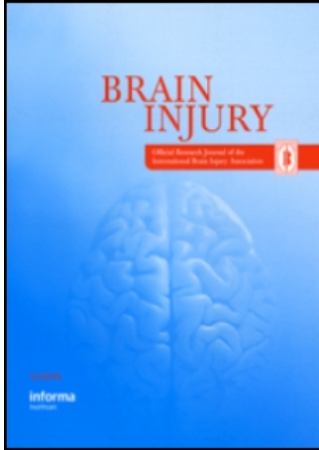


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The development of the therapeutic working alliance, patients' awareness and their compliance during the process of brain injury rehabilitation

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Abstract

Purpose: To examine the development and interaction of the therapeutic alliance, patients' compliance and awareness during the process of brain injury rehabilitation and the role of demographic and injury related variables in this process. Subjects were 86 patients who underwent a holistic neuropsychological outpatient rehabilitation programme. Patients had suffered a traumatic brain injury ($n=27$), a cerebrovascular accident ($n=49$) or another neurological insult ($n=10$).

Measures: The therapeutic alliance between clients and their primary therapists, clients' awareness and their compliance were rated four times during the 14-week rehabilitation programme. The therapeutic alliance was rated by both clients and therapist using the Working Alliance Inventory (WAI), awareness and compliance were rated by the therapists.

Results: The development of the process measures over time is described in the article. Clients' and therapists' perspectives on their alliance tended to converge over time. Clients' experience of their emotional bond with their therapist added as much to the prediction of clients' awareness as the localization of their brain injury. Clients' awareness was related to their compliance and mediated the impact of the therapeutic alliance on their compliance.

Discussion: A good working alliance is the basis of successful rehabilitative work. The article discusses therapeutic implications of the results.

Keywords: *Therapeutic working alliance, awareness, compliance, acquired brain injury, rehabilitation, process research*

Introduction

The physical, psychological and social consequences of brain injury are well documented [1, 2] and considerable effort has been made to develop rehabilitation programmes that fit the needs of such patients. The success of holistically-oriented post-acute neuropsychological outpatient rehabilitation is documented in several studies [3–6]. However, treatment success varies between patients such that even a good programme does not have the same effect on all patients. This is partly due to what does and does not happen during therapy. In psychotherapy research, there is now a strong focus on the analysis of the therapeutic process and the

impact of elements of this process on outcome. The therapeutic working alliance, patient's awareness and compliance with the treatment regimen are regarded as important process elements.

The importance of a functioning working alliance (also called the therapeutic alliance) for a successful therapy has been documented across a wide variety of therapeutic settings (for a review, see [7–9]). In Bordin's pantheoretical view, the working alliance is a combination of (a) the agreement between client and therapist on goals, (b) their agreement on how to achieve these goals (common work on tasks) and (c) the development of a personal bond between client and therapist.

Within brain injury rehabilitation, only a few studies addressed the therapeutic alliance [6, 10–13]. In all of these studies a relationship between the therapeutic alliance and outcome could be found. However, the alliance measures employed in most of these studies did not explicitly address the emotional aspects of the therapeutic alliance and none of these studies addressed patients' perspective on the therapeutic alliance. Only two studies examined the working alliance over time [10, 13]. The latter two studies do not report the alliance scores on the different time points and do not relate the therapeutic alliance to other process elements, such as patients' awareness and compliance. Moreover, little is known about the impact of brain injury on the therapeutic alliance. Summarizing, one can say that one does not know how the therapeutic alliance, patients' compliance and awareness develop and interact during the process of brain injury rehabilitation, how brain injured patients experience their alliance with their therapist and how patients' injury affects the therapeutic process.

In accordance with Prigatano [14], it is argued that a patients' behaviour is not solely determined by his or her brain injury, but also by her pre-morbid personality and the present situation. That is to say, a lack of awareness of injury and consequences has or at least can have a psychological component, such as being a defense mechanism. A trusting client-practitioner relationship can provide a structured and secure framework that may allow the patient to overcome defense mechanisms [15]. Moreover, patients' experience of a good working alliance, together with an increase of patients' awareness, may enhance patients' compliance in therapy, which generally is seen as a pre-requisite for therapeutic success [16]; for studies of the compliance within neuro-rehabilitation, see [11, 17]. What is being described here are processes well known from psychotherapy research, but with special regard to neuropsychological patients' circumstances, such as the possible impact of the brain injury on clients' awareness. The present study had the following goals, questions and hypotheses:

- (1) Description of the Working Alliance in post-acute brain injury rehabilitation with a measure that includes the emotional aspects of the therapeutic relationship. One were interested in both the patients' and their therapists' perspective. Do they agree in their perspectives on their alliance? How does their therapeutic alliance develop during rehabilitation?
- (2) Description of the development of patients' awareness and compliance during post-acute brain injury rehabilitation. One was interested

to see if awareness and compliance were stable over time or if there was any variation, for example a change to the better or worse on group level.

