

Animal-assisted therapy with dolphins in eating disorders

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Abstract

This pilot study examined a dolphin assisted therapy for patients with eating disorder (EDs). 25 patients received a multimodal treatment consisting of dolphin interaction in combination with psycho education, cognitive behavioral therapy, nutritional education and craniosacral therapy. These patients were compared to a control group of 7 patients with standard behavioral therapy program. Three months after the treatment only the patients in the dolphin group showed a stable decrease in their overall psycho-social performance as measured by the SCL90-R while both groups had significant improvement of eating behavior as assessed by the EDI-2. These results are the first to show that dolphin-assisted therapy is an effective tool in the treatment of EDs and is of special use in improving psycho-social variables like depression and somatization. Further research is necessary to further observe the long-term outcome of this therapy approach on patients with EDs.

Key words: Anorexia nervosa, Bulimia nervosa, somatic symptom, treatment

Introduction

Eating disorders (EDs) are the most prevalent psychiatric disorders in females aged between 14 and 26 years and are associated with considerable physical and psychological morbidity¹. In the last decades, the frequency of these illnesses has greatly increased²⁻⁵, representing a great challenge for physicians of various specialties and significantly impacting health care in the female population⁶. Anorexia nervosa and bulimia nervosa are the main types of eating disorders described in the International Classification of Diseases ICD-10⁷.

The main features are eating patterns such as refusal to eat enough food or loss of control, followed by counter-regulatory measures. In addition, preoccupation with body shape and weight and with food is an important feature of eating disorders⁸. Binge eating disorder has been included as an additional variant of disturbed eating in the American classification system of mental disorders (DSM-IV;⁹). Patients with anorexia nervosa are foremost underweight (BMI < 17.5 kg/m²), those with a bulimia nervosa are usually in the normal weight range⁸. The treatment of eating disorders is challenging and requires a multimodal approach which consists of several components, e.g. weight rehabilitation, nutritional counselling, individual and family psychotherapy, and treatment of comorbid psychiatric disorders¹⁰.

A new, alternative approach in the treatment of psychiatric disorders includes animal-assisted therapy. The idea to use animals in a therapeutic way was introduced in the early 1970s in the work with emotionally disturbed children¹¹⁻¹³. Different animals like horses, dogs and dolphins were used in animal assisted therapy whereby research on dolphins is very sparse and stems mainly from its use with handicapped children^{14,15}. Due to a lack of adequately controlled and designed research studies there is till now more considerable speculation concerning the effectiveness of animal-assisted therapy than reliable data¹⁶. Antonio and Reveley were one of the first who could demonstrate a clear therapeutic benefit of animal-assisted therapy with dolphins in the treatment of mild to moderate depressive disorders¹⁷. Additionally, the authors argue that also the natural setting has an influence on the effectiveness of this therapy approach. These results highlight the possible benefit of animal-assisted therapy for the treatment of psychiatric disorders like depression and other behavioral disorders.

It is till now an open question whether this therapy approach is also an effective tool in the treatment of EDs. In spite of some casuistics there is no empirical evidence that animal-assisted therapy is a useful approach in the treatment of EDs. The main objective of the present pilot study was to investigate the effect of animal-assisted therapy with dolphins on the treatment of EDs. In accordance to the work of Antoniolo and Reveley we hypothesized that animal-assisted therapy should be of benefit in the treatment of EDs as compared to a control group being treated with standard behavioral therapy. Especially disease associated depression and anxiety should be reduced to a greater extent in the dolphin group with additional animal contact as compared to patients with mere standard cognitive behavioral therapy. The animal-assisted therapy took place with wild living dolphins in Florida, U.S.A., for fourteen days and was embedded in a behavioral therapy program with ambulant psychotherapy before and after this module. Additionally, during all time in Florida there was a close contact between psychotherapists and patients who attended the therapeutic program and all interventions together. In contrast the control group participated in a standard behavioral program in Germany.

Method

Participants

All participants were recruited by the charity homepage or by patient self-help groups specialised in the treatment of eating disorders in Germany. Using a self-report questionnaire interested patients with the diagnosis of an EDs based on clinical interventions or hospital stays could apply via an application form for study participation. Exclusion criteria included past or present psychotic disorders, drug and alcohol abuse, severe somatic diseases, a BMI lower 16 and pregnancy. All participants were then invited to a first talk in which a health professional assessed height and weight and conducted a clinical interview in order to verify the presence of an EDs in accordance to the DSM-IV criteria for anorexia nervosa, bulimia nervosa or eating disorder not otherwise specified.

