Constraint Induced Language Therapy in Sub-Acute Aphasia

Applicability and Effect in Inpatient Multidisciplinary Neurorehabilitation

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Background

Constraint induced language therapy (CILT) is an intensive short term therapy founded on the principles of prevention of compensatory communication (constraint), shaping (induced), and massed practise (Pulvermüller, 2001; Maher et al., 2006). Previous research indicates that CILT can lead to substantial and lasting improvements in language functions in chronic aphasia (Cherney et al, 2008). Recovery after stroke is most profound in the first months after insult, but the applicability and the effect of CILT in the sub-acute phase of recovery and rehabilitation have only been sparsely investigated (Kirmess et al, 2010).
CILT is a very resource demanding method of treatment. Therefore evidence is needed to justify application of the method, especially in a sub-acute multidisciplinary setting where the timing of various rehabilitation efforts is crucial.

Aim

The aim of the current study is to investigate the applicability and the effect of CILT in stroke patients in the sub-acute phase of recovery (< 6 months post onset) in the frame of an inpatient multidisciplinary neurorehabilitation program.

Method

Design:

Prospective multiple case study design (A – B design) with follow-up.

Test I	Test II	Test III	Test IV
A Standard 2 weeks	B Standard +CILT 2 weeks	Follow-up Post CILT 12 weeks	

Figure 1. Design
Standard is inpatient multidisciplinary neurorehabilitation program including speech therapy. In the follow-up period (Post CILT) the individual participants received very different rehabilitation.

Participants:

All patients with suspected aphasia in Hammel Neurorehabilitation and Research Centre were tested with Western Aphasia Battery (WAB).

Inclusion criteria

- First-time stroke affecting left cerebral hemisphere
- Time post onset < 6 months
- Aphasia Quotient (AQ) according to WAB > 31.2 and < 93.7
- Age >18 years
- Native Danish speaker

CILT groups

Overall 11 patients were included. A CILT group was initiated when two or three patients were included. If only one patient could be included effort was made to establish a group by recruiting a second non-participant patient with aphasia who could be a co-player (e.g. patient with AQ> 93.7, patient with other aetiology, or patient with second or third-time stroke).

	Age	Education (years)	Days since stroke	Gender	Aetiology	FIM* at admission to HNRC	Classification	WAB AQ pre-CILT	Treatment hours
PA	54	13	46	M	ischemic	50	Broca	62,6	30
OC	57	11,5	75	M	ischemic	68	Conduction	60,5	28
LHH	60	12	100	M	hemorrhagic	79	Conduction	59,0	25
GJ	63	7	96	F	ischemic	86	Amnesic	79,6	30
PIV	66	17	100	M	ischemic	56	Amnesic	74,0	30
AJ	43	12	51	F	hemorrhagic	75	Amnesic	82,7	28
KG	63	17	92	M	ischemic	57	Broca	31,3	30
KJ	65	17	51	M	ischemic	110	Transcortical sensoric	58,5	30
EMH	56	14	56	F	hemorrhagic	89	Conduction	62,8	30
LH	67	11	109	M	hemorrhagic	20	Conduction	51,4	26
ET	64	14	60	F	ischemic	123	Amnesic	91,8	28
Mean	59,8	13,2	76,0			73,9		64,9	28,6
SD	6,7	2,9	22,8			27,4		15,8	1,7

Table 1. Participants
** Functional Independence Measure*

Measures

Language functions:

- Western Aphasia Battery (WAB)
- MAST (Danish version of Communicative Effectiveness Profile).

The amount and quality of communication were assessed by relatives and staff with:

- Communication Effectiveness Index (CETI).

All tests were conducted and scored by experienced speech and language therapists (SLTs), who did not participate in CILT. Scoring was carried out by at least two SLTs for accuracy.

WAB, MAST and CETI were carried out four times: Test I, II, III and IV, see Figure 1.

