

# The Connection between Obsessive Compulsive Disorder and Traumatic Brain Injury in Paediatric and Young Patients, Therapeutic Guidelines and New Therapeutic Approaches

Laura Ion 

Department of Neuroscience, School of Advanced Education, Research and Accreditation, Castellon, Spain  
Email: office@byyourbrain.com

**How to cite this paper:** Ion, L. (2021). The Connection between Obsessive Compulsive Disorder and Traumatic Brain Injury in Paediatric and Young Patients, Therapeutic Guidelines and New Therapeutic Approaches. *Psychology*, 12, 327-348.  
<https://doi.org/10.4236/psych.2021.123022>

**Received:** January 14, 2021  
**Accepted:** March 15, 2021  
**Published:** March 18, 2021

Copyright © 2021 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).  
<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

Traumatic brain injury (TBI) is considered, worldwide, to be the leading cause of disability and mortality between the ages 1 and 45. In USA only, a report of Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, mentioned that from 2006 to 2014, the number of TBI-related emergency unit visits, hospitalizations and deaths increased by 53%. In 2014, for example, an average of 155 people in the US died each day from injuries that included a traumatic brain injury, no matter the severity. Significant neurologic complications occurred after a traumatic brain injury including seizures, dementia, Alzheimer's disease, and cranial nerve injuries. People may suffer from various psychiatric complications such as depression, PTSD, anxiety, obsessive-compulsive disorder (OCD) and other cognitive and behavioural disorders. Considering that, TBI may be regarded as one of the significant public health burdens. This present study addresses the emergence of OCD and OCD symptoms after TBI and the necessity of having an on target therapeutic intervention plus the assessment of new therapeutic approaches, with the purpose to support the practitioners during the rehabilitation program of TBI patients suffering from OCD, focusing on the counselling and psychotherapy programs like Cognitive Behavioural Therapy, Rational Emotive Behaviour Therapy, Exposure and Response Prevention Therapy, NLP—yet, not considered a therapy and Hypnotherapy Post-TBI emergent psychopathology, especially obsessive-compulsive disorder (OCD) is influenced by underlying sub-clinical diathesis, brain injury lesions sites, environmental stressors and the rehabilitation process including the attention paid to the depression period that follows the TBI, where the intrusive thoughts, that are not therapeutically approached, may turn later on into ob-

sessive thoughts that trigger compulsive behaviours. Along with that, the management of family, friends, environmental stressors and the enhanced clinical identification of symptoms after traumatic brain injury (TBI) can be used in the rehabilitation process to improve prognosis and control the psychiatric complications.

### Keywords

Traumatic Brain Injury, Obsessive Compulsive Disorder, Anxiety, Depression, Cognitive Behavioural Therapy, Exposure and Response Prevention, Rational Emotive Behavioural Therapy, NLP, Hypnotherapy

---

## 1. Introduction

In the literature a TBI is considered to be a penetrating or closed injury, and it depends on if there was any part of a brain tissue exposition or not. When it comes about the central nervous system, the injuries can be primary or secondary. Primary injuries are, mainly, related to the tissue impairment which always results directly from the impact. Primary injuries can be localized injuries like a laceration of the brain parenchyma, or, for example, a diffuse lesion like those in the diffuse axonal injury. Now, the secondary injuries are developed, somehow, subsequently as a tissue response to the primary injuries.

The cognitive sequel of traumatic brain injury included, in many reported cases, memory impairments, impairment of executive function, problems with attention and information/data processing as well as language difficulties like understanding and communication both written and verbal language. Behavioural changes and impairments of executive function were very common following traumatic brain injury and often proved to be the more serious obstacles to rehabilitation as much as the OCD appeared after a TBI or after a depression period that followed a TBI. In addition to changes in cognitive function, behaviour, and mobility, TBI can trigger symptoms of OCD including obsessions and compulsions.

Obsessive-compulsive disorder (OCD) is characterized by recurrent and persistent thoughts, images or impulses named obsessions and repetitive behaviours or mental acts known as compulsions, always in response to the obsessions.

When it comes about OCD after a TBI, researchers (Grados, 2003; Coetzer, 2004) noticed that the obsessive-compulsive disorders may occur soon after a traumatic brain injury or months later after a traumatic brain injury, in most cases after a patient experienced a major depression episode. For each of these two cases, while taking brain scans, specific, localized brain damage it can or can't be seen. It is important to note that there are only some case reports and a few series in literature describing the main factors associated to OCD after TBI or after a major depression period following a TBI. Many of these cases presented patients with lesions in frontal and subcortical areas. Regarding the orbi-

to frontal cortex, caudate nucleus, and anterior cingulate cortex, those were areas where the structural lesions or functional abnormalities were frequently demonstrated (Berthier et al., 2001). The question was whether the major depression period was a consequence of the traumatic brain injury or a consequence of some other external socio-psychological factors. What is still unclear for the scientists are the conditions that trigger an obsessive-compulsive disorder after a traumatic brain injury, but what is known for sure is that the most common situation is that in which an obsessive-compulsive disorder follows a major depression episode after a traumatic brain injury.

The questions that arise from the information provided above are:

- What is the connection between the major depression period and OCD after a TBI?
- Are the intrusive, limitative, negative thoughts and distortions met in the major depression period, a pool of “destructive thoughts” that turn into obsessive thoughts as part of OCD?
- Is a successful rehabilitation process including most suitable psychotherapies (CBT, REBT, ERP, NLP (although not considered a therapy) and Hypnotherapy) going to stop intrusive thoughts from depression to turn into obsessive thoughts in OCD?

Before moving further into the essence of the subject treated in this present study and respond to the question mentioned above, trauma concept needs to be defined. Traumatic events are both individual and collective experiences, there being some similarities and differences based on how individuals react to the experience, chose to respond consciously or unconsciously.

In terms of what a traumatic event means, there is a large pallet of events that lead to traumatic experiences combined with the way the person responds this when it comes about emotional trauma and the biological resistance when it comes to TBI.

The first step taken in TBI cases is evaluating it and defining its severity. In most cases, the classifications consider data of the clinical history records, physical exam and/or neuroimaging. Glasgow Coma Scale (GCS), a scale which is applied during the patient’s primary evaluation, after the TBI, is a worldwide accepted severity classification. There is also a commonly used classification based on the lack of consciousness and amnesia according to The Mild Traumatic Brain Injury Committee of the Head Injury Interdisciplinary Special Interest Group of the American Congress of Rehabilitation Medicine.

It is important to consider the two classifications of a TBI, penetrating or closed, depending on if there was brain tissue exposition or not and the central nervous system injuries, primary or secondary, the exact location in the brain affected by a traumatism when connecting obsessive compulsive manifestations to a traumatic brain injury. Primary injuries can be localized, such as a laceration of the brain parenchyma or diffuse lesions, as in the diffuse axonal injury, for example. The secondary injuries are developed subsequently as tissue res-

ponses to the primary injuries or to systemic event. Here are some examples of secondary injuries: inflammation, ischemia, and lack of blood flow auto regulation (Nortje & Menon, 2004).