- (3) Examination of the effect of demographic and injury related variables on the therapeutic alliance, patients' awareness and their compliance. Apart from a general explorative analysis, frontal or right-hemisphere damages were expected to affect both the therapeutic alliance and patients' awareness negatively.
- (4) Examination of the relative importance of injury-related variables (localization and severity of injury) on the one hand and patients' experience of a good bond with their primary therapist on the other for patients' awareness. This study was interested in predicting both awareness itself and changes in awareness over time. Clinical experience tells that there is a relationship between clients' experience of a good emotional bond and their awareness in the here-and-now of the therapeutic sessions, while a good emotional bond does not necessarily mean that patients increase their awareness in general when they walk out the door.
- (5) Examination of the impact of the therapeutic alliance and patients' awareness on patients' compliance. One wanted to test if none, one or both of the following was true: (1) patients' experience of a positive therapeutic alliance with their primary therapist affects patients' compliance positively in itself by providing a constructive working atmosphere and (2) patients' experience of a positive working alliance with their primary therapist influences patients' compliance indirectly by fostering patients' awareness, which in turn affects patients' compliance. In other words, under option number 2, awareness is thought to mediate the impact of the therapeutic alliance on compliance.

Method

Subjects

Subjects included in the present study comprised patients who underwent a post-acute neuropsychological rehabilitation programme at the Center for Rehabilitation of Brain Injury at the University of Copenhagen. The rehabilitation programme accepts adult patients with acquired brain injury. The programme involves attendance at the centre for 4 days a week for ~4 months with subsequent follow-up according to individual requirements. The patients included in this study commenced the programme in groups of 15–20, twice yearly. Of the 104 patients who attended the programme

Table I. Patients' demographic and medical characteristics.

	Percentiles					<i>n</i>	%
	25%	50%	75%	M	SD		
Age at injury (years)	34.8	46.5	53.0	43.5	12.0		
Duration of hospitalization (days)	25.0	51.5	124.0	81.5	87.3		
Age at programme entry (years)	38.0	47.2	53.9	44.9	11.5		
Time between injury and admission to the programme (years)	0.64	0.90	1.30	1.22	1.08		
Sex:							
Male						55	64
Female						31	36
Type of injury							
Traumatic brain injury						27	31.4
Cerebrovascular accident						49	57.0
Other						10	11.6
Injury localization							
Bifrontal, right frontal or right hemisphere						34	40
Other						52	60

between February 2002 and December 2004, 86 participated in the study. The dropouts were due to administrative difficulties. Table I shows basic demographic and medical characteristics of the patients included in the present study. Older patients are rarely referred to the rehabilitation centre and, within this sample, the oldest patient was 60 years old at the time of injury. There was considerable variation in the duration of hospitalization (defined as a combination of acute trauma care and inpatient rehabilitation). Median duration was 51.5 days. The time between injury and programme entry was comparatively short: 55% of patients entered the programme within 1 year after their injury and 93% within 2.5 years ($M=1.22$, $SD=1.08$). These numbers were computed after deletion of the chronicity of one case who, with more than 14 years, was an outlier in this regard. The proportions of males and females were approximately equal in all diagnostic groups. Included within the 'other'-injury type category are patients with brain tumours, anoxia following cardiac arrest and with infections, e.g. meningitis.

Information was collected about the localization of the patients' brain injuries from their medical records. For the purpose of this study, patients were divided into two groups. Those with a bifrontal, right frontal or other right hemisphere cortical injury were compared with patients with any other or diffuse injury localization. Forty per cent of the patients fell into the former group, 60% into the latter. Type of injury was not related to injury localization.

