

Case Report

What can Comprehensive Cognitive Behavioural Therapy Achieve in People with Spider Phobia? – A Case Series

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Abstract

Background and Objectives

This study evaluated the effectiveness of an optimised and comprehensive cognitive behavioural therapy (CBT) course for spider phobia using the most up-to-date, evidence-based techniques combined into a treatment programme.

Methods

Twelve individuals with spider phobia were recruited to receive a sequential CBT package delivered by trained psychiatrists. Questionnaire measures (Fear of Spiders Questionnaire (FSQ), Fear Survey Schedule-III (FSS), Beck Anxiety Inventory (BAI)) and brain imaging techniques were used to evaluate the effectiveness of the CBT course.

Results

Scores on the FSQ and the spider related item (80) on the FSS in phobics were significantly reduced following a course of this CBT treatment and were related to the ability to cope with spiders and touch them. The overall FSS and the BAI were unchanged.

Limitations

Limitations of the work included a small sample size, two of whom withdrew pre-treatment, and one after 4 sessions. The study was conducted with a wide age range of participants (16-44).

Conclusions

Our results indicate that the CBT treatment described is effective in addressing spider phobia specifically. CBT treatment did not eradicate all spider related fear, but coping was improved very significantly. This should be discussed with patients who choose CBT treatment for spider phobia to ensure they have reasonable expectations of what therapy can achieve.

Keywords: Spider Phobia; Cognitive Behavioural Therapy; Questionnaires

Introduction

Background

Specific phobia affects a large proportion of the population, with a projected lifetime risk of 13.2% [1]. The National Comorbidity survey found that approximately a third of people with simple phobia reported that their phobia “interfered a lot” with their “life and activities” [2]. Research suggests that individuals with a specific phobia may be more likely to develop other mental health conditions including various anxiety disorders, major depression and somatoform disorders [3]. Research estimates that 1.2% of men and 5.6% of women in the developing world have a spider phobia [4]. A person suffering from spider phobia may readily admit that their fear is excessive and be unable to inhibit fear responses when exposed to spiders [5].

As medication has so far proven mostly ineffective for specific phobia, talking and exposure therapies remain the most common treatments, although a recent review found that treatments are not equally effective among phobia subtypes [6]. Effective treatment usually involves *in vivo* exposure, [7], but high drop-out rates are common [6,8].

Systematic desensitization has lower drop-out rates and higher treatment acceptance but tends to be less effective as a treatment than *in-vivo* exposure [6]. More recently virtual reality, which does not involve any exposure to the actual phobic stimulus, has been used as an effective treatment method. It can create a highly controlled environment and shows promising results for the treatments of spider phobia [9,10].

Cognitive Behavioural Therapy (CBT) as a treatment for specific phobia

CBT has also been used to treat specific phobia. Cognitive factors have a significant role in any anxiety disorder, and CBT has increased in popularity in the treatment of anxiety disorders in general. CBT aims to restructure thoughts and responses to the phobic stimulus (e.g. irrational fear) and has repeatedly shown its effectiveness in the treatment of claustrophobia (e.g. Öst et al, [11]), social phobia [12], dental phobia [13, 14], school phobia [15] and agoraphobia [16]. It can be used with a wide variety of patients and has been used successfully in adults, children & adolescents [6,17- 21]. Choy and colleagues [6] reviewed six studies examining CBT alone as a treatment. Five of these showed it to be an effective treatment and one found a negative result. Studies to date have failed to show an improvement in spider phobia outcomes when compared to *in vivo* exposure alone [22] because of a ceiling effect, as *in vivo* exposure alone is highly effective.

Straube and colleagues [23] randomised 28 subjects to a CBT

treatment group and a waiting list control group and found CBT strongly reduced phobic symptoms in the treatment group while the waiting list group remained behaviourally unchanged. Koch et al [22] found that, not only was CBT as effective as behavioural therapy in reducing behavioural, cognitive and somatic phobic symptoms in people phobic of small animals, it was also the preferred treatment choice of participants.

A series of questionnaire measures and brain imaging techniques were used to evaluate effectiveness. In this paper, we describe the behavioural outcomes and provide a comprehensive description of the course of CBT that we used.

