Reference

Hesse, S., Herrmann, C., Bardeleben, A., Holzgraefe, M., Werner, C., Wingendorf, I., Kirker, S. G. B.

Medical Park Berlin Humboldtmühle, Neurological Rehabilitation, Charité - University Medicine Berlin, Germany.

A new orthosis for subluxed, flaccid shoulder after stroke facilitates gait symmetry: a preliminary study.

Journal of Rehabilitation Medicine 2013; 45 (7): 623-629.

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Products

Omo Neurexa

Major Findings

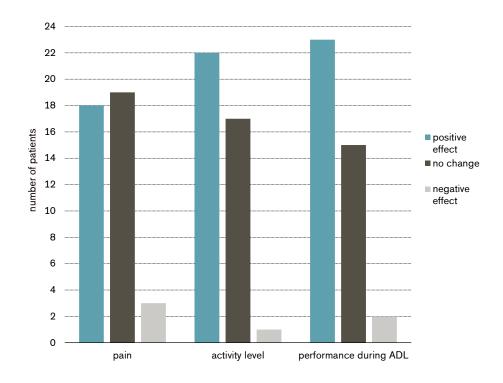
With Omo Neurexa compared to no orthotic treatment:

- → In 83.3% of radiographed patients: repositioning of the humeral head
- → 45% of patients reported a reduction of pain
- → Improved patient- and therapist-reported activity level and performance in mobility related activities of daily living
- → Significantly more symmetric gait

Prolonged hemiparetic side stance phase Higher and more appropriately timed muscle activity of the paretic quadriceps muscle

→ Very good wearing comfort and minimal odour nuisance

Omo Neurexa improved the ability of the patient to participate in daily activities



Population

Subjects: 40 patients (27 men, 13 women)

Mean age: 60.3 ± 16.7 years Time since stroke: 6.3 ± 3.3 weeks

Inclusion criteria: - first-ever supratentorial stroke

- hemiparesis

- participation in a comprehensive in-patient rehabilitation programme

- non-functional upper extremity

- subluxated shoulder

 pain in the effected shoulder, reported by the patient and/or therapist

- ability to walk at least 20 m

- no relevant impairment of pain sensation in the arm

Study Design

Before-and-after study with 4-week follow-up (with Omo Neurexa compared to no orthotic treatment)



Radiography of the shoulder and instrumented gait analysis with dynamic EMG recording with and without the orthosis was performed in 12 of the 40 patients in one trial site after at least one week of wearing the orthosis.

Results

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

Category	Outcomes	Results for Omo Neurexa	
Biomechanics – Gait analysis	Relative stance phase duration (affected leg)	Significant increase by 7.5% (from 58.8% to 63.2%)	
	Stance symmetry ratio Significant increase by 6.9% (from 0.87 to 0.93)		++
	Walking velocity	No significant differences	
	Stride length	No significant differences	0
	Cadence	No significant differences	0
	Relative double support ratio	ort No significant differences	
	Swing symmetry ratio	No significant differences	0
X-Ray	Distance between the point of the acromion	Distance decreased by a mean of 0.8 ± 0.6 cm (in 83% of radiographed patients (10 out of	++