Intervention

The programme involves elements of cognitive, physical and social training and it is intentionally

multi-dimensional. The centre's professional staff includes neuropsychologists, physiotherapists, speech pathologists, an occupational therapist and a special education teacher. Each patient has a primary therapist who has the role of a case manager and who guides the patient and their relatives through the process of rehabilitation, co-ordinates interventions, works on the patient's social integration and work re-entry and provides individual psychological counselling and psychotherapeutic sessions with a frequency of 1–2 sessions per week. Typically, the primary therapist is a psychologist. Further details of the programme are presented elsewhere [18, 19].

Measures

The study has a prospective design. Four times throughout the rehabilitation programme clients as well as their primary therapists completed a process questionnaire. Measurement time points were 2, 6, 10 and 14 weeks into programme, the last measurement being at programme end. At all four time points, the clients and their respective primary therapists completed a questionnaire regarding their working alliance. Also at all four time points, the primary therapists rated their clients' awareness and compliance.

For the measurement of the working alliance between the clients and their primary therapists, the short form of the Working Alliance Inventory (WAI) [20] was used. The WAI, originally developed by Horvath and Greenberg [21], is based on Edward Bordin's pantheoretical definition of the working alliance. The client/therapist short forms of the WAI comprise 12 items, each four measuring the goal, task and bond aspects of the working alliance. All 12 items together assess one general, second-order

alliance dimension [20]. The WAI short forms are standard measures in therapy process research, but were, to the authors' knowledge, not used in a brain-injury rehabilitation setting before. The item content was evaluated to be appropriate for this setting. The WAI items were rated separately and independently by the patients and their respective primary therapists on a 7-point Likert scale ranging from 1 = 'not at all' to 7 = 'a lot'. Prior to the completion of the questionnaires, both the clients and therapists were informed that their ratings would be treated as confidential, so that the therapists would not get knowledge of patients' ratings (and the reverse). However, patients were assisted in completing the questionnaires by research or administrative staff or trainees if necessary (mostly in case of aphasic problems). For the computation of the WAI sub-scales and total scale, item polarization was reverted if appropriate and mean scores were computed. WAI scores were also computed, averaged over all time points and WAI scores showing pre- to post-changes by subtracting the pre-scores from the post-scores.

Cronbach's α for therapists WAI total scale on the four time points varied between 0.86–0.89. For patients' WAI total scale, Cronbach's α varied between 0.74–0.83. The internal consistency was reduced by the two items that had a reversed polarization. Because this was true for both the clients' and therapists' scales and because one had assured clients' proper understanding of the questions, these items were not excluded from the analysis. Re-test-reliability (time point 1 vs. 4) for therapists' WAI total scale was $r=0.75$ ($p<0.001$), for the clients' WAI total scale it was $r=0.46$ ($p<0.001$). For therapists' WAI sub-scales, Cronbach's α ranged from 0.74–0.96 for the bond and task scale and from 0.60–0.67 for the goal scale containing the two reversed items and two non-reversed items. For clients' WAI sub-scales, Cronbach's α ranged from 0.78–0.88 for the bond and task scale and from 0.45–0.65 for the goal scale. Re-test-reliabilities were 0.72, 0.71 and 0.73 for the therapists' and 0.37, 0.53 and 0.69 for the patients' task, bond and goal sub-scale, respectively. The WAI therapist sub-scales were moderately-to-strongly inter-correlated, while the WAI client sub-scales varied largely. For the WAI therapist scales averaged over time, correlations were $r=0.89$ between task and bond, $r=0.65$ between task and goal and $r=0.60$ between bond and goal (all p -values <0.001). For the WAI client scales averaged over time, correlations were $r=0.81$ between task and bond ($p<0.001$), $r=0.47$ between task and goal ($p<0.001$) and $r=0.35$ between bond and goal ($p<0.01$).

For the measurement of patients' awareness, a 4-items scale was used derived from Fleming et al. [22], measuring (1) patients' awareness of their problems and strengths, (2) patients' awareness of the implications of their brain injury for their social life, (3) patients' awareness of the implications of their brain injury for their working life and (4) patients' ability to set realistic goals. The items were rated by patients' primary therapists on a 7-point Likert scale ranging from 1 = 'not at all' to 7 = 'a lot'. For the computation of the awareness scale, all four items were averaged. The internal consistencies for this scale varied between Cronbach's $\alpha=0.89$ –0.94 on the four time points, the re-test-reliability was $r=0.63$. Awareness scores were also computed, averaged over all time points and awareness scores showing pre- to post-changes by subtracting the pre-scores from the post-scores. Cronbach's α for the scale averaged over time was 0.95.