Taking into account the information mentioned above, considering the TBI classifications, after a traumatic event what makes a huge difference in terms of recovery and rehabilitation, both on short and long term, is efficient intervention. Therefore, the more efficient intervention on clinical conditions, the better contribution for the inference of other secondary injuries. This is highly important in order to determine the long-term prognostic in traumatic brain injury patients. There are some specific conditions that allow specialized intervention like intracranial hypertension, venous thrombosis with lung embolism, central nervous system infections, seizures, hypoxia and shock. Furthermore, early and on target intervention on cognitive, emotional and behavioural disruptions, can lead to a far better life for traumatic brain injury patients.

Traumatic brain injuries are, significantly, taken into account being considered, worldwide, a major public health problem. The sequels following a traumatic brain injury are still unknown and it is hardly possible to define the cognitive, emotional and behavioural symptoms. Most of the symptoms, physiologically speaking and psychologically speaking, are unlikely to be foreseen. There are too many unpredictable internal and external factors that influence or decide the consequences after a traumatic brain injury. It is known that at least 1.4 million cases occur each year in the United States of America. About 50,000 are fatal, more than 235,000 are admitted to hospitals and 1.1 million are treated then released from the emergency units. Approximately 5.3 million people continue living suffering from long-term disabilities, both physical and psychological, as a result of traumatic brain injury. In terms of money, the annual cost to investigate and treat traumatic brain injury patients is more than 56 billion dollars (Schwarzbold et al., 2008).

A traumatic brain injury proved to leave deep sequels in patients' life and there is enough data to bring evidence in terms of psychiatric disorders following a traumatic brain injury (Deb et al., 1999), succeeded in evaluating 164 traumatic brain injury patients, after one year from their traumatic event, using some sort of a structured interview that was based on the International Classification of Diseases, 10th Revision. The results showed that 21.3% of them got a psychiatric diagnosis after applying the interview. As a result of their study, depression (13.9%) and panic disorder (9%) were higher than it was met in general population. Also, a significant percentage was covered by patients who developed obsessive-compulsive symptoms, soon after a traumatic brain injury or after a major depression episode that followed a traumatic brain injury.

As any other sort of diagnosis, psychiatric diagnosis as well is impacted by some factors that should always be considered. One of these factors is the score obtained after applying the Glasgow Outcome Scale, previous record of other traumatic brain injuries, age, level of education, any other psychiatric comorbid-

ities, alcohol/drug use or other substances related.

Usually, after a traumatic brain injury, patients respond completely differently depending on many factors starting with age and ending up with education level. Therefore, some patients who experience a traumatic event may respond with short-term struggles, but they can recover quickly thanks to some protective factors like supporting family, friends and communities, a very good rehabilitation program, knowledge and education, young age and no traumatic brain injuries experienced before. Others may respond with long term stress and difficulties covering the three major psycho-social areas: cognitive, emotional and behavioural.

There are also some other factors that may influence the consequences after a traumatic brain injury and one of them is the duration of the traumatic event and the intensity of the experience felt by the patient. It is a well-known fact that traumatic experiences can severely disrupt children's and young people cognitive, emotional and social development.

In terms of how efficient are well-known therapies like CBT or REBT, Exposure and Response Prevention (some considering it part of CBT), a paediatric OCD treatment study (POTS Team, 2004) used in their study a number of 117 young patients who were randomly assigned to be medicated either with CBT, sertraline, CBT combined with sertraline, or placebo for about 12 weeks. It was concluded that young patients with OCD, in order to improve their condition, should begin Cognitive Behavioural Therapy plus selective serotonin reuptake inhibitor or only Cognitive Behavioural Therapy.

## 2. Objective

The goal of this present study is to understand the connection between OCD and TBI, no matter if we talk about OCD following a traumatic brain injury (TBI) or OCD following a major depression period that occurred after a traumatic brain injury (TBI), reveal the behaviour and cognition particularities in paediatric and young patients, mainly, who developed obsessive-compulsive disorder (OCD) after suffering a traumatic brain injury (TBI), and emphasize the impact of proper pharmacology and successful psychotherapies using therapies like Cognitive Behavioural Therapy, Rational Emotive Behaviour Therapy, Exposure and Response Prevention Therapy and new therapeutic approaches like NLP (not considered a therapy though, but producing long lasting changes for the best) and Hypnotherapy when treating OCD following TBI, seen, in some cases, as a coping mechanism to keep the traumatic experience suppressed.

## 3. Material and Methods

I have searched articles in PubMed, Research Gate, Science Direct and Cochrane Library using the following keywords: traumatic brain injury; hippocampus; obsessive compulsive disorder; depression; rehabilitation; psychotherapy, cognitive behavioural therapy, exposure and response prevention.

The results of the systematic search and review were as follows: records identified through database searching 3325; records after duplicates removed, 2052; records screened (title), 1285; records excluded, 1212; records screened (abstract) 73; records excluded, 56; full text articles assessed for eligibility, 17; full text articles excluded with reason (cases that contained other conditions other than OCD and major depression), 5; studies included in the synthesis, 12; studies included from other cited references, 2; total studies included in the qualitative synthesis: 14.

The inclusion criteria were to identify those articles where the main subject was the connection between OCD and TBI, OCD after depression period in traumatic brain injury patients and psychotherapy used in treating OCD and depression for TBI patients.

#### 4. Results

Traumatic brain injury (TBI) constitutes a major source of psychiatric morbidity and disability. There are lots of studies examining the onset of obsessions and compulsions as part of Obsessive Compulsive Disorder that occurs soon after a traumatic brain injury or after a major depression episode following a traumatic brain injury and they all come to underline that fact that, although there are no certain criteria based on that scientists can predict when a depression occurs after a TBI or why (as a result of the traumatic event or as a result of psycho-social environment where the patient is leaving). Also, there are theories (Fontenelle et al., 2011) suggesting that obsessive compulsive symptoms, especially in post-traumatic syndrome after a traumatic event, may function as some type of coping or protective response to trauma-related thoughts and emotions that are too psychologically distressing to endure, but still, there is a need for more scientific evidence or data coming out of specific studies to confirm or infirm this theory.

Among the most common obsessive thoughts are worries about the consequences of the traumatic event, cleanliness or excessive cleaning, doing things in a certain way or putting them in a certain order, dressing up specific cloths items like those covering the entire body, rejecting some specific cloths items, paying too much attention to timing and sequence of actions. Prior to obsessive compulsive manifestations, there have been seen other psychological disruptions like anxiety, mania, depression and posttraumatic stress disorder. Injury severity was not associated with new onset OCD. Obsessive compulsive disorder proved to be common after severe paediatric traumatic brain injury and it was also associated with greater comorbidities. New onset obsessions are associated with female sex, psychosocial adversity, and mesial prefrontal and temporal lesions.

Among all the psychological disruptions, both cognitive and behavioural, the incidence of obsessive-compulsive disorders (OCD) proved to be greater than in the general population. The damages to the orbitofrontal cortex, cingulate cortex and subcortical structures (caudate nucleus) seem, so far, to promote OCD

(Stéfan & Mathé, 2015).