Treatment Guide Development

Most studies use specific elements of CBT treatment. For example, Götestam [24] compared direct, modelled and video exposure. We wished to use an optimised and comprehensive CBT programme to yield the best possible outcomes in a case series. This could then be used as a gold standard treatment against which elements of treatment could be compared in neuroimaging studies seeking to establish a better understanding of the neurophysiological correlates of successful psychological treatments. We put successful elements of treatment together into a sequential therapeutic package. The sessions were drawn from existing literature on spider phobias, and made use of any reported and replicated CBT strategies that were successful. Since we were interested in the highest rates of success, rather than cost-effectiveness, or which elements of treatment were contributing to success, we were able to combine various approaches into a package (described below).

Materials and Methods

Participants and recruitment

The sample was twelve people from a clinical population sequentially referred for treatment of spider phobia. All participants were recruited directly by referral to mental health services for spider phobia treatment in one locality. Posters were also put up in schools, GP surgeries and at the local University advertising the research. Self-referral was available with GP notification. Participants were recruited if they were aged 15-45 and met the ICD-10 research diagnostic criteria for phobic disorder involving spiders [25]. This upper age limit was chosen as participants also entered a neuroimaging study [26] and was important to minimise any confounding factors from the older brain.

CBT was delivered by psychiatrists trained in treatment methods. Appointments were on a 1 - 3 weekly basis depending on patient preference and clinician availability.

Exclusion criteria included any serious mental illness requiring acute treatment that would mean that CBT for spider phobia would not be practicable. There were no ethnic or language based exclusions.

Age, gender and IQ matched controls without spider phobia were chosen for comparison.

Ethics and consent

Participants gave fully informed consent after being given an information leaflet and meeting with the study Chief Investigator. Full ethical committee and research governance approval was obtained and the study was monitored for research governance compliance.

Measures

Outcome Measures

Participants completed the following measures pretreatment and at treatment completion:-

- Fear of Spiders Questionnaire (FSQ) [27]
- Fear Survey Schedule-III (FSS) [28]
- Beck Anxiety Inventory (BAI) [29]

These measured global and specific fear, spider phobia and general anxiety.

1. Fear of Spiders Questionnaire (FSQ) [27]

The FSQ is an 18-item self-report questionnaire assessing spider phobia by asking individuals to select responses on a 7 point likert scale (from 1: does not apply to me to 7: very much applies to me) to a variety of questions relating to spiders. It has been demonstrated to discriminate phobics from non-phobics [27], as well as showing decrements in phobic responding from pre-test to post-test following cognitive therapy. Psychometrically, the measure has demonstrated excellent split-half reliability and internal consistency alongside good test-retest coefficients [27].

2. Fear Survey Schedule III (FSS) [28]

The standard FSS III is a 72 item questionnaire that asks subjects to rate their anxiety responses on a five point likert scale (from 1: not at all to 5: very much) to a variety of possible fearful stimuli relating to 6 categories (animal, social or interpersonal, tissue damage, illness and death and their associations, noises, other classical phobias, miscellaneous). The FSS III provides a way of surveying a wide range of reasonably common fears over a short time period and has been regarded as psychometrically well suited as a screening instrument [30] for screening individuals before behavioural therapy [28]. A

108 item version of the FSS has also been produced which includes an item (number 80) asking respondents to specifically rate their fear to "harmless spiders". Although we selected this, for subscale analysis we used the 72 items of an earlier version of the scale as we were unable to find validated subscales for the 108 item version. Regardless of the version used an overall score is generated, from the addition of each item response, between 0 and 288 (72 item) or 0 to 432 (108 item).

3. Beck Anxiety Inventory (BAI) [29]

The BAI is a self-report questionnaire comprising twenty-one questions about how the subject has been feeling in the last week. Questions cover both physiological and cognitive symptoms of anxiety. Participants respond to each question by ticking one of four options scored between 0 and 3 (not at all (0), it didn't bother me much (1), it was very unpleasant but I could stand it (2), I could barely stand it (3)). The BAI has a maximum score of 63 with scores between 0-7 indicating a minimal level of anxiety, 8-15 a mild level, 16-25 a moderate level and 26-63 a severe level.

The BAI has been shown to have good reliability and validity [31], internal consistency and test-retest reliability [32].

Treatment sessions

Treatment was delivered using a structured approach by the 2 study psychiatrists.