For the measurement of patients' compliance, a scale comprising five items was developed, namely (1) client participating actively in the individual sessions with his/her primary therapist, (2) client participating actively in the therapeutic community, (3) client engagement, (4) client acceptance of programme elements and objectives and (5) client following the therapist's advice. The first three items were derived from Prigatano et al. [6], the latter two items from Ezrachi et al. [23]. Four of the items were rated on a 7-point scale from 1 = 'not at all' to 7 = 'a lot'. Only patients' engagement was rated on a 5-point scale from 1 = 'active and independent, spontaneous input' to 5 = 'poor or no activity'. For further computations, the latter item was reversed and transformed into a 7-point scale. For the computation of the compliance scale, all five items were averaged. Internal consistencies for the compliance scales on the four time points varied between $\alpha=0.85$ –0.90, the re-test reliability was $r=0.72$. Compliance scores were also computed averaged over all time points. Cronbach's α for this scale was 0.87.

It should be noted that not all patients and therapists completed all questionnaires at all time points (see Tables II and III). Whenever average scores were computed over time for the process variables, valid scores were required of the clients for at least three out of the four time points. Otherwise, a missing value was coded. For inferential statistics, parametric procedures were used with α set to 0.05 (2-tailed). T -tests and ANOVAS with correction for unequal variances/violation of the sphericity assumption were employed when appropriate. Analyses were performed using SPSS 13.0.

Table II. Working alliance inventory (WAI) descriptives.

Rater	Time point	WAI scale															
		Task				Bond				Goal				Total			
		<i>n</i>	<i>M</i>	SD	<i>r</i>	<i>n</i>	<i>M</i>	SD	<i>r</i>	<i>n</i>	<i>M</i>	SD	<i>r</i>	<i>n</i>	<i>M</i>	SD	<i>r</i>
Therapist	t1	66	5.22	1.06		68	5.60	0.74		67	5.02	1.01		67	5.28	0.83	
	t2	80	5.34	1.07		80	5.75	0.85		80	4.93	1.04		80	5.34	0.88	
	t3	69	5.38	1.09		69	5.69	0.95		66	5.08	1.03		69	5.40	0.93	
	t4	82	5.38	0.96		82	5.70	0.90		82	4.85	1.05		82	5.31	0.85	
	Mean t1-t4	66	5.39	0.92		66	5.73	0.76		66	5.06	0.93		66	5.39	0.78	
Client	Pre-post changes	65	0.28 ^a	0.76		66	0.20 ^b	0.61		66	0.09	0.74		66	0.19 ^b	0.58	
	t1	63	5.65 ^c	0.96		63	5.95 ^c	0.93		63	5.19	0.10		63	5.59 ^c	0.78	
	t2	65	5.68 ^c	0.91		65	5.89	0.93		65	5.58 ^d	1.00		65	5.71 ^c	0.76	
	t3	61	5.70 ^c	0.92		61	5.75	0.98		59	5.41	1.02		61	5.62	0.83	
	t4	63	5.86 ^d	0.81		64	5.90	0.98		60	5.46 ^c	1.14		64	5.73 ^c	0.83	
Client-therapist	Mean t1-t4	61	5.73 ^d	0.75		61	5.84	0.88		59	5.38 ^d	0.95		61	5.65 ^c	0.70	
	Pre-post changes	56	0.14	0.95		57	-0.09	0.93		53	0.15	0.88		57	0.07	0.82	
	t1	61		0.09	62		0.13	62		0.49 ^e	62		0.19				
	t2	63		0.32 ^g	63		0.11	63		0.361 ^f	63		0.25 ^g				
	t3	57		0.26 ^g	57		0.12	52		0.63 ^e	57		0.37 ^f				
Client-therapist	t4	62		0.341 ^f	63		0.341 ^f	59		0.55 ^e	63		0.45 ^e				
	Mean t1-t4	60		0.31 ^g	60		0.24	58		0.65 ^e	60		0.38 ^f				
	Pre-post changes	54		0.08	56		0.12	52		0.17	56		0.15				

^a Improvement over time is significant at the 0.01 level; ^b Improvement over time is significant at the 0.05 level; ^c Client-therapist difference is significantly different from 0 at the 0.05 level (2-tailed paired-samples *t*-tests); ^d Client-therapist difference is significantly different from 0 at the 0.01 level (2-tailed paired-samples *t*-tests); ^e Correlation is significant at the 0.001 level (2-tailed); ^f Correlation is significant at the 0.01 level (2-tailed); ^g Correlation is significant at the 0.05 level (2-tailed).