According to these authors (Stéfan & Mathé, 2015), the main studies on prevalence rates of anxiety, posttraumatic stress disorder, and obsessive-compulsive disorder after traumatic brain injury look like that (See **Table 1**).

Next to neuroimaging approach so as to sustain an OCD diagnostic after a traumatic brain injury (TBI), psychiatric management of OCD is indicated, especially when symptoms interfere with functioning or cause significant distress to patient and families and communities. The psychiatrist should assess the patient for symptoms of OCD, guided by the diagnostic criteria of DSM-IV-TR, after that, the team where the psychiatrist is part of it, is going to design a rehabilitation program.

The action plan prior to designing the rehabilitation program contains professional actions and interventions designed to treat the patients and change their life for the best. These actions and interventions include:

**Table 1.** TBI: Traumatic Brain Injury; DSM: Diagnostic and Statistical Manual of Mental Disorders; SCID: Structured Clinical Interview for DSM-IV Diagnoses.

References	Design	Level	Conclusion
Fann et al., 1995	<i>n</i> = 50 TBI Measured by “Medical Outcomes Study Health Survey”	4	Prevalence of Generalized Anxiety Disorder: 24%
Hibbard et al., 1998	<i>n</i> = 100 TBI DSM-IV as measured by SCID	4	19% Posttraumatic Stress Disorder 14% Panic Disorder 10% phobia 15% Obsessive-Compulsive Disorder
Deb et al., 1999	<i>n</i> = 120 TBI measured by “Clinical Interview Schedule Revised” and “Psychosis screening Questionnaire”	4	9% panic disorder 2.5% Generalized Anxiety Disorder 0.8% phobia 1.6% Obsessive-Compulsive Disorder
Van Reekum et al., 2000	Review	–	9.1% Generalized Anxiety Disorder (relative risk = 2.3) 9.2% Panic Disorder (relative risk = 5.8)
Hoofien et al., 2001	<i>n</i> = 76 severe TBI followed in rehabilitation center. DSM-III	4	44% Generalized Anxiety Disorder at 15 years 30% Obsessive-Compulsive Disorder in the 15 years post-TBI
Silver et al., 2001	<i>n</i> = 361 outpatients, moderate and severe TBI Assessment with DSM-III	4	3.3% Panic Disorder 4.7% Obsessive-Compulsive Disorders
Koponen et al., 2002	Retrospective study, <i>n</i> = 60 TBI, assessed 30 years after TBI Assessment with DSM-IV	4	1.7% Generalized Anxiety Disorder 8.3% Panic Disorders

- Pharmacotherapy and psychotherapy according to the patient's particularities, diagnosis and prognosis;
- Guidance and support offered to the patient and family members or community involved in his recovery, about the psychotherapeutic, psycho educational materials as part of the rehabilitation program;
- On target Information about specialized local support groups, communities and centres.

The results revealed in the approached articles as part of this present study, have shown that in the case of young OCD patients after a traumatic brain injury or after a depression period following a traumatic brain injury, pharmacological and psychotherapy (behavioural therapy-cognitive behavioural therapy) together may improve OCD symptoms (O'Kearney et al., 2006). It was proved that pharmacological treatment like serotonergic antidepressants and proper psychotherapy, Cognitive Behaviour Therapy, as part of the rehabilitation process, have the best preliminary evidence in the case of treating major depression episodes following TBI (Fann et al., 2009). Besides the pharmacological support, as long as the patient learns how to deal with the trauma and its consequences, the chances to deal with intrusive or obsessive thoughts as part of OCD, are higher. Clinical trials (POTS Team, 2004) suggested that paediatric patients with OCD, in order to improve their condition, should begin Cognitive Behavioural Therapy plus selective serotonin reuptake inhibitor or only Cognitive Behavioural Therapy in order to have results and take control over obsessive thoughts and compulsive behaviours. Here are the results after treatment with sertraline alone and sertraline plus Cognitive Behavioural Therapy. (See **Table 2**)

Considering the results of these studies and taking into account the common ground that CBT is sharing with REBT and Exposure and Response Prevention or other similar set of techniques like NLP, not to mention Hypnotherapy, might have a huge impact on OCD patients following a TBI. This idea, to be validated needs to be tested in practice and have specific criteria that can underline the therapeutic success.

The studies (Mckee & Daneshvar, 2015) have shown that a traumatic brain injury may lead to long-term disabilities, both physical and psychological. OCD after a TBI is one of the most challenging psychiatric disorder still under investigation and more studies are required in order to elucidate completely the connection between a traumatic brain injury and the obsessive compulsive manifestations and the percentage of population suffering from OCD after a TBI. The diagnosis of obsessive-compulsive disorder (OCD) in TBI people requires special attention, though. Neuroimaging plays an important role in establishing obsessive compulsive manifestations after a traumatic brain injury. OCD patients who had suffered a traumatic brain injury, were reported with lesions in frontal and subcortical areas. Also, orbitofrontal cortex, caudate nucleus, and anterior cingulate cortex were main areas where the structural lesions, chemical and functional abnormalities were demonstrated (Maia et al., 2008).



**Table 2.** Baseline demographic and clinical characteristics by treatment group\*.

Characteristics	Cognitive-Behaviour Therapy (n = 28)	Sertraline (n = 28)	Combined Treatment (n = 28)	Placebo (n = 28)
Sex, No%				
• Male	14 (50.0)	17 (60.7)	11 (39.3)	14 (50.0)
• Female	14 (50.0)	11 (39.3)	17 (60.7)	14 (50.0)
Age, mean(SD), y	11.4 (2.8)	11.7 (2.4)	11.7 (2.8)	12.3 (3.0)
Scalar variables, mean (SD)CY-BOCS score <sup>†</sup>				
• Obsessions	12.6 (2.6)	11.5 (2.6)	11.2 (1.8)	11.9 (2.1)
• Compulsions	13.4 (2.5)	12.0 (2.6)	12.6 (1.7)	13.3 (1.7)
• Total	26.0 (4.7)	22.5 (4.7)	23.8 (3.0)	25.2 (3.3)
NIMH Global Severity score <sup>‡</sup>	9.4 (1.5)	8.8 (1.5)	8.8 (1.1)	9.0 (1.2)
CGIScale Severity score <sup>§</sup>	4.9 (0.8)	4.4 (0.8)	4.6 (0.6)	4.7 (0.6)
Psychiatric comorbid disorders, No. (%)				
• Internalizing <sup>  </sup>	22 (81.5)	17 (63.0)	15 (53.6)	16 (61.5)
• Externalizing <sup>‡</sup>	9 (33.3)	9 (33.3)	4 (14.3)	7 (26.9)
• Tic	3 (11.1)	5 (18.5)	4 (14.3)	5 (19.2)

Abbreviations: CGI, Clinical Global Impression; CY-BOCS, Children's Yale-Brown Obsessive-Compulsive Scale; NIMH, National Institute of Mental Health; \*No significant pre-treatment differences were found for any of these variables; <sup>†</sup>Possible range, 0 - 40; <sup>‡</sup>Possible range, 1 - 15; <sup>§</sup>Possible range, 1 - 7; <sup>||</sup>Affective or anxiety disorder; <sup>‡</sup>Attention deficit/hyperactivity disorder, oppositional defiant disorder, conduct disorder.

