Neuroscience Informed Treatment of Trauma

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Objectives

• Brain maturation in Emerging Adulthood

• Neurobiology of Trauma

• A neuroscience informed treatment model

• Implications & applications for psychotherapy
Emerging adulthood is a maturational window for brain development in the following systems:

- identity integration
- motivation & reward systems
- self-regulation: cognitive & attachment
- executive function
- attachment patterns

(Schore 2012, Siegel 2012, Cozolino 2015)
Normal Brain Maturation: The Frontal Lobes mature later into emerging adulthood

Sprouting and pruning of synapses; information processing & logic (Keating 2004)

Myelination- Increases in connectivity, efficiency of integrative processing & executive functioning (Lenroot 2007)

Subcortical – Cortical projections & PFC balance; socio-emotional processing, emotional regulation, exec function (Eluvathingal et al, 2007; Giedd 2008)

Proliferation in reward system networks; (Chambers 2003)
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Basic Neuro-Biological Principles

• Neuroplasticity allows for new networking
• Window(s) of proliferation & re-networking
• Use it or lose it; repetition, persistence
• What fires together wires together
• Kindling (Post)
• Secure attachments are the foundation for brain functioning & maturation (Shore, Siegel)
• “Exchange of words between brains changes minds.” (Kandel 1979)

• “Human connections shape neural networks!” (Siegel 1999)

• For better or worse
States of dysregulation increase the grip of the unconscious. (limbic/right brain dominance) (Panksepp & Biven 2012)
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Predisposing Neurobiological Risk Factors

• Chronic pain & medical illness
• Chronic effects of substance dependence (withdrawal; cravings).
• Genetic vulnerability
• Pre-existing Psychiatric or Processing Disorder (Khantzian & Albanese 2008).
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How Neuroscience Informs Treatment

Imaging The Depressed Brain:
Courtesy Mayo Clinic
Earlier Onset of **Substance Abuse in ADHD**:


* *p<.05 vs control*
Disrupted attachment & self-regulation

• Unsafe, overstimulating family context
• Neglect
• Loss of structuring communities
• Violence
• Sexual Abuse
• Bullying
• Loss
• Provocative peer communities
Self destructive patterns interfere with brain regulation, maturation and attachment

- Alcohol & substance use
- Eating disorders
- Re-traumatization
- Self-injury
- Avoidance
SPECT Scan – brain function in an 18 y.o. woman with ADHD, Conduct Disorder and Polysubstance Dependence → IMPULSE DYSCONTROL Sx

Note the hypofunction = “hole” in left inferior cortex (OFC)
Trauma

• Wounds the soul
• Breaks the heart
• Shatters the mind
• Damages the brain
Emotional Experience of Trauma

- Terror
- Helplessness-Loss of control
- Violation/Loss of self
- Disillusionment: safety, protection, goodness
- Shame
- Rage
- Self-judgment
- Self-doubt
Adverse Childhood Experiences Study (Kaiser; CDC 1995-Present)

- Abuse, neglect, family disruption
- Shortened lifespan by 25 years if ACE > 4
- +12x: suicidality
- +7x: Depression
- +5x: impulsivity
- +3x: 7 leading causes of adult death
Neurobiological Response to Trauma

• Initial Hyper-Arousal: Fight-or-flight mechanism in limbic system- amygdala & hippocampus, & hypothalamic-pituitary-adrenal (HPA) axis.

• Activates sympathetic ANS: raises HR, BP, skin temperature, & stress hormone-corticotropic releasing factor (regulates noradrenaline and adrenaline); also lowers serotonergic receptor sensitivity (Hansenne, Pitchot & Pinto, et al., 2002).
Neurobiological Response to Trauma

• Secondary Hypo-Arousal: Metabolic shut-down - Reduces HR, BP, respiration, noradrenaline and adrenaline; 30% (Glaser)

• ACC activates dorsal “vagal brake” (Frewin 2006, Porges 2010)

• Neurobiology of traumatic dissociation; internal flight; detachment; freeze & submit
Autonomic Arousal Model

[Ogden, Minton & Pain, 2006]

