
IMPLEMENTATION OF A TRAUMA-FOCUSED COGNITIVE BEHAVIORAL THERAPY PROGRAM IN CHILDREN AND ADOLESCENTS: EXPERIENCE OF A CHILD AND ADOLESCENT PSYCHIATRY SERVICE

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ABSTRACT

Introduction: Post-traumatic stress disorder (PTSD) in children and adolescents constitutes a major public health problem, particularly in contexts of exposure to sexual and intrafamilial violence. Trauma-Focused Cognitive Behavioral Therapy (TF-CBT) is currently recommended as the first-line treatment for pediatric PTSD. This study aims to evaluate the feasibility and clinical efficacy of implementing a TF-CBT program within a Moroccan public child and adolescent psychiatry service.

Methods: We conducted a single-center retrospective before-after cohort study within the psychotrauma unit of the Child and Adolescent Psychiatry Department at Ar-Razi Hospital in Salé, Morocco. Twenty children and adolescents under the age of 18 presenting with a PTSD diagnosis according to DSM-5-TR and ICD-11 criteria were included. Participants underwent a TF-CBT protocol comprising an average of 12 individual weekly sessions following the PRACTICE model, with involvement of non-offending caregivers. Symptomatic progression was assessed using the PTSD Checklist for DSM-5 (PCL-5) before and after the intervention.

Results: The mean age of participants was 12 years and 60% were female. Sexual violence accounted for 70% of documented traumas, while 55% of patients presented with complex trauma and 50% with intrafamilial trauma. At admission, 20% of patients reported a history of suicide attempt and 15% presented with self-injurious behaviors. Following TF-CBT, a significant reduction in post-traumatic symptomatology was observed, with mean PCL-5

scores decreasing from 55.4 ± 14.2 to 30.1 ± 11.2 ($p < 0.001$). This improvement was accompanied by restoration of academic, emotional, social, and autonomy functioning.

Conclusion: The implementation of TF-CBT within a Moroccan public child and adolescent psychiatry service appears feasible and is associated with significant improvement in PTSD symptoms and overall functioning in traumatized children and adolescents. These results support the development and dissemination of specialized pediatric psychotraumatology programs in Morocco.

KEYWORDS: *Post-traumatic stress disorder, Cognitive behavioral therapy, psychotrauma, child, adolescent, psychological trauma.*

INTRODUCTION

Worldwide, exposure of minors to traumatic events represents a major and alarming public health problem. International epidemiological data indicate that approximately one in eight girls and one in eleven boys experience sexual assault before the age of 18 years [1]. In sub-Saharan Africa, these figures are even more concerning, affecting more than one in five girls during childhood, with prevalence exceeding 25% in crisis zones and areas of instability [2]. Morocco is unfortunately part of this reality. Official data published in 2024 by the Ministry of Justice report 3,854 cases of sexual assault against minors, representing 40% of all violence reported against children [3]. In addition, more than 3,500 cases documenting physical violence have been recorded [3]. Analysis of these data highlights a particularly deleterious factor: the perpetrator is almost systematically a person close to the victim (family members, guardians, or educational staff) in whom the child had initially placed their trust [3]. Nevertheless, due to the cultural weight and persistent taboo surrounding these issues, a significant proportion of victims are slow to break their silence or remain mute out of fear of reprisals or stigmatization [3]. These official statistics therefore represent only the visible part of a far more extensive phenomenon.

These macroscopic data find direct resonance in our daily clinical practice. Indeed, our child and adolescent psychiatry service faces a progressive and continuous increase in referrals for situations of great clinical complexity, characterized by heterogeneous trauma profiles. Illustrating this institutional pressure, our service received 109 patients in consultation for trauma-related reasons over the past ten months alone [4].

Faced with this distress and the complexity of clinical presentations observed in child psychiatry, the choice of a validated and structured therapeutic intervention is fundamental.

Among the internationally recommended approaches, Trauma-Focused Cognitive Behavioral Therapy (TF-CBT) has established itself as the first-line treatment (gold standard) for children and adolescents presenting with post-traumatic stress disorder (PTSD) [5, 6].