What other studies (Berthier et al., 2001) have shown is that major depression is considered a common sequel in TBI survivors, also posttraumatic stress disorder, panic attacks and aggressive behaviour. When it comes about the chemical changes inside the brain of patients suffering from depression after a traumatic brain injury, low levels of serotonin, proved to be associated to emotional and cognitive changes, aggression and disinhibition. Also, malfunctioning in the neurotransmission systems, including serotonin and dopamine were described in TBI patients as well (Schwarzbold et al., 2008). As long as low level of serotonin stays behind depression and OCD as well, could be this the reason why OCD follows, in some cases (Coetzer, 2004) a major depression period after a TBI?

Recent studies (Jorge et al., 2007) have also revealed that the hippocampus, next to other regions of the brain, is one of the anatomic regions extremely vulnerable in the case of traumatic brain injury patients. Therefore, disruption in hippocampal functioning and, especially, morphology has been briefly described in cognitive, emotional and depressive disorders.

As there is not an extensive amount of literature sealing the relationship between a traumatic brain injury and the way in which an obsessive-compulsive disorder follows it or the mechanism behind, same for the depression period after TBI, more studies are required in the field.

Psychotherapy and pharmacology play a huge role in the process of rehabilitation of the patients who developed OCD after they experienced trauma, seen as a coping or protective mechanism to manage the traumatic experience, according to some scientists (Fontenelle et al., 2011). Cognitive Behavioural Therapy, Rational Emotive Behaviour Therapy, Exposure Therapy, NLP (not considered a therapy though, but producing long lasting changes for the best) and Hypnotherapy are considered top therapies to pay off when dealing with intrusive thoughts, obsessive thoughts and compulsions in OCD patients who experienced trauma.

Appropriate therapeutic interventions including Cognitive Behavioural Therapy, mainly as it was proved by studies to pay off in treating OCD in traumatic brain injury patients, secondly those that share the same ground like Rational Emotive Therapy, Exposure and Response Prevention Therapy and Hypnotherapy it makes a huge difference in patients' rehabilitation process. Even so, further studies are needed to guide the clinicians and all members involved in the rehabilitation program of OCD patients after a traumatic brain injury, in determining which patients are likely to benefit from a psychotherapeutic intervention in combination with proper pharmacology and what are the main guidelines supporting this. In addition, further studies are required to establish the mechanism behind OCD in TBI patients, what triggers the depression after TBI, what makes in some cases OCD to follow directly a traumatic brain injury and in other cases OCD occurs after a depression period that followed a TBI. Also, there is still a theory that requires proper assessment and attention: is OCD a sort of coping mechanism able to suppress the traumatic experience? Is this the reason why an obsessive-compulsive disorder follows, in some cases, directly the traumatic event?

What some studies (O'Kearney et al., 2006) reveal so far is that Cognitive Behavioural Therapy, alone or in combination with proper pharmacology may improve the symptoms of OCD patients after TBI. Acknowledging this and taking into account the fact that other well-known therapies like REBT, Exposure and Response Prevention Therapy, Hypnotherapy and auxiliary self-development techniques like NLP, share the same ground in terms of best practices with CBT, it is enough to consider them too as the most suitable therapies that can be used successfully when treating OCD patients after TBI. Further studies, though are required to consider this theory as a fundamental data.

## 5. Discussion

A traumatic brain injury (TBI) leads to multiple psychiatric disorders that encompass the main areas of a psychological ground of a human being. Therefore, after a traumatic brain injury, no matter if we consider a major depression period following the traumatic event or an OCD following a TBI, cognitive deficits in attention, memory, and executive function are seen. Next to these, there are behavioural "deficits" like aggression, poor impulse control, irritability, compulsive behaviours or apathy. Beyond every neuropsychological assessment, psy-

chologists, psychiatrists and other members part of the rehabilitation team, have also worked intensively on the design, implementation, and testing of post-TBI interventions. Psychology has aided in the cognitive rehabilitation of OCD patients after a TBI or after a major depressive episode following a TBI, as well as in helping them to manage the emotional impact of this condition through psychotherapy (Cognitive Behavioural Therapy, Rational Emotive Behaviour Therapy, Exposure Therapy, NLP (not considered a therapy though, but producing long lasting changes for the best) and Hypnotherapy) psycho educational programs. Family and communities' interventions are another technique applied to TBI survivors since the condition can adversely impact relatives, who often play a critical supporting role in the patient recovery process. As the most widely used psychotherapeutic approach, CBT is built on the assumption that cognitions (i.e., thoughts) strongly affect behaviours, but, through awareness, can be quantified and controlled. In other words, a person can attain behavioural changes through acknowledgment and control of preceding cognitions. Application of CBT for OCD patients after a TBI, has been aimed at reducing anger, depression, anxiety, destructive, obsessive and intrusive thoughts and compulsive behaviours and at improving coping, with promising results.

Intrusive thoughts play a huge role in OCD manifestations, therefore, their management aims to contribute to overall control gaining over self when dealing with obsessive compulsive behaviours. Some authors (Winston & Seif, 2009) established steps to be taken for coping with the intrusive thoughts: recognizing the thoughts; acknowledge the intrusive thoughts, their automatic level; accepting them and allow them to flow instead of fighting them back or repressing them; float and feel or concentrate on *what is* as opposed to *what if*; let time pass, be patient, don't urge on it and finally, proceed as continuing to do whatever you were doing prior to the intrusive thoughts.

When contemplating treatment options for OCD and traumatic experiences, it is important to be mindful of the various modalities available and make up for each particular case an individual feasible rehabilitation plan so as to get best possible results. A large spectrum of psychotherapies, among them, Cognitive Behavioural Therapy, Rational Emotive Therapy, Exposure Therapy and Hypnotherapy being considered, along with more than 20 non-traditional Western therapies and healing techniques, including Neuro Linguistic Programming, top therapies when dealing with patients suffering from OCD following a TBI or a major depression period after TBI.

Therapies like those already mentioned, along with, apparently, new ones like Hypnotherapy and NLP defined by professor John Grinder, the co-creator of NLP next to Richard Bandler, as the art of modelling human excellence by challenging limitations, limited beliefs, destructive thoughts and patterns, intrusive thoughts and destructive linkages between obsessive thoughts, specific feelings attached to these and the compulsive behaviour, wrong strategies or coping mechanism, considered effective for individuals who have experienced trauma and

have been diagnosed with PTSD but also OCD, might produce long lasting results in patients' lives. For these particular forms of therapy, future studies are required, though.

