



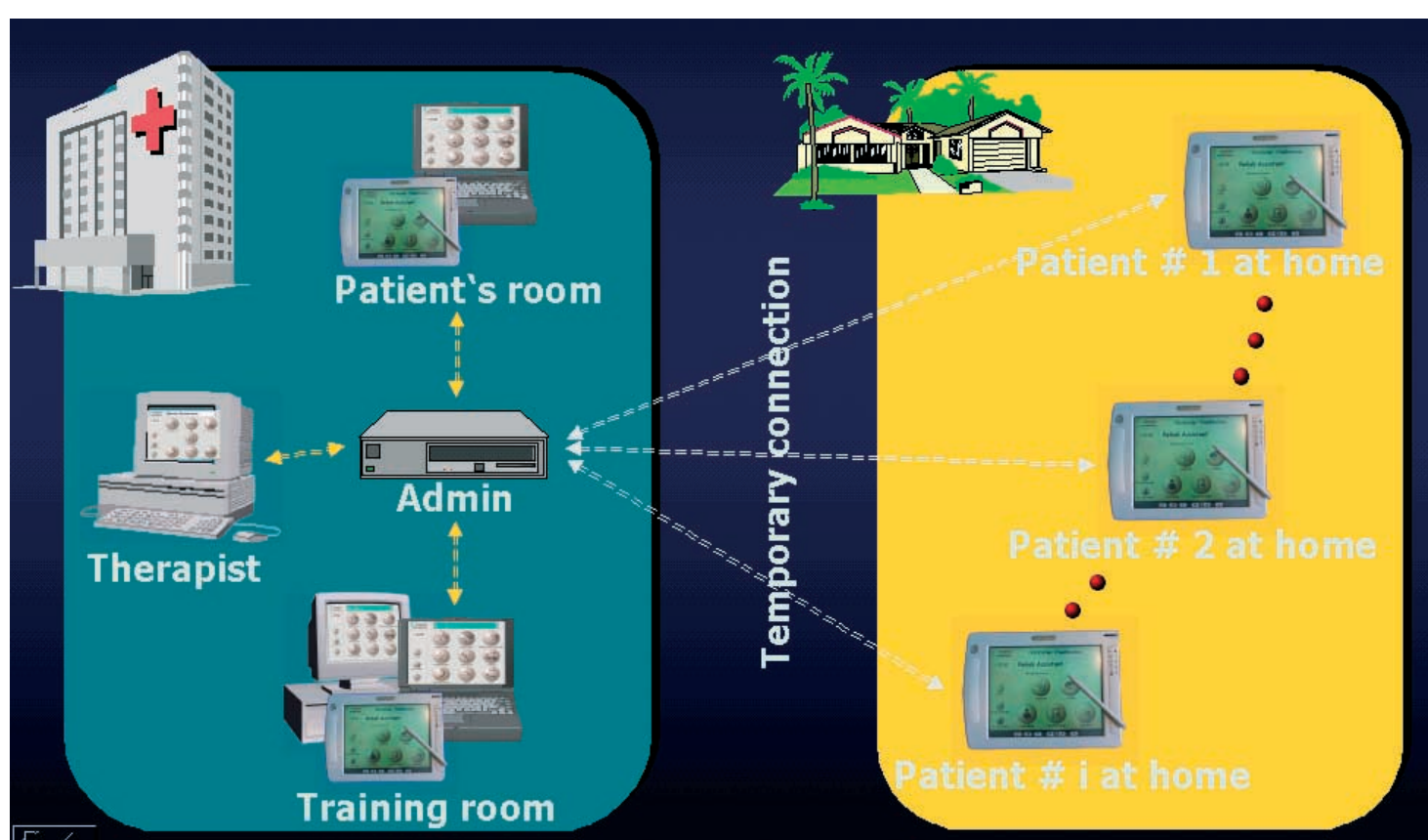
Home based neuropsychological training using tele therapy – Practicability and first results

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Introduction

Approximately 80% of all patients suffering from an acquired brain lesions (esp. stroke, TBI) show attentional deficits (van Zomeren et al, 1984). These deficits are the most frequent and long term persisting neuropsychological problems. They also have severe impact on rehabilitation outcome in general (Lezak, 1987; Robertson et al, 1997) and on the patients' private and occupational life. Some studies have proven that specific restitutorial training on attentional deficits is effective (Gray et al, 1992; Knab, 2000), when the exercises are guided and prescribed by therapists after detailed functional diagnostics. But neuropsychological therapy is rarely available outside of inpatient and outpatient rehabilitation institutions in most European countries.

