

Case Report

Implementation of Cognitive Behavioral Therapy in a Child with Obsessive - Compulsive Disorder: A Case Study

Ioannis Syros ^{1,2,*}, Xenia Anastassiou-Hadjicharalambous ²

1. Department of Child Psychiatry, School of Medicine, National and Kapodistrian University of Athens, "Aghia Sophia" Children's Hospital, Athens, Greece; E-Mail: jonsir9975@yahoo.com
2. Psychology Program, University of Nicosia, 46 Makedonitissas Avenue, P.O. Box 24005, 1700 Nicosia, Cyprus; E-Mail: hadjicharalambous.xenia@gmail.com

* **Correspondence:** Ioannis Syros; E-Mail: jonsir9975@yahoo.com

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Abstract

Obsessive-Compulsive Disorder (OCD) is a prevalent child and adolescent psychiatric condition characterized by substantial functional impairments. Cognitive Behavioral Therapy (CBT) has emerged as the primary therapeutic approach for managing mild to moderate cases of OCD in children and adolescents. Significant advancements have been made in applying CBT specifically to this age group in the past decade. Exposure and response prevention (ERP) is a core therapeutic technique grounded in the principle that anxiety tends to diminish through repeated exposure to anxiety-inducing stimuli, leading to a gradual reduction in anxiety response. In the present study, we present the case of a 9-year-old boy with OCD who was treated with CBT. The evaluation of this case highlights the necessity for rigorous behavior analysis to precisely implement exposure therapy and the significance of multidisciplinary intervention in the child's daily life. In the discussion that follows the analysis of the case, parameters such as the differentiation of ERP in children compared to adults, the control of OCD over the rest of the family members and the OCD phenomenology of parents have been



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discussed. Additionally, the effect of the patient's comorbidity on the treatment outcome and his compliance with homework were also addressed.

Keywords

Obsessive-compulsive disorder; cognitive behavioral therapy; gradual exposure and response prevention; behavioral analysis; inhibition learning; children

1. Introduction

Obsessive-Compulsive Disorder (OCD) is a prevalent child and adolescent psychiatric condition characterized by substantial functional impairments. OCD was considered a rare condition in the past [1]. The concealment of symptoms and associated functional limitations by affected children and adolescents, driven by feelings of shame and fear of retribution, have contributed to the underdiagnosis of the disorder until recent years [2].

Nowadays, the World Health Organization (WHO) places OCD in the top ten of the most handicapping disorders [3]. The prevalence in children and adolescents is estimated to range from 1% to 3%, and the average age of onset is between 7.5 and 12.5 years. The ratio of affected boys to girls is 3:2 [2-5]. Correct identification and early treatment of OCD, from early childhood, is considered essential for the best clinical course of these patients over time [6].

Cognitive Behavioral Therapy (CBT) has emerged as the primary therapeutic approach for managing mild to moderate OCD symptomatology in children and adolescents. In the past decade, significant advancements have been made in applying CBT specifically to this age group [7, 8]. In instances where OCD symptoms are more severe and pharmacological treatment is prescribed, it is crucial to incorporate CBT alongside medication to enhance treatment outcomes and ensure sustained remission during the medication discontinuation phase [4, 9, 10].

Exposure and response prevention (ERP) is a core therapeutic technique grounded in the principle that anxiety tends to diminish through repeated exposure to anxiety-inducing stimuli, leading to a gradual reduction in anxiety response [11-13]. Response prevention includes refraining from ritualizing or other compulsive behaviors (e.g., not performing a particular compulsion for the rest of the day) [14]. In other words, the use of ERP in treating OCD is based on the learning theory perspective. This theory sees obsessional thoughts (and their external triggers) as conditioned stimuli that induce fear and anxiety as conditioned responses. It also considers avoidance behaviors, compulsive rituals, and other safety cues as methods for managing obsessional fear, which become negatively reinforced by the decrease in distress they cause. A seminal study conducted by March et al. [15] is an illustrative example, where ERP incorporated within CBT was utilized to treat a cohort of 15 children. The treatment involved systematic and gradual exposure to feared stimuli, coupled with the prevention of anxiety-driven behavioral responses. Results demonstrated that 9 children (60%) achieved a minimum of 50% reduction in symptoms, with sustained therapeutic improvements observed for an additional 18 months. Subsequent meta-analyses and internationally recognized guidelines confirm the therapeutic utility of ERP in children and adolescents with OCD [8, 16-18]. Furthermore, further studies ([19, 20], for a summary) documented various factors framing the inhibition learning approach in patients with anxiety that

seem to lead to failure or unsustainability of the benefit of exposure therapy. These factors include parental involvement and accommodation [21, 22]. Therefore, their control is considered essential to maximize the strength, durability, and generalization of the learning in the context of this therapeutic technique [23].

In our view, the primary objectives of CBT encompass empowering individuals to regain their self-efficacy [24], shifting their locus of control inward [25], and fostering heightened awareness and sensitivity to their challenges [26].

Despite the established efficacy of ERP in addressing OCD symptomatology in children [7, 27], a notable number of therapists do not readily employ this intervention technique despite their CBT training. This hesitation stems from negative beliefs among therapists regarding the effectiveness of exposure therapy and the perceived distress of children when subjected to this particular approach [28, 29].

