

Calming the Fear-Driven Brain: Neurofeedback in Developmental Trauma

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Outline