System Description



Therefore, together with Siemens Medical Solutions and Dr. Hein GmbH (formerly Evosoft Tele Care) we developed a system software package for telerehabilitation in the field of neuropsychology. It includes:

- Different cognitive training software being available on the market
- Files for the prescription and monitoring the patients' performance and results by the therapists
- Tools for subjective assessments and e-mail exchange between patients and therapists
- A statistical package for training effects and evaluation (can be sent to cost bearers like social health insurances)

Patients and their therapists can do their work completely independent in time due to a server and LAN based solution meeting any data safety requirements.

First evaluation study

Following questions are to be proven:

- Is it feasible to use "teletherapy" to train alertness functions?
- How do patients accept the training of attentional functions by teletherapy?
- What's about the effectiveness of this kind of training?
- Does the training show negative side effects?

Patients and Methods

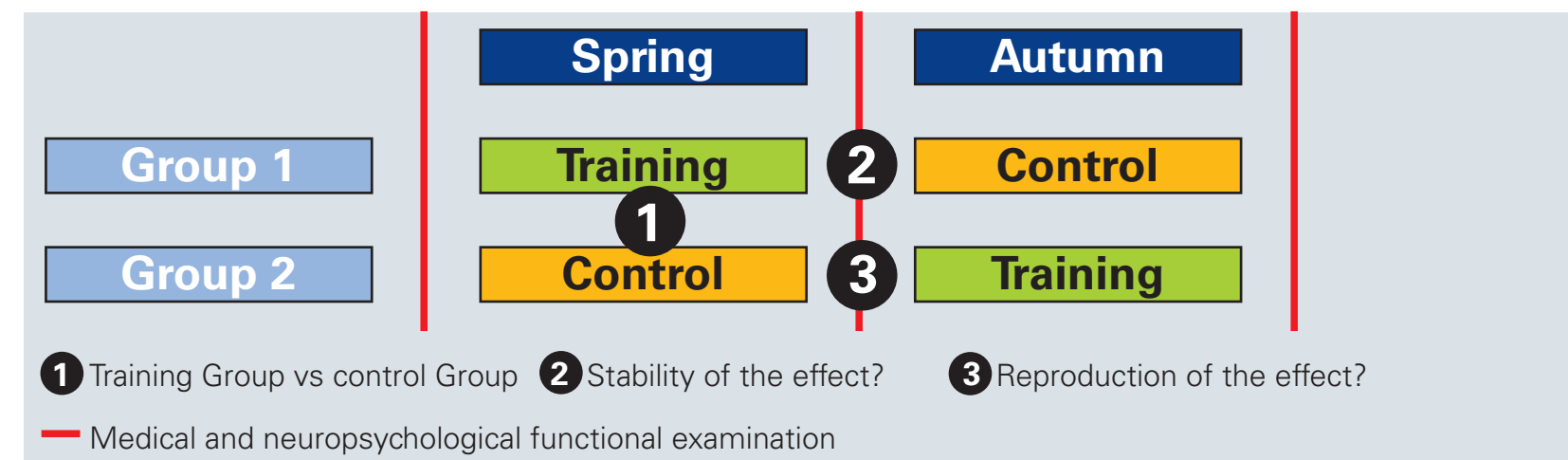
Patient Sample (N = 48):

- Age: Range 18-70, Middle (Median) 53.50 years
- Gender: female 18, male 30
- Elapsed time since acquired brain lesion: Range 5-50, Middle 26.00 months
- Types of brain lesion: cerebral infarct 71%, cerebral hemorrhage 15%, head injury 10%, other 4%
- Side of brain lesion: left 15, right 25, uncertain 8
- ADL function level: FIM score at admission Range 59-126, Middle (Median) 124.00

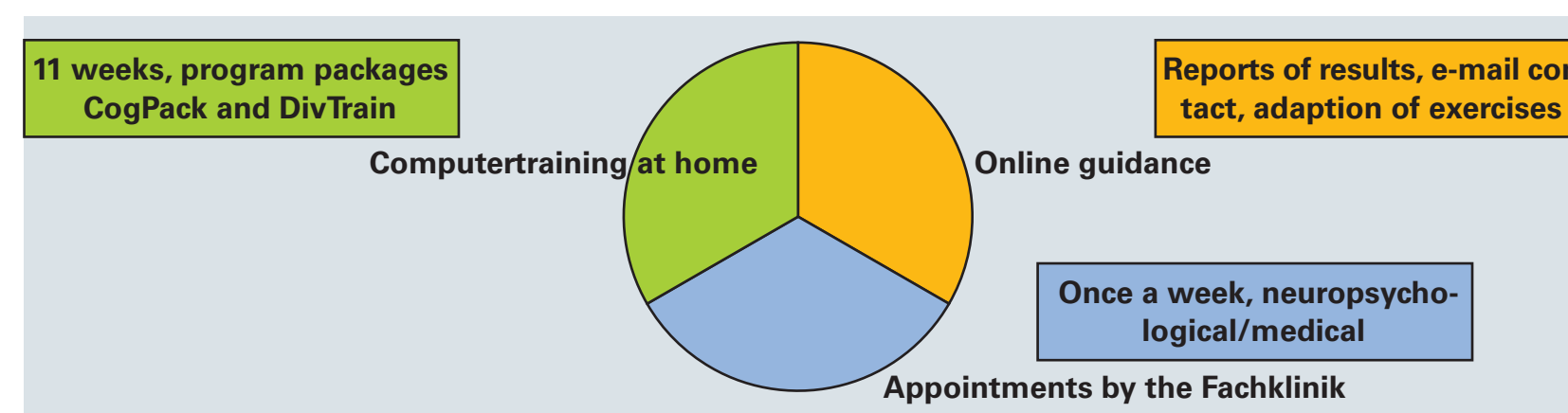
Concerning these criteria above we have built up matched pairs who have been assigned to a training and a control group for the "spring" training period.