Initially developed by psychiatrists and psychologists Judith A. Cohen, Anthony P. Mannarino, and Esther Deblinger, the fundamental components of this model first emerged in the scientific literature of the 1990s [7] before being exhaustively formalized in their reference manual published in 2006 [5]. The primary objective of TF-CBT is to reduce PTSD symptomatology as well as frequently associated clinical manifestations. Originally, this model was specifically designed to treat the psychological sequelae related to sexual abuse, including depressive symptoms, behavioral disorders (such as aggression or inappropriate sexual behaviors), as well as dysfunctional cognitions, guilt, and shame. Given its empirical efficacy, the model was progressively expanded and adapted to a broad range of traumas: physical or emotional violence, severe neglect, exposure to domestic or community violence, natural disasters, war contexts, as well as situations of traumatic bereavement [5, 8].

Clinically, TF-CBT is distinguished by its capacity to articulate classical cognitive-behavioral principles around two major developmental dimensions: the evolving nature of emotional regulation in children and the central role of the caregiver. The protocol is designed to be delivered over a relatively brief period, generally 12 to 16 sessions in an outpatient setting, while retaining the flexibility necessary to adapt to the child patient's comprehension abilities and pace [5].

One of the major strengths of this approach lies in the systematic involvement of parents or so-called “non-offending” caregivers — that is, those who did not participate in the perpetration of abuse [5]. The model actively accounts for the caregiver's own emotional distress and potential PTSD symptoms, as they are often profoundly affected by the child's experience. In complex situations where a caregiver may have previously been involved in a traumatic event (e.g., in a past context of domestic violence), their integration into treatment remains feasible under the strict condition that they have successfully completed their own treatment and are deemed capable of ensuring the child's physical and emotional safety [5].

The architecture of this intervention is structured around the PRACTICE acronym, encompassing key components such as psychoeducation, the acquisition of relaxation and affective regulation techniques, cognitive restructuring, progressive exposure through trauma narrative construction, body safety skills enhancement, and conjoint parent-child sessions [5]. The application of TF-CBT within our local Moroccan context thus provides a framework

that is both rigorous and adaptable to the cultural and institutional specificities of our patient population.

The emergence of our psychotrauma unit thus raises a fundamental question: to what extent is this reference therapeutic approach applicable and effective in the clinical reality of a public child and adolescent psychiatry service in Morocco?

It is to address this issue that we conducted this research. The objective of this retrospective cohort study is to evaluate the feasibility and clinical efficacy of a trauma-focused CBT program in children and adolescents followed within our facility, in order to document the progression of their symptomatology and guide future care strategies within our service.

MATERIAL AND METHODS

1. Study Design and Setting

This is an observational, retrospective, single-center before-after cohort study. The research was conducted within the psychotrauma unit of the Child and Adolescent Psychiatry Department at Ar-Razi Hospital in Salé, Morocco.

Data collection spanned a period of 10 months, from [Month Year] to [Month Year]. This study was designed and reported in strict compliance with international reporting guidelines.

2. Eligibility Criteria and Participant Selection

The study population consisted of children and adolescents consecutively admitted for outpatient consultation within our unit.

Inclusion criteria

To be included in the cohort, patients were required to: (1) be under 18 years of age at the time of admission; (2) present with a primary diagnosis of Post-Traumatic Stress Disorder (PTSD) established by consensus among a panel of clinical experts (child and adolescent psychiatrists) based on the structured criteria of the DSM-5-TR (Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision) and ICD-11 (International Classification of Diseases, 11th Revision); (3) have a validated therapeutic indication and have commenced the targeted treatment protocol.

Exclusion criteria

The following patients were excluded from the retrospective analysis: (1) those presenting with an acute psychiatric comorbidity requiring urgent institutional care (e.g., acute psychotic episode, unstabilized bipolar disorder, or imminent suicidal risk); (2) those with documented severe intellectual disability precluding engagement with the verbal cognitive components of the protocol; (3) those with incomplete medical records preventing reliable extraction of

primary clinical scores. Application of these criteria yielded a final analytical sample of 20 patients ($N = 20$).

3. Data Collection Procedure

Data were collected retrospectively. Sociodemographic variables (age, sex, family situation) and clinical variables (nature of trauma, comorbidities) were rigorously extracted by double data entry from three interconnected documentary sources: (1) the institution's computerized medical and hospital records; (2) hetero-anamnestic reports and semi-structured clinical admission interview notes; (3) clinical progress notes documented by treating physicians within the psychotrauma unit.