The treatment sessions aimed to:

- **Use psychoeducation** exploring misbeliefs about the dangerousness of spiders and the psychological reasons for the maintenance of fear [23]. Discussions included evolutionary theories of the origins of Spider Phobia, such as the idea that a fear of the spider shape might be protective and adaptive near the equator where some spiders are poisonous. Phobic genes may code for survival in places where spiders can kill, but become a liability in environments where spiders are not dangerous.

- **Address negative beliefs** about ability to cope in an encounter with a spider [33]. We paid attention to disgust responses, which have been shown to be associated with phobias [34, 35] as well as fear responses [36], especially in females [37].

- **Address irrational beliefs** about spiders [17,23, 33] and seek reattributions about their danger. Participants were asked to rate a range of animals and insects for the risk of bite, infection, allergic reaction or death on a 100 point scale. They were asked to compare a spider to a rat, bee, wasp, mosquito, fly and daddy-long-legs. Participants were also asked to rate their feelings of fear and disgust towards each creature. This

invariably produced a clear graphical demonstration of how their fear of a spider was disproportionate to the risk of harm it poses compared to other creatures.

- **Reduce vigilance, preoccupation and selective attention** which heighten both spider awareness and anxiety [38].
- **Reduce avoidance behaviour** [17,23,38].
- **Provide gradual exposure to a hierarchy of spider stimuli** [23] in conjunction with the cognitive positive coping strategies. Initially pictures of spider cartoons and drawings were used followed by photographs of spiders, plastic spider toys and dead spiders. The participants were then presented with live spiders in a glass jar, then free on the table or floor, then the therapist would model the spider running across his/her hands.
- Provide **modelling** of exposure and coping [17,24], including video exposure [24].
- **Maintain exposure until anxiety subsides** [17,23]. Emphasize therapist and participant teamwork to “break down” the participant’s phobia [17].
- **Provide therapist directed live exposure** [17,23,24,39].
- **Use self exposure to spiders outside sessions**, with an emphasis on viewing chance exposure to spiders in naturalistic settings, as an opportunity *to practice coping responses in daily life situations* [17, 23]. Discussion about the relationship between fear and coping were pursued. It was emphasised that although instinctive fear may not be completely eradicated by treatment, coping could be significantly improved in the presence of a spider.
- **Promote “overlearning” and coping memories** so that the participant reaches their goal of exposure on multiple occasions during the treatment course [17]. Most people could only identify memories involving an inability to cope in the presence of a spider. The safe therapeutic space was used to lay down new memories of coping, and participants were encouraged to repeat experiments at home to apply such memories across different environments.

Additional aspects included:

- **Reattribution of unhelpful personifications**
The participants were asked to write 10 adjectives to describe the personality of a spider emphasising the importance of imagination in appraisal of fear. These descriptions invariably included words like “mean”, “sneaky”, “evil”, “shifty”, “unpredictable”, “aggressive” and “manipulative”. Some described a

spider as ‘like a rapist’ or ‘a thief in the night’. They were asked to experiment with alternative personifications, and they generated examples including ‘vulnerable’ ‘elderly’ ‘frightened’ ‘playful’ ‘childlike’. Taking this further the participants were encouraged to expand these images and make suggestions of other personifications. Examples were a gangly shy teenager or a frail old lady who is lonely and frightened. When faced with a live spider the participants were encouraged to give it a name and a benign personification.

- **Understanding automatic interpretation of spider body language** and the misattributions this creates. Humans’ tendency to automatically decode body language in each other was discussed in the context of the anthropomorphisation of spiders. For example, participants were asked to consider who they might avoid at a party based on that person’s body language. They suggested people “standing watching in a corner”, “looking aggressive and agitated”, “with sudden changes in movements” and “unpredictable”. Many descriptions were similar to those given in their earlier personification of a spider. Many participants felt that their reading of “body language”, movement and position might be enhancing fear. Alternative reasons for a spider’s body language were discussed including the need for food, warmth, staying alive and reproduction. The spiders fear of humans, and their desire to hide or escape and be safe was also discussed. The logic of decoding spider “body language” as if they were human was challenged.