Each of these therapies go further back in the individual's past where the relationships, connections, personal experiences, subjective interpretations, beliefs and values are discussed so as to move into the patterns and origins of behaviours and feelings that might be part of OCD symptoms that follows a TBI or a major depression period after a TBI. It is important to create a non-judgmental environment for the patient, therefore, an exploration of the patient's conscious and unconscious behaviours, feelings and thoughts, and mindfulness approach, acceptance and practice is vital to getting best hoped results.

What is extremely important to underline at these therapies mentioned above, is that they do not focus, exclusively, on symptom management only, but understand that the most important aspect is to get to the patients' depths and heights and try to elaborate the mechanisms behind this terrible disorder that manifest after a TBI directly or after a major depression period. Therefore, when approaching the individual, on-target steps must be taken, starting with acknowledgment and awareness up to creating healthy strategies to move from hesitation and blockage to action and progress, from remembering (traumatic event with the feelings attached to that, that triggers, in OCD cases the compulsive behaviours) to thinking where the patient has the opportunity to question, challenge personal limitations to create successful and constructive coping mechanisms and strategies to deal with traumatic events. There are not enough studies supporting psychodynamic treatment only for individuals with OCD, but utilizing a psychodynamic approach next to Cognitive Behavioural Therapy, Rational Emotive Therapy, Exposure and Response Prevention Therapy and Hypnotherapy might be the most appropriate approach for all individuals seeking support. Further studies are required in order to support this assumption.

The psychodynamic perspective, a very interesting one, derives from the work of Sigmund Freud, his students and followers, later on. It is defined by unconscious, the part of mind that contains, according to Sigmund Freud, the hidden desires, needs and motivating forces. The psychodynamic approach sees human mind functionality being based upon the interaction two important sides: drives, needs and forces within the person, considered to be particularly unconscious and between the different structures of human personality. Now, the main method of investigation in the psychodynamic approach is psychoanalysis, purely and solely developed by Dr. Sigmund Freud, which main purpose is to uncover the unconscious elements, forces, desires and needs that affect a person's choices, decisions and actions. Somehow, in a psychodynamic approach, the model of the mind is perceived like an iceberg, with the top being visible and that is the conscious mind.

The psychodynamic approach attempts to define, explain and understand the symptoms of obsessive-compulsive disorder (OCD) in terms of excessive, mala-

daptive efforts of a human mind to cope with the personal perceived dangers expressed by aggressive impulses, sexual impulses, distorted information, rigid and limitative cognitive styles. There is also a traditional psychoanalytic point of view, in the psychodynamic approach of OCD and it is mainly defined in terms of a constant conflict between feelings of love and hate, for example, acceptance and rejection, appreciation and depreciation. One of the most recent psychodynamic theories about obsessive compulsive manifestations such as the object-relational model, focuses on the main role of ambivalent mental representations or cognitive-affective schemas of the self and the others. This theory and this particular model of ambivalent mental representations or cognitive-affective schemas creates a bridge between the psychodynamic approaches to cognitive-behavioral approach of obsessive compulsive disorder.

Psychodynamic therapy, regarded in its classic form, appears, so far, to be ineffective for the deep core symptoms of obsessions and compulsions. The issue is that the psychodynamic approach may be very helpful in getting awareness and understanding the process or what is the mechanism through which the patients make of their symptoms, the way the obsessive thoughts are created and connected to our history from unconscious mind, the way the obsessive thoughts triggers specific compulsions but it is not enough as a therapy to produce change and it is necessary to form a therapeutic alliance that facilitates more evidence-based approaches and leads to long lasting changes in patients lives by decreasing the intensity, frequency and severity of obsessive compulsive manifestations . That's why an Why deriving from a psychodynamic approach must be connected to a How from more practical based therapies like CBT, ERP or REBT, already used worldwide, alone or with pharmacological interventions, and new therapeutic approaches, very similar to those mentioned above, like NLP and Hypnotherapy.

No matter the type of therapy chosen, a smart feasible plan successful in treating OCD after a TBI must contain the following steps:

- designing an individual therapeutic plan;
- creating a therapeutic bondage with the patient;
- creating a safe and supportive environment so as the patient feels secure;
- expressing understanding, patience and empathy;
- concentrating on the individual's strengths and opportunities in order to overcome intrusive, obsessive thoughts, destructive patterns, limited beliefs, destructive strategies and coping mechanisms that holds the patient grounded to obsessive compulsive manifestations;
- generating a holding space for the patient's affect, this one step being essential for the success of the therapeutic intervention;
- creating a strong connection based on mutual understanding and commitment by generating constant feedback upon the therapeutic act;
- getting alignment with the patient regarding the therapeutic act by communicating and clarifying the information-part of the process.

Considered, at the beginning of researches, the primary and quite alone treatment for OCD patients, *Cognitive Behavioural Therapy's* main purpose is to change the clients' thoughts, behaviours, and feelings in order to decrease the intensity and frequency of OCD symptoms as it is a well-known fact that the main frame of CBT is designed by the relationship between thoughts, feelings and behaviour, meaning that behind any behaviour there is a specific feeling that makes it happen and behind every feeling there is a thought (an image, a film, an internal dialogue inside human brain) that produces some chemical and structural changes in the brain triggering specific feelings.

Cognitive Behaviour Therapy operates on two levels (Wiaart et al. 2016). On the cognitive level as a cognitive restructuring process, the main idea being to identify malfunctioning thoughts, cognitive distortions and construct other logic-rational alternatives. On the behavioural level, Cognitive Behavioural Therapy operates gradually, meaning that the exposure to problematic situations is done step by step, starting with the establishment of the behavioural experiments, then the development of an internal dialogue, the use of psychotherapeutic notes, diaries being the most recommended ones, role plays, training in problem defining, problem solving and taking decisions and the use of meditation, mindfulness and relaxation techniques.

As well-known therapies like Cognitive Behavioural Therapy, Rational Emotive Therapy, Exposure Therapy proved to play a significant role in patients' life and alone or in combination with proper medication they improve the OCD symptoms that follow a TBI, new studies and researches are required to see how Hypnotherapy and NLP defined by professor John Grinder, the co-creator of NLP next to Richard Bandler, as the art of modelling human excellence by challenging limitations, limited beliefs, destructive thoughts and patterns, intrusive thoughts and destructive linkages between obsessive thoughts, specific feelings attached to these and the compulsive behaviour, wrong strategies or coping mechanism, could lead to excellent results and improve the symptoms of OCD patients after a TBI.

In Cognitive Behavioural Therapy, the individual is required to analyse destructive thoughts, patterns, maladaptive behaviour, reactions and responses, so as to understand the underlying beliefs and values that may be behind destructive behaviours, reactions and responses. It is not only that all those beliefs or values are untrue, unrealistic and counterproductive, they might be as well distorted, consciously or unconsciously. The main benefit of CBT is that it can alter behaviour by challenging the limited beliefs, distortions, generalizations and deletions, operations with which human mind is functioning, at point in a destructive way as the thoughts altered by distortions, deletions and generalisations lead to certain feelings (peppered with anxiety in most cases) and certain behaviours like compulsions as part of obsessive-compulsive disorders.