4. Therapeutic Intervention Protocol

The evaluated intervention is Trauma-Focused Cognitive Behavioral Therapy (TF-CBT), delivered by clinicians previously trained and supervised in this model. Treatment was conducted in a format of individual weekly sessions, each lasting 45 to 60 minutes. Across the cohort, the care pathway was structured around a mean of 12 sessions per patient.

In accordance with the reference treatment manual, the protocol systematically integrated the parallel presence and engagement of non-offending parents or legal guardians. The intervention was structured around the eight sequential components of the PRACTICE model:

- Psychoeducation and parenting skills
- Relaxation and physiological regulation
- Affective expression and modulation
- Cognitive processing and restructuring
- Trauma narrative construction
- In vivo mastery of trauma reminders
- Conjoint child-parent sessions
- Safety consolidation and treatment closure

5. Outcome Measures

The primary outcome measure for assessing clinical efficacy was the change in PTSD symptom severity, quantified using the PCL-5 (PTSD Checklist for DSM-5) — an internationally validated self-report (or clinician-assisted hetero-report, age-dependent) psychometric scale.

RESULTS

1. Sociodemographic Characteristics

Among all patients referred to our child and adolescent psychiatry service for trauma-related reasons during the study period, a selected sample of 20 children and adolescents ($N = 20$) meeting eligibility criteria was consecutively included and completed the full pre- and post-intervention assessment protocol.

Descriptive analysis revealed a predominance of female participants, representing 60% of the sample (F/M sex ratio = 1.5), while males accounted for 40% of the cohort. The mean age of participants at inclusion was 12 years. The pre-adolescent and adolescent age group (11–14 years) was particularly well-represented, constituting 40% of the total cohort, underscoring high clinical vulnerability during this transitional developmental phase.

Regarding the modality of exposure to the traumatic event, the vast majority of included patients were direct victims (90%), while only 10% were witnesses to the traumatizing event. With respect to the nature of traumas, two clinical profiles were identified: simple (single-incident) trauma, representing 45% of cases, and complex (repeated/chronic) trauma, constituting the majority at 55% of patients.

Analysis of the traumatic events reported in followed children and adolescents revealed a clear predominance of sexual violence, representing approximately 70% of documented events. Physical violence ranked second at approximately 25% of cases. Invasive or painful medical procedures and road traffic accidents each constituted a smaller minority of identified traumas.

2. Modalities of Exposure and Impact of Intrafamilial Context

Initial clinical assessment revealed considerable diversity in the modalities and nature of traumatic exposure. Traumas were classified according to their single (simple) or repeated/chronic (complex) character.

Notably, 50% of patients in our cohort were exposed to traumas of an intrafamilial nature, in which the alleged or identified perpetrator belonged to the child's closest circle of trust (parents, legal guardians, extended family, or proximate educational staff). This subgroup was characterized by complex PTSD clinical presentations.

For this specific subgroup of intrafamilial trauma victims, the initial symptom burden at admission was particularly severe. The total initial PCL-5 score for these patients had a mean of 56 ± 12 (median = 58; range: 35–70), reflecting acute traumatic distress correlated with betrayal of the protective relationship.

3. Psychiatric Comorbidities, Risk Behaviors, and Functional Impairment

The clinical severity of the initial cohort at admission (T_0) was further reflected by a high prevalence of associated psychiatric comorbidities and severe self-injurious behaviors:

- Self-injurious behaviors: 15% of patients presented with active self-harm behaviors documented during initial clinical interviews.
- Suicidal behaviors: 20% of participants had at least one medically documented suicide attempt (SA) prior to admission to the psychotrauma unit.

On a functional level, hetero-anamnestic reports and initial neurodevelopmental assessment revealed global and significant impairment of executive functions — including marked deficits in attention, working memory, inhibition, and planning capacities — relative to developmental norms. This executive dysfunction manifested in multidimensional functional impairment:

- Academic: Severe concentration difficulties, disorganized learning, and marked decline in academic performance.
- Emotional: Major emotional dysregulation with episodes of neurovegetative hyperactivation, aggression, or inhibition.
- Social: Relational withdrawal, pronounced isolation, and frequent interpersonal conflicts.
- Autonomy: Loss of independence with emergence of regressive behaviors or dependency toward non-offending attachment figures.