- **Examining live spider behaviour**

The participants were encouraged to learn from the experience that spiders are predictable as they move away when touched, and this was demonstrated with live spiders in the room. Better understanding of a spider’s response to humans was elicited by encouraging participants to touch live spiders to demonstrate the ‘fear’ and survival instinct of the spider (often directly contradicting the belief of the participants that the spider would turn and run towards them). This demonstrated that no matter which spider leg was touched the spider invariably ran away. This began with the therapist modelling after which the participant took control. They habituated to fear by multiple repetitions.

- **Self-awareness of improvement.** The principles of desensitisation and habituation were discussed. The participants were asked to rate their fear at regular intervals and encouraged to be aware of how their fear rating reduced both within a session and between sessions.

These cognitive techniques were offered to the participants as pieces of ‘a jigsaw of strategies’ that would help them cope when in the presence of a spider.

Results

12 people (2 male, 10 female) were recruited for treatment (mean age 29; range 16-44). They included two participants who consented and then withdrew because they left the area. One participant completed four sessions and then decided to withdraw because of time restraints. The remaining nine completed the treatment programme. By the end of treatment all were able to achieve the goals of being able to take a spider from a room by covering it with a jar, applying a lid and dropping it outside. All nine were regularly able to touch large, live English common spiders in sessions. Eight were able to repeatedly let them run across their hands.

The mean number of sessions was 14.5 (range 6-26).

Baseline differences

Ratings on the three questionnaires for all phobics who completed the treatment (SP1) were compared with those of 11 non-phobic participants (C1). The differences between these groups are summarised in table 1. To address the issue of multiple comparisons we adjusted the cut-off for significance according to the number of conducted t-tests using the Bonferroni method. Therefore, the level of significance for these contrasts was set at $p < 0.016$. Phobic participants recorded significantly higher scores than controls on the FSQ ($SP1_{M(SD)} = 99.44, (9.98)$; $C1_{M(SD)} = 23.27 (7.41)$, $t = 19.58$, $df = 18$, $p < 0.001$) (see table 1).

Table 1. Score differences between spider phobics' pre-treatment (SP1) and controls (C1) for the FSS, FSQ and BAI.

	Phobics		Controls		Mean difference	t	p
	M	(SD)	M	(SD)			
Fear of Spider Questionnaire (FSQ)	99.44	9.98	23.27	7.41	76.17	19.58	0.001**
Fear Survey Schedule (FSS)	48.22	15.37	69.64	37.30	-21.41	-1.73	0.105
Beck Anxiety Inventory (BAI)	10.11	5.06	7.64	7.32	2.47	0.85	0.402

** $p < .001$

Legend: M - mean score, SD - standard deviation, t - test statistic

Table 2. 72 Item FSS subscale results comparison between phobics pre-treatment (SP1) and controls (C1).

	Phobics		Controls		Mean difference	t	p
	M	(SD)	M	(SD)			
Animal	3.67	1.73	4.82	3.40	-1.15	-0.92	0.370
Social or Interpersonal	9.44	3.00	16.82	12.44	-7.37	-1.89	0.083
Tissue Damage, Illness, Death	9.67	7.69	16.18	9.19	-6.51	-1.69	0.108
Noises	1.00	1.22	2.45	2.16	-1.45	-1.79	0.090
Other classical phobias	6.33	3.96	7.09	3.93	-0.75	-0.42	0.675
Miscellaneous	4.78	2.43	7.36	4.61	-2.58	-1.60	0.128

Legend: M - mean score, SD - standard deviation, t - test statistic.

No significant differences between the two groups were ob-

served in the more general FSS (see table 2) total mean score ($SP1_{M(SD)} = 48.22, (15.37)$; $C1_{M(SD)} = 69.64 (37.30)$, $t = -1.73$, $df = 18$, $p = 0.105$) or BAI ($SP1_{M(SD)} = 10.11, (5.06)$; $C1_{M(SD)} = 7.64 (7.32)$, $t = 0.85$, $df = 18$, $p = 0.402$). There were no statistically significant differences on any of the 6 FSS subscales (Animal, Social or Interpersonal, Tissue Damage, Illness and Death and Their Associations, Noises, Other Classical Phobias, Miscellaneous). The question on the 108 item version of the FSS relating to the fear of "harmless spiders" (item 80) showed a statistically significant difference ($SP1_{M(SD)} = 3.67, (0.50)$; $C1_{M(SD)} = 0.45, (0.68)$; $t = 11.69$, $df = 18$, $p < 0.001$).

