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REVIEW

Exposure and Response Prevention in the Treatment of Obsessive-Compulsive Disorder: Current Perspectives

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Abstract: Numerous clinical trials support the efficacy of exposure and response prevention (ERP) for the treatment of obsessive-compulsive disorder (OCD). Accordingly, ERP has been formally recognized as a first-line, evidence-based treatment for OCD. This review discusses the theoretical underpinnings of the treatment from a behavioral and neurobiological perspective and summarizes the evidence supporting the efficacy of ERP across child and adult populations. Next, we discuss predictors of ERP treatment outcome and discuss implementation strategies designed to improve feasibility and adoption. Finally, strategies to improve treatment dissemination are discussed.

Keywords: extinction, learning, rituals, behavior, treatment

Introduction

Obsessive-compulsive disorder (OCD) impacts millions of people. Approximately 2.3% of adults – 1 out of 40 adults – in the United States will meet the criteria for OCD at some point in their lives.[1] OCD is a chronic psychiatric condition characterized by the presence of unwanted, recurring thoughts (obsessions) and/or the performance of repetitive behaviors or rituals (compulsions). Compulsions are typically performed in an attempt to alleviate discomfort and/or anxiety arising from obsessional thoughts or a general sense of incompleteness. Obsessions and compulsions are distressing and disruptive to day to day life. Obsessive compulsive disorder has been ranked as one of the top 10 leading causes of disability in the world[2] and has been associated with diminished quality of life,[3] significant functional impairment,[3] and high healthcare costs.[4]

Exposure and response prevention (ERP) is a first line treatment for OCD.[5,6] ERP is a form of cognitive behavioral therapy (CBT) that involves providing psychoeducation to the patient, helping the patient confront fears or discomfort related to their obsessional thoughts (exposure), and having the patient resist performing compulsions (response prevention). Patients can be exposed to actual situations (in vivo exposure), imagined situations (imaginal exposure), or the physical sensations associated with anxiety or discomfort (interoceptive exposure). The goal of ERP is to challenge how a patient responds to distress and to eventually learn that feared stimuli are safe. In this review, we will discuss the theoretical background of ERP, factors related to the efficacy and effectiveness of ERP, and treatment utilization and dissemination.

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Exposure and Response Prevention

The development of ERP was based on behavioral theories. Accordingly, obsessions are formed through classical conditioning and compulsions are maintained by operant conditioning. Mowrer's two-factor theory[7] combined the learning principles of classical and operant conditioning to explain the development and maintenance of fear. Classical conditioning can explain how a neutral stimulus, such as thoughts, can elicit fear when associated with an event that naturally causes pain or distress. However, classical conditioning alone cannot explain avoidance and escape behaviors – behaviors that often negatively impact a person's life and are commonly performed amongst phobic individuals. Mowrer[7] used the concept of operant conditioning to theorize that avoidance and escape behaviors are maintained because they remove anxiety and/or distress. The temporary relief gained from performing compulsions serves as a reward, prompting reinforcement of the behavior. Theoretically then, weakening the conditioned response can extinguish obsessions and compulsions.

Exposure therapy involves procedures that prompt for extinction. Habituation, or a natural decrease in fear elicited by a stimulus with repeated exposure (and no escape or avoidance behavior), has been described as one method to achieve extinction. In a habituation model, the primary goal of exposure is anxiety reduction. As suggested, extant studies have shown that anxiety declines during exposure trials.[8–10] The habituation model was further supported by initial studies that found habituation to be predictive of treatment outcome.[11] However, in a review of the scientific literature, Craske et al[12] noted that although habituation does occur during exposure, the decline in anxiety is not predictive of treatment outcome. More recent research supports this notion, finding no relationship between within-session habituation and treatment outcome[13,14] and that successful response to exposure can occur in the absence of habituation.[15]

More recently, extinction has been understood using an inhibitory learning model.[12] Based on this model, extinction is maximized when patients learn new information that can block out – or inhibit – their obsessional thoughts and/or urges. The established anxiety-provoking association ("I will get sick if I touch a dirty counter") remains intact while new, non-threatening associations are formed ("The chances of getting sick from touching a dirty counter are low"). Several animal studies have shown that an extinguished response can recover after a period of time,[16] a change in context after extinction,[17] and a reinstatement of the conditioned stimulus.[18] This supports the idea that extinction does not erase the conditioned memory but instead, prompts the formation of a new non-threatening association that can override the conditioned association. Response prevention would have the purpose of enhancing these non-threatening associations to ensure extinction.[19] ERP should then focus on distress tolerance rather than habituation – on informing patients that their obsessional thoughts, anxiety, and uncertainty are tolerable and that compulsions are not necessary for handling their distress.[19] In an inhibitory learning model, the goal of ERP is to teach that the experience of distress is bearable rather than aiming for an overall decline in anxiety.[12]