Table III. Patients' awareness and compliance descriptives.

Time point	Awareness scale			Compliance scale		
	<i>n</i>	<i>M</i>	SD	<i>n</i>	<i>M</i>	SD
t1	66	4.87	1.14	52	5.69	0.89
t2	80	4.96	1.02	63	5.59	0.99
t3	66	4.91	1.19	51	5.54	1.02
t4	82	5.03	1.08	82	5.55	0.99
mean score (t1-t4)	66	4.95	0.95	52	5.68	0.78

Repeated-measures ANOVAs showed no significant variation of the awareness ratings between the four time points ($p > 0.5$) and no significant difference between pre- and post-programme scores ($p > 0.1$); Repeated-measures ANOVAs showed no significant variation of the compliance ratings between the four time points ($p > 0.5$) and no significant difference between pre- and post-programme scores ($p > 0.7$).

Missing value analysis

In this study, one cannot exclude the possibility that it were the less motivated patients who decided not to complete all questionnaires. One would expect patients' motivation in rehabilitation to be influenced by their awareness and to affect their compliance. To examine if missings were connected to poor awareness and compliance, those clients with a missing value in their averaged WAI bond ratings (missing if less than three questionnaires were completed) were compared with the remaining. The former group was only rated significantly lower on the compliance scale on time point 4 (effect size $d = 0.5$; $p < 0.05$). That is to say there is

some but not consistent evidence for the missings to be related to comparably poor compliance.

Results

Reg. question (1) Description of the working alliance

Table II shows means and standard deviations for the WAI scales on all four time points and for the scores averaged over all four time points. Repeated-measurement ANOVAs showed significant improvements on the task, bond and total WAI therapist scales over time (p -values of the linear contrasts < 0.01 for the task scale and < 0.05 for the bond and total scale), but for none of the patient scales.

Clients' and therapists' WAI ratings were compared. Clients rated the therapeutic relationship more positively on all scales and time points. The difference was significant on the task scale on all time points, on the bond scale at t1, on the goal scale at t2 and t4 and on the total scale at t1, t2 and t4 (Table II). Clients' and therapists' ratings were weakly correlated on the task scale at t2–t4 and on the bond scale at t4, while correlations were moderate on the goal scale and weak-to-moderate on the total scale (Table II). The correlations tended to rise during the programme, so that rater agreement was higher at t4 than at t1.

Reg. question (2) Description of awareness and compliance

Table III shows means and standard deviations for the awareness and compliance scores on all four time points and for the scores averaged over all four time points. Repeated-measures ANOVAs showed no significant variation of the awareness and compliance ratings between the four time points and no significant difference between pre- and post-programme scores. However, single-item analyses showed close-to-significant improvements for clients' awareness of their injury's implications for their working life, for their ability to set realistic goals and their participation in the individual sessions with their primary therapist ($p=0.09$, 0.1 and 0.11, respectively).

Reg. question (3) The role of demographic and injury data

The process measures were compared with patients' sex, age at programme start, chronicity, length of hospitalization and type and localization of injury. For the therapists' WAI ratings, alliances were found with younger patients to be rated higher on the goal scale on and across all time points ($r=-0.37$, -0.24 , -0.35 , -0.26 and -0.37 on t1–t4 and the averaged WAI therapist goal score; all p values < 0.05). The working alliance with patients with a bifrontal or right hemisphere injury was rated lower on all therapists' WAI scales at programme start than the alliance with patients with other or diffuse injury localizations. This finding was significant for the task and total scale ($t(64)=2.4$, $p<0.05$ and $t(65)=2.4$, $p<0.05$, respectively) and close-to-significant for the bond and goal scale ($t(66)=2.0$, $p<0.1$ and $t(65)=1.8$, $p<0.1$, respectively). Therapists' alliance ratings were not related to injury localization on time point 2–4. For the clients' WAI ratings, it was found that younger patients rated higher on both the task, goal and total

scales; however, not all relations reached significance on all time points ($r=-0.21$, -0.30 and -0.27 for the task, goal and total scale averaged over all time points; $p=0.1$, 0.02 and 0.04, respectively). Localization of injury showed no relation to patients' WAI ratings.