4. Evolution of PTSD Severity Scores (PCL-5) Following TF-CBT

The primary outcome of our study was the change in the total PCL-5 score between treatment initiation (T_0) and end of treatment (T_1), after a mean of 12 TF-CBT sessions.

Comparative analysis demonstrated a clinically and statistically highly significant reduction in post-traumatic stress scores following the intervention. The overall mean PCL-5 score decreased from 55.4 ± 14.2 at T_0 to 30.1 ± 11.2 at T_1 . This mean reduction of more than 25 points is statistically highly significant ($p < 0.001$). A narrowing of extreme values was also noted, with the maximum observed score decreasing from 77 pre-therapy to 54 post-therapy.

Table 1. Comparison of PCL-5 scores before and after the TF-CBT program.

Measure	Pre-treatment	Post-treatment	p-value
Mean $\pm$ SD	55.4 ± 14.2	30.1 ± 11.2	< 0.001
Minimum	32	15	—
Maximum	77	54	—

5. Functional Impact and Improvement Across Life Domains

Alongside remission of the cardinal PTSD symptoms (intrusions, avoidance, hyperarousal), completion of the TF-CBT protocol was accompanied by significant restoration of global functioning in children and adolescents. Standardized end-of-protocol clinical assessments documented major improvements across the four previously impaired life domains:

- Cognitive and academic restoration: Improvement in attentional and mnemonic capacities, enabling effective resumption of academic learning and reduction of attentional complaints in the classroom.
- Affective modulation: Recovery of adequate emotional regulation capacities, characterized by a decrease in anxiety crises and hyperreactivity to traumatic reminders.
- Social reintegration: Notable reduction in social avoidance behaviors, facilitating active re-affiliation with peers and a decrease in intrafamilial conflicts.
- Resumption of autonomy development: Progressive resolution of regressive symptoms and reinforcement of a sense of personal security and control over the environment.

Table 2. Summary of clinical characteristics and PCL-5 score progression after TF-CBT. (N = 20)

Variable	Result	Detail / p-value
A — Sociodemographic Characteristics		
Total sample size	N = 20	—
Female sex	60%	F/M sex ratio = 1.5
Mean age at inclusion	12 years	Age group 11–14 years: 40%
B — Modalities of Traumatic Exposure		
Direct victims	90%	Witnesses: 10%
Complex trauma	55%	Simple (single-incident): 45%
Intrafamilial context	50%	Initial PCL-5 score: 56 ± 12 Median = 58; range: 35–70
C — Nature of Traumatic Events		
Sexual violence	≈ 70%	Primary etiology
Physical violence	≈ 25%	2nd etiology
Road traffic accident (RTA)	≈ 5%	Minor etiology
Invasive or painful medical procedures	≈ 5%	Minor etiology
D — Comorbidities and Risk Behaviors (T₀)		
History of suicide attempt	20%	Medically documented
Active self-injurious behaviors	15%	Documented at admission
Executive function impairment	100%	Academic, emotional, social, and developmental domains
E — TF-CBT Efficacy (PCL-5: T₀ → T₁)		
Mean score T ₀	55.4 ± 14.2	Min: 32 — Max: 77
Mean score T ₁	30.1 ± 11.2	Min: 15 — Max: 54

Mean reduction	– 25.3 points	p < 0.001
Mean number of sessions	12 sessions	Standard TF-CBT protocol
<i>PCL-5: PTSD Checklist for DSM-5; TF-CBT: Trauma-Focused Cognitive Behavioral Therapy; T₀: baseline assessment; T₁: post-intervention assessment; RTA: road traffic accident. Significance threshold: p < 0.05.</i>		

DISCUSSION

1. Developmental Vulnerability in Adolescence: A High-Risk Neurobiological Substrate

The over-representation of the 11–14 year age group in our cohort (40%) does not constitute an isolated finding, but is consistent with a coherent and particularly well-documented neurobiological framework in contemporary developmental neuroscience literature. Adolescence represents a period of profound and unprecedented cerebral reorganization, characterized by asymmetric and non-synchronous structural and functional maturation of different brain regions. This asynchrony constitutes the fundamental neurobiological substrate of the specific traumatic vulnerability characteristic of this age group.