As there were several controlled trials (POTS Team, 2004) demonstrating the benefit of adding Cognitive Behavioural Therapy (CBT) to the treatment of pa-

tients with OCD who have responded to selective serotonin reuptake inhibitor, leading to great results in treating obsessive compulsive symptoms, Rational Emotive Behavioural Therapy and Hypnotherapy, could be more and more used, next to proper pharmacology, for patients to gain great improvements in terms of reducing the intensity, frequency and severity of obsessive compulsive manifestations, as they both are therapies related to Cognitive Behavioural Therapy.

In the future, the *Exposure and Response Prevention* therapy for the treatment of OCD patients after a TBI should be deeply and seriously assessed and being part of the rehabilitation process. This approach is considered to be effective, by the studies made so far, mainly because ritual prevention and exposure to the individuals' triggers, which facilitate their obsessions and, obviously their compulsions, proved to pay off. Exposures, part of ERP, are utilized to desensitize a patient to their triggers, which in turn it proved to decrease the levels of distress surrounding the triggers (Carlat Publishing, 2020). It is important to underline the fact that, while doing this, the anxiety level is increasing during treatment. When it comes about the purpose of the ritual prevention it is mandatory to underline the fact that it is designed to reduce the urge to perform rituals. But what are rituals? Rituals are defined as on purpose, intentional behaviours that decrease anxiety for an individual, as the person is practicing them, with certain discipline but, the bad side of this, is that over time it increases the possibility that the ritual will be performed with such a strict discipline that it becomes impossible for the patient to have any kind of control over them. By using ERP, OCD patients get to have, in time, a rational understanding of their behaviours, they get to be aware of the triggers and the responses they choose, consciously or unconsciously, to have and the distorted thoughts that triggers certain feelings and obviously certain compulsions.

*Rational Emotive Behavioural Therapy*, another effective therapy for OCD patients after TBI, is mainly specialized in helping clients to give themselves a genuine self-acceptance (Ellis, 1994) about their being affected by OCD, as well as to minimize their low frustration tolerance about this. REBT offers to the OCD patients a set of know how techniques, cognitive, emotive, and behavioural approaches to cut down OCD's symptoms, especially obsessive-compulsive rituals.

One important aspect, part of REBT and not REBT only, is the awareness and acknowledgement gains that the OCD patients after a traumatic brain injury get to have. Their awareness happens, thanks to these therapies, at all levels: emotional, behavioural and cognitive, as these therapies approach OCD symptoms both rationally and emotionally. In order to have a successful therapeutic approach, definitely, specific techniques must be used, such as relaxation techniques, meditation, self-talk methods including mantras, for example. As soon as the patient becomes aware of the destructive, intrusive, obsessive thoughts, their origins, the mechanism behind them and the triggers, the next step to be taken is to work with the patient at self-monitoring, reaction/response control, physiology

control relaxation, cognitive assessment and restructuring, and asking support.

Now, having proved the fact that main therapies like Cognitive Behavioral Therapy, Rational Emotive Therapy, Exposure and Response Prevention Therapy contribute to improving lives of patients with OCD after a traumatic brain injury (TBI) or after a major depression period following a TBI, a feasible action plan that includes specific steps must be defined.

Any kind of therapeutic intervention should have an individualized strategy according to patient's particularities, therefore any strategy behind a therapeutic intervention, despite the type of therapy used, should take into account the following aspects:

- Consider the patient's strong points, opportunities and weaknesses when designing the individualized strategy;
- Incorporate what patient already learned and know it are still preserved after the traumatic brain injury;
- Consider the patient's learning style (written information, oral information or both) and make sure that the intervention is according to it;
- Get genuine and full commitment of the patient. Genuine commitment involves full understanding and acceptance; therefore, the patient is 100% involved in the process, assuring the success of the therapeutic act;
- Ensure a periodic on target feedback along the therapeutic intervention by taking into account the two major parts of feedback: getting and asking for feedback, both the therapist and the patient should be encouraged to give and ask for feedback;
- Consider adjustments during the on-going therapeutic process, if necessary;
- Ensure that the strategy is practical and considers other external factors that might diminish the patient's progress. Time, funding issue, family concerns, vulnerabilities, environment limitations should also be taken into account.

Designing an intervention plan and working at an individualized strategy, considering all the aspects mentioned above, is not an easy job and it looks like psycho education is a very important aspect, part of the rehabilitation program, next to psychotherapy and pharmacology. The purpose of psycho education is to strengthen the clients understanding of their diagnosis and prognoses. Clients are given different assignments, only where traumatic brain injuries consequences allow this, so they continue to practice the skills they are taught in therapy while they gain three major strengths:

- awareness of their present state and the desired outcome;
- acknowledgement of the present status and of the expected outcome;
- acceptance.

Psycho education regarding OCD symptoms is recommended during treatment, so that the client may become increasingly aware of how their diagnosis may affect their entire life, their functioning and what are the prognoses, the next steps, therapeutically and pharmacologically, to be taken, so as to get control over their obsessive thoughts and compulsive behaviours.



We have been discussing about famous and successful therapies like CBT or REBT and its time to move further to some revolutionary (referring to NLP) techniques that shapes human brain for the best. When it comes about Hypnotherapy and NLP, what makes them be successful in OCD cases is that they are providing a sense of control to sufferers of this disorder is that it helps them understand how the OCD works. An OCD begins as a pattern of thought (intrusive, obsessive thoughts), leading to feelings that influence certain behaviours (compulsions). It is an automatic, often unconscious response to what the mind considers to be a stressful, uncontrollable situation, looking to the patient, like being out of their knowledge and control.

OCD is considered to be another way of coping with stress, an attempt to regain control in a situation that imposes some sort of a threat.

NLP and Hypnotherapy bring awareness of what OCD means and how it gets triggered, giving the people struggling with this disorder the chance to control behaviour before it starts controlling them. This is done by learning the code of know-how of NLP. Patients learn specific techniques to control imagination by “taming” the imagination, by understanding the way it works up to the fine details of sub modalities and metaprograms. The moment the patient understands the way his/her imagination works he/she can control it and program it in the same way you play with a computer through the reinforcement of positive, constructive, lucrative thoughts over obsessive, destructive thoughts. Thanks to NLP they create new behavioural patterns by learning a new behaviour, creating a new behavioural scheme or relearning an apparently forgotten one.