The therapists' ratings of their patients' awareness was related to patients' localization of injury. This relationship was significant or close-to-significant on all time points, with bifrontal or right-hemisphere patients scoring on average 0.61 scale points lower ($t(35.1)=2.4$, $p<0.05$). The awareness ratings were not related to length of hospitalization. In a post-hoc analysis, this study compared the patients who were up to half a year post-injury with those who entered the programme more than half a year post-injury. Both groups did not differ significantly in their awareness at programme start. However, the former group improved their awareness during programme by $M=0.88$ scale points ($SD=0.67$), while the latter group on average showed no change in awareness over time (time by chronicity interaction; $F(1, 57)=9.0$, $p<0.01$). Length of hospitalization had no impact on this finding.

Therapists' ratings of their patients' compliance was not related to patients' demographic and injury data.

Reg. question (4) The relative importance of injury and emotional bond for patients' awareness

For the examination of predictors of patients' awareness, several regression analyses had been planned. First, a sequential regression analysis was planned, with localization coded binary (bifrontal or right-hemisphere vs. other localization), length of hospitalization (as a measure of injury severity) and a term showing a possible interaction between localization and length of hospitalization entering the analysis as predictors in a first step and WAI bond clients averaged over time points entering in a second step. The dependent variable in the analysis was patients' awareness score averaged across all time points. The first step of the sequential regression analysis showed a significant contribution only of localization, not of length of hospitalization and the interaction term ($R^2=0.13$; $p=0.08$; $n=53$). When one entered the averaged WAI clients bond scale in a second step, R^2 rose to 0.22 ($p=0.02$; $n=53$). The WAI bond clients scale contributed significantly ($p<0.05$), while injury localization contributed close-to significantly ($p=0.06$). Length of hospitalization and the interaction term contributed not significantly ($p=0.21$ and 0.13, respectively). Tolerance was above 0.6

for all predictors. The model including all predictors looks as follows (standardized coefficients are shown):

$$\begin{aligned} \text{Awareness} = & -0.25 \times \text{localization} - 0.21 \times \text{hosp.} \\ & - 0.25 \times \text{local./hosp. interaction} + 0.30 \\ & \times \text{WAI bond} \end{aligned}$$

Secondly, regression analyses were computed to predict changes in awareness between successive time points and from pre- to post-programme from the same injury data and from WAI bond clients scales on one of the time points 1–3. The only significant effect found was that length of hospitalization and the interaction between hospitalization and localization predicted changes in awareness from time point 2 to 3 negatively ($\beta = -0.37$ and -0.38 , respectively; p -values < 0.05), while the WAI bond client scale did not make a significant contribution on any time point.

Reg. question (5) The impact of working alliance and awareness on compliance

To investigate if the therapeutic alliance is directly related to patients' compliance or if the effect is mediated by clients' awareness, the procedure recommended by Baron and Kenny [24] was followed. Baron and Kenny [24] claim that if a mediator relationship is present, all variables have to correlate significantly. This would also be true if the alliance affected patients' compliance directly. However, if both the predicting and the mediating variable are entered as predictors into a regression analysis, only the mediator variable should contribute significantly. Therefore, for the investigation of the relationship between the therapeutic alliance, awareness and compliance, zero-order correlations were first computed between the three variables, averaged over all time points. Correlations of $r = 0.74$ were found between awareness and compliance ($p < 0.001$), $r = 0.30$ between WAI bond clients and compliance ($p < 0.05$) and 0.28 between awareness and WAI bond clients ($p \leq 0.05$). Next, a regression analysis was computed with patients' compliance score as the criterion and patients' awareness score and WAI total clients score as predictors. Again, all three variables were averaged over all time points. The following regression equation (standardized coefficients are shown) was found:

$$\begin{aligned} \text{Compliance} = & 0.72 \times \text{awareness} + 0.10 \\ & \times \text{WAI total clients} \end{aligned}$$

The overall R^2 was 0.56 ($p < 0.001$; $n = 50$; tolerance > 0.90). Only awareness contributed

significantly to the prediction. Thereby, the requirements laid out by Baron and Kenny [24] to claim a mediating relationship were fulfilled. The results indicate that clients' experience of a good emotional bond with their therapist is not directly related to their compliance, but affects patients' awareness positively, which in turn fosters patients' compliance. Including duration of hospitalization, as a measure of injury severity, into the regression analysis did not change this pattern of results and did not itself make any significant contribution nor did the inclusion of a awareness \times working alliance interaction term.