Signs of Hyperarousal:
- overwhelm, panic, impulsivity, hypervigilance, defensiveness, feeling unsafe, reactive, racing thoughts

Window of Tolerance:
- feelings and reactions are tolerable; we can think and feel simultaneously; our reactions adapt to fit the situation

Signs of Hypoarousal:
- numb, “dead,” passive, no feelings, can’t think, disconnected, shut down, “not there,” can’t defend

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Neurobiological Response to Trauma

- Diminished serotonin transport
- Activated limbic system (Heim 2000)
- Dysregulated Pre-Frontal Cortex
- Diminished hippocampus volume/connections (Bremner 1997, 1999) (Stein 1997)
- Time sensitive impairment (Anderson 2008)
Activated Limbic System

- Hyperarousal fear responses
- Hypervigilance/startle; perceptual distortion
- Irritability/anger
- Impulsivity
Dysregulated Pre-Frontal Cortex, ACC

- Hypoarousal/detachment
- Avoidance/ Isolation
- Cognitive impairment
- Loss of executive function
- Somatic expression
Diminished Hippocampus Function

- Dissociation
- Self-disconnection
- Memory interruption
- Intrusive re-experiencing
- Re-enactment/re-traumatization
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Neuroscience Informed Treatment

• Quieting the limbic system
• Enhance cortical governance
• Re-network motivation
• Secure, attuned attachment
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Quieting the Limbic System
Quieting The Limbic System - Brain Hygiene

- Sleep-wake cycle
- Nutrition
- Exercise
- Meditation; yoga; mind-body work
- Relaxation training
- Exposure Response Prevention
- Collaborative genomic pharmacology
- DTCS – alpha-stimulation
Quieting the limbic system
• Personally defined safety
• Boundaries & power
• Mindfulness
• Reliable distress tolerance skills
• Mentalization
• Being known
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Increased Governance
Increased Governance - Activating frontal lobe

• Mentalization (Fonagy 2002)
• Reflection & reframing (Ginot 2016)
• Skills based therapies (CBT, DBT, ACT)
• Memory consolidation (Alberini, Ecker)
• EMDR
• Exposure Response Prevention
• Enhanced use of language
Enhancing Networking: Coherence Therapies

- Art Therapy
- Metaphor
- Narrative & Storytelling
- Visualizations
- Attention to somatic & non-verbal
- Yoga
- Body work
- Music & movement
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Re-networking Motivation
Re-network motivation

- Authenticity vs compliance
- Competence (van der Kolk, 2005)
- Self-efficacy & support (AA)
- Dopamine to oxytocin
- Education, career, community service
- A life that matters

“Moments of more lead to lives of less”
(Turkle, 2015)
“There is no such thing as a baby; only a baby and its Mother” (Winnicott)

Empathically attuned attachment promotes regulation of core self functions (Schore 1993, Cozzalini 2002, Siegel 2006,)

Secure attachments protects against stress (Glaser 2000)
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**Wounded Self & Attachments**

- Speak vs silence, hiding & secrets
- Connection to self: mindfulness
- Connection to others: mentalization
- Genuine self-empowerment; authority & agreements
- Competence: Self-regulation; exec. function
- Paradoxical strength through vulnerability
- Interfering with avoidance; knowing self through experience and engagement
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Shame

• Acceptance & non-judgment
• Walk towards the shame
• Challenge avoidance & attributions
• Challenge impaired truthfulness
• Supported risks
• The cavalry (rescue) are not coming!
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• Valid Rage
• Defensive Rage
• Attachment to re-traumatization
• Internalized Rage; “Bad Self”; identification with/protection of...
• Forgiveness, self compassion, praise
• (Plakun 2011, Fowler 2014)
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Power & Need

- Pseudo-self sufficiency
- Caretaking of others
- “Special”; idealized mergers; secret coupling
- Denied needs; resentment; aloneness; unlovable
- Lack of collaboration; seize power
- Lack of conflict resolution skills
- Willingness, Comittments/Agreements vs Trust
- Paradoxical strength within vulnerability
Attachment / Wounded Self

Therapeutic Enactment - Structural Dissociation

- “Enactments reveal implicit, neurally coded self-representations and relational patterns.”
- Enactments access unconscious, neural systems holding dissociated, traumatic memories (Ginot 2007).
- Integrating what can’t be known directly through shared experience.
Attachment / Wounded Self

Therapeutic Enactment

• Enactments are the behavioral language for the history of dissociated emotional experiences and memories that have shaped the traumatized self. (Bromberg)

• Traumatized self networks can be transformed within new attachment experiences. (Schore)
Attachment/Wounded Self

Relational trauma results in dissociation; experience that never entered consciousness but is encoded relationally and in the body.

