



# CTBT

Centre for Transfer of  
Biomedical Technology

## TECHNOLOGY SUMMARY



### Technology Owner

University Hospital Hradec Králové

### Inventors

Marika Hrušová, MSc.  
Ondřej Němeček, MSc.

### IPR Status

Czech utility model application  
submitted PUV 2022-39935  
(priority 26. 5. 2022)

### Stage of Development

Tested prototype

### Contact

Lucie Bartošová, Ph.D.  
lucie.bartosova@fnhk.cz  
+420 727 802 314

## Positioning sling for paretic upper limb

### Background

Paresis of the upper limb is one of the most common consequences of a stroke or brachial plexus injury. Patients have difficulties controlling the paretic limb, especially against gravity so it can create overloading-induced soft tissue damage in the shoulder area, which can lead to the painful shoulder syndrome. Reduced ability of paretic upper limb to perform functional movements (e.g., reaching, grasping, and manipulating an object) leads to difficulties in performing daily activities and dependence of the individual on the help of others. In addition to the irreplaceable role of intensive rehabilitation, temporary positioning of the limb is necessary. For this, rehabilitation aids are used to improve the user's self-service and quality of life.

Common solution for positioning paretic upper limb are currently, for example, a non-woven triangular bandage or a „bag“ type arm sling in which the forearm is placed in a soft „bag“ with a free wrist. However, these aids can overload the cervical spine and cause pain, while at the same time, it can be difficult for the patient to fix the paretic limb in such aids by himself.

### Description of the Invention

Our invention is intended to be used for simple fixation of the paretic upper limb in the ideal position without the need to be hung over the neck area. The aid is intended to be used for temporary period, until the patient's condition stabilizes, and he can already be equipped with a suitable orthosis or for a temporary period until the function of the upper limb improves. The positioning sling fixes the elbow joint and the wrist of the handicapped upper limb into a „pocket“, which forms a support and ensures the ideal position of the limb by preventing damage to the muscles and joints of the upper limb. Thanks to the elastic part, there is no overloading in the shoulder area and the sling does not slip and fits well. The sling can put on by the patient himself, thus increasing patient's self-service and quality of life during recovery.

The sling is suitable for patients after a stroke, with brachial plexus paresis, peripheral paresis and after injuries of the upper limb, where temporary positioning is necessary. It can also be used, for example, in Sudeck syndrome, which is associated, among other things, with the development of edema. The use of a sling ensures a smaller bend in the elbow joint and a better lymphatic drainage of the upper limb, thus reducing the edema, enabling better rehabilitation process and minimizing the occurrence of secondary problems.

After being given instructions, the patient usually manages to put the device on the limb by himself.

### Advantages and Potential Applications

Simplicity - setting the appropriate length of the sling using velcro makes aid universal and efficient during recovery, it also improves patient's self-service during daily activities. Easy handling, confirmed by social workers and medical staff. Can be used both in home and institutional care.

*The development was supported by the Technology Agency of the Czech Republic within the programme for applied research, experimental development and Innovation GAMA 2 – Project TP01010034 – Centre for Transfer of Biomedical Technologies – PoC2.*