A total of 32 females aged between 15 and 23 years (mean 17.6 years of age, SD 2.5 years) with anorexia nervosa (DSM IV 307.1), bulimia nervosa (DSM IV 307.51) or eating disorder not otherwise specified (DSM IV 307.50) participated in the study and filled in all questionnaires being focus of this work. In the dolphin group (experimental group) there were 25 patients (mean age 17.2 years, SD = 2.2 years): 11 patients with a diagnosed anorexia nervosa, 8 with anorexia nervosa, restrictive type and 2 with anorexia nervosa, purging type. 9 patients had a bulimia nervosa, and 5 had an eating disorder not otherwise specified. The BMI was 18.18 kg/m². The control group (mean age 21.8 years, SD 2.9 years) were formed by seven patients with a mean BMI of 20.63 kg/m² of which one had a diagnosed anorexia nervosa (purging type) and six had a bulimia nervosa (purging type).

Procedure

All participants who were selected for a first talk were provided with written information about the study and informed consent was obtained. 25 patients were selected for the dolphin group, seven patients served as control group. Behavioral and psychological measures were conducted at baseline (t_0 = three weeks before intervention), at the beginning (t_1) and at the end of the of the intervention program (t_2), and as follow-up three weeks (t_3) and three months (t_4) after the end of the intervention program by using the standardized symptom checklist (SCL-90-R) and the eating disorder inventory (EDI-2).

The dolphin program took place in Florida, U.S.A. and lasted two weeks. All patients travelled by plane accompanied by the therapeutic staff and without family or friends. They shared common bed rooms and were supervised by the therapeutic staff the whole day round. After a physical training session (yoga) in the morning group therapy with focus on psycho education and cognitive behavioural aspects of EDs took place, followed by individual craniosacral therapy. Under supervision of the therapeutic team patients bought the ingredients for their meals, cooked and ate together. Additionally, the BMI was assessed each day in the morning. The dolphin session lasted about three to four hours a day in the afternoon for a total of ten days. The dolphin interactions took place with wild living dolphins: Supported and supervised by professionals the group was taken by boats to places where dolphins can be usually found. The dolphin contact was unstructured so that free and spontaneous interactions occurred. The control group took part in standard behavioral therapy program and filled in all questionnaires in the same time intervals as the dolphin group.

Psychological questionnaires

Symptom-Checklist (SCL-90-R)

The SCL-90-R test¹⁸ contains 90 items which measure nine primary symptom dimensions together with three global indices. This test is a widely used instrument with sufficient reliability, validity, and utility designed to provide an overview of a patient's symptoms and their intensity at a specific point. The subscales aim to assess somatization, obsessive compulsive symptoms, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism, the global severity index is designed to measure overall psychological distress, the positive symptom distress index quantifies the intensity of symptoms and the positive symptom total refers to the number of affecting self-reported symptoms. Higher scores indicate more psychological symptoms in each subscale as well as a higher degree of distress, higher intensity of symptoms and more self-reported symptoms.

Eating Disorder Inventory (EDI-2)

The Eating Disorder Inventory (EDI) is a self-report measure of psychological features commonly associated with anorexia nervosa and bulimia nervosa which has become a standard tool in studies investigating EDs. The EDI-2 contains of 64 items and additional 27 items which assess behavioral and psychological traits on eleven scales. These scales are drive for thinness, bulimia, body dissatisfaction, ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness, maturity fears, asceticism, impulse regulation and social insecurity¹⁹. The EDI-2 has good internal consistency reliability and show appropriate content, convergency, and discriminant validity¹⁹. Higher scores are related to poorer psychological functioning and a higher prevalence and/or intensity of eating disorder related symptoms.

Data analysis

SCL 90-R and EDI-2 data was submitted to repeated measures analyses ANOVAs with twelve (SCL-90 R subscales and global indices) or eleven (EDI2 subscales) levels of Psychological Dimension, two levels of Time (baseline vs. three month follow up) and two levels of Group (dolphin vs. control group) using the SPSS, version 14 (SPSS, Chicago, IL, USA) analysis software. In the Results section, uncorrected F-values are reported together with the Greenhouse-Geiser epsilon values and corrected probability levels. In order to focus on relevant results in accordance to the main questions we will

only refer to main effects of Time and Group and to possible interaction effects between Time, Group and Psychological Dimension.