Post-treatment differences

Spider phobics' ratings before and after therapy were compared for those completing treatment (n=9). Scores on the FSQ post CBT were significantly lower when compared with pre CBT scores ($SP1_{M(SD)} = 99.44, (9.98)$; $SP2_{M(SD)} = 49.00 (11.67)$, $t = 9.62$, $df = 8$, $p < 0.001$) (see table 2). The differences between pre and post CBT scores for the FSS ($SP1_{M(SD)} = 48.22, (15.37)$; $SP2_{M(SD)} = 31.78 (11.67)$, $t = 2.57$, $df = 8$, $p = .032$) and BAI ($SP1_{M(SD)} = 10.11, (5.06)$; $SP2_{M(SD)} = 4.56 (4.58)$, $t = 2.59$, $df = 8$, $p = 0.033$) were not significant when the Bonferroni correction was applied although interestingly these scores did decrease (see tables 3 and 4). The difference pre and post on the spider item in the FSS was significant ($SP1_{M(SD)} = 3.67, (0.50)$; $SP2_{M(SD)} = 1.78, (0.97)$; $t = 5.37$, $df = 8$, $p = 0.001$).

Table 3. Scores before (SP1) and after (SP2) therapy (n=9) in phobic participants.

	Pre CBT scores		Post CBT scores		Mean difference	t	p
	M	(SD)	M	(SD)			
Fear of Spider Questionnaire	99.44	9.98	49	11.67	50.44	9.62	0.000**
Fear Survey Schedule	48.22	15.37	31.78	15.89	16.44	2.57	0.032
Beck Anxiety Inventory	10.11	5.06	4.56	4.58	5.55	2.59	0.033

** $p < .001$

Legend: M - mean score, SD - standard deviation, t - test statistic

Table 4. Scores before (SP1) and after (SP2) therapy on 72 Item FSS subscales (n=9) in phobic participants.

	Pre-treatment		Post-treatment		Mean difference	t	p
	M	(SD)	M	(SD)			
Animal	3.67	1.73	1.89	1.76	1.77	2.34	0.047
Social or Interpersonal	9.44	3.00	6.44	5.31	3.00	1.57	0.154
Tissue Damage, Illness, Death	9.67	7.69	7.44	6.44	2.22	1.12	0.294
Noises	1.00	1.22	0.89	1.16	0.11	0.31	0.760
Other classical phobias	6.33	3.96	4.67	3.39	1.66	1.66	0.134
Miscellaneous	4.78	2.43	2.33	1.41	2.44	2.87	0.021

Legend: M - mean score, SD - standard deviation, t - test statistic

The significant decrease of FSQ scores for phobic participants post-treatment indicated an improvement in their phobia response compared to the pre-treatment baseline and corresponded with clinical improvement. We also sought to explore

whether this brought fear to levels experienced by control participants. To address this, a t-test was run comparing FSQ scores for the controls ($n = 11$) and the post-treatment phobic participants ($n = 9$) (see table 5). This revealed a significant mean difference (SP2M (SD) = 49.00, (11.67); C1 M (SD) = 23.27 (7.41), suggesting that phobic participants still retained a significantly greater fear of spiders than their control counterparts ($t = 5.99$, $df = 18$, $p < 0.001$) despite high levels of success clinically. The difference in the FSS scores between phobics post treatment and controls was also significant (SP2M (SD) = 31.78, (15.89); C1 M (SD) = 69.64 (37.30), $t = -3.04$, $df = 18$, $p = 0.009$) with phobic participants scoring significantly lower, attaining lower scores on all subscales (table 6). The difference in the spider item of the FSS between phobics post-treatment and controls was also significant (SP2_{M(SD)} = 1.78, (0.97); C1_{M(SD)} = 0.45, (0.68); $t = 3.56$, $df = 18$, $p = 0.002$).

Table 5. Score differences between spider phobics post-treatment (SP2) and controls (C1) for the FSS, FSQ and BAI.