Based on the concerns above, we consider it beneficial to present the following incident, the evaluation of which highlights the necessity for a rigorous behavioral analysis to precisely implement exposure therapy based on the identification of treatment targets. This also points to the significance of a multidisciplinary intervention in all aspects of the child's daily life. Moreover, behavior analysis provides the opportunity to examine the effect of behavioral changes on treatment outcomes. In addition, it would be interesting to investigate, in the present case, whether there were some factors - individual and family - that maximized the inhibition of learning and, subsequently, the therapeutic outcome of this methodology, in agreement with the reports of relevant studies [19, 22, 23]. Written consent was obtained from the child's parents to use information from the medical record for research and publication purposes.

2. Case Report

Aiden is a 9.5-year-old boy who presented with his parents, referred from the Pediatric Psychiatry Department of the Public Children's Hospital to the Community Unit for CBT. He resided in an urban center with his parents and his younger sibling.

3. Primary Concern

A prominent challenge revolved around the presence of repetitive behaviors, which noticeably induced anxiety and significantly impacted Aiden's daily functioning. Aiden experienced an inherent urge to engage in these behaviors as a coping mechanism in response to anxiety-provoking, anger-inducing, or highly uncomfortable situations. These behaviors predominantly manifested during bedtime routines, academic study periods, and other instances characterized by heightened levels of anxiety, anger, or discomfort. Additionally, Aiden's parents are concerned about his limited social adaptability, perfectionistic tendencies, an exaggerated sense of obligation, and difficulties with written expression.

Therefore, the psychiatric history was obtained, with an emphasis on behavior analysis, and the findings were as follows:

3.1 Situations/Stimuli (Primarily)

Nighttime darkness, bedtime, and afternoon study.

3.2 Emotional Response

Anxiety, fear, anger.

3.3 Behavioral Response

Symmetry and avoidance rituals, reassurance seeking, and other coping strategies (mentioned in Table 1).

Table 1 Behavioral Analysis.

Stimulus (activity, situation, location)	Emotional Response	Compulsions / avoidance rituals / reassurance seeking	Impact
Darkness, at bedtime during the night.	Anxiety, fear	He feels compelled to move his legs ceremoniously under the blanket. He seeks to manage his anxiety through this ritual by placing a heavy pillow on his legs. He holds his favorite green pillow, which "protects" him. He desires to keep the lights on in his room and in the hallway. He wants someone to accompany him for a while so that he can fall asleep (preferably his mother, whom he asks to lie down next to him) and then "listen" to his mother on the floor above, keeping his bedroom door partially open.	He delays sleep by approximately one hour. He wants to involve his parents in his bedtime rituals, which often leads to tension between them.
During afternoon study time, especially when he is studying language or preparing for exams.	Anxiety and/or anger.	Rituals of symmetry involving his feet: he feels the need to touch symmetrically and repeatedly with both of his feet, either the same spot on the floor or a specific point on his desk, or any surface with the same texture or temperature	He is experiencing difficulties in focusing and concentrating on his studies, resulting in a delay of approximately 45 minutes. Additionally, he engages in arguments or conflicts with his parents

When he is speaking or thinking about something anxiety-inducing, boring, or when he is angry (for example, at school or during his playtime)	Anxiety and/or anger	He feels the need to engage in the aforementioned rituals of symmetry with his feet.	Self-criticism, Low self-esteem.
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3.4 Impact

The main issue exerted significant repercussions on various facets of Aiden's life. He demonstrated a penchant for seeking companionship during bedtime, leading to delayed sleep onset. Consequently, his ability to concentrate on studying was compromised, resulting in late afternoon study sessions and subsequently diminished academic performance. Additionally, tensions arised within his familial relationships, contributing to self-criticism, a diminished sense of self-worth, and reduced self-esteem.

3.5 Medication - Medical History

No significant findings were noted from the Medical History. Regarding the pharmacological aspect, a comprehensive medical history revealed that, on admission, Aiden had already started a regimen that included Risperidone 0.25 mg administration spanning 10 months, while, for the last 2 months, the additional administration of fluoxetine 20 mg. The addition of CBT to the already existing pharmacotherapy appears to be associated with improved treatment outcomes in individuals with OCD [30, 31].

3.6 History of the Primary Concern

Aiden's symptomatology was observed to have started at around the age of 6. During his 1st grade, Aiden exhibited a distinctive ritualistic behavior, associating each letter with a specific vocalization. This behavior elicited anxiety and resulted in feelings of embarrassment, as he felt compelled to perform the vocalizations without connecting them as a response to any clear obsessive thoughts. This behavior manifested at home and in the school environment, and Aiden coped with it through self-critical thoughts.

Furthermore, during that period, Aiden was presented with secondary enuresis, which gradually resolved over time. A thorough physical examination yielded no notable findings. Concurrently, despite being an academically proficient and intelligent student, he expressed pervasive thoughts of self-depreciation, particularly related to his academic performance. In addition, Aiden engaged in a self-soothing behavior of tightly clenching his fists and pressing his fingers, claiming that it provided a distraction from his anxiety.

In 2nd grade, Aiden's parents were prompted by concerns regarding their child's difficulties and conducted online research related to autism spectrum disorders. This led them to seek an evaluation for Aiden at a private Medical-Pedagogical Center, where a comprehensive assessment was conducted, ruling out the presence of autism.

During this time, Aiden expressed excessive fear of staying in his room during the evening without the presence of his parents, indicative of separation anxiety.

Furthermore, Aiden developed a new behavioral pattern after receiving information from his teacher regarding the importance of ecological awareness and behavior. This manifested as accumulating insignificant objects in his room, such as informational brochures, bottle caps, candy wrappers, and other miscellaneous items.