Discussion

Methodological considerations

One is aware of the fact that the measure of injury localization could only give a rough idea of how a brain injury can affect the process of rehabilitation. Future studies addressing the relationship between brain injury and the therapeutic process should employ more detailed measures of injury localization. Problems with the use of the length of clients' hospitalization as a measure of severity of injury are described elsewhere [25–27].

Reg. question (1) Description of the working alliance

The finding that both clients' and therapists' working alliance ratings at programme start were overall positive is comparable to the large scale study of the working alliance in psychotherapeutic settings by Hatcher [28]. It was found interesting to see that only the therapists, but not the patients rated their therapeutic alliance more positively at programme end. However, with the patients starting out with higher ratings at programme start, this may be due to a ceiling-effect. If all patients and therapists are included in the pre-post comparison and not just those who have completed the questionnaire both pre- and post-programme, on a descriptive level it is actually the patients' ratings that improve more. Therefore, this finding should be interpreted with cautiousness.

The agreement between clients and therapists on their view on their alliance tended to get stronger during the rehabilitation process. This finding is in accordance with a view on the therapeutic alliance as a facet of a dynamic inter-personal relationship that develops over time. It may be of interest for therapists that their view on their working alliance with their client not necessarily reflects their client's view, especially at programme start, but that the perspectives tend to converge over time.

Reg. question (2) Description of awareness and compliance

Despite a positive trend for two of the awareness-items, the finding that patients did not improve on the awareness scale over time is at first sight contradictory to Fleming and Strong [29], who, using the Patient Competency rating Scale as an awareness measure, found that self-awareness improved from 3 to 12 months post-injury. Many of the patients in their sample had received occupational therapy in this time period. However, the patients in the sample had a longer chronicity (Table I) and the time interval under investigation was much shorter. Spontaneous recovery of brain functions, which could lead to improved awareness, may therefore be less in this sample. This assumption is in accordance with the finding that awareness is not related to injury severity as measured by length of hospitalization in the sample. Spontaneous recovery may already have been finished in most of the patients. The post-hoc finding that those of the patients with a injury chronicity of less than half a year improved their awareness during rehabilitation while others did not may be explained as an interaction of patients' experiences after discharge from hospital and therapeutic work: If patients enter a neuropsychological rehabilitation programme within the first months post-injury, this offers the possibility to guide the patients in their experience of changes in their life and identity in a secure framework and in a constructive way, making it easier for the patients to face and accept changes. Patients who enter the programme at a later stage may already have found a way of dealing with changes in their life and identity that may involve less understanding of their brain injury and its consequences than would have been possible if rehabilitation would have been offered earlier. At this later stage, work on awareness and insight may be more difficult, resulting in less progress during the programme. Future research should address if patients' coping mechanisms at programme start are a function of injury chronicity and if improvements of awareness are related to therapeutic interventions (control group design).

Compliance ratings were stable over time and re-test-reliability was fairly high, indicating that patients' compliance should not be expected to enhance if it is not subject to therapeutic interventions.

Reg. question (3) The role of demographic and injury data

It was found that younger clients had better working alliances with their therapists in their own view and, as far as concerns agreement on goals, also in their

therapists' view. An explanation might be that adolescent clients are more flexible in their goals and, therefore, easier to agree with than elder clients who are used to set and follow their own goals. As concerns the patients' ratings, one can state that younger clients generally experience a more positive alliance with their therapist.

The relationship between injury location and therapists' WAI ratings at programme start reflects the clinical experience that clients with frontal or right hemisphere damages can be difficult to work with. The fact that one could find this relationship only at programme start supports the view that the location of the brain injury can have an initial impact on the therapeutic work and, therefore, should be taken into regard when one wants to understand what happens between client and therapist, but it does not make the development of a good working alliance impossible. In this regard, it is interesting that the clients' own experience of their therapeutic alliance was not related to their brain injury.

The finding that clients' awareness was related to injury localization was expected. However, future studies should investigate the role of the brain injury in the therapeutic process in more detail.