	Phobics		Controls		Mean difference	<i>t</i>	<i>p</i>
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)			
Fear of Spider Questionnaire (FSQ)	49.00	11.67	23.27	7.41	25.72	5.73	0.000**
Fear Survey Schedule (FSS)	31.78	15.89	69.64	37.30	-37.85	-3.04	0.009*
Beck Anxiety Inventory (BAI)	4.56	4.58	7.64	7.32	-3.08	-1.09	0.288

* $p < .016$

** $p < .001$

Legend: *M* - mean score, *SD* - standard deviation, *t* - test statistic

Table 6. 72 Item FSS subscale results comparison between phobics post-treatment (SP2) and controls (C1).

	Phobics		Controls		Mean difference	<i>t</i>	<i>p</i>
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)			
Animal	1.89	1.76	4.82	3.40	-2.92	-2.33	0.031
Social or Interpersonal	6.44	4.46	16.82	12.44	-10.37	-2.49	0.025
Tissue Damage, Illness, Death	7.44	6.44	16.18	9.19	-8.73	-2.40	0.027
Noises	0.89	1.16	2.45	2.16	-1.51	-1.56	0.067
Other classical phobias	4.67	3.39	7.09	3.93	-2.42	-1.45	0.163
Miscellaneous	2.33	1.41	7.36	4.61	-5.03	-3.42	0.005*

* $p < .008$

Legend: *M* - mean score, *SD* - standard deviation, *t* - test statistic.

Discussion

The results demonstrate that pre-treatment phobic participants score significantly higher than controls on spider specific fear measures but not on other fear measures. This confirms that the anxiety experienced by the phobic participants is not related to a more generalised anxiety state. The difficulty was a specific fear of spiders.

We have described a comprehensive course of CBT and related techniques for spider phobia based on best available current evidence. The FSQ score and responses to item 80 on the FSS in phobics were significantly reduced following this CBT

treatment course. The overall FSS and the BAI were however unchanged. This change in behavioural data not only supports previous research findings (e.g. Koch et al, [22]; Straube et al, [23]) but indicates that the CBT treatment described is effective in specifically addressing spider phobia. These measured differences are demonstrated robustly and clinically with all participants experiencing significant effects on their coping in the presence of spiders. Despite being able to have spiders on the hands in 89% participants (75% if the drop-out patients are included) and being able to deal with spiders in the house in 100% of those who completed treatment, some participants still retained subjective fear as measured in the questionnaires. Fear of spider scores (on the FSQ and item 80 of FSS) were still significantly greater post CBT when compared to the non-phobic control group. This suggests that although the CBT treatment reduces fear and helps participants cope with their fear, some fear is retained. It is important for this to be discussed with phobic patients who choose to embark on CBT treatment for spider phobia so that they will have reasonable expectations of what therapy can achieve.

Drop-out rates in spider phobia therapeutic research can be high. For example in one study of 103 participants, 38 participants (37%) dropped out and 59 (57%) of those recruited improved [40]. Both our drop-out rate (25%) and improvement rate (75%) compared favourably to this showing that the treatment is acceptable to participants. This may be due to the lengthier treatment where participants could go at their own pace. This is more expensive than many of the treatment models involving 1-5 sessions [11].

A number of limitations to the study design may have impacted on the overall generalisability of its findings. Firstly, although the study was conducted with a wide age range of participants (16-44), previous studies indicate that the onset of the phobia begins in childhood [41]. In addition our sample size was very small with the recruitment of only 12 individuals, two of whom withdrew pre-treatment, and one after four sessions. Despite this, however, we were able to confirm the findings of Straube and colleague's [23] study, which was conducted with considerably more participants.

The number of CBT sessions delivered varied widely between participants (6-26 mean 14.5). Future research could include refining the CBT treatment method so it fits into a defined number of sessions to be delivered as a brief intervention and then examining cost effectiveness and whether shorter treatments can deliver the same outcomes. Video exposure or on-line treatment programmes could also usefully be researched alongside the inclusion of a wider age range including children and adolescents.

Conclusions

Optimising CBT using best available evidence does lead to good clinical improvement with participants able to touch spiders, have them walking on their hands, remove them from rooms and sleep peacefully in their houses. However even when treatment extends to the point where clients are entirely satisfied with the outcome and see the treatment as a great success, some are left dealing with residual automatic fear. Understanding this is therapeutically honest and helps those with spider phobia understand the strengths and limitations of treatment.

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