

The GivMohr Sling for Low Tone Upper Extremities During Upright Mobility

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Background

Motor weakness or paresis/paralysis is often seen in people with Multiple Sclerosis (MS). Usually this paralysis is associated with increased tone or spasticity, however, occasionally low tone may be present. An unsupported low tone/flaccid upper extremity (UE) is at risk for injury, increased pain, functional limitations and participation restrictions. This UE has limited swing when the person is upright, which interferes with their ability to perform functional activities including balance and gait.

The role of the upper extremity (UE) during gait is complex. Reduced or inhibited arm swing in normal subjects has a negative effect on energy expenditure and induces abnormal muscle activation in the trunk and lower extremities. The majority of slings used to support a flaccid UE inhibit it's ability to move, which further limits the individuals balance and upright function.

The GivMohr Sling

The GivMohr Sling, specific for low tone UE's, is designed to position the UE appropriately while providing joint compression through the arm. The sling holds the extremity in a functional position with retraction and depression of the scapula, the humerus in near neutral rotation, and the elbow in mild flexion. This sling supports the UE while leaving it free to swing and provide counterbalance weight shifting in the upright position. The GivMohr sling places the arm in a position that facilitates arm swing during body movements, which improves balance and gait.



The Purpose/Research Question

To determine if the GivMohr sling demonstrates long term changes in gait in a subject with a flaccid UE:

- Spatial parameters of gait such as stride length or step length
- Temporal parameters such as velocity, single or double limb support time

Methods

This study is a single subject, repeated measures design, including a 61 year old female s/p stroke with right sided hemiparesis and a flaccid upper extremity. At two months post stroke (time A), and again at 6 months post stroke (time B), she walked across the GAITRite® mat, with and without the GivMohr sling in a randomly assigned order. The subject walked at a self-selected speed with standby assist for safety.

The GAITRite® mat, is a portable walkway with embedded sensors that collects temporal and spatial gait parameters as the participant walks across the mat.



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Findings

Variables	Time A	Time B
Ambulation Time (seconds)		
Walk with sling	14.0	5.5
Walk without sling	15.2	5.5
Velocity (m/sec)		
Walk with sling	26.5	69.0
Walk without sling	25.6	65.4
Step Count		
Walk with sling	12	9.0
Walk without sling	15.5	8.5
Step Length Involved Side		
Walk with sling	25.2	39.5
Walk without sling	22.8	38.3
Step Length Uninvolved		
Walk with sling	36.5	44.3
Walk without sling	26.9	45.2

Discussion

The velocity of gait is one primary predictor of functional ambulation, with .80 m/sec or greater needed for community ambulation. In addition, velocity is related to falling and quality of life. A change of as small as .05 m/sec has been shown to be clinically significant.

Use of the GivMohr sling enhanced spatial and temporal parameters of this subject's gait at both evaluation times. All aspects of her gait improved between the two testing sessions, however, the enhanced variables of increased velocity and changed step length between sides of her body when wearing the sling were still demonstrated at time B.

While low tone extremities are not the norm in people with MS, it is a possibility, perhaps due to a secondary complication. Maintaining functional mobility in individuals with MS is crucial over time, even with a flaccid extremity. The GivMohr sling is a simple and inexpensive option that not only supports and protects the UE, but properly positions it during upright postures. The sling may be an appropriate treatment option for some people with MS allowing continued safe upright activities.