Moreover, Aiden frequently referenced the concepts of "fortunate" and "unfortunate" days, numbers, and events throughout his daily experiences (a tendency that the father reported that he also presents). Additionally, Aiden began engaging in ritualistic behaviors, including persistent, repetitive checking of his written work, to seek reassurance and identify potential errors.

At the beginning of 3rd grade, due to Aiden's persistent and intense linguistic rituals, his family sought assistance from the Child Psychiatry Department at the General Children's Hospital. Following a comprehensive diagnostic evaluation, Aiden received a diagnosis of OCD.

3.7 Social Conditions

Aiden exhibited challenges in social skills, demonstrating limited friendship connections and rigidity in social interactions. He tended to withdraw when faced with situations that did not align with his expectations. More specifically, when participating in peer groups, he tended to distance himself and move away if something did not go his way in the game. He preferred frequent association with a small, consistent group of friends, most younger than him. Recently, Aiden had encountered difficulties in his relationships with classmates, expressing feelings of being misunderstood. He displayed sensitivity and a tendency to quickly become angry with peers while gravitating towards socializing with older or younger children.

3.8 Temperament

Aiden's temperament was described as "typical and structured " by his mother. He demonstrated tendencies of perfectionistic thinking and inflexibility in social interactions, coupled with a strong sense of duty. A notable discomfort arose in situations where the potential for making mistakes existed.

3.9 Family History/Situation

Within the family context, Aiden's father presented personality traits associated with OCD. Furthermore, the father often responded to the child's energetic behavior with intense anger and frequently engaged in personal confrontations with Aiden during disagreements. This further contributed to the escalation of the child's anxiety. The father also experienced heightened anxiety, consistently worrying about potential exploitation of his children by peers as well as presenting fears about coping with their upcoming adolescence. Moreover, he demonstrated inflexibility in planning family activities and holds various biases related to the significance of "lucky" numbers in their daily lives. These traits were emphasized by the mother, who, in contrast to the father, tended to be excessively accommodating to the children's desires, considering the father's approach as "harsh". The mother frequently became angry with the father and occasionally threatened to divorce him. Aiden had a younger brother, aged 7, and he often felt envy for him. In regards to family mental

health history, the maternal aunt was diagnosed with "depressive psychosis" while relatives described the paternal grandfather as a "peculiar, distant, and inflexible person".

3.10 Individual/Developmental History

During preschool, no notable peculiarities were observed in Aiden's developmental progression, including motor development, speech, and socialization. Stereotypical or generally autistic-like behaviors during this phase were not reported.

3.11 Current Picture

Aiden generally had a likable appearance and a modern and well-groomed demeanor. He demonstrated good eye contact, smiled frequently, and exhibited an increased willingness to cooperate. He established satisfying emotional contact, providing explanatory and detailed descriptions, suggesting a desire to make a favorable impression. He occasionally tended to downplay his difficulties while he presented as a child with a relatively mature demeanor for his age.

Aiden displayed a consistent level of anxiety, which is manageable without significant fluctuations in intensity. He exhibited a natural appetite and experienced delayed sleep onset, approximately one hour later than expected.

He demonstrated satisfactory thought structure, organization, and flow. The content of thoughts did not reveal distinct ideations directly linked to his compulsive behaviors. He possessed a rich vocabulary and spoke rapidly with satisfactory pragmatics and organization. Thought control and retention were considered normal.

Aiden displayed a satisfactory awareness for his age regarding the excessive and irrational nature of his ritualistic behaviors and their impact on his daily life. He struggled, however, to fully comprehend the anxiety-reducing (magical) effect that particular objects, such as his pillow, had on his life.

During the interview, his orientation in space, time, and persons was intact. However, a mild distraction of attention was observed. Furthermore, he was noted to be clumsy and exhibited an aversion towards sports games in terms of mobility.

3.12 Summary & Case Formulation

Aiden was raised in a family context conducive to the development of insecurity and anxiety. Paternal authoritarian style intertwined with maternal permissive style and the formation of secret alliances (on behalf of the mother) with the children to override the father's desires led to even greater tensions between the family members. The father's tendency to organize rigidly all family activities, in the context of his perfectionistic personality, further intensified Aiden's anxiety and perfectionistic tendencies.

In the search for stability and self-control, Aiden began engaging in rituals at 7, adopting a peculiar language code. Concurrently, he experienced a recurrence of nocturnal enuresis. Academic performance-related anxiety escalated at school, and his perfectionistic tendencies became more pronounced. The parents' anxious efforts to control Aiden's behavior led to conflicts, exacerbating his self-critical thoughts and feelings of insecurity. To manage anxiety, Aiden employed "magical"

tactics, such as relying on lucky numbers and colors, and imbuing favored objects, like his pillow, with protective attributes.

The impact of this symptomatology on family relationships led them to seek assistance at the Child Psychiatry Department of the General Children's Hospital. Following a diagnostic evaluation, pharmacological treatment was prescribed, and subsequently, a referral to community CBT unit was made for therapy. The ritual involving Aiden's personal language code has diminished, but new symmetry rituals with his legs have emerged, significantly affecting his sleep and daily study routine.

The diagnosis given was OCD, with predominant compulsive behaviors and avoidance rituals in the current phase. Favorable prognostic factors included the child's motivation for therapy and high intellectual capacity. Additionally, the absence of concurrent emotional disorders and the family's willingness to cooperate was also significant. On the other hand, poor prognostic factors encompassed early onset of OCD behaviors and the presence of OCD-related traits in the father's personality.

