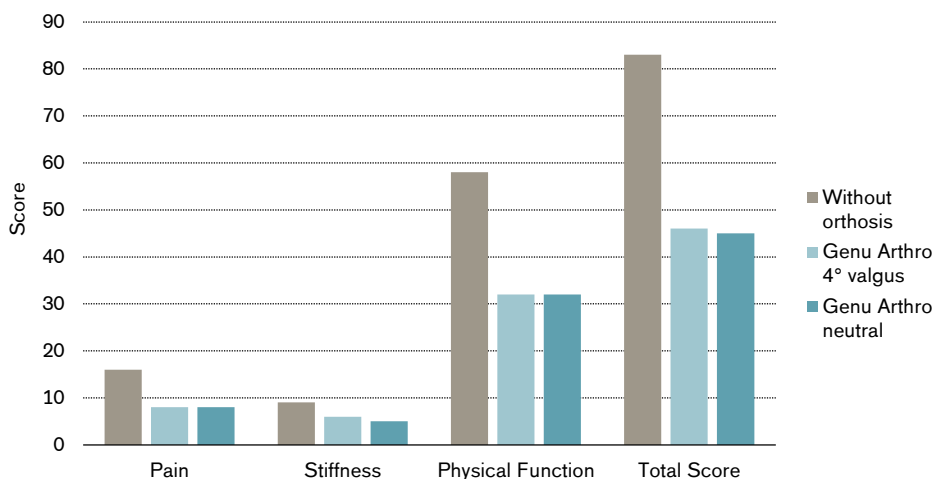
With 4° valgus adjustment: 19.5% faster

With neutral adjustment: 18.7% faster

→ Pain and stiffness are significantly reduced, physical function improved

WOMAC total score improved by about ca. 44 % under both adjustments

Pain, stiffness and physical function improved significantly

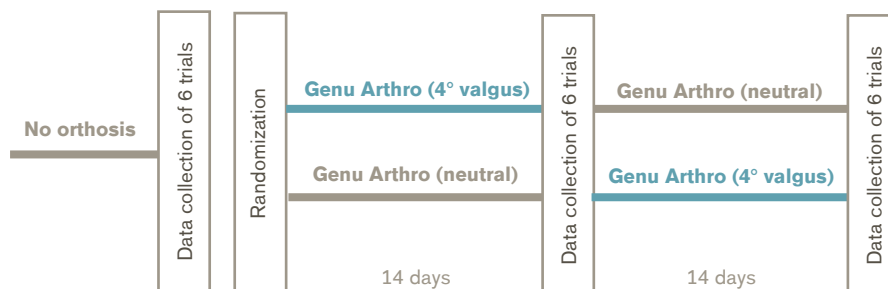


Population

Subjects: 11 subjects (8 female, 3 male)
Mean age: 55.5 ± 5.5 yrs
Mean body mass: 79.8 ± 14.3 kg
Inclusion criteria: symptomatic medial knee osteoarthritis grade II or III, absence of other musculoskeletal disorders and lower-limb surgery

Study Design

Interventional, single crossover with randomization and blinding:



Patients were randomly assigned to the order of the neutral or 4° valgus condition. They were also blinded and did not know which adjustment was made. The moments calculated using the kinematic and GRF data collected during these trials were defined as external knee adduction moments. For the conditions with orthosis (neutral and 4°), net moments were calculated by subtracting the orthosis moments from the external knee adduction moments.

Results

Functions and Activities						Participation
Biomechanics – Static measures	Biomechanics – Gait analysis	X-Ray	EMG	Functional tests	Clinical effects	Satisfaction

Category	Outcomes	Results for Genu Arthro	Sig.*	
Biomechanics – Gait analysis	External knee adduction moments	The external peak knee adduction moment (first peak) did not differ significantly.		
		The external peak knee adduction moment (second peak) was significantly lower:		
		4° valgus vs without	Neutral vs without	4° valgus vs neutral
		16.7% lower	12.5% lower	4.2% lower
		++	++	+
		The external knee adduction angular impulse was significantly lower:		
4° valgus vs without	Neutral vs without	4° valgus vs neutral		
13.1% lower	13.1% lower	No difference		
		++	0	
Orthosis moment		The orthosis valgus moment varied significantly from 0.009 Nm/kg (neutral) to 0.065 Nm/kg (4°) in the first and from 0.015 Nm/kg (neutral) to 0.064 Nm/kg (4°) in the second peak of the stance phase.		
Net knee adduction moments	Reductions of the net knee adduction angular impulse:	4° valgus vs without	Neutral vs without	4° valgus vs neutral
		29.0 % lower	15% lower	16.5 % lower
		++	++	++
		The net peak adduction moments of the first peak did not decrease significantly.		

Category	Outcomes	Results for Genu Arthro			Sig.*
		The net peak adduction moments of the second peak decreased:			
		4° valgus vs without	Neutral vs without	4° valgus vs neutral	
		25% lower ++	12.5% lower ++	14.3% lower ++	
Functional tests	Stairs - Velocity	4° valgus vs without	Neutral vs without	4° valgus vs neutral	
		19.5% faster ++	18.7% faster +	No significant difference (0)	
	6 min walk test	No significant differences were found.			
Clinical effects	WOMAC questionnaire	The pain was significantly lower:			
		4° valgus vs without	Neutral vs without	4° valgus vs neutral	
		50 % lower ++	50 % lower ++	No difference 0	
		The stiffness was significantly lower:			
		4° valgus vs without	Neutral vs without	4° valgus vs neutral	
		33.3% lower ++	44.4% lower ++	20% higher -	
		The physical function was significantly better:			
		4° valgus vs without	Neutral vs without	4° valgus vs neutral	
		44.8% better ++	44.8% better ++	No difference 0	
* no difference (0), positive trend (+), negative trend (-), significant (++/--), not applicable (n.a.)					

Author's Conclusion

"In patients with moderate medial knee OA, a 4° valgus orthosis was more effective in decreasing net knee adduction moment and net knee adduction angular impulse than a more flexible orthosis^{*)}. Both orthoses produced similar effects on pain reduction and improvement in function." (Fantini Pagani et al. 2010)

^{*)} Genu Arthro with neutral adjustment

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