From a neuroanatomical and functional perspective, this period is dominated by relative hyperactivation of the amygdala — the central limbic structure in the automatic processing of threatening stimuli, fear conditioning, and the generation of intense emotional responses. This amygdalar hyperreactivity is accompanied by still-incomplete maturation of the prefrontal cortex, whose roles are determinant in top-down inhibitory control, voluntary emotion regulation, cognitive flexibility, decision-making, and adaptive modulation of stress responses. The resulting functional imbalance — between a hypersensitive and reactive limbic system and a structurally and functionally immature prefrontal regulatory system — creates a neurobiological vulnerability window unprecedented in the life cycle, during which exposure to a traumatic event can have particularly profound and lasting repercussions on brain organization [9].

This amygdala–prefrontal cortex imbalance manifests clinically through several characteristic and well-recognized features: fragile and unstable emotional regulation, disproportionate hyperreactivity to stress stimuli, an increased tendency toward flight or freeze responses to traumatic reminders, and a substantially elevated risk not only of developing PTSD following traumatic exposure, but also of the disorder evolving toward a chronic and treatment-resistant form in the absence of early and targeted therapeutic intervention [9]. These neurobiological data, substantiated by structural and functional neuroimaging research conducted in adolescents — notably cutting-edge research on the links between PTSD, alterations in brain connectivity, and risk of substance use disorder comorbidities [9] — emphasize that

traumatic exposure during this pivotal period carries lasting consequences for brain architecture and connectivity.

Indeed, the untreated persistence of chronic hypervigilance and pathological hyperconnectivity of fear circuits can permanently compromise the subsequent development of emotional regulation capacities and higher cognitive functions, with potentially major repercussions on long-term developmental, academic, relational, and professional trajectories [9]. Conversely, early and appropriate therapeutic intervention, leveraging the maximum cerebral plasticity still present at this age, offers a privileged intervention window to prevent chronification and restore harmonious neurobiological development. These considerations strongly advocate for the implementation of systematic early PTSD screening from the onset of adolescence, particularly in all contexts of documented or suspected traumatic exposure, and fully justify the allocation of specific, age-appropriate therapeutic resources for this age group.

2. Intrafamilial Trauma and Complex PTSD: Betrayal of the Attachment Bond as a Clinical Severity Amplifier

2.1 Psychopathological Specificity of Intrafamilial Trauma

The high proportion of intrafamilial trauma documented in our cohort (50%) constitutes one of the most clinically and theoretically significant results of this study, and warrants thorough analysis in light of current theoretical models and available empirical data in the specialized literature.

When the perpetrator belongs to the child's primary circle of trust — biological parent, stepparent, legal guardian, extended family member, or proximate educational figure with authority over the child — the traumatic dynamic acquires a specific, paradoxical, and particularly deleterious relational dimension from a psychopathological standpoint. The attachment figure who should, by biological and social definition, ensure the child's safety, protection, and fundamental sense of trust becomes the primary source of danger and suffering. This places the child in a profound and insoluble psychological impasse: they can neither flee — due to their affective, material, and legal dependency on this figure — nor protect themselves, nor cognitively and emotionally integrate the fundamental contradiction between the expected protective role and the abusive reality experienced [10].

2.2 Specific Psychopathological Mechanisms

This context of fundamental betrayal of the attachment bond sets in motion several specific psychopathological mechanisms, well-identified in the literature, which explain the

qualitatively different complexity and severity of clinical presentations observed in these situations compared to traumas occurring outside the family context [10].

First, the early and profound disruption of emotional development and internal attachment models constitutes a central mechanism. Disorganized attachment — the most severe form of attachment insecurity, characterized by the absence of a coherent strategy in relation to an attachment figure simultaneously perceived as a source of comfort and danger — is the most frequently observed form of attachment in these contexts, and constitutes in itself a major and lasting psychopathological vulnerability factor [10]. Second, the necessarily repeated and chronic nature of traumatic exposures in this context — the child living under the same roof as their abuser — precludes any possibility of spontaneous recovery between episodes, maintains a permanent state of anticipatory stress and hypervigilance, and promotes the progressive installation of chronic neurobiological dysregulation of the stress system. Third, the intense and prolonged loyalty conflicts generated by this situation — the child being forced to maintain a vital bond with the very figure causing their suffering — constitute a particularly toxic source of guilt, shame, and relational ambivalence from a developmental perspective [10]. Fourth, these dynamics contribute to the progressive establishment of a profoundly and durably negative self-image, associated with traumatic cognitions of unworthiness, personal responsibility for the abuse suffered, and shame, which represent specific and essential therapeutic targets in the management of these patients.

