A Tipping Point for Developmental Trauma Treatment?

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Abstract

There has been a progressive appreciation of the importance of developmental trauma in mental disorder presentations. Now the underlying plastic brain structural and functional responses, due to evolutionary protective mechanisms, are becoming clearer. Usual treatment options have not been very effective in calming the fear-driven brain. Evidence is increasing that quantitative electroencephalography (qEEG) analysis and guided neurofeedback is of major benefit within comprehensive treatment programs, but such programs for the general public do not exist.

Key Words: developmental trauma/ complex PTSD/ psychosis/ schizophrenia/ neurofeedback/ qEEG/

Paper

The NSW Service for the Treatment and Rehabilitation of Torture and Trauma Survivors (STARTTS) treats around 7,500 refugees with every type of trauma each year, and over the last 32 years, they have progressively improved their understanding of the evolution determined plastic responses of the brain. Experimentation has led to establishing effective components of care, with operant conditioning via heart rate variability and ultimately, since 2003, qEEG analysis and guided neurofeedback, being most effective for re-regulating brain functions. However, their comprehensive and neuroscience based approach to treating trauma is not provided to the general population, and yet the cost of not doing so is massive.

The Adverse Childhood Experiences (ACE) studies (Centers for Disease Control & Prevention, USA) concluded that child maltreatment was the most costly public health issue in the United States, calculating that the overall costs exceeded those of cancer or heart disease, and that eradicating child abuse in America would reduce the overall rate of depression by more than half, alcoholism by two-thirds, and suicide, serious drug abuse, and domestic violence by three quarters. It would also have a significantly positive effect on workplace performance, and vastly decrease the need for incarceration. Around 17% have 4 or more types of trauma with very significant effects on mental and physical health, and if 6 or more, life expectancy is reduced by 20 years. Developmental trauma affects physical health as much as mental health, because the brain controls almost everything and maltreatment is a known major risk factor for many medical disorders (cancer, heart, liver, digestive, and respiratory diseases).

Pinto Pereira et al (2017) used the data from 8,076 in the 1958 British birth cohort study, collected at age 16 and measures of employment, financial stability and social class at age 23 up to age 50. 21% had experienced one type of maltreatment, 10% two types, 16% some form of neglect, 10% psychological abuse and 1% sexual abuse. The odds ratio for long term sickness increased from 1.0 for no maltreatment to 1.76 for one type and up to 2.69 for two or more types. Exposure to sexual or non-sexual abuse was linked to the need for income support (OR 1.75). Neglect was associated with being unemployed, or not having education or training (OR 1.43).

The Blue Knot Foundation with Pegasus Economics in 2015, calculated the cost of unresolved childhood trauma and abuse in 5 million adults in Australia would be as high as $24 billion. The NSW Government commissioned report in 2018 by Taylor Fry Actuaries, Forecasting Future Outcomes, which data matched 8 million data points in government controlled databases, showed that 7% of the NSW population would use 50% of the state resources by the age of 40. The identified vulnerable groups clearly suffer from developmental trauma. There are many other economic studies supporting the massive costs, not forgetting the associated personal, family and social pain. We should be aggressively and methodically looking for solutions, and particularly prioritising the more severely affected.

While there has been increased emphasis on trauma informed care, and increased training available for trauma psychotherapies, it has not led to real growth in comprehensive treating services. There has been an emphasis on treating PTSD in adults, armed forces veterans and first responders, but being traumatised as an adult is different from as a child or adolescent. PTSD is a minority subset of responses to trauma, with emotional abuse and neglect being more prevalent. However, those likely to develop PTSD as adults are often those with background developmental trauma. While there are benefits for the mild to moderate levels of developmental trauma, many do not fully respond to cognitive exposure therapy, dialectic behaviour therapy (DBT), eye movement desensitization and reprocessing (EMDR) and other talking therapies. There is little benefit from medications. Those that do better have single or limited trauma events.

Teicher & Sampson (2016) provided a very important review of plastic brain changes resulting from developmental trauma, which are evolutionary protective mechanisms to enable survival in a toxic environment, until the capacity to produce the next generation at puberty. The brain then switches from growth to pruning for efficiency, and behavioural programming changes to competing with peers for the best mate and resources for raising children. The previously protective changes cease to be helpful and may be harmful. Psychopathology may emerge due to the mismatch between the world the brain was modified to survive in, and the world it finds itself in during subsequent developmental stages.