Extinction has also been examined from a neurobiological perspective. The ventromedial prefrontal cortex (vmPFC) has been implicated in the memory or retention of learned extinction (ie, extinction recall) in animal and human studies.[20,21] Milad and colleagues[22] found blunted vmPFC activation and impaired extinction recall in OCD patients relative to healthy individuals, consistent with clinical observations in OCD highlighting an inability to extinguish inappropriate fear responses. Relatedly, research highlights a lack of safety signaling in the vmPFC whereby individuals with OCD fail to differentiate between threatening and safe stimuli.[23] This finding has led some to posit that this impairment in the ability to deem a stimuli as safe may hinder the formation of a non-threatening memory, a process that is critical to successful ERP.[23] Fullana et al[24] also noted significant reductions in cortical thickness of a sub-region within the vmPFC in OCD patients that responded to exposure therapy compared to those that did not. Taken together, these studies suggest the variability in the size and function of the vmPFC may predict treatment outcomes in exposure therapy.[23,24] Indeed, one recent study demonstrated that decreased resting-state functional connectivity between the vmPFC and basolateral amygdala predicts better outcome in patients receiving CBT with ERP for OCD.[25]

N-methyl d-aspartate (NMDA) receptors in the amygdala have a role in the extinction process.[26] Since the activation of NMDA receptors inhibit extinction,[27] it has been postulated that NMDA receptor agonists have the potential to enhance extinction learning in combination with ERP. Animal studies have indicated that d-cycloserine (DCS), a partial agonist, can facilitate the extinction of conditioned fears.[27,28] Moreover, two clinical studies demonstrated patients with phobias who received DCS

showed greater reductions in anxiety after exposure treatment compared to controls.[29,30] Based on these initial findings, DCS appeared to be a promising pharmacological agent to use in conjunction with ERP for OCD. However, randomized controlled trials (RCTs) comparing ERP + DCS to ERP + placebo have yielded inconsistent results on whether DCS can augment extinction learning. Wilhelm et al[31] found that OCD patients receiving DCS showed greater improvement in OCD symptoms following ERP than those receiving placebo. In contrast, Storch et al[32] and Andersson et al[33] found no significant differences between the two groups, suggesting that DCS does not improve the process of extinction in ERP for OCD. Methodological differences in the studies may explain these mixed results. Variables such as dosage, timing and frequency of DCS administration, and number of ERP sessions may influence response.[31,34] Additionally, Andersson et al[33] found a significant interaction between antidepressants and DCS that may impair treatment response. This is consistent with animal literature suggests that long-term use of antidepressants can downregulate NMDA receptors which can interfere with the standard effects of DCS of enhancing fear extinction.[35] Thus, DCS may only be beneficial for a subset of patients. Larger prospective studies optimizing DCS administration based on this growing body of research will help determine whether the inclusion of DCS can improve extinction learning in those undergoing ERP.

Efficacy of Exposure and Response Prevention

Although the mechanisms contributing to the process of extinction continue to be discussed, the efficacy of ERP for OCD has been well established through several well-powered RCTs.[36–39] In adults, ERP is as efficacious, if not more efficacious than existing, first-line pharmacological treatments for OCD (eg, serotonin reuptake inhibitors (SRIs)). For example, in a randomized placebo-controlled trial, Foa et al[37] found that ERP alone and ERP + SRI were both superior to SRI alone in the treatment of adults with OCD. Notably, there was no significant difference between the combined treatment versus ERP monotherapy.[37] Moreover, whereas 45% to 89% of patients treated with SRIs have a reoccurrence of OCD symptoms after medication discontinuation,[40,41] improvement after ERP tends to persist long-term.[42] Further, adult patients who are nonresponsive to medication have shown significant improvement in OCD symptoms when given ERP.[43] Unlike adult studies, research in children and adolescents supports a combined approach to treatment. Several RCTs have documented the superiority of ERP + SRIs compared to ERP alone for youth with OCD.[39,44] Though the literature on older adults is more limited, several case studies have documented success using ERP to reduce OCD symptoms in geriatric patients.[45–47] Researchers have considered augmenting ERP to improve treatment outcome.[48,49] However, results from small RCTs comparing mindfulness-based ERP and acceptance and commitment therapy enhanced ERP, respectively, to standard ERP have found no significant differences in outcome.[48,49] Behavioral augmentation of ERP through these methods does not appear to improve the treatment's efficacy. Overall, about 50–60% of patients who complete ERP treatment show clinically significant improvement in OCD symptoms[50–52] and treatment gains have shown to be maintained long-term.[42]