Results

BMI

The BMI did not increase significantly over the time (19.4 vs. 19.8 ; $F(1, 21) = 2.40$; $p = .14$) for neither control nor dolphin group.

SCL-90-R

Figure 1 summarizes the mean of the nine SCL-90-R subscales contrasting baseline and three month follow-up for each group separately. Furthermore concerning the three compound SCL-90R scales, in the dolphin group at t_0 the global severity index was 1.38, the positive symptom distress index was 2.2 and the positive symptom total was 55.8 as compared to a global severity index of 0.8, a positive symptom distress index of 1.6 and a positive symptom total of 35.6 at t_4 . In the control group the global severity index was 1.6, the positive symptom distress index was 58.3 and the positive symptom total was 2.2 at t_0 as compared to a global severity index of 1.4, a positive symptom distress index of 2.1 and a positive symptom total of 49.2 at t_4 .

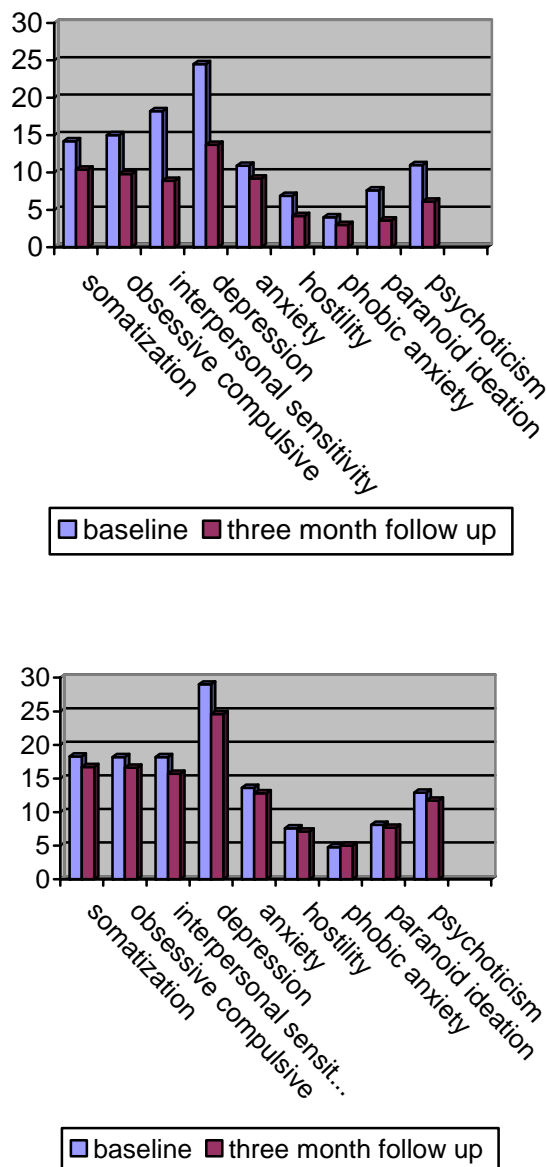


Figure 1: Mean SCL-90 subscales contrasting baseline and three month follow-up for dolphin (upper panel) and control group

All observed differences were tested for significance with repeated measurement analyses in order to avoid multiple testing. Post hoc analyses were only performed in case of significant main or interaction effects. The repeated measurements analyses revealed a highly significant effect for Time ($F(1, 30) = 19.54$; $p < .001$; $\eta^2 = .39$; $\varepsilon = .99$) indicating that mean scores were significantly reduced between baseline and three month follow-up.