Teicher, Gordon & Nemeroff (2021), in another important review, state that childhood maltreatment is the most important preventable risk factor for psychiatric disorder. Maltreated individuals typically develop psychiatric disorders at an earlier age, have a more pernicious course, more comorbidities, greater symptom severity, and respond less favourably to treatments, than non-maltreated individuals with the same primary DSM-5 diagnosis. Furthermore,
maltreated individuals have alterations in stress-susceptible brain regions, hypothalamic-pituitary-adrenal response, and inflammatory marker levels not discernible in their non-maltreated counterparts. Hence, maltreated and non-maltreated individuals with the same primary DSM-5 diagnoses appear to be clinically and neurobiologically distinct. The failure to embody this distinction
in DSM-5 has interfered with our ability to discover novel treatments, to recommend currently available treatments most likely to be efficacious. It has been a largely unrecognized confound that has thwarted our ability to identify the biological basis for major psychiatric disorders. They discuss several diagnostic alternatives and recommend the inclusion of a Developmental Trauma Disorder diagnosis for severely dysregulated individuals, of all ages, with numerous comorbidities, who experienced interpersonal victimization and disruptions in attachment, such as emotional maltreatment or neglect. For less severely affected maltreated individuals, they suggest using conventional diagnostic categories, such as major depression, but with an essential modifier indicating a history of childhood maltreatment, or early life stress, to delineate the ecophenotypic variant. Implementing this strategy should improve our ability to effectively diagnose and treat individuals with psychiatric disorders and to accelerate scientific discovery.

After the benefits of new classes of medications from the 1950s onwards and evolving new psychotherapies with the professional development of psychology, things seem to have stalled. In the last 30 years we got some marginally better anti-depressant and anti-schizophrenia medications, and some better talking therapies. But the more severe the disorder, the less the progress. A recent umbrella review and meta-analytic evaluation of recent meta-analyses of the efficacy of psychotherapies and pharmacotherapies for mental disorders in adults (Leichsenring et al, 2022) reported that across disorders and treatments, the majority of effect sizes for target symptoms were small. The effect size is a statistical calculation (Cohen's *d*) revealing the practical and clinical significance of a study result – the closer to 1.0 the better. For example, an effect size of 0.8 is good,

0.5 medium and 0.2 low. They found an effect size (standardized mean difference) of only 0.34 for psychotherapies and 0.36 for medications, compared to placebo or treatment as usual, and combined treatments compared with either monotherapy was only 0.31. They also noted that the risk of positive bias in studies was high.

After more than 50 years of research, thousands of randomized controlled trials and billions of invested funds around the world, the results are limited, suggesting we have hit a ceiling for standard treatment research. If we are to better help Australians suffering from disabling mental disorders, a paradigm shift is required to achieve further progress! What are we missing – is it developmental trauma?

A meta-analysis of executive functions in trauma-exposed youth (Op den Kelder et al 2018) showed that in the age range of 2-25, working memory, inhibition and cognitive flexibility were all significantly impaired, dose related to the severity of trauma. These impairments interfere with the efficacy of talking therapies and life performance.

The first umbrella meta-analysis, published in October 2022 (Hogg et al), and using data from a large majority of childhood trauma studies, showed "that psychological trauma in childhood is associated with a nearly three times greater risk of having a mental disorder (OR = 2.92), and demonstrate that psychological trauma is a transdiagnostic risk factor for psychopathology.

We need a developmentally appropriate trauma diagnosis (D'Andrea et al 2012). Children exposed to interpersonal victimisation often meet criteria for psychiatric disorders other than PTSD. A wide range of symptoms is common in victimised children and adolescents, related to genetic predisposition. The interaction between the toxic environment and genes determines which symptom clusters will appear, such as mood disorders, anxiety disorders, substance abuse, psychosis, eating disorders, personality disorders etc. Symptoms include affect and behaviour dysregulation, disturbances of consciousness and cognition, alterations in attribution and schema, and interpersonal impairment. Currently multiple comorbid diagnoses, based on symptom clusters, are necessary, but not necessarily accurate, leading to both under-treatment and over-treatment, with a failure to actually treat the trauma.

A systematic review of developmental trauma subtypes and their association with onset and severity of psychiatric disorders in adulthood (Carr et al 2013) showed physical abuse, sexual abuse and unspecified neglect with mood disorders and anxiety disorders; emotional abuse with personality disorders and schizophrenia; and physical neglect with personality disorders. Sub-types in childhood and adolescence can predict the development of psychopathology in adults – they trigger, aggravate, maintain and increase the recurrence of psychiatric disorders. Emotional, physical and sexual abuse types of trauma generally lead to high anxiety and over-arousal on the qEEG, while neglect leads to under-arousal. Some episodes of trauma can lead to dissociative shut-down.