2.3 Empirical Data and Clinical Implications

These observations are directly consistent with reference work on the developmental approach to complex PTSD, which has robustly demonstrated that the cumulativeness of childhood traumas and their relational nature constitute independent and powerful predictors of symptom complexity in the short, medium, and long term [10]. This work establishes notably that subjects exposed to early interpersonal traumas — particularly in an intrafamilial context — present not only higher immediate symptomatic severity, but also a significantly elevated risk of disorder persistence, resistance to conventional treatments, and development of multiple psychiatric comorbidities in adulthood.

The particularly marked initial severity observed in this subgroup of our cohort — with a mean PCL-5 score of 56 ± 12 (median = 58; range: 35–70), clearly above the cohort-wide mean — constitutes a direct, concrete, and convincing clinical illustration of all these mechanisms. These results confirm that the intrafamilial nature of trauma constitutes not only a major psychopathological vulnerability factor, but also a robust determinant of initial symptom burden, with direct practical implications for the planning of treatment intensity,

duration, and specificity. In particular, these patients require specific clinical attention to the dimensions of shame, guilt, and attachment disruption — dimensions that TF-CBT specifically addresses through its trauma cognition processing and non-offending caregiver skills reinforcement components.

3. Comorbidity Burden and Functional Impairment: A Severity Consistent with Epidemiological Data

3.1 Psychiatric Comorbidities and Risk Behaviors: Beyond PTSD Alone

The high prevalence of psychiatric comorbidities and risk behaviors documented in our cohort at admission — 20% medically documented suicide attempts and 15% active self-injurious behaviors — does not constitute a particular feature of our sample, but is directly and rigorously consistent with large-scale epidemiological data in the international literature on childhood and adolescent PTSD.

Epidemiological data conducted on representative cohorts of young people provide particularly valuable and nuanced insight on this point [11]. By methodically comparing three groups — trauma-unexposed subjects, exposed subjects without PTSD development, and exposed subjects with confirmed PTSD — these studies demonstrate convergently that the presence of PTSD constitutes a decisive and independent amplifier of comorbid risk, well beyond the simple deleterious effect of traumatic exposure itself. The elevated risk simultaneously and concomitantly encompasses a very broad and clinically heterogeneous psychiatric spectrum: major depressive disorder, generalized anxiety disorder, psychotic symptoms, attention-deficit/hyperactivity disorder (ADHD), conduct disorders, as well as alcohol, cannabis, and other psychoactive substance dependencies [11].

This multi-comorbid profile, qualitatively and quantitatively different from that observed in subjects merely exposed to trauma without developing PTSD, underscores the specific, independent role of PTSD in the genesis and maintenance of these comorbidities [11]. From a neurobiological standpoint, this link can be understood through the effects of chronic dysregulation of the hypothalamic-pituitary-adrenal axis, persistent hyperactivity of the noradrenergic system, and disruptions in functional connectivity of reward and emotional regulation circuits induced by untreated chronic PTSD. These neurobiological disturbances create a shared vulnerability terrain explaining the frequency of observed comorbidities.

Clinically, these data decisively reinforce the imperative of comprehensive, multidimensional, and systematic psychiatric assessment at each admission, integrating not only PTSD screening and characterization, but also active and rigorous investigation of the full comorbid spectrum: suicidal behaviors, self-injurious behaviors, depressive and anxiety

symptoms, dissociative manifestations, conduct disorders, and substance use — in order to design and implement a truly integrated and personalized therapeutic strategy, not limited to treatment of the cardinal PTSD symptoms alone.

3.2 Executive Dysfunction and Neurocognitive Impairment: A Specific Marker of Pediatric PTSD

The global and documented impairment of executive functions observed across our entire cohort at admission — jointly and interactively affecting sustained attention, working memory, inhibition, and planning capacities — with its multidimensional, clinically severe impact on academic, emotional, social, and developmental domains, finds solid theoretical and empirical grounding in contemporary specialized neuropsychological literature.

