

Sub-acute Specialized Rehabilitation for Children with Severe Traumatic and Non-traumatic Brain Injury

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AIM

During 2003-2017, 141 children <18 years old received treatment and rehabilitation after severe brain injury. Consequently the aim of this study was to describe how rehabilitation is organized at the sub-acute phase and to present demographics and one-year follow-up data from the TBI Unit.

INTRODUCTION

The TBI Unit opened in 2000 and covers the Eastern part of Denmark, the Faroe Islands and Greenland (figure 1).

Figure 1: Uptake area

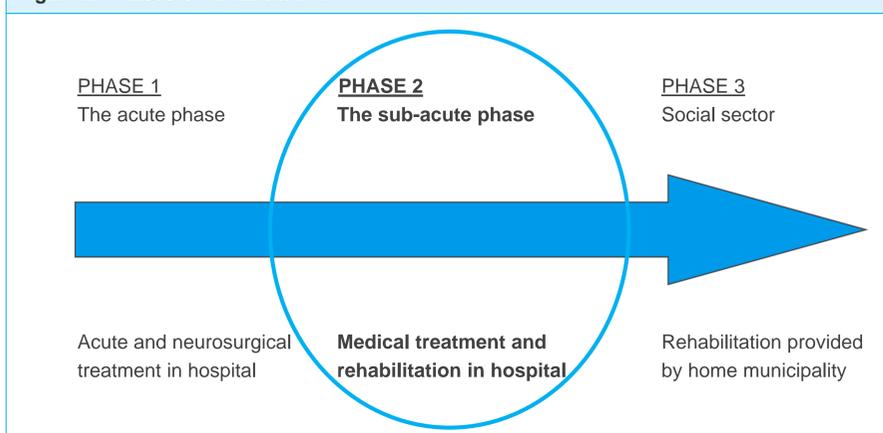


In Denmark, treatment and rehabilitation of patients with severe brain injury consists of three phases. The TBI Unit is a specialized unit in the sub-acute phase (figure 2).

The unit admits children <18 years old when respiratorically stable and fulfilling the admission criteria:

- 1) Children <5 with a Glasgow Coma Scale (GCS) from 3-9
- 2) Children >5 with a GCS from 3-11
- 3) Children with a GCS >9 with severe focal neurological deficits: aphasia, hemiparesis, agitation and cognitive deficits

Figure 2: Phases of rehabilitation



TBI UNIT

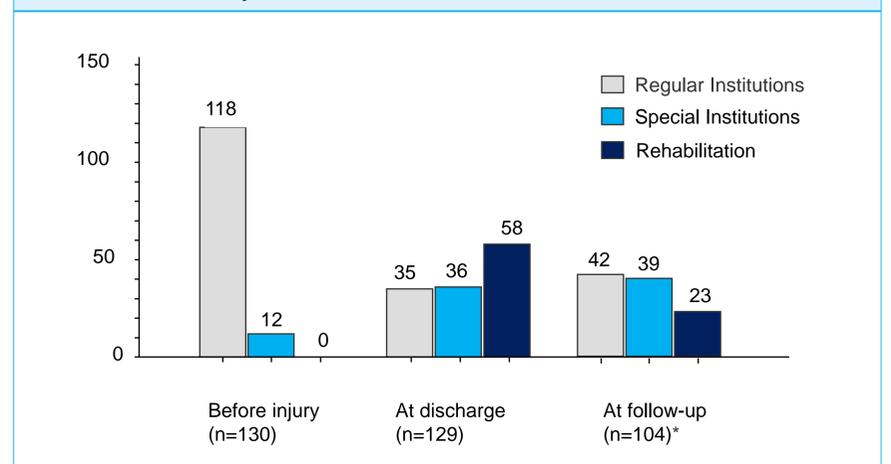
- The TBI Unit treats adults (18 beds) and children (4 beds)
- Etiology: severe traumatic brain injury, stroke, subarachnoid hemorrhage, encephalitis, anoxia or low-grade tumors
- Children receive treatment and rehabilitation provided by a team:
 - 1) pediatric neurologist
 - 2) nurse
 - 3) occupational therapist
 - 4) physiotherapist
 - 5) speech therapist
 - 6) neuropsychologist
 - 7) neuro pedagogue
 - 8) school teacher
 - 9) social worker
- The rehabilitation is continuously adapted to the child's level of consciousness, confusion and post-traumatic amnesia (PTA)
- During weekly meetings individualized rehabilitation goals are planned by the team in collaboration with the parents
- The parents receive ongoing information and psychological support
- The parents and representatives from the home municipality monthly participate in a meeting to plan the transition from phase 2 to phase 3
- Before discharge from the TBI Unit the home municipality receives a rehabilitation plan describing the needs for further rehabilitation
- One year post injury the child and the parents are invited to a follow-up meeting at the TBI Unit to evaluate the rehabilitation plan

RESULTS

Table 1: Children admitted to the TBI Unit 2003-2017 (n=141)

	n (%)
Gender: Males	74 (52)
Females	67 (48)
Etiology: TBI	53 (38)
NTBI	88 (62)
	mean (SD)
Age at injury	8.7 (5.6)
GCS at injury	5.8 (3.2)
GCS admission sub-acute phase	12.6 (2.9)
Length of PTA (TBI), days	39.5 (35.1)
Length of confusion (NTBI), days	42.8 (42.6)
Length of stay, acute phase, days	31.8 (33.7)
Length of stay, sub-acute phase, days	78.9 (49.0)

Table 2: Level of activity



Regular Institutions: At home, daycare, kindergarten, school, with no or minimal support.
Special Institutions: Special institution or special class with much and continuous support.
Rehabilitation: A specialized rehabilitation center in the daytime.

*Children/parents participated at follow-up (n=116). Follow-up data available (n=104).
Did not participate (n=25): died (n=4); <1 year (n=9), Did not want to participate (n=12).

CONCLUSION

Rehabilitation of children with severe brain injury is a complex process, where inter-professional teamwork in cooperation with the parents and home municipality is important through all phases of rehabilitation.

Children with severe brain injury:

- need a long hospitalization with treatment and rehabilitation in the sub-acute phase
- need specialized rehabilitation after the sub-acute phase longer than one year post injury
- need continuous follow-up more than one year post injury

FUTURE PERSPECTIVES

Data collection can be improved by ongoing systematic prospectively data registration from time of injury through the rehabilitation phases and late follow up.

It will contribute to:

- better understanding of the child's development in functioning over time
- better prediction of the child's need for intensity and frequency of rehabilitation over time
- more appropriate information and support to the child and the parents over time