Teicher's group has shown that the timing of stressors is important. The adolescent tasks of competing with peers, creates vulnerability to new plastic changes from bullying around 13-14 years. Then sexual abuse in girls becomes a major factor around 15 years. For example, the timing and type of trauma will affect symptoms of psychosis and dissociative shutdown (Schalinski & Teicher 2015, Schalinski et al 2017).

Being the victim of childhood abuse has been found to have a dose response relationship with psychosis, with experiencing mild, moderate and sever abuse being associated with 2,11 and 48 times, respectively, the likelihood of having "pathology level" psychosis, compared with no childhood trauma (Janssen et al, 2004). Conus et al (2010) in an audit study of 658 first episode psychosis patients, at what was the Early Psychosis Prevention and Intervention Centre (EPPIC) in Melbourne, found that 83% had at least one type of stressful event (separation of parents 42.1%; physical abuse 26.0%; death or loss of close other 21.1%; migration 18.5%; problems with partner 17.5%; sexual abuse 16.0%) and 34%

had either or both physical and sexual abuse. Unfortunately the files had not recorded emotional abuse or neglect, which would have significantly increased the rates for multiple types of trauma. A systematic review of the association with the severity of hallucinations and delusions in psychotic disorders (Bailey et al 2018) showed significant dose related correlation, but not correlation with the severity of negative symptoms. Severity of childhood neglect was correlated with negative symptoms of schizophrenia.

Symptom clusters, as the base for DSM-5, do not predict causation or treatment response. An example is Attention Deficit Hyperactivity Disorder (ADHD), where there is good evidence of developmental trauma as a strong factor in causation, and qEEG analysis showing that there are 5 types of ADHD that will not be evident from symptoms alone (Kropotov 2016). Analysis of the qEEG and event related potentials (ERP) allows differentiation of brain functions that can lead to similar symptoms, through comparison with normative qEEG databases. Analysis of the person's qEEG enables personalised treatment (Kropotov 2016, Gunkelman 2014). The qEEG can be recorded pre and post treatment, to show abnormality returning to normal functioning.

The emerging application of qEEG assessment and qEEG guided operant conditioning neurofeedback (Sitaram et al 2017) could drive major changes in diagnostic categories and treatments, that utilise the developing brain's plasticity in correcting dysregulation. This includes improving the speed of communication where there has been excessive pruning in adolescence (Whitford et al, 2011), improving cognition, and the ability of the cortex to more effectively inhibit and fine tune emotions and behaviours. It is possible that the main cause of cognitive decline with psychosis is due to developmental trauma effects, well before the symptoms of psychosis emerge (Bora & Murray 2014), and possibly able to be improved by neurofeedback (Surmeli 2016). There is evidence that the operant conditioning by neurofeedback produces statistically significant upregulation of functional connectivity in the salience network (Ros et al 2010 & 2013).

The key studies that have applied neurofeedback to chronic conditions did not control for developmental trauma, except for chronic PTSD (Van Der Kolk et al 2016, Askovic et al 2017, Askovic & Gould 2009, Askovic et al 2019). In spite of this, there have been good results for qEEG guided neurofeedback for chronic schizophrenia (Surmeli 2011, Bolea 2010, Nan et al 2017), Obsessive Compulsive Disorder (Surmeli 2011), Intellectual Disability (Surmeli 2016) and ADHD (many papers), where there was not a good response to treatment as usual.

For example, Surmeli (2011) treated 51 patients with chronic schizophrenia with neurofeedback. They had Positive and Negative Syndrome Scale (PANSS) scores within the range 76-156, mean 110.24 (SD 21.62). 47 out of 48 final participants showed clinical improvement, as the mean PANSS score decreased to 49.56 (SD 26.78) which was statistically significant, along with improvements in Minnesota Multiphasic Personality Inventory (MMPI) and Test Of Variables of Attention (TOVA) measurements. They were followed for around 2 years with the mean reduction in PANSS scores of 82%, where above 20% is considered good for antipsychotic medications (aripiprazole 30.1%, placebo 22.3% in adolescents – US FDA approval data). 19 ceased to meet criteria for schizophrenia, 27 no longer needed medication and the remaining 24 required about half their previous dosage and were more functional. However, as stated above, this study was confounded by not asking about developmental trauma or controlling for it, but because Surmeli (and Bolea) was using qEEG guided neurofeedback, the qEEGs showed the signs of trauma, which were treated.