3.13 Diagnostic Assessment

A thorough patient history and a detailed clinical evaluation took place as part of the diagnostic evaluation. To gather more information about Aiden's obsessive and compulsive behaviors, the clinician-administered the semi-structured interview "Children's Yale-Brown Obsessive-Compulsive Scale (CY-BOCS)" [32, 33], to the child. The CY-BOCS is designed to rate the severity and pervasiveness of obsessive and compulsive symptoms in children and youth aged 6-17. It yielded a target symptom list (a list of the child's most severe obsessions and compulsions) and a severity rating (an index of the impairment caused by the symptoms, including the amount of time spent and the amount of distress experienced).

4. Basic Information Driven from CY-BOCS

According to the CY-BOCS interview, Aiden reported that his compulsive behaviors significantly hindered him (score 3, i.e. severe impact) and consumed a considerable amount of his time (i.e., score 3, i.e. much time). Specifically, it took him nearly an hour to fall asleep, and these behaviors also interfered with his academic pursuits and other secondary activities such as play and school attendance. He estimated spending approximately 4 hours overall engaging in ritualistic behaviors. However, the reliability of this self-report requires validation (score 2, i.e. moderate reliability).

During the interview, Aiden demonstrated significant awareness of the irrational nature of these rituals and expressed a strong motivation to change this condition. He described increasing efforts to resist the rituals (score 1, i.e. strong resistance) but acknowledged experiencing reduced control over them (score 3, i.e. minimal control). The CY-BOCS interview with the child yielded a score of 11, indicative of mild OCD symptoms, with a moderate level of reliability. Aiden exhibited a reduced score, albeit higher than the score indicative of clinical decline according to the guidelines of the POTS team, 2004 [34]. This finding may be attributed to the following: a. no obsessions were reported by Aiden. This is in line with the existing literature documenting that OCD may present with compulsions without distinct or clearly defined obsessions [8]. b. the child initially intended to conceal his difficulties and c. Aiden was already taking psychiatric pharmacotherapy for a sufficient duration, as indicated on page 5 (a combination of SSRI and antipsychotic medication). Therefore, it seems plausible that pharmacotherapy partially mitigated the intensity and frequency of OCD

symptoms. However, a baseline CY-BOCS score before starting medication was not available in order to support this claim. On the other hand, the absence of psychotherapy seems to have resulted in a lack of further improvement in the patient, as well as the establishment of chronicity in his maladaptive behaviors.

4.1 Therapeutic Plan

The therapeutic plan consisted of the following evidence-based interventions aimed at addressing the child's OCD and improving overall functioning. The protocol encompassed comprehensive psychotherapy sessions held once a week with the child and once a month with the parents, with the option to increase the frequency for parents if deemed necessary by the therapist. The plan comprised the following key components:

1. Psychoeducation: Conducting educational sessions for both the child and parents to enhance their understanding of the behavioral therapy model and its relevance to OCD treatment.
2. Gradual Exposure and Response Prevention: Implementing a systematic approach to gradually expose the child to anxiety-triggering stimuli and rituals while concurrently preventing the compulsive responses.
3. Parental Involvement and Counseling: Engaging parents as active co-therapists in the treatment process and providing specific counseling on parenting matters related to effectively managing the child's OCD symptoms.
4. Socialization Opportunities: Creating structured opportunities to facilitate the child's socialization.
5. Development of a Structured Program: Designing a comprehensive and structured program tailored to the child's needs, addressing daily routines and study time at home, and incorporating enjoyable activities.
6. Gradual Medication Tapering.

5. Psychoeducation

The family and the child were provided with in-depth information about the nature of OCD. They were educated on how the child's avoidance strategies and safety behaviors, such as seeking reassurance from parents or relying on specific objects like the pillow, perpetuated anxiety. In this context, the therapist sought to externalize the problem, as suggested by the empirical literature [35, 36], explaining thoroughly that the OCD symptomatology explains Aiden's behavior, and not a "mistake" in his personality. Thus, the therapist highlighted that all parties involved, Aiden, his family and the therapist, will collaborate to deal with the symptomatology displayed by the disorder called OCD (Figure 1).



Figure 1 "I am not alone in my struggle with OCD"

Also, Aiden and his family were informed of the pathophysiological manifestations of anxiety, as well as the distinction between "good", fruitful or otherwise mobilizing stress, and "bad", dysfunctional stress. Based on this, they explained how compulsive behaviors and other avoidances, in the long run, enhance dysfunctional stress. The therapist conveyed the significance of behavioral change in leading to habituation and remission of OCD symptomatology. The family gained a profound understanding of the therapeutic process through the illustration of the vicious cycle of compulsive behavior, which constitutes a form of active avoidance, and the resulting anxiety manifested in the child. The therapist represented this example graphically (visualized), making it more and understandable to the child and his parents (Figure 2 & Figure 3).

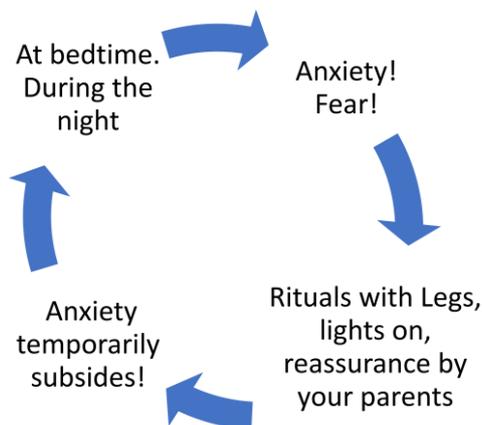


Figure 2 The vicious cycle of avoidance and induced anxiety: "As long as you engage in rituals in bed and seek reassurance from your parents, the anxiety temporarily recedes; however, in the long term, it becomes entrenched...".