Category	Outcomes	Results	for Omo Neurexa		Sig.*
	and a perpendicular vertical line through the central point of the hu- meral head	12)) → repos	itioning of the hum	eral head	
EMG	Lateral vastus muscle	tern of ac	% of patients had a more normal phasic pat- rn of activation in early stance phase (8 out of patients)		n.a.
	Medial vastus muscle / biceps femoris muscle	tern of ac	75% of patients had a more normal phasic pattern of activation in early stance phase (6 out of above mentioned 8 patients)		
	Medial gluteus muscle		42% of patients showed more muscle activity during the early stance phase (5 out of 12 patients)		
	Shank muscles / erector spinae muscle	r No chan	No changes in muscle activation pattern		
Functional tests	Shoulder ROM [Fugl-Meyer-score]		Mean increase: 2.2 ± 3.2 Tendency towards an increased shoulder ROM		+
	Muscle strength sum score [Medical Researc Council (MRC) grades	h	Mean increase: 6.2 ± 6.0		++
	Muscle tone	Remaine	d constant		0
			or pain, activity level	and performance of	
	related activities of daily	living Positive e	effect No change	Negative effect	
	related activities of daily Pain	Positive 6	effect No change 47.5%	Negative effect 7.5%	
	related activities of daily	living Positive e	effect No change 47.5% 42.5%	Negative effect	
	Pain Activity level Performance of mobil-	Positive 6 45% 55% 57.5% e assessmen	effect No change 47.5% 42.5% 37.5% ant of activity level and	Negative effect 7.5% 2.5% 5%	
	Pain Activity level Performance of mobility related ADL Therapist: results for the	Positive 6 45% 55% 57.5% e assessmen	effect No change 47.5% 42.5% 37.5% Int of activity level and e patients	Negative effect 7.5% 2.5% 5%	
	Pain Activity level Performance of mobility related ADL Therapist: results for the	Positive 6 45% 55% 57.5% e assessmer living for the	effect No change 47.5% 42.5% 37.5% Int of activity level and e patients	Negative effect 7.5% 2.5% 5% performance of mole	
	Pain Activity level Performance of mobility related ADL Therapist: results for the related activities of daily	Positive e 45% 55% 57.5% e assessmer living for th Positive e	effect No change 47.5% 42.5% 37.5% Int of activity level and e patients ffect No change	Negative effect 7.5% 2.5% 5% performance of mol	
Satisfaction	Pain Activity level Performance of mobility related ADL Therapist: results for the related activities of daily Activity level Performance of mobility related ADL Wearing comfort 0 = very bad	Positive e 45% 55% 57.5% e assessmer living for th Positive e	effect No change 47.5% 42.5% 37.5% Int of activity level and e patients ffect No change 27.5%	Negative effect 7.5% 2.5% 5% performance of mole Negative effect 2.5% 12.5% a score >7, indicati	pility-
Satisfaction	Pain Activity level Performance of mobility related ADL Therapist: results for the related activities of daily Activity level Performance of mobility related ADL Wearing comfort 0 = very bad 10 = excellent	Positive e 45% 55% 57.5% e assessmer living for th Positive e 70% 55% Patients:	effect No change 47.5% 42.5% 37.5% Int of activity level and e patients Iffect No change 27.5% 32.5%	Negative effect 7.5% 2.5% 5% performance of mole Negative effect 2.5% 12.5% la score >7, indicationt ne therapists rated w	ng a
Satisfaction	Pain Activity level Performance of mobility related ADL Therapist: results for the related activities of daily Activity level Performance of mobility related ADL Wearing comfort 0 = very bad 10 = excellent Odour 0 = absent	Positive e 45% 55% 57.5% e assessmer living for th Positive e 70% 55% Patients:	effect No change 47.5% 42.5% 37.5% Int of activity level and e patients Iffect No change 27.5% 32.5% 80% of patients had good wearing comform in 73% of patients the comfort with a score	Negative effect 7.5% 2.5% 5% performance of mole Negative effect 2.5% 12.5% 12.5% la score >7, indicationt the therapists rated we >7, indicating a good a score <3, indicati	ng a vearing
Satisfaction	Pain Activity level Performance of mobility related ADL Therapist: results for the related activities of daily Activity level Performance of mobility related ADL Wearing comfort 0 = very bad 10 = excellent Odour 0 = absent 10 = intolerable	Positive e 45% 55% 57.5% e assessmer living for th Positive e 70% 55% Patients: Therapists:	effect No change 47.5% 42.5% 37.5% Int of activity level and e patients Iffect No change 27.5% 32.5% 80% of patients had good wearing comfort with a score ing comfort 85% of patients had	Negative effect 7.5% 2.5% 5% performance of mole Negative effect 2.5% 12.5% 12.5% a score >7, indication the therapists rated we >7, indicating a good a score <3, indication the therapists rated one therapists rated one	ng a vearing od weal ng a dour

^{*} no difference (0), positive trend (+), negative trend (-), significant (++/--), not applicable (n.a.)

Author's Conclusion

"In conclusion, the well-tolerated shoulder orthosis improved gait quality and repositioned the subluxated humeral head, offered a good fit, eased performing activities, but did not help reduce pain. The orthosis may be a clinical option for wheelchair-bound stroke subjects with PSS when re-learning walking and performing mobility-related activities. This preliminary study does not warrant any definite conclusions on the effectiveness of the orthosis; further studies are needed to compare its effect with other models." (Hesse et al. 2013)

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