A reference systematic review and meta-analysis provides a major theoretical and clinical contribution on this point [12]. By rigorously analyzing all available data on executive functions in children and adolescents with PTSD symptoms, this work convincingly demonstrates that PTSD patients are significantly distinguished in executive performance not only from non-traumatized children — which was expected — but also, and most importantly, from trauma-exposed children who have not developed PTSD [12]. This double contrast, particularly robust methodologically, unambiguously establishes that executive function degradation observed in childhood and adolescent PTSD does not simply represent the non-specific consequence of traumatic exposure itself, but rather a specific neuropsychological marker intrinsic to PTSD pathology, reflecting the neurobiological brain modifications induced by persistent untreated traumatic disorder [12].

The pathophysiological cascade model proposed by these authors describes a particularly illuminating process consistent with our clinical observations: childhood PTSD generates deficits across the four main components of executive functions — sustained attention, working memory, inhibition, and planning — which secondarily propagate in an interconnected manner toward three distinct major functional domains. Academically, these deficits manifest concretely as severe concentration and learning organization difficulties, disorganization of personal work, and generally incomprehensible academic performance decline if PTSD is not diagnosed and addressed. Emotionally, they manifest as persistent and pervasive affective dysregulation, with recurrent episodes of intense emotional hyperactivation or, conversely, inhibition and affective blunting. Socially, they generate progressive relational isolation and frequent interpersonal conflicts. These three axes of functional impairment ultimately converge toward profound disruption of developmental

autonomy, manifested by regressive behaviors, increased dependency on non-offending attachment figures, and generalized disorganization of daily functioning [12].

This cascade model precisely and coherently corresponds to the multidimensional clinical profile observed in our cohort, and confirms the relevance and necessity of an integrated therapeutic approach explicitly incorporating objectives of cognitive remediation and executive function reinforcement as complementary and inseparable components alongside the reduction of traumatic symptoms *stricto sensu*.

4. Efficacy of TF-CBT: Results, Psychotherapeutic Mechanisms, and Neurobiological Bases

4.1 Clinical Results and Validation by International Literature

The highly significant reduction in PCL-5 scores observed following the TF-CBT protocol in our cohort — mean reduction of 25.3 points ($p < 0.001$), with a decrease from 55.4 ± 14.2 at T_0 to 30.1 ± 11.2 at T_1 , and concomitant narrowing of extreme value distribution (maximum score decreasing from 77 to 54) — is convincingly consistent with the consolidated international evidence base positioning TF-CBT as the first-line psychotherapeutic intervention for childhood and adolescent PTSD, carrying the highest recommendation level from the major international scientific societies in child psychiatry and trauma psychiatry.

A large body of randomized controlled trials and meta-analyses, conducted on diverse pediatric populations in varied cultural contexts, has robustly, replicably, and convergently established TF-CBT's capacity to induce clinically and statistically significant reductions across all cardinal PTSD symptoms — intrusive memories and nightmares, active and passive avoidance behaviors, negative alterations in cognition and mood, neurovegetative hyperarousal [13].

Beyond this action on the core symptom cluster, TF-CBT is also associated with documented and significant improvements in the child's global psychosocial functioning — including family relationships, academic performance, and social integration — as well as structural and lasting modification of dysfunctional traumatic cognitions, particularly those related to personal guilt, shame, and responsibility for the trauma suffered, two cognitive dimensions particularly prominent and clinically central in contexts of intrafamilial trauma and sexual violence that constituted the majority etiologies in our cohort [13].

4.2 Future Perspectives: TF-CBT in the Digital Era

Of particular relevance and prospective significance for contemporary public health and access-to-care challenges, recent 2026 data published within a rigorous feasibility trial confirm that the clinical efficacy of TF-CBT is satisfactorily maintained even when delivered

in a fully digital format, therapist-guided remotely (iTf-CBT), in adolescents presenting with PTSD [13].

This demonstration of the efficacy of the digital version of TF-CBT carries considerable public health significance: it opens promising and concrete perspectives in terms of improving geographical access to specialized psychotraumatological care, reducing waiting times, destigmatizing the use of psychological care — particularly important among adolescents — and reducing social and territorial inequalities in access to evidence-based interventions, particularly in geographical, socioeconomic, or cultural contexts where physical access to in-person care remains structurally limited or insufficient [13].