Method:

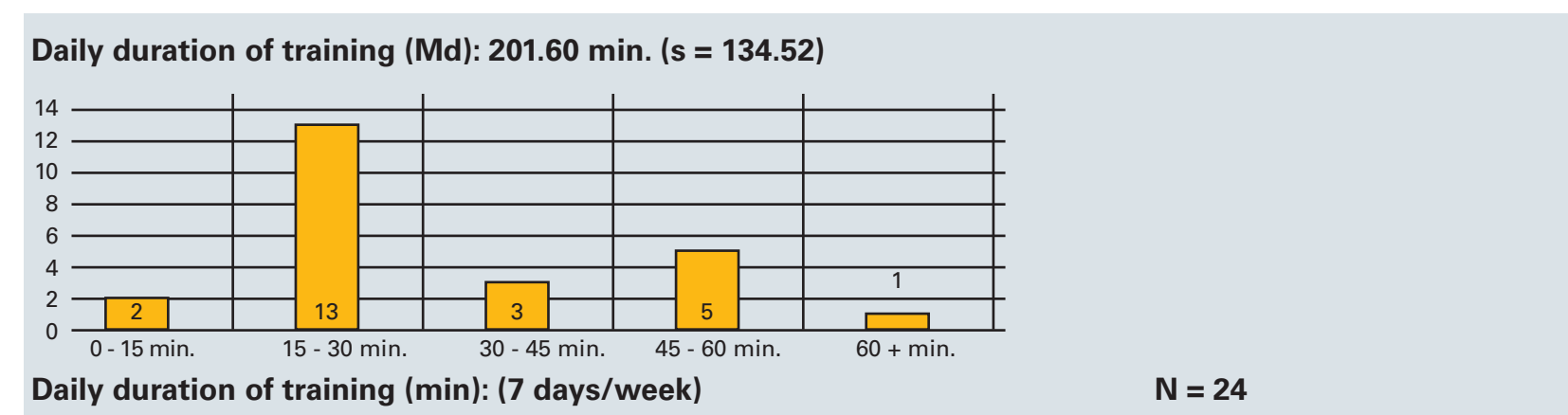
- Examinations, training periods and statistical analyses



- Elements of the neuropsychological telerehabilitation program



- Training performance



Results (for the "spring" training period, see No. 1 above)

Practicability

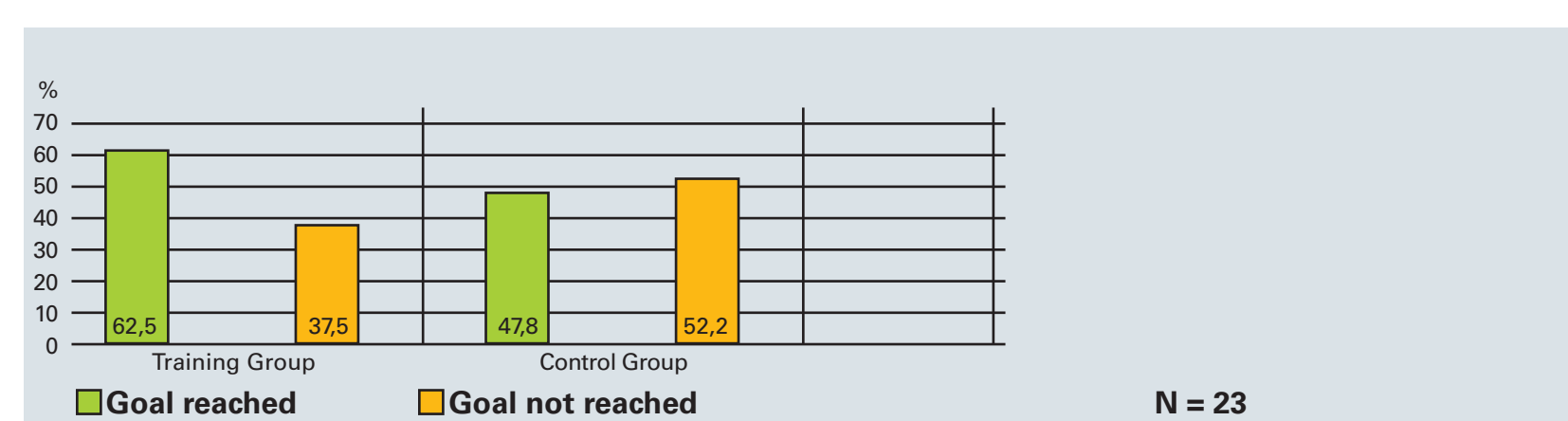
- Very high acceptance by the patients
- After some initial problems no more assistance needed at the patients' home
- Patients' demands for more variability in training software
- Personal contact to the therapist is "a must"
- System software well suitable