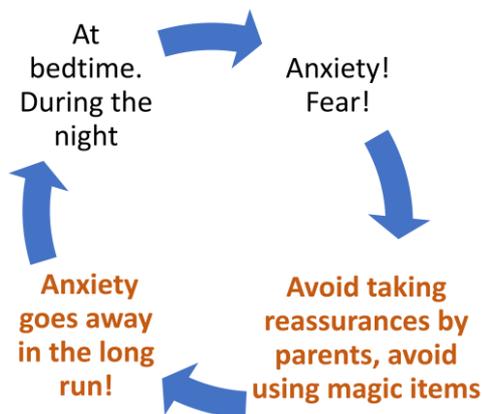


Figure 3 The gradual and repetitive exposure during bedtime and the prevention of the previously employed responses (reassurance from parents, withdrawal of safety measures, and magical rituals) ultimately leads to desensitization to the anxiety-provoking situation in the long term.

Consequently, a pivotal element in our therapeutic arsenal was gradual exposure and the response prevention. An essential prerequisite for Aiden to comprehend and objectify his anxiety experience was his education in the anxiety and avoidance scale, for which, at his request, anxiety

was mapped onto numbers, as is commonly done with adults. Aiden described this scale as the "anxiety thermometer" (Figure 4) for a better understanding.

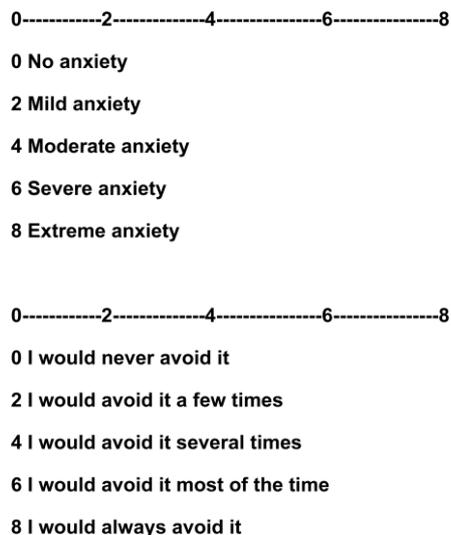


Figure 4 Anxiety and Avoidance Thermometer.

Following the acquisition of the anxiety thermometer and once Aiden comprehended the rationale behind gradual exposure to all the stimuli triggering his anxiety, the final therapeutic goals were mutually agreed upon with him. These goals were deemed the most challenging to execute. In other words, the objectives that, if Aiden were to carry out at this (initial) stage of psychotherapy, would induce the highest levels of anxiety and avoidance.

Therefore, the following two goals were set:

- A. To be able to study without engaging in symmetry rituals with my feet (anxiety 6/8, avoidance 6/8).
- B. To be able to sleep without engaging in foot rituals, without relying on the presence and reassurance of my parents, and without the presence of my magical green pillow and other "magical" items in order to fall asleep (anxiety 7/8, avoidance 7/8).

6. Implementation of Gradual Exposure and Response Prevention

After prioritizing therapeutic goals based on the anxiety thermometer, which quantifies the intensity of induced anxiety, and after explaining the rationale behind the ERP technique in a manner suitable for Aiden's age, an agreement was reached between the therapist and Aiden. Aiden would initiate with a focus on Goal B, specifically through an "easy" exercise. This exercise, therefore, would induce moderate anxiety and avoidance in the child, clearly less than what the final goals would elicit. Aiden reported that he expected that this easy exercise would cause him an anxiety level of 3/8 if he were to do it right now, and the degree of avoidance would be 4/8 to prevent anxiety. Within the framework of this exercise, which we will refer to as *Exercise 1*, Aiden was required to maintain a daily diary, rating his anxiety level three times a day: one minute before the exercise, ten minutes later, and the next morning (Table 2). Aiden was requested to endure the anxiety-provoking situation without engaging in any safety measures (seeking parents, turning on lights, etc.). Considering recent findings from relevant studies on factors that enhance inhibitory

learning, particularly the importance of affect labeling, the child was asked to identify and name the anxiety he experienced during the exposure. He was also asked to articulate the phobic belief that surfaced. "I feel anxious and afraid that right now something bad will happen to me in the dark and also, I won't be able to control my legs!" [20, 23]. Aiden's parents were involved as they were asked to reinforce his efforts on the weekends. Specifically, the exercise that Aiden was called upon to perform was as follows.

Table 2 Maintenance of a diary for Exercise 1 related to Goal B.

Date	Goal	How much would you avoid it?	How much anxiety do you have?	Comments
	B		at 21:59, just before I lie down. after 10 minutes. next morning	
Daily Assessment (day 1, day 2 etc)				

6.1 Exercise 1

I go to bed at 10:00 PM on my own, with minimal lighting in the hallway, and my parents are downstairs. When I wake up during the night, I don't go to their room to seek them out. Anxiety: 3/8 Avoidance: 4/8.

Aiden daily recorded the level of anxiety induced by this exercise. It is important to emphasize that the therapist had prepared Aiden for the expected anxiety resulting from the withdrawal of safety measures, which he was required to endure to facilitate habituation. The child completed *Exercise 1*. Its completion led him to understand the rationale behind the exercise and how its repetition leads to new learning. The anxiety he documented in his diary at the end of the week was noticeably reduced compared to the anxiety he experienced in the initial days.