Predictors and Moderators of ERP Treatment Outcome

Despite strong evidence supporting the use of ERP in the treatment of OCD, about 50% of patients do not show significant improvement and 25% to 30% drop out of treatment prematurely.[50] Research has indicated differences in patient OCD symptomology as a predictor of treatment outcome. Across both adult and child samples, lower baseline symptom severity predicts greater symptom improvement following ERP.[53–55] Additionally, greater insight predicts better ERP treatment response.[53,56,57] In regards to particular symptoms, some research suggests poorer response to ERP for individuals whose OCD is characterized by unacceptable or taboo thoughts.[55,58] Moreover, individuals with OCD that primarily perform compulsions in response to "not just right" sensations/incompleteness, rather than to avoid a feared outcome, may benefit less from ERP. Foa and colleagues[56] found that compared to those who articulated feared consequences, patients with OCD that did not showed less symptom reduction post-treatment.

Several studies have investigated the relationship between psychiatric comorbidity and ERP treatment outcome. Findings have been inconsistent on whether the presence of depressive symptoms is associated with treatment outcome in patients with OCD.[59,60] Researchers have suggested that severe depression, rather than just the presence of depressive symptoms, may be a better predictor

of poor treatment outcome.[59] Regardless, even those with severe depression have shown to at least receive moderate to significant gains from ERP.[59,60] Comorbid obsessive-compulsive personality disorder (OCPD) predicted worse ERP outcome in one study, which also highlighted the relationship between the OCPD criterion of perfectionism and poor treatment response.[61] Perfectionism has been associated with significant increase in negative affect when faced with failure[62] and difficulty in establishing strong therapeutic alliances[63] – factors that can greatly impact treatment success. A diagnosis of autism spectrum disorder (ASD) also appears to moderate ERP outcomes. Flygare and colleagues[64] found that OCD patients with ASD received less benefit from CBT with ERP than those without ASD potentially due to greater difficulties engaging and adhering to exposure-based treatment. While difficulty treating OCD in the presence of other serious mental illnesses (eg, psychotic disorders) is often noted clinically, a small number of case studies suggest that ERP is not iatrogenic for these populations.[65]

Family members and significant others may inadvertently contribute to the maintenance of the patient's OCD symptoms by assisting in rituals and providing frequent reassurance.[66,67] Prospective, longitudinal investigations demonstrate that parental accommodation predicts OCD symptom severity at long-term follow-up in children with OCD.[68] Not surprisingly, high levels of family accommodation have been found to predict worse ERP treatment outcome in pediatric OCD.[53] For adults, individuals with OCD may intentionally involve their significant others in managing their distress or significant others may willingly accommodate patients' symptoms.[66] Addressing family accommodation in ERP has the potential to improve the short- and long-term effects of ERP. Indeed, developmentally tailored interventions that address family accommodation promote more robust decreases in OCD symptoms compared to treatment as usual in children with OCD.[69]

The process of ERP, including patient compliance, ERP administration, and therapist factors, is also associated with outcomes. Early between-session homework compliance has repeatedly been shown to predict better acute and long-term treatment outcomes.[70,71] A meta-analysis on ERP administration found that receiving exposure therapy under therapist supervision, complete abstention from rituals, and a combination of in vivo and imaginal exposure is associated with greater symptom improvement than their alternatives.[72] Therapist factors including encouraging distraction during exposure, providing reassurance to the patient, and treating the peripheral symptoms rather than the core fear can hinder the breakdown of feared association, making relapse more likely.[73] Further, mental compulsions (eg, repeating words and phrase to alleviate anxiety) can easily be overlooked due to its unobservable nature and thus, can complicate treatment.[73] Therapists may fail to recognize them, mistake them for obsessions, or incorrectly teach a patient to identify mental compulsions in a way that can lead to a reassurance ritual.[73]

Barriers to Treatment Utilization and Strategies to Improve Dissemination

ERP is underutilized despite its proven effectiveness.[74] Negative beliefs about ERP amongst therapists have contributed to this.[75,76] ERP can be an emotionally and logistically difficult treatment to administer. In a large-scale survey on therapists, 37.3% agreed or strongly agreed that exposure is strenuous for them and 14.7% disagreed or strongly disagreed on feeling competent in conducting exposure for OCD.[77] Purposefully evoking anxiety can be unsettling for the therapist recommending it and the patient experiencing it. Gillihan et al[73] discussed how maximizing the disconfirmation of obsessions is necessary to prevent relapse which involves including extremely distressing and out of the ordinary activities (ie, having a patient with contamination OCD put their hand in toilet bowl water). Therapists have also reported feeling unsure if patients are ready for exposure (13.4%) and fears of harming their patients (10%) as factors that impede their use of ERP.[77] Olatunji et al[76] analyzed the concerns around ERP such as the exacerbation of symptoms and concluded that exposure therapy is a safe and tolerable treatment with minimal risk of causing harm to patients.