4.3 Neurobiological Mechanisms: TF-CBT-Induced Cerebral Neuroplasticity

Beyond clinically measurable symptomatic remission and documented behavioral and cognitive modifications, the therapeutic benefits of TF-CBT extend to profound and objectively measurable neurobiological changes in functional neuroimaging, providing fundamental mechanistic understanding of its therapeutic mode of action. A rigorous longitudinal fMRI study conducted pre- and post-treatment in adolescents with PTSD provides neurobiological insights of considerable theoretical and clinical significance on this point [14].

This work documents that pre-therapy PTSD patients are characterized by pathological and specific functional hyperconnectivity of cerebral fear and hypervigilance circuits, constituting the direct neuronal substrate of hyperarousal symptoms, hyperreactivity to traumatic stimuli, and intrusive phenomena dominating the clinical picture [14]. This pathological hyperconnectivity reflects the state of chronic, unextinguished fear conditioning that characterizes PTSD at a neurobiological level.

Following completion of the full TF-CBT protocol, significant and clinically meaningful normalization of this pathological functional connectivity is observed across several strategic neural axes involved in emotional regulation and traumatic memory processing: the dorsal cingulate cortex to anterior cingulate cortex connection involved in conflict detection and cognitive emotional regulation; the dorsal cingulate cortex to posterior cingulate cortex connection playing a role in contextual and autobiographical information integration; and the right hippocampus to superior temporal gyrus connection, a central structure in the consolidation and contextualization of traumatic memories [14].

Crucially, these changes in cerebral functional connectivity directly, significantly, and dose-dependently correlate with the magnitude of clinical PTSD improvement measured by

standardized scales, establishing a plausible neurobiological causal link between therapy-induced brain changes and observed clinical remission [14].

These neurobiological results establish a fact of major theoretical and practical importance: TF-CBT does not act exclusively on surface-level clinical symptoms or consciously accessible cognitions, but induces genuine and profound adaptive neuroplasticity within the fundamental cerebral circuits involved in emotional regulation, traumatic memory processing, and extinction of the conditioned fear response [14]. This rigorous neurobiological demonstration of TF-CBT's efficacy confers upon this psychotherapeutic approach a scientific and mechanistic legitimacy fully comparable to that typically reserved for pharmacological interventions, and constitutes a decisive, scientifically grounded argument in favor of its systematic, priority, and early deployment in the management of pediatric and adolescent PTSD.

5. Study Limitations

Several limitations inherent to the design of this study warrant mention. The small sample size ($N = 20$) and the absence of a randomized control group limit statistical power and generalizability of results. The single-center nature of the study constitutes a potential source of selection bias. The absence of long-term longitudinal follow-up precludes assessment of the durability of therapeutic benefits beyond the end of the protocol. Furthermore, assessment of functional impairment relied on clinician-reported hetero-reported data, without recourse to standardized objective neuropsychological measures or functional neuroimaging tools. Prospective multicenter studies with randomization, active control group, extended follow-up, and objective neurobiological measures would be necessary to confirm and extend the results of the present study.

CONCLUSION

This study confirms the clinical efficacy of TF-CBT in the management of post-traumatic stress disorder in children and adolescents, demonstrating a significant reduction in symptom severity associated with global restoration of developmental, emotional, academic, and social functioning. These results are consistent with the international literature, which robustly and replicably establishes TF-CBT as the reference treatment for pediatric PTSD, with large, stable, and durable effects at 12-month post-treatment follow-up [15, 16].

The severity and complexity of the clinical presentations observed — notably the predominance of intrafamilial traumas, the frequency of psychiatric comorbidities, and the

impairment of executive functions — underscore the imperative of systematic multidimensional assessment and early, specialized intervention. For patients presenting with complex PTSD, adaptation of the standard protocol — integrating an increased number of sessions, a phased approach, and emotional regulation components — appears necessary to optimize therapeutic outcomes [10, 15].

These results advocate for the systematic deployment of TF-CBT within child and adolescent psychiatry structures and for the development of accessible psychotraumatological care pathways for all children and adolescents exposed to trauma, regardless of their socioeconomic or geographical context. Prospective multicenter studies with extended longitudinal follow-up remain necessary to confirm the durability of therapeutic benefits and to clarify predictive factors of treatment response.

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