Dissociation is at the center of implicit neural and psychic threat-survival mechanisms. (van der Kolk, 1989, 1994).
• Core enactment
• Structured repeated self-damaging patterns
• Established in traumatic distress
• Primarily embedded in right brain subcortical-cortical networks (amygdala, ACC, PFC)
• The interpersonal manifestations of the aspects of self-experience which cannot be faced or experienced.
  (Ginot 2007, Stern 2010, Bromberg 2000)
Recognizing enactment: Patient

- Breakdown in collaboration
- Stalemate or impasse
- Insoluble dilemmas
- Threat of termination or self-harm
- Patient hurt, angry, shamed
- Patient defeated, hopeless, shut down
Recognizing enactment: Therapist

• Therapist experiences extreme affects
• Therapist has disrupted self-worth, self-doubt
• Fear of risk and loss of patient
• Self-Dissonance & Dilemmas: no right way
• Self-dissonance: Shame if feelings known
• Self-Dissonance: Compelled into a “not me” state and/or action
• Somatic experiences that are “not me”
Changing right brain structure and patterning requires intense emotional arousal. (Schore, Ginot 2016)
“Limbic dialogue”  
(Schore 2003)  

“Amygdala whisperer”  
(Cozalini 2015)
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Facilitating Right > Right Brain Dialogue

• Follow “Red Thread” of affect, non-verbals, somatic experience

• Seizing emotional arousal

• Patient vulnerable-Therapist available

• Empathic immersion in the experience beyond words

• Mind-brain-body attentiveness & communication

• Attentive attunement & reflection to rhythm and spirit
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• Therapist monitoring of own distress, disavowal, meaning and emotions in relation
• Self-reflection as to what is being warded off in therapist
• Bring forward what is not spoken; avoided
• Give voice to binds, dilemma and secrets derived from the pattern of interaction
• Therapist disclosure; reflective sharing of self-states
Optimizing Neuroplasticity Treating Trauma

- Context of safety
- Structure, predictability, boundaries
- Quieting hyper-arousal
- Challenging, acknowledging, non-judgmental community of support
- Immersion in attuned relationships
- Interference with self-damaging/detaching behaviors
- Interference with hypo-arousal, avoidance
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Optimizing Neuroplasticity
Treating Trauma

- Assistance with self-connection
- Assistance with distress tolerance
- Assistance with competence
- Integration of dissociated self
- Repetitive deepening of core therapeutic enactment
- Grief & mourning
Neuro-psychoanalytic approaches in psychotherapy has been demonstrated to increase white cortical tracts in the right brain linked with socio-emotional competence.

(DePisapia 2014)
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Outcome Variables

• Collaborative Transitions; Ownership
• Patient & Father alliance
• Severe hypo-arousal
• Neuromodulation adherence & sobriety
• Brain hygiene: sleep, nutrition, exercise
• Peer connections
• Executive function & working memory support
• Development of mindfulness and mentalization
• Engage core enactment
Pre/Post Coherence

BDI= 28

BDI= 12
Humility

Khantzian: “Show up; don’t give up!”

“Though none among us may complete the task, none among us is exempt from contributing our unique part”.

(Talmud-Ethics of our Fathers)
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Developing Programs for Developing Minds

- The Residence
- Life Strategies Program (IOP)
- Trauma Recovery, Addictions, Soma-Self IOPs
- Adolescent Services; After-School IOP
- Emerging Adult Consultation & Assessment Center
- Center for Clinical Neuroscience
- Emerging Adult Career Development Center
- Core Competence Home Health Services