While there will be a placebo effect included (as with every psychiatric treatment – Hammond 2011),

the long term follow-up rates in studies have shown that the improvements with neurofeedback have been virtually permanent, unlike with medications and some brain stimulation techniques.

Mainstream psychiatry has been moulded by the state hospital systems, with their restricted training environments, and behaviour shaping by the pharmaceutical industry, towards a limited biological model of mental disorder (Read et al 2009). We have failed to find clear genetic causes and it is time we took on board the massive evidence for the role of epigenetics and social determinants of health. Psychiatrist have the important role in diagnosis, integrated to take account of all factors, bio-psycho-social, but we have failed to implement new knowledge. Psychiatry has basically ignored the effects of trauma on other diagnoses (Zammit et al 2018), so when 29 specialist mental health services actually screened for PTSD in adult patients, no matter what main diagnosis was given, around 30% scored positively, only 2.3% mentioned it in the case notes and no service actually treated the PTSD. As PTSD is only a subset of responses to trauma, many more were missed and probably not treated for emotional abuse, attachment disorders and neglect.

There is a strong connection between developmental trauma and persistent substance dependence in adults (Meier et al 2015). Around 70% of people with eating disorders have one or more types of developmental trauma at a significant level (Afifi et al 2017). Bryant et al (2018) showed that PTSD in refugees is associated with harsh parenting styles, leading to adverse effects on their children's mental health. There is plenty of evidence that developmental trauma can be passed on to the next generation, so treating the trauma is also a form of prevention. Early identification and treatment of those at risk before becoming parents, reducing in poor choices and behaviours, domestic and social, could make a significant difference. This is why the 12-25 age group is so important for identification and treatment of developmental trauma.

Not systematically asking about child abuse in our diagnostic interviews is now ethically problematic. In spite of clinician concerns, that to ask will open Pandora's Box, the opposite is true (Read et al 2007). People want to reveal their trauma, as it is often the core basis of their distress. The evidence is that we should ask as part of the initial assessment process, as the longer you put it off the less is revealed. What people detect is our reluctance to hear about their trauma, correctly interpreted as we are not emotionally strong enough to be helpful, to keep both parties safe and know how to effectively treat. Just as asking about suicide does not cause it, asking about trauma may be distressing, but it is a positive development in their recovery. The longer you leave it, the presentation is modified into one of our more acceptable diagnostic categories and treated as such, so the person learns to keep their trauma to themselves and despair about being truly helped.

Specialist services attempting to treat developmental trauma, whether for children, adolescents, youth or adults, have shown in their articles and books considerable consensus on what is needed to provide effective treatment (Courtois & Ford 2013; Ford & Courtois Eds 2013; Briere & Lanktree 2012; Mendelson et al 2011; Blaustein & Kinniburgh 2010; Frewen & Lanius 2015; Hopper et al 2019). There are four components – engagement and development of trust, regulation of emotions and other brain functions, dealing with the trauma with psychotherapies and then re-socialisation, as relationships are always affected.

There can be a hierarchy of care model, whereby simpler treatments, such as on-line education and therapy programs, will be enough to help some, but even then, there can be a superficial appearance of resilience that does not reverse the disturbance of brain functions and the effects on physical health. Developmental trauma always creates strong psychodynamic issues, such as disturbed attachment, and transferences (Herman 2015), while traumas experienced in adulthood may not. However, developmental trauma makes people vulnerable to more severe reactions to new stresses in adulthood. The Dunedin prospective cohort showed that severe maltreatment in the first decade of life leads to a significantly higher risk of PTSD when exposed to adult trauma by the age of 38, compared to no trauma, with 12.7% having a diagnosis of PTSD (Breslau et al 2014).

As much trauma occurs before the development of language, and there is evidence that language centres shut down when the brain moves resources to fight, flight or playing dead and dissociating, so language based therapies can be very slow to help. For most, particularly with youth, individual psychotherapy is required to provide re-parenting, with ancillary therapies, such as body work to connect to somatic memories (Van Der Kolk 2014). Brand et al (2017) did a systemic review of trauma focussed Cognitive Behaviour Therapy (CBT) interventions for people with psychosis, who also had a diagnosis of PTSD and across 25 studies found low effect sizes, poorly sustained when treatment ceased. Raio et al (2013) found that stress markedly impairs cognitive regulation of emotion and highlights critical limitations of CBT to control affective responses under stress.

