

## Therapeutic Effects of Positioning Patients with CNS-lesion-RCT

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**Background:** Positioning severely impaired patients with stroke and other acquired brain lesions is used as a matter of course, but there is little evidence regarding the effectiveness of positioning. This study compares the effects of conventional positioning (CON) with Lagerung in Neutralstellung (engl.: Positioning in Neutral [LiN]), which is a fairly new positioning concept.(Table 1)

**Aims:** To show whether LiN has more effect on the passive range of motion (pROM) of hips and shoulders and on comfort than CON.

**Methods:** In this prospective, multicenter, assessor blinded, randomized, controlled trial, we enrolled 218 non-ambulatory patients (stroke: 141, brain hypoxia: 28, head trauma: 20, other lesions of the central nervous system: 29). They were randomly assigned to LiN (n = 105) or CON (n = 113) and to 5 positions (90° side lying left, 30° partial side lying left, suLiNe, 30° side lying right, 90°side lying right). Patients remained in the allocated position for two hours. pROMs were measured with a goniometer, comfort on a three-point scale. Primary outcome measure was change of pROM of the hips, secondary outcome was pROM of the shoulders and comfort. For primary analysis, an analysis of covariance (ANCOVA) with change of pROM of the hips as dependent variable, type of positioning (LiN/CON) and type of posture as independent variable and baseline measurement as covariate was used. The pROM values are the mean of both sides.

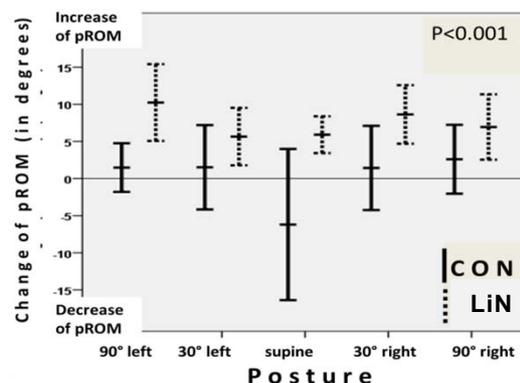
**Table 1: Characteristics of the two positioning concepts**

**Conventional Positioning**

- Positioning material is placed under defined body parts (e.g. back, arm)
- The effect on the alignment is ignored
- Body adapts to the surface
- Alignment of the body parts secondary
- Unsupported cavities may occur
- Cautious use of positioning material

**Positioning in Neutral (LiN)**

- Focus on the alignment of body parts to each other, stretch and shortening of muscles is → joints in neutral position as far as possible
- Support against gravity
- Cavities are avoided
- Paretic body parts are firmly supported by sufficient duvets and pillows



**Figure 1:** Change of flexion of the hips (mean of both sides); for Pin 12,8°, for CON 0,0°

**Results:** Hip pROM improved by 12.8° in the LiN group as compared to the CON group ( $p < 0.001$ , 95 % CI, 5.72° to 19.96°), whereas there were no changes in the CON group. The same was true for shoulder flexion ( $p < 0.001$ , 11.85° [95% CI, 4.50° to 19.19°];) and external rotation ( $p < 0.001$ , 7.08° [95% CI, 2.70° to 11.47°]). LiN was perceived as substantially more comfortable than CON ( $p < 0.001$ ).

**Conclusion:** Decreased pROM is associated with pain, limited function and delay of rehabilitation. For the first time we could show the advantage of one positioning approach over another. Only LiN showed therapeutic effects while being perceived as more comfortable. Effects of longer intervention time need to be evaluated in future.