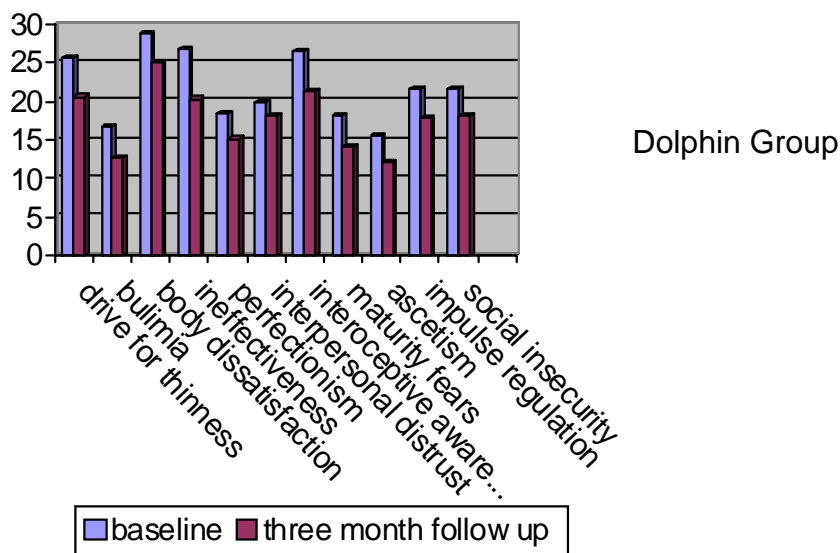
An additional Time X Group interaction effect ($F(1, 30) = 4.30$; $p < .05$; $\eta^2 = .13$; $\varepsilon = .52$) showed that this observed general decrease concerning the SCL-90 R scales and global indices in the mean, was significantly more pronounced in the experimental group (mean 14.3 vs. 8.9) as compared to the control group (16.1 vs. 14.1). Post hoc analyses additionally demonstrated that only in the experimental group the SCL-90 R was significantly reduced between baseline and three month follow up ($F(1, 24) = 48.95$, $p < .001$; $\eta^2 = .67$; $\varepsilon = 1.00$), while the main effect Time did not reach significance in the control group ($F(1, 6) = 1.66$, $p = .25$).

Although both groups differed descriptively in some of the SCL-90 R scales both in the baseline as well as in the three month follow-up, there was no significant effect of Group ($F(1, 30) = 1.30$; $p = .15$): Taking the significant interaction between Group and Time into account, post hoc analyses were performed for each time point separately showing no significant difference in the mean SCL-90R scales at the time point t_0 ($F(1,30) = 0.62$, $p = .44$) between dolphin and control group (mean 14.3 vs. 16.1) and a trend towards lower SCL-90R scores in the experimental group compared to the control group in the three month follow up (mean 8.9 vs. 14.1; ($F(1,30) = 3.73$, $p = .07$).

The additional main effect Psychological Dimension X Time indicated that a reduction of symptoms between t_0 and t_4 was only significant for some of the SCL90-R subscales. Post hoc analyses showed that these subscales were somatization, obsessive compulsive symptoms, depression, hostility, paranoid ideation and psychoticism ($p < .05$). Furthermore all three global indices were significantly reduced ($p < .01$).

EDI2

Figure 2 depicts means of the nine EDI subscales contrasting baseline and three month follow-up for each group separately. The repeated measurement analyses revealed a highly significant effect for Time ($F(1, 27) = 14.38$; $p < .01$; $\eta^2 = .34$; $\varepsilon = .95$) indicating that mean EDI scores were significantly reduced between baseline and three month follow-up.