The great challenge has been how to quickly re-regulate the brain, as it is clear that progress is slow until that has been achieved. Mindfulness, trauma sensitive yoga, sensory modulation, Capoeira, etc. have been tried with some success, but the real breakthrough has been neurofeedback for the most severe, who have not responded to other therapies. Sebern Fisher has been a pioneer, providing neurofeedback treatment to children and adolescents who were in institutional care, due to an inability to change their difficult behaviours (Fisher 2014). She was able to calm their fear-driven brains so that psychotherapy could work and the normal developmental roles be achieved. Ruth Lanius (Nicholson et al 2020) in a controlled use of fMRI and EEG neurofeedback for adults with chronic PTSD, showed mechanistic evidence for therapeutic changes in the Default Mode Network and the Salience Network connectivity, that are known to be associated with PTSD psychopathology. They concluded that this result merits further research to demonstrate fully the clinical efficacy of EEG neurofeedback as an adjunctive therapy for PTSD.

Rogel et al (2022) did a controlled pilot study treating polysymptomatic traumatised children (ages 6-13) with neurofeedback and showed a significant improvement on affect regulation and executive functioning. They concluded this offers the possibility of being able to improve learning, enhance self-efficacy, and develop better social relationships in this hitherto largely treatment resistant population. As part of early intervention, Prof Bessel van der Kolk is now campaigning for neurofeedback treatment to be available at every school.

Having reviewed the potential use of neurofeedback for psychosis (Gurr, 2019), we carried out a small pilot case series (n=13) in 2021, of young people registered as first episode psychosis or at ultra high risk of developing psychosis in the headspace Early Psychosis Youth Service in Western Sydney. All the young people had abnormal qEEGs and they all responded positively to neurofeedback, with reduced symptoms, reduced comorbidities (particularly substance abuse), and improved cognitive and executive functioning. The study was adversely affected by Covid-19 and limited funds, but the results have been very encouraging. Two had treatment resistant schizophrenia were on clozapine medication, despite having had best practice model care for 4 years. Both did well. The female's anxiety and paranoid thoughts were rapidly reduced, she slept well, reduced substance use, learnt to drive, rejected an abuse boyfriend, halved her dose of clozapine and enrolled to complete a university degree. She said the treatment was the best treatment that she had experienced. The benefits of neurofeedback have persisted at a one year follow up.

The challenge now is to achieve investment in specialist treatment services with the critical mass and capacity to experiment and look for answers to the many questions, that require longer term prospective studies. Rather than start with the mild to moderately affected by developmental trauma, weeding out many to meet narrow research requirements, we need to take on real world young people, the most severe with multiple problems. There is a need for specialist programs for perinatal/early childhood, later childhood, youth (12-25) and adults (a large legacy group).

Experience at STARTTS has shown that there are effective treatments in a hierarchy of care model. With refugees, engagement needs go beyond the individual to the whole family, ethnic group, culture, religion, school and sports etc, to develop trust, security and a sense of identity in a new environment. They need group programs that enable re-socialisation in safe environments. This is also true for the traumatised youth we see at headspace. Individual clinician office practice is not able to provide the range of treatments/supports that are required for the more severely affected.

Considering the personal, family and social pain, and massive economic costs, for those who have not responded to current treatments as usual, qEEG guided neurofeedback should be more extensively used in psychiatry practice. The risks are low if qEEG guidance is provided, as the brain finds its own solution, like earning to ride a bicycle. Once learned, it is not forgotten.

STARTTS has seen so many lives changed for the better and the savings to society have been huge. However, while fully controlled trials with sufficient participants are slow to be achieved with standard academic research funding and processes, we need to develop treatment skills and services that can provide for long term prospective studies. The specialist pilot services must have critical mass to support a wide range of interlinked purposes: sufficient throughput for good power in longitudinal prospective studies, diverse treatment skills and practices, training for internal and external clinicians, support for clinicians hearing trauma stories. A service design has been modelled and costed to achieve these goals (Gurr 2022).

It has been said that if we can effectively treat and prevent developmental trauma, it would be the greatest public heath initiative of all time. The above evidence makes a strong case that developmental trauma is the missing factor holding back the effectiveness of talking and medication therapies.

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