NLP, thanks to its techniques, can help OCD patients in being grounded and getting real. Obsessive thoughts are not about being real, getting grounded. Compulsions as well. When it comes about obsessive thoughts and compulsion behaviours, reality is being distorted in such a way that it looks real for the patient. Using NLP techniques, the patient learns, consciously, based on real life evidence, how to make difference between what’s real and not, what makes sense and not. Once the patient learns how his/her brain works, how to distinguish between what is real and what is not, what are the traps inside the brain, what a behavioural pattern is made and how, when it becomes destructive, it can be broken, how to create coping strategies and mechanisms to deal with traumatic events, he/she gains control and confidence. And this is NLP about: getting awareness and acknowledgement, self-control, creating confidence, empowering and modelling human excellence by learning, forgetting and relearning new ways, new patterns, new strategies and behaviours. Neuro Linguistic Programming (NLP), developed in the early 1970s by Richard Bandler and John Grinder, can be quite difficult to define. What is known for sure is that its main focus is on understanding how verbal and non-verbal communication affects our brain and how the brain itself is working. Its aim is to make people aware of the relationship between how they think, feel and communicate and how they behave and empower them to take action and change for the best. In the case of anxiety,

phobias, depression, PTSD and OCD, the aim of NLP is to offer tools to provoke the cognitive distortions and challenge limitations, generalizations, deletions and distortions those being the main characteristic of patients suffering from anxiety, depression, phobias, OCD and PTSD and teach techniques to prevent the unconscious mind from creating phobic responses, distortive thoughts, obsessive and intrusive thoughts and trigger, further, anxious, panic or compulsive behaviours.

Hypnotherapy and NLP might make a difference in the life of OCD patients, as they are aimed at giving an obsessive-compulsive patient the possibility to conquer the disorder by overcoming its limitations and inadvertences. Therefore, studies and clinical trials are required to see the effectiveness and efficiency of these two therapies.

Regarding Hypnotherapy, The American Psychological Association note that there are plenty of scientific examples, out of practice, of how useful clinical hypnosis is but still they are looking for more evidence. One study (McCann & Landes, 2010), with the purpose to prove how effective is hypnosis in treating depression (one of the most encountered symptoms after TBI, for example) concluded that, on average, the patients suffering from depression who received as therapy CBT combined with hypnosis (Cognitive hypnotherapy) fared better than 75% of patients who received only CBT therapy and no hypnosis. So, as long as Cognitive hypnotherapy, that is hypnotherapy combined with CBT, proved to be a very effective treatment for people suffering from depression, it is a good start to consider future clinical trials and studies related so as to test the effectiveness of hypnosis alone or combined with CBT in the case of OCD patients following a TBI.

Since OCD is about repetitive actions, compulsions, due to intrusive, obsessive thoughts, the most suitable therapeutic approach to this condition might be one working at challenging these destructive patterns that triggers compulsive behaviours, with the purpose of regaining control and a sense of equilibrium. Again, to sustain such an idea, future clinical studies are required. All the therapies mentioned in the present study, along with the action plan designed prior to any therapeutic intervention, the individualized strategy behind a therapeutic act considering all the steps already detailed, have the sole aim: to decrease the symptoms of an OCD patient after a traumatic brain injury (intensity, frequency and severity) restore control over personal thoughts, feelings and behaviours, regain balance and a sense of normality. To get the best results with OCD patients after a TBI, the intervention following the guidelines in the present study, should be considered as soon as possible no matter if we talk about obsessive compulsive disorder following a traumatic brain injury or following a major depression period after a traumatic brain injury.

## 6. Conclusion

This present review discussed the definitions of trauma and OCD after a traumatic brain injury (TBI) or after a major depression period following a TBI and

---

the importance of psychotherapy (Cognitive Behavioural Therapy, Rational Emotive Behavioural Therapy, Exposure and Response Prevention Therapy, Hypnotherapy and a revolutionary finding in the field of personal development, Neuro Linguistic Programming) and pharmacology in treating the OCD patients in order to decrease the intensity, frequency and severity of the symptoms.

As a conclusion, after a summing up of so many studies, CBT, ERP and REBT hold particular promise to effective treatment for OCD patients after a traumatic brain injury. Hypnotherapy and NLP need to be more and profoundly assessed when it comes about treating OCD patients after a traumatic brain injury as their approach looks extremely promising. Also, it is vital to admit the importance of psychotherapeutic alliance with psycho education and proper pharmacology, an excellent combination in treating OCD patients who experienced a traumatic brain injury

Considering the strengths and also the limitations of the current present study, there is a need for future studies to investigate the relationship between OCD and trauma, specifically to assess the theory suggesting that OCD after a traumatic brain injury is a coping mechanism to suppress the traumatic experience. The intention behind this present study was not only to explore the relationship between OCD and trauma in paediatric and young patients, but also to investigate the potential significance behind OCD symptoms and traumatic experiences such as a coping mechanism to suppress the painful memories following that traumatic event, but for this specific purpose, further studies need to be taken.

My present work will, hopefully, offer to present clinicians the opportunity of introducing revolutionary therapies or techniques able to change OCD patients' lives for the best by reducing the intensity, severity and frequency of their symptoms up to full eradication. In the meantime, the designed steps in a therapeutic act, next to the guidelines in defining an individualized strategy behind the therapeutic intervention should be considered when treating OCD patients after a traumatic brain injury, and it will bring huge benefits to clinicians.

All the findings in the field of psychological interventions for TBI patients showed that CBT, REBT, ERP are the preferred therapeutic approaches for treating behavioural and emotional disturbances and that psycho education next to a specific action plan prior to designing the rehabilitation program. Other related therapies or set of self-management techniques such as hypnotherapy, NLP, mindfulness, have been proposed, and the literature regarding their effectiveness is sure to grow in the coming years. Psychotherapeutic and neurocognitive rehabilitation programs for OCD patients after traumatic brain injury (TBI) are challenging for clinicians as well as for researchers. Therefore, future research needs to include more diverse populations, different level of education, ages and gender and alternative therapies that share a common ground with those already well-known.

In addition, to have success in attaining the desired objective in this present

study it is mandatory to follow the steps behind any therapeutic act designed for each particular patient, the guidelines of the individualized strategy specific to any psychotherapeutic intervention and assess the possibility of introducing revolutionary techniques and therapies next to those already used. The sooner the intervention begins and the more it pays attention to individual particularities, strong points and opportunities, the more chances to get success, therapeutically speaking. A proper combination of multidisciplinary interventions in treating OCD patients following a traumatic brain injury, psychiatric, pharmacological and psychological treatment, including best therapies and techniques, could offer the greatest potential for getting the best outcomes for people with obsessive compulsive disorders (OCD) following a traumatic brain injury (TBI).

### Acknowledgements

My compliments as well as my gratitude to all the teachers from SAERA (School of Advanced Education, Research and Accreditation S.L), Spain. I appreciate them being there anytime I needed. I appreciate their grounded and valuable feedback, support and guidance, delivering precious information and resources that sustained, scientifically speaking, the subject approached in this present study.

Thank you to my kind, loving and supportive family and friends, for their interest in my work, for their appreciation, on target feedback when needed, support and unconditional love

### Conflict of Interest

No economic interest or any kind of other conflict of interest exists. All data generated or analysed during this study are included in this published article and its supplementary information files.