Reg. question (4) The relative importance of injury and emotional bond for patients' awareness

As was expected, the emotional bond between client and therapist showed to add to the prediction of awareness. The emotional bond added even slightly more to the prediction than the injury localization did. This finding may be encouraging for clinicians for whom clients' awareness is a cornerstone in their therapeutic work, because the emotional bond between client and therapist is something that can be worked upon. However, if one wants clients to experience a good working alliance in general and particularly a good emotional bond, neuropsychological rehabilitation should not follow a purely technical procedure. Clients need a therapist with whom they can build up a relation and to whom they can talk. Moreover, continuity in the therapeutic work is important, not only in psychological work, but also in other rehabilitative activities. In practice, it is important to give time and space for the development of a 'good enough' therapeutic alliance early in therapy that can form the basis for therapeutic work. This may take time and resources, but the results indicate that it is worth the effort. However, the results indicate also that the impact of the therapeutic alliance on patients' awareness is limited to the here-and now of the therapeutic work and does not predict an enhancement of patients' awareness. This finding corresponds to the clinical experience that clients may be willing to face

problems in the presence of their therapist, but that awareness not necessarily improves in general. Unawareness is and remains a challenge in brain-injury rehabilitation and a good therapeutic alliance is a basis for successful work, but not necessarily the solution in itself. Future research should address how the 78% of variation in clients' awareness can be explained that the injury and alliance variables that are used did not account for. The influence of patients' pre-morbid personality, self-image and coping styles should be addressed as well as the dynamics in the patient group.

It should be noted that this study does not assume simple unidirectional relationships between working alliance, awareness and compliance. These process factors are likely to influence each other in a reciprocal process and this process should further be investigated. It is likely that patients' awareness not only is influenced by the working alliance, but that patients' awareness has an impact on the quality and development of the working alliance. The present study found in a post-hoc analysis that positive awareness ratings are predictive for positive changes in patients' working alliance ratings (task, bond and goal scale) over the four measurement time points (repeated measurement ANCOVA with awareness at programme start as a covariate; $F(3, 123) = 3.4, p < 0.05$ for the time \times awareness interaction).

Reg. question (5) The impact of working alliance and awareness on compliance

The relation between working alliance and compliance was found to be mediated by awareness. The association between awareness and compliance replicates the finding of Schönberger et al. [17]. The underlying causal pathway assumed is that a good therapeutic alliance enhances patients' awareness. Patients who are aware of their problems are the ones who engage themselves in the rehabilitation programme. However, one could imagine that the working alliance affects patients' compliance also in other ways, by providing a constructive framework for therapeutic work that in itself fosters engagement. The results indicate that this is not the case and that the alliance affects compliance only by its impact on patients' awareness. However, regression co-efficients vary between samples drawn from the same population. Therefore, it would be desirable to replicate this result. For a better understanding of the therapeutic process, it would also be desirable to compare the relation between working alliance, awareness and compliance in different brain-injury rehabilitation settings, to address what can be done to secure an optimal development of the therapeutic alliance and to examine how ruptures of the alliance

should be addressed. Moreover, it would be important to examine the role of patients' motivation in this process.

Conclusion

Apart from describing the development of central elements of the therapeutic process in brain injury rehabilitation, one could show what is well-known, but easily can be forgotten in everyday clinical work when one focuses on the training effort: The basis of successful work is that the patients experience a good working relationship, including a good emotional bond, with their therapist. This is both true for psychotherapeutic work and for cognitive and physical training, because therapeutic success is dependent on patients' engagement and patients' compliance is affected by their experience of a good working alliance and their awareness. Of course, one acknowledges the role of personality and injury related factors for patients' compliance and awareness, but one could show however compliance and awareness are fairly stable over time, they can be influenced in a brain injury rehabilitation setting. Therefore, neuro-rehabilitation should not be seen as a purely technical process, but as a process that develops between clients and therapists. It could not be shown that the therapists' view on this process is not identical with their clients' view. Due to the importance of the clients' perspective for the therapeutic process, it should therefore be part of the therapist's work to understand his or her client's perspective. The administration of the WAI might be one approach, bringing up the issue during the therapeutic dialogue another.

This study is seen as a step on the way to an integration of neurosciences and the dynamic, inter-personal process of brain injury rehabilitation. Future studies should incorporate a broader spectrum of measures of patient, therapist and inter-personal variables and outcome.

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