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

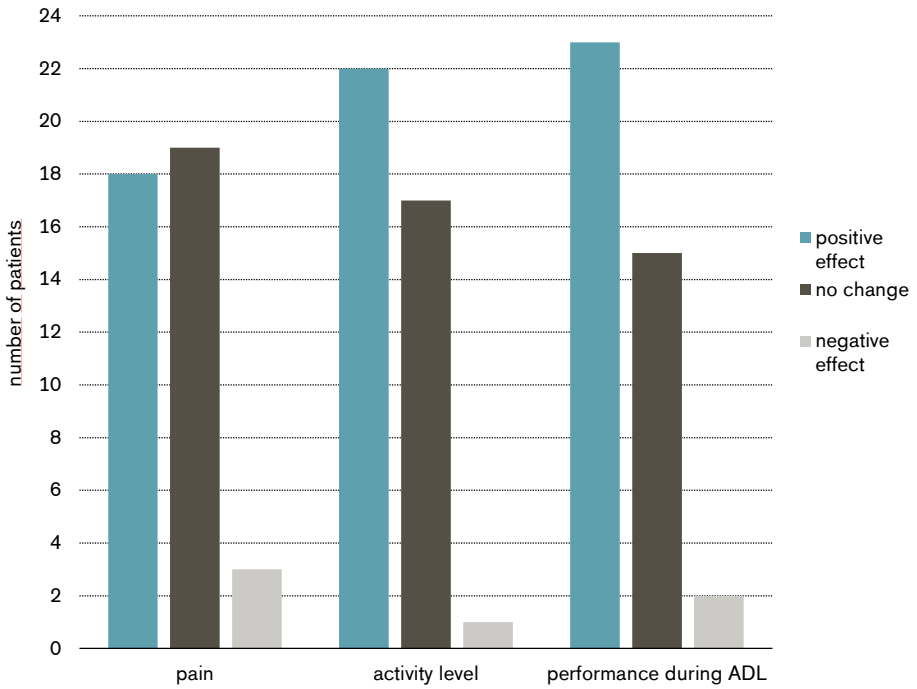
→ Significantly more symmetric gait

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

Category	Outcomes	Results for Omo Neurexa	Sig.*
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	0
	Stride length	No significant differences	0
	Cadence	No significant differences	0
	Relative double support ratio	No significant differences	0
	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 humeral head	**12))** **→ repositioning of the humeral head**	
EMG	Lateral vastus muscle	67% of patients had a more normal phasic pattern of activation in early stance phase (8 out of 12 patients)	n.a.
	Medial vastus muscle / biceps femoris muscle	75% of patients had a more normal phasic pattern of activation in early stance phase (6 out of above mentioned 8 patients)	n.a.
	Medial gluteus muscle	42% of patients showed more muscle activity during the early stance phase (5 out of 12 patients)	n.a.
	Shank muscles / erector spinae muscle	No changes in muscle activation pattern	n.a.
Functional tests	Shoulder ROM [Fugl-Meyer-score]	Mean increase: 2.2 ± 3.2 Tendency towards an increased shoulder ROM	+
	Muscle strength sum score [Medical Research Council (MRC) grades]	**Mean increase: 6.2 ± 6.0**	**++**
	Muscle tone	Remained constant	0
Clinical effects	Patient: results for the assessment of pain, acitivity level and performance of mobility-related activities of daily living		

	Positive effect	No change	Negative effect
Pain	45%	47.5%	7.5%
Activity level	55%	42.5%	2.5%
Performance of mobility related ADL	57.5%	37.5%	5%

Therapist: results for the assessment of activity level and performance of mobility-related activities of daily living for the patients

	Positive effect	No change	Negative effect
Activity level	70%	27.5%	2.5%
Performance of mobility related ADL	55%	32.5%	12.5%

Satisfaction	Wearing comfort 0 = very bad 10 = excellent	Patients: 80% of patients had a score >7, indicating a good wearing comfort
		Therapists: in 73% of patients the therapists rated wearing comfort with a score >7, indicating a good wearing comfort
	Odour 0 = absent 10 = intolerable	Patients: 85% of patients had a score <3, indicating a tolerable odour nuisance
		Therapists: in 83% of patients the therapists rated odour with a score <3, indicating a tolerable odour nuisance
	Wearing time per day	Mean: 6.8 ± 1.8 hours

* 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)