### References

- Berthier, M. L., Kulisevsky, J., Gironell, A., & López, L. O. (2001). Obsessive-Compulsive Disorder and Traumatic Brain Injury: Behavioural, Cognitive, and Neuroimaging Findings. *Neuropsychiatry, Neuropsychology, and Behavioural Neurology*, *14*, 23-31.
- Carlat Publishing (2020). *CBT with Exposure and Response Prevention for OCD*. <https://www.thecarlatreport.com>
- Coetzer, B. R. (2004). Obsessive-Compulsive Disorder Following Brain Injury: A Review. *International Journal of Psychiatry in Medicine*, *34*, 363-377. <https://doi.org/10.2190/XENN-NNWT-7N2K-R26A>
- Deb, S., Lyons, I., Koutzoukis, C., Ali, I., & McCarthy, G. (1999). Rate of Psychiatric Illness One Year after Traumatic Brain Injury. *The American Journal of Psychiatry*, *156*, 374-378.
- Ellis, A. (1994). Rational Emotive Behaviour Therapy Approaches to Obsessive-Compulsive Disorder (OCD). *Journal of Rational-Emotive & Cognitive-Behaviour Therapy*, *12*, 121-141. <https://doi.org/10.1007/BF02354608>
- Fann, J. R., Hart, T., & Schomer, K. G. (2009). Treatment for Depression after Traumatic Brain Injury: A Systematic Review. *Journal of Neurotrauma*, *26*, 2383-2402.

- <https://doi.org/10.1089/neu.2009.1091>
- Fann, J. R., Katon, W. J., Uomoto, J. M., et al. (1995). Psychiatric Disorders and Functional Disability in Outpatients with Traumatic Brain Injuries. *American Journal of Psychiatry*, *152*, 1493-1499. <https://doi.org/10.1176/ajp.152.10.1493>
- Fontenelle, L. F., Cocchi, L., Harrison, B. J., Miguel, E. C., & Torres, A. R. (2011). Role of Stressful and Traumatic Life Events in Obsessive-Compulsive Disorder. *Journal of Neuropsychiatry*, *1*, 66-69. <https://doi.org/10.2217/npj.10.1>
- Grados, M. A. (2003). Obsessive-Compulsive Disorder after Traumatic Brain Injury. *International Review of Psychiatry*, *15*, 350-358. <https://doi.org/10.1080/09540260310001606737>
- Hibbard, M. R., Uysal, S., Kepler, K., Bogdany, J., & Silver, J. (1998). Axis I Psychopathology in Individuals with Traumatic Brain Injury. *Journal of Head Trauma Rehabilitation*, *13*, 24-39. <https://doi.org/10.1097/00001199-199808000-00003>
- Hoofien, D., Gilboa, A., Vakil, E., & Donovick, P. J. (2001). Traumatic Brain Injury (TBI) 10-20 Years Later: A Comprehensive Outcome Study of Psychiatric Symptomatology, Cognitive abilities and Psychosocial Functioning. *Brain Injury*, *15*, 935-945. <https://doi.org/10.1080/026990501300005659>
- Jorge, R. E., Acion, L., Starkstein, S. E., & Magnotta, V. (2007). Hippocampal Volume and Mood Disorders after Traumatic Brain Injury. *Biological Psychiatry*, *62*, 332-338. <https://doi.org/10.1016/j.biopsych.2006.07.024>
- Koponen, S., Taiminen, T., Portin, R., Himanen, L., Isoniemi, H., Heinonen, H., et al. (2002). Axis I and II Psychiatric Disorders after Traumatic Brain Injury: A 30-year Follow-up Study. *American Journal of Psychiatry*, *159*, 1315-1321. <https://doi.org/10.1176/appi.ajp.159.8.1315>
- Maia, T. V., Cooney, R. E., & Peterson, B. S. (2008). The Neural Bases of Obsessive-Compulsive Disorder in Children and Adults. *Development and Psychopathology*, *20*, 1251-1283. <https://doi.org/10.1017/S0954579408000606>
- McCann, B. S., & Landes, S. J. (2010). Hypnosis in the Treatment of Depression: Considerations in Research Design and Methods. *The International Journal of Clinical and Experimental Hypnosis*, *58*, 147-164. <https://doi.org/10.1080/00207140903523186>
- Mckee, C. A., & Daneshvar, H. D. (2015). The Neuropathology of Traumatic Brain Injury. In *Handbook of Clinical Neurology* (Vol. 127, pp. 45-66). Amsterdam: Elsevier. <https://doi.org/10.1016/B978-0-444-52892-6.00004-0>
- Nortje, J., & Menon, D. K. (2004). Traumatic Brain Injury: Physiology, Mechanisms, and Outcome. *Current Opinion in Neurology*, *17*, 711-718. <https://doi.org/10.1097/00019052-200412000-00011>
- O'Kearney, R. T., Anstey, K. J., & von Sanden, C. (2006). Behavioural and Cognitive Behavioural Therapy for Obsessive Compulsive Disorder in Children and Adolescents. *The Cochrane Database of Systematic Reviews*, No. 4, CD004856. <https://doi.org/10.1002/14651858.CD004856.pub2>
- Pediatric OCD Treatment Study (POTS) Team (2004). Cognitive-Behavior Therapy, Sertraline, and Their Combination for Children and Adolescents with Obsessive-Compulsive Disorder: The Pediatric OCD Treatment Study (POTS) Randomized Controlled Trial. *JAMA*, *292*, 1969-1976. <https://doi.org/10.1001/jama.292.16.1969>
- Schwarzbold, M., Diaz, A., Martins, E. T., Rufino, A., Amante, L. N., Thais, M. E., Quevedo, J., Hohl, A., Linhares, M. N., & Walz, R. (2008). Psychiatric Disorders and Traumatic Brain Injury. *Neuropsychiatric Disease and Treatment*, *4*, 797-816. <https://doi.org/10.2147/NDT.S2653>

- Silver, J. M., Kramer, R., Greenwald, S., & Weissman, M. (2001). The Association between Head Injuries and Psychiatric Disorders: Findings from the New Haven NIMH Epidemiologic Catchment Area Study. *Brain Injury, 15*, 935-945.  
<https://doi.org/10.1080/02699050110065295>
- Stéfan, A., & Mathé, J. F. (2015). *What Are the Disruptive Symptoms of Behavioral Disorders after Traumatic Brain Injury? A Systematic Review Leading to Recommendations for Good Practices*. <https://doi.org/10.1016/j.rehab.2015.11.002>
- Van Reekum, R., Cohen, T., & Wong, J. (2000). Can Traumatic Brain Injury Cause Psychiatric Disorders? *Journal of Neuropsychiatry and Clinical Neurosciences, 12*, 316-327. <https://doi.org/10.1176/appi.neuropsych.12.3.316>
- Wuart, L., Luauté, J., Stefan, A., Plantier, D., & Hamonet, J. (2016). Non Pharmacological Treatments for Psychological and Behavioural Disorders Following Traumatic Brain Injury (TBI). A Systematic Literature Review and Expert Opinion Leading to Recommendations. *Annals of Physical and Rehabilitation Medicine, 59*, 31-41.  
<https://doi.org/10.1016/j.rehab.2015.12.001>
- Winston, S. M., & Seif, M. N. (2009). *Overcoming Unwanted Intrusive Thoughts: A CBT-Based Guide to Getting over Frightening, Obsessive, or Disturbing Thoughts*. London: New Harbinger Publications.