Therapeutic effects:

Improvements in attentional functions

The therapy goals for the subjects addressed different attention functions. Therefore the procedure for the assessment of effectiveness was developed as follows :

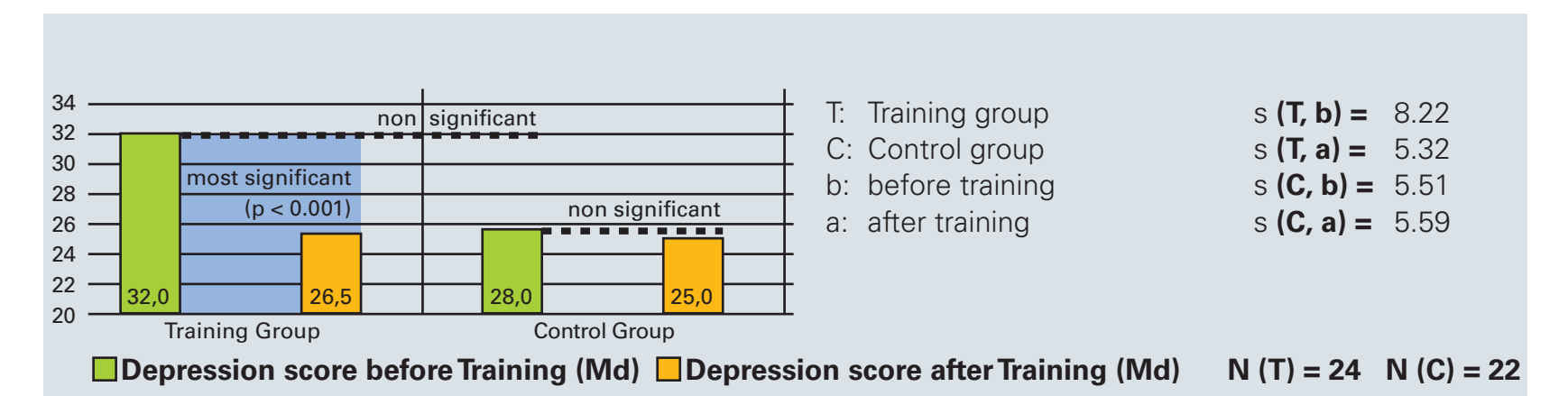
- For every subject a main focus of treatment was established
- For each main focus of treatment the critical difference was established as the therapeutic hurdle for treatment success.
- Based thereon, the variable "reaching the goal (y/n)" was set.



The differences in both groups were analysed with chi-square analyses and were not significant.

Other therapeutic side effects

- On the patients' mood functions (DSI, Kolominsky-Rabas et al, 1999)



Telerehabilitation intervention reduced depression in the training group.

- On the burden of caregiving relatives (BFSC, Graesel et al, in press):

	Md	SD	N
HPS (T, b)	25.50	16.01	14
HPS (T, a)	12.50	12.94	14
HPS (C, b)	29.00	14.44	5
HPS (C, a)	27.00	17.42	5

T: Training group
C: Control group
b: before training
a: after training

Wilcoxon and Mann-Whitney-U analyses:
Comparison of the initial scores: p=0.408
Comparison before - after (training group): p=0.003
Comparison before - after (control group): p=0.715

No negative side effects could be seen on sensorimotor deficits, spasticity or ADL functions during the training period.

Conclusions

Attentional deficits following acquired brain lesions like stroke or TBI can be trained for a long term period using a telerehabilitation equipment with one face-to-face therapeutic meeting a week. It also reduces depression in these patients and the burden of their caregiving relatives. No negative side effects could be seen. The patient only needs 15-30 minutes a day in average to perform this neuropsychological training program.

We are in work to broaden our telerehabilitation equipment in the neuropsychological field, but also in neurolinguistic field (telerehabilitation in aphasia/dysphasia) or in sensorimotor and coordinative field (telerehabilitation in paresis or equilibrium disorders).

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