Subsequently, based on the hierarchy of goals, an agreement was reached with the child to proceed to a more challenging exposure exercise, which was as follows:

6.2 Exercise 2

I go to bed at 10:00 PM alone, with some lights on in the hallway, while my parents are downstairs. When I wake up during the night, I don't go to their room to seek them out. I don't hold my favorite green pillow tightly, but I place it on a chair in my room. Anxiety: 6/8 Avoidance: 5/8.

Although *exercise 2* induced more anxiety and avoidance in the child, Aiden, having the experience from the previous exercise, managed to endure the anxiety and uncertainty associated with gradually detaching himself from the magical green pillow, resulting in his gradual adaptation to anxiety over the week. At the end of this exercise, Aiden reported significantly reduced anxiety compared to the beginning of this exercise. Subsequently, *exercise 3* followed, which was even more challenging:

6.3 Exercise 3

I go to bed at 10:00 PM alone, with some lights on in the hallway, while my parents are downstairs. When I wake up during the night, I don't go to their room to seek them out. I don't hold my favorite green pillow tightly; instead, I give it to my mother. Anxiety: 7/8 Avoidance: 6/8.

During this phase of the therapeutic exercises, Aiden expressed difficulties separating from his magical pillow, describing an ongoing need to be constantly aware of its location. As per the agreed-upon exercise, Aiden relinquished the pillow to his mother, who permitted him to keep it during other parts of the day, except for bedtime, where its whereabouts were unknown. It is important to note that the ERP exercises were not easy for Aiden every day. He would often become discouraged, and although he understood their purpose, he sometimes "negotiated" whether he would actually do them. As shown in the image below, the child did not record the level of anxiety on the 6th and 7th days but wrote the word "infinite" on a day when he happened to argue with his parents (Table 3).

Table 3 Maintenance of a diary for Exercise 3 related to Goal B.

Date	Target	How much would you avoid it?	How much anxiety do you have?			Comments
			at 21:59, just before I lie down	after 10 minutes	Next morning	
	<i>Exercise 3</i>					
1st Day		6	7	7	6	
2nd		6	6	7	5	
3rd		5	6	7	5	
4th		5	5	6	4	
5th		5	5	5	3	
6th			Infinite!!!!			fighting with parents
7th			Infinite!!!!			fighting with parents

Despite the difficulties, Aiden completed all the gradual exposure exercises, accomplishing one of his therapeutic objectives. Exposure was continued not only until his anxiety was reduced but also until Aiden was led to find out that he was not in danger from the specific phobia condition, thus challenging his initial catastrophizing expectations. In other terms, Aiden was led to the conclusion, "the fear of not putting my legs in symmetrical order is tolerable, so I don't have to rid myself of this fear." Notably, alongside his progress in this specific exercise, Aiden gradually reduced engaging in rituals during his daily study sessions, indicating improved focus and academic performance. His parents and teacher at school confirmed significant advancements in Aiden's behavior. This observation exemplifies the cascade effect often observed in behavior therapy, wherein addressing one area of dysfunction, such as sleep, can positively impact other aspects of the child's daily life [37]. After completing goals A and B, Aiden was encouraged to expose himself to different contexts in which he felt compelled to do the leg rituals (e.g. school), so that his inhibitory learning would generalize as broadly as possible. This process could enhance long-term

retrieval of inhibitory learning and subsequently restrain a lapse in Aiden's OCD symptoms [23, 38]. Furthermore, the guidance provided for organizing Aiden's school responsibilities and establishing a consistent study schedule yielded significant anxiety-reducing effects for both the child and the parents. The structured approach facilitated a sense of stability and predictability in Aiden's routine, contributing to a more positive and constructive learning environment.

7. The Involvement of Parents as Co-therapists

Parent sessions took place every 3rd week of session with the child and did not include the child's presence with them. The involvement of parents as co-therapists and the provision of counseling on parenting issues was an integral part of the therapeutic approach. The parents willingly participated in the therapy process and expressed a desire to comprehend how their previous tactics had influenced their child's symptomatology.

Specifically, the frequent reassurances provided by Aiden's parents regarding his anxieties, as well as the frequent punishments and outbursts of anger on behalf of the father in his attempts to motivate Aiden to study. These were identified as factors that exacerbated the child's symptomatology. The parents' differing perspectives on daily household rules led to confusion for Aiden and his sibling, prompting them to form alliances with one parent or the other to avoid punishments.

Moreover, the father's inflexible and perfectionistic tendencies served as a model for Aiden, contributing to the child's difficulties. Recognizing these patterns and dynamics within the family system was crucial in fostering a more supportive and constructive environment for Aiden's therapeutic progress.

It is important to note that at the time of Aiden's treatment initiation, the parents had shown a personal interest in seeking individual therapy to resolve their difficulties. The mother, prompted by her health issue, came to recognize the significant impact of mental health on her interactions with her children. Simultaneously, the father, despite his rigidity, started to acknowledge that his chronic challenge in comprehending and empathizing with others' emotions might be linked to attachment difficulties within the family and his own OCD symptoms. On the other hand, the therapist often took care, in the context of their counseling, to connect the child's current obsessive-compulsive type difficulties with the communication difficulties between parents to highlight the need for their immediate involvement in Aiden's treatment. Based on the above, the father also began individual OCD-oriented CBT therapy to alleviate his own OCD symptoms. At the same time, the mother started individual counseling with the assistance of therapists different from Aiden's therapist.

8. Facilitating the Child's Socialization Opportunities

This was an essential therapeutic goal aimed at providing Aiden with avenues to receive support and improve his social interactions. Enrolling Aiden in the neighborhood tennis team allowed him to receive positive reinforcement through collaboration and shared experiences with peers, counteracting his preoccupation with compulsions and attachment to inanimate objects. Role-playing exercises with the therapist also allowed Aiden to acquire problem-solving skills and enhance his assertiveness.