Estimation of depression and neuropsychological assessment were performed at Test II. Stroke severity and general level function were measured by Scandinavian Stroke Scale at admission to acute care and FIM measured latter during rehabilitation.

In this poster we only present data from WAB and FIM.

Intervention

Two periods of two weeks; Standard and Standard + CILT

Standard

- Inpatient neurorehabilitation program
- Highly qualified multidisciplinary staff
- Non-specific, non-intensive speech therapy

CILT

- Intensive speech therapy over 10 weekdays
- Three hours a day
- Group treatment with 2 – 3 participants and two SLTs
- The card game “Go fish” inciting natural verbal acts of importance in everyday life
- Constraint of compensatory communication
- Shaping of required, verbal response by tailored application of cueing, cards, and visual barriers

Results

Figure 2 shows a significant improvement in all three periods (A, B, and follow-up; p-values inside bars).
As regards to the effect of CILT the difference in improvement between period A and B is not statistically significant: p = 0.3206.
In addition improvement is maintained even with a small increase in the follow-up period.
Analysis revealed that in all three periods there was large inter-individual variation in the WAB AQ at baseline as well as in the size of improvement (Figure 3).

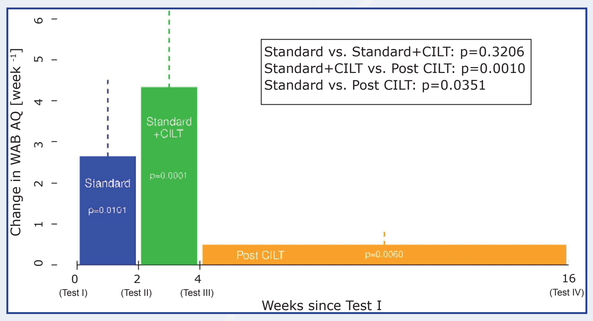

Figure 2. *Average improvement per week in the three periods: A, B, and follow-up.*

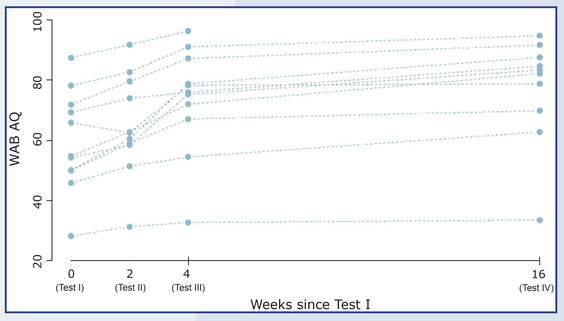

Figure 3. *Individual WAB AQ-scores at Test I, II, III and IV*

Discussion

Our study did not reveal statistically significant differences in improvement of AQ scores between a period with standard neurorehabilitation as compared to a period with standard neurorehabilitation with the addition of CILT. However, there is a clear tendency towards increased improvement in the CILT-period, and considering the rather small number of participants the results are promising.

The results indicate that gains continued after the termination of CILT. This could be due to spontaneous recovery or the findings could suggest that the impact of CILT may actively continue beyond the direct treatment-period. The latter is consistent with findings in other CILT-studies (Meinzer et al, 2005; Maher et al, 2006).

Regarding the applicability of CILT in the sub-acute phase of rehabilitation different dilemmas arise. Priorities need to be made regarding which functions are the most relevant and / or have the best prognosis.

Conclusion and perspectives

The aim of this study was to explore the application and effect of CILT in sub-acute phase. Results show with a clear tendency, that CILT improves the language function of participants. The results however are non-significant. In addition results support the notion that CILT can effectively be applied to patients with aphasia in the first months after stroke.

Further research is needed to investigate whether and why patients with different types and severity of aphasia benefit from CILT with large diversity. In addition further research should investigate the optimal time for CILT post stroke. Moreover, an important issue of further research should be whether CILT in the sub-acute phase potentates patients long-term recovery.

References

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