Reference

Fantini Pagani CH, Hinrichs M, Brüggemann G-P.

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

Kinetic and Kinematic Changes with the Use of Valgus Knee Brace and Lateral Wedge Insoles in Patients with Medial Knee Osteoarthritis

Orthop Res 2012; 30:1125-1132.

Products

Genu Arthro vs Lateral Wedge Insoles

Major Findings

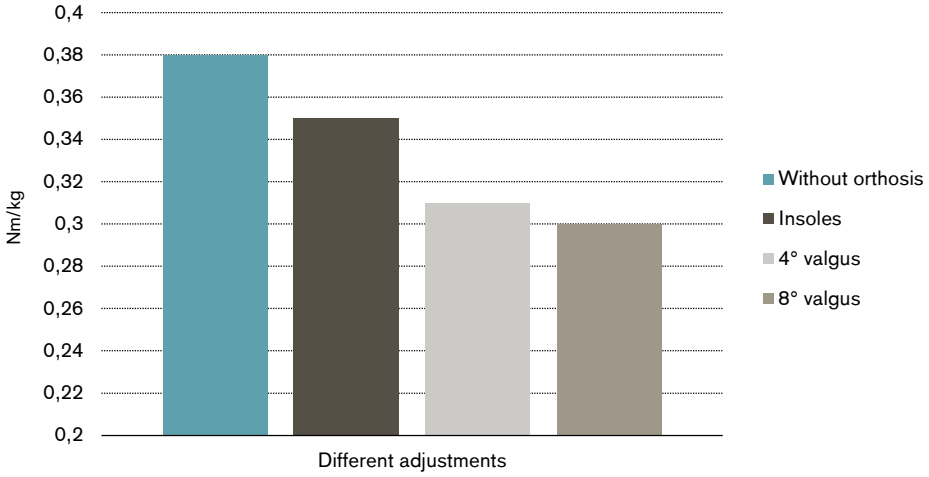
With Genu Arthro compared to lateral wedge insoles and wearing no orthosis:

→ **External knee adduction moments with Genu Arthro at the second peak of the gait cycle were**
18-21% lower than without orthosis
11-15% lower than with lateral wedge insoles

→ **Knee lever arm with Genu Arthro at 20-30% and 70-80% of the stance phase was**
9-12% shorter than without orthosis (20-30% of the stance phase)
19-21% shorter than without orthosis (70-80%of the stance phase)

The effect was twice to three times bigger than with the lateral wedge insoles.

External knee adduction moments at second peak of the gait cycle

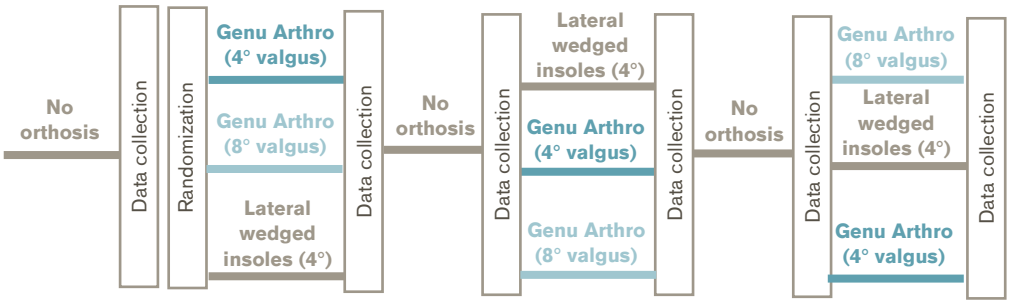


Population

Subjects:	10 patients (8 female, 2 male)
Mean age:	57.5 ± 7.1 yrs
Mean body mass:	78.8 ± 12.2 kg
Inclusion criteria:	age over 50 yrs, diagnosis of medial osteoarthritis grade II or III

Study Design

Observational, comparative:



The patients were not informed about the different adjustments of the orthosis.

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, 4° and 8°), 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 with Genu Arthro with both adjustments:	

4° valgus vs no*	8° valgus vs no	Insoles vs no	4° valgus vs insoles	8° valgus vs insoles
18% lower ++	**21% lower ++**	**7% lower ++**	**11% lower ++**	**15% lower ++**

The knee adduction angular impulse was also significantly lower under almost all conditions:

4° valgus vs no	8° valgus vs no	Insoles vs no	4° valgus vs insoles	8° valgus vs insoles
14% lower ++	**18% lower ++**	**7% lower ++**	8% lower +	**12% lower ++**

Orthosis moment	8° vs 4° valgus: **32% higher (first peak), 30° higher (second peak)**	++
Net knee adduction moment	8° vs 4° valgus: **14.7% lower (first peak), 14.8% lower (second peak)**	++
Net knee adduction angular impulse	8° vs 4° valgus: **22.2% lower**	++

Category	Outcomes	Results for Genu Arthro		Sig.*
	Knee lever arm	The knee lever arm at 20-30% of the stance phase was lower with both adjustments:		
		4° valgus vs no	**8° valgus** vs no	**Wedges** vs no
		9% lower +	**12.6% lower** **++**	5.4% lower +
		The knee lever arm at 70-80% of the stance phase was significantly lower with both adjustments:		
		4° valgus vs no	**8° valgus** vs no	**Wedges** vs no
		19.3% lower **++**	**21.4% lower** **++**	**7.1% lower** **++**

* no difference (0), positive trend (+), negative trend (–), significant (++/––), not applicable (n.a.)
no = without orthosis

Author's Conclusion

"In conclusion, the knee orthosis tested in this study and 4° laterally wedged insoles were effective in reducing knee lever arm in the frontal plane, knee adduction moment, and possibly joint load. However, a small effect size was observed with the insoles. The knee orthosis was more effective than 4° wedged insoles in reducing the external knee adduction moment." (Fantini Pagani et al. 2012)