Furthermore, individuals with OCD may face numerous barriers to seeking and accessing treatment which has likely contributed to the underutilization of ERP. There is a substantial gap of approximately 10 to 17 years between onset of OCD and initiation of treatment.[78,79] Among a sample of 202 adults with OCD, Mancebo et al[74] found that about 30% did not initiate CBT treatment despite recommendations or dropped out of treatment prematurely. Logistic issues (eg, access to services), financial concerns (eg, cost of treatment, health insurance) and lack of time (eg, unable to attend appointments) are commonly reported as obstacles to treatment.[74,78] Researchers have proposed a stepped care model to address these barriers.[80] Under this approach,

individuals with OCD would initially receive a low cost and low-intensity form of ERP treatment. This could involve the use of mediums that are widely accessible and affordable such as bibliotherapy,[81] computer-guided behavior therapy,[82] or mobile ERP applications.[83] Those that fail to respond adequately to the first treatment would be given higher cost therapist-administered treatment. Tolin et al[81] randomized adults with OCD to receive either standard ERP or a stepped care approach consisting of bibliotherapy plus counselling as a first step that was followed by standard ERP if there was no clinically significant change in OCD symptoms. Both treatments were found to be efficacious and showed no difference in patient satisfaction scores. However, patient cost for stepped ERP was significantly lower than standard ERP. This study suggests that a stepped care approach to ERP has the benefit of lowering costs for patients without sacrificing treatment effectiveness and patient satisfaction.[81] More recently, researchers are investigating the use of a 4-day intensive ERP treatment for OCD which has the potential of addressing barriers of time and cost.[84,85] Although initial results are promising,[86,87] further large-scale RCTs are needed to demonstrate the treatment's efficacy.

Considering the barriers individuals with OCD face and the substantial societal cost associated with OCD, there is also a general need to improve OCD treatment dissemination. Many low income and culturally diverse patients with OCD receive healthcare from community mental health centers (CMHCs). However, community clinicians may not be adequately trained to treat patients with OCD. Cummings et al[88] found that only 23% of communities in the lowest income quartile offered a specialized mental health treatment resource. Mancebo et al[89] trained MA-level community providers and bachelor's level behavioral coaches to deliver ERP to patients with OCD and found that a team-based approach was feasible in CMHCs. Half of the patients that completed treatment in this pilot study showed clinically significant reductions in OCD symptoms. Mancebo et al[89] suggested modifying ERP protocols to include training on serious mental illness, rolling admission groups, and sessions to address therapy interfering behaviors can further improve community patient outcomes. As this study has indicated, providing ERP training to community providers can be a practical way to increase access to care.

A transdiagnostic approach to treatment is one method to improve treatment dissemination that has received increasing attention over the past several years.[90] Targeting the similarities between disorders provides a more parsimonious and comprehensive approach to treatment.[91,92] In an RCT with patients with OCD and anxiety disorders, those that received a transdiagnostic model of treatment including exposure showed significant improvement in symptoms related to primary and comorbid disorders compared to a waitlist control.[92] A large RCT follow-up study demonstrated equivalence between a transdiagnostic treatment protocol and disorder-specific protocols like ERP for OCD.[93,94] A transdiagnostic approach has the potential to improve outcomes by addressing multiple components of varying disorders and by increasing the ease of implementing evidenced-based treatment into clinical settings.[91,93]

Conclusion

OCD is a debilitating psychiatric condition that causes significant distress and impairment in functioning. ERP is one of the most efficacious and effective forms of treatment for OCD. Despite strong evidence supporting the use of ERP in the treatment of OCD, a sizeable percentage of patients do not adequately improve or drop out of treatment prematurely.[50] Research suggest that OCD symptomology, psychiatric comorbidity, symptom accommodation, and the process of ERP can impact treatment outcome. Furthermore, researchers have identified several barriers to treatment (eg, logistical issues, financial concerns, and availability of services). Efforts to improve treatment dissemination and outcome include providing psychoeducation to the therapist and client, using a stepped care model, and utilizing a transdiagnostic approach. Future research should focus on improving the reach of ERP by addressing individual, therapeutic, and social factors that interfere with treatment success.

Disclosure

The authors report no conflicts of interest in this work.

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