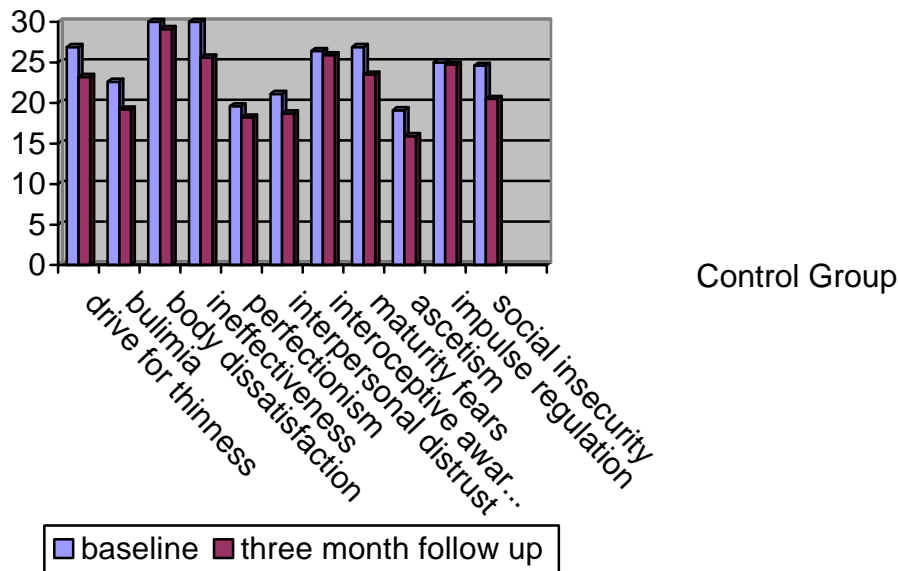


Figure 2: Mean EDI2 scales contrasting baseline and three month follow-up for dolphin and control group

The Time X Group interaction effect was not significant ($F(1, 27) = 0.26$; $p = .62$) indicating that in both groups there was a comparable reduction in symptoms of EDs as assessed by the EDI2. In the experimental group the mean score (formed as mean across all EDI subscales) was reduced from 21.8 to 17.6 and similar in the control group the mean score decreased from 25.5 to 22.2.

Additionally, the main effect Group was not significant ($F(1, 27) = 3.02$; $p = .16$) showing that EDI2 scores were comparable between both groups at both time points.

Discussion

Our data are the first to show that animal-assisted therapy with dolphins is a promising new tool in the treatment of EDs. The dolphin-assisted therapy improved the degree and intensity of psychopathologic symptoms including depressive symptoms and somatization as well as the mean psychological distress level significantly more than the conventional standard therapy approach. This result extends former data on the positive effect of dolphin assisted therapy on mild and moderate depression²⁰ and highlights the possible use of this therapy on a broader range of emotional and behavioral disorders including EDs. The present study also underlines the additional benefit of animal-assisted therapy with dolphins on global emotional and somatic performance of patients with EDs, who often suffer from comorbid depression or anxiety disorders.

Behavior associated with EDs as assessed by the EDI2 did improve in the experimental group which was nevertheless comparable to the observed improvement in the control group. Concerning eating attitudes and maladaptive eating behavior it can be assumed that the embedded psycho education, cognitive behavioral therapy and nutritional education which is part of all behavioral standard therapy programs might play the essential role for improving psychological features commonly associated with anorexia nervosa and bulimia nervosa as assessed by the EDI2. It would be of great interest to further investigate, whether a lower intensity of psychopathologic symptoms as reflected in the significant decrease of SCL-90R scores only in the group with dolphin assisted therapy contact group, might be an advantage in the stability of improved eating attitudes and EDs' symptoms.

Animal-assisted therapy with dolphins uses the multiple positive aspects of interactions with wild living animals which might act as trigger and therefore ease the emotional and behavioural modification as suggested by Nathanson^{15,21}. In the present study the contact to the wild living dolphins was not "planned" or "prepared" but occurred - under supervision in order to support the patients - in a free and individual way. It can be suggested that the nature of these interactions is experienced as more authentic and emotionally touching especially in patients who have often a history of abuse or narrowing family structures. Feelings arising or triggered by such interactions

might have enriched the embedded therapy sessions and could therefore account for the observed significant increase in psycho-social functioning in the experimental group as suggested by Lukina^{22,23}.

We conclude that dolphin assisted therapy is a new and promising tool in the treatment of EDs and is of special use in improving psycho-social variables like depression and somatization. As the treatment of EDs requires a multimodal approach¹⁰ animal assisted therapy might be integrated in present therapeutic interventions. Further research is necessary to elucidate if additional benefits occur in patients who have already undertaken psychotherapy without long-time success. Further research on subpopulations of patients with EDs concerning the amount of former therapy interventions might be helpful to clarify this point. Though our study presents promising results this work has several limitations. They refer to the fact that the patients could not be “blinded” concerning the nature of their treatment which might have influenced the study outcome. Besides, participants of the control group were not taken to Florida and were not participating in an intensive program comparable to the dolphin interaction, which makes it impossible to rule out possible interacting variables like nature, “holiday feeling” and separation from the core family. Furthermore, due to the exploratory character of the study there was a focus on possible effects of dolphin assisted therapy and therefore fewer patients were included the control group as compared to the dolphin group. Further research should also include a greater amount of patients in order to highlight possible differences between anorexia nervosa and bulimia nervosa concerning the long-term benefit of animal-assisted therapy.

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