9. Development of a Structured Program Tailored to the Child's Needs

Developing a structured schedule for Aiden that encompasses his daily routine and study time at home while incorporating enjoyable activities proved beneficial. Including activities like chess lessons and tennis in Aiden's schedule after his midday study sessions motivated him to become more focused and effective in studying. This led to a noticeable reduction in symmetrical rituals involving his feet. As part of the therapeutic plan, pleasant activities were introduced on weekends, such as visits to the planetarium, rewarding his dedication to daily studies. Furthermore, Aiden's desire to care for and enjoy the companionship of a small dog regularly positively impacted his overall well-being [39].

10. Gradual Tapering off Aiden's Medication

Gradual tapering off Aiden's medication was undertaken after careful consideration of his history and treatment progress. As previously mentioned in his history, Aiden was initially prescribed 20 mg of Fluoxetine for two months and 0.25 mg of Risperidone for 10 months. However, due to the emergence of side effects, specifically akathisia, a decision was made to reduce his medication gradually. As a result, Aiden has been free from OCD symptoms without medicines for the past 6 months.

11. Current Status

At the end of therapy, Aiden and his family have been engaged with the CBT Community center for a total of 9 months, and for the last 6 months, he no longer met the criteria for OCD. Significant improvements were observed in various aspects of his life, including enhanced adaptation in school, a reduction in tensions with his parents, satisfactory control of his anxiety, and the establishment of new friendships. As a result, beyond the reduction in the severity of the symptomatology, there was an improvement in the quality of life for both the child and the family. This finding is not always evident in cases of CBT intervention for patients with OCD [5].

After completion of therapy, CY-BOCS assessment indicated notable improvement (i.e. post-treatment total score 1), with an increase in the child's reliability in reporting (i.e. post-treatment reliability 2). This suggests that Aiden finally possessed a deeper understanding of his difficulties related to OCD. At the same time, the post-treatment score was much lower than the cut-off score proposed by the Pediatric OCD Treatment study, which denotes treatment response status [34].

As part of the ongoing therapeutic process, the therapist conducts monthly follow-up sessions with the parents and the child to ensure continued progress and support. These booster sessions are considered particularly important for reinforcing the cognitive aspects of CBT therapy within the family and, by extension, for maintaining the gains achieved during treatment [40, 41].

12. Discussion

The successful treatment outcome in this case aligns with the findings reported in other case reports in the literature [42-45]. A vital aspect of this case report is the quantification of improvement in OCD symptomatology through the use of the CY-BOCS, which is considered the gold standard interview for mapping OCD symptoms, both before and after the completion of the

treatment [33, 46]. Therefore, tracking symptomatology during treatment through CY-BOCS enhances the reliability of our results.

Studying this particular case, we observe that the design and execution of CBT in children present crucial differences compared to the treatment of adults. Specifically, the distinctive clinical presentation seen in children, along with their developmental immaturity in understanding instructions and their reliance on caregivers who are also involved in therapy, present challenges in implementing CBT. These factors make it more difficult to guide children toward logical and beneficial thoughts and behaviors within the therapeutic alliance with the therapist [47, 48]. These factors, combined with children's tendency to "hide" their OCD symptoms, primarily due to fantasies of punishment or shame [3], as well as therapists' biases against well-established effective methods like exposure therapy [29], lead to objective difficulties in the successful application of this form of psychotherapy.

A significant challenge in addressing OCD is the disruption it causes within the family due to family accommodation (FA) [49, 50]. FA is the process whereby other family members participate in or assist with a child's OCD symptoms [22]. FA has been significantly correlated with OCD symptom severity and poorer treatment outcomes, and there is data to suggest that FA may mediate OCD symptom outcomes [51]. This phenomenon highlights the necessity of intervention for the entire family. Provided that a high percentage of parents of children with OCD actively participate in the child's rituals, psychoeducation of these parents represents a vital therapeutic component in the overall intervention effort [52]. In this case, despite significant difficulties in their communication, the parents were immediately willing to commit to the therapist's recommendations. In addition, they worked continuously to avoid "enabling" their son's OCD symptomatology, as well as to lower family conflict and blame for the child [53]. Furthermore, they actively participated in exposure exercises. The inclusion of counseling parent sessions in the treatment of children with OCD needs to be further promoted, as well as novel therapeutic strategies that specifically target family variables, such as FA, blame, cohesion, conflict, and general family functioning, must be implemented to maximize such a parental involvement [22]. Upon this, the fact that Aiden's parents were seen alone every third week of individual sessions with Aiden, but not in the context of a family session, constitutes a study limitation.

Furthermore, it is common for a parent of a child with OCD also to display symptoms of the same disorder [54-56]. In this particular case, the affected family member was the father, who subsequently engaged in individual OCD - oriented CBT therapy. This collaborative effort proved beneficial in the treatment of Aiden.

In interventions primarily aimed at children and secondarily at adolescents, therapists often use allegories and symbolism. However, what was unique in this particular case was the use of vocabulary and techniques typically employed with individuals in a more mature developmental stage. Thus, as a child with high intelligence and familiarity with mathematics and numbers, Aiden did not find this approach challenging. It was his desire.

On the other hand, we know that comorbid psychopathological disorders or subclinical symptoms are frequent in children with OCD [57]. However, in Aiden's case, significant comorbidity was not observed, only a mild attention deficit and some inherent difficulties in written expression. The fact that Aiden responded well to our therapy confirms the existing knowledge that the absence of comorbidity is a positive outcome factor [58].

A positive outcome factor in Aiden's case was his relatively good compliance with homework assignments. Specifically, it is known that homework compliance between sessions is not as common among children compared to adults. Nevertheless, Aiden consistently and diligently completed the exercises given to him by the therapist between sessions. In accordance with existing literature, this fact contributed positively to the final therapeutic outcome [59]. The experience of the ERP technique helped Aiden to violate his expectations that through the withdrawal of safety strategies during his nighttime sleep routine, his fear would become unbearable and uncontrollable. Refutation of Aiden's catastrophizing expectations may have played the most substantial role in the therapeutic outcome, as opposed to the habituation-based model of exposure therapy [19]. Additionally, through exposure and successful inhibition learning, Aiden was taught how to tolerate the uncertainty caused by his phobic stimuli. For example, new inhibitory associations were acquired, such as that he "could endure the fear of the dark and the stress of evening study without enlisting magical objects and rituals.

Indeed, as evidenced in this specific case, the application and efficacy of the ERP technique in pediatric populations present unique challenges compared to adults. The reasons for this difference can be attributed to children's inherent difficulty in tolerating uncertainty, as well as their difficulty in waiting for the delayed gratification that will follow their familiarization with the anxiety-provoking stimulus. Additionally, the successful execution of exposure exercises depends on parents' attitudes, which can either assist or hinder their successful completion. In this context, it was noted that the child occasionally did not complete his homework, possibly to express his anger towards his parents. Fortunately, his parents did not personalize his behavior, remaining steadfast in rewarding his efforts in therapy and disregarding any "regressions" he may have exhibited. Finally, the literature indicates that the extinction process during exposure in children appears to differ from that in adults due to the rapid developmental changes characterizing children [60-62].

Notably, questions arise regarding the substantial role of pharmacotherapy in regard to the reduction of symptomatology in this case. As previously mentioned, when the family initiated cooperation with the psychotherapy unit, Aiden was already receiving antidepressant medication for two months and antipsychotic medication for ten months. Pharmacotherapy continued for an additional three months, after which it was discontinued due to side effects. Subsequently, the child received only psychotherapy for the next six months until the completion of treatment. At that time, Aiden no longer met the diagnostic criteria for OCD based on the Diagnostic and Statistical Manual of Mental Disorder - IV - TR classification system. After completion of therapy, it was challenging to make definitive statements about the individual contributions of psychotherapy, pharmacotherapy, or their combination to the favorable therapeutic outcome. In this context, follow-up evaluations conducted six and twelve months after therapy completion may provide further insights into the long-term effects of these interventions.

While therapy was just completed, the absence of the possibility to document the sustainability of the gains in the upcoming follow-ups constitutes a limitation of our study. From now on, the therapist asked Aiden every time he comes in contact with stimulus that cause him anxiety/a tendency to do the symmetry rituals with his legs, to mentally "reinstate" what he learned during exposure, picturing the various situations in which he has already learned to master his compulsion [63]. Also, he encouraged Aiden not to hesitate to expose himself to various compulsion-induced conditions (e.g., discomfort during school or playtime) to consolidate his inhibition learning and generalize it as broadly as possible [38].

In this case study, the therapeutic intervention encompassed multiple dimensions, including education about the disorder, gradual exposure to anxiety-provoking stimuli, enhancement of social skills, addressing the child's learning and organizational difficulties, comprehensive support for the parents, and adjunctive pharmacotherapy. Therefore, it would be risky to generalize our conclusions to suggest that CBT yields beneficial results for all patients within this age group. Additionally, considering that CBT did not achieve the expected outcomes in some research studies, it is intriguing to explore how researchers seek various strategies to optimize its effectiveness [64].

13. Conclusion

OCD constitutes a debilitating psychiatric disorder significantly impacting the quality of life of affected children. The diagnosis and management of pediatric OCD pose distinctive challenges. Clinicians need to remain vigilant for OCD symptomatology when assessing children with emotional and behavioral difficulties. We propose the inclusion of screening questions to exclude OCD in routine mental status examinations for children and adolescents. In cases where the diagnosis is confirmed, CBT, with a focus on ERP techniques, appears to provide a substantial reduction of OCD symptomatology. It is of paramount importance for families to receive comprehensive support. A future challenge for both research and further enhancement of OCD treatment lies in optimizing the ERP technique by identifying factors that contribute to better therapeutic outcomes, for instance, the inclusion of developmental factors in the implementation of an inhibitory learning model, the systematic use of a diary and the appropriate involvement of parents in the therapeutic alliance (as in the current case). Elements of CBT that seem to be more effective should also be pinpointed. Additionally, distinguishing subtypes of OCD (based on specific age groups, populations with distinct symptomatology, cultural factors, and characteristics) that may respond more favorably to CBT compared to other interventions is an area worth exploring.

Abbreviations

ASCAP	American Academy of Children and Adolescent Psychiatry
CBT	Cognitive Behavior Therapy
CY-BOCS	Children's Yale-Brown Obsessive-Compulsive Scale
ERP	Exposure and response prevention
OCD	Obsessive Compulsive Disorder
POTS	Pediatric OCD Treatment Study

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Author Contributions

Syros Ioannis conceived the original idea, wrote the manuscript and supervised the project. Anastassiou-Hadjicharalambous Xenia provided critical feedback and helped shape the manuscript.

Competing Interests

The authors have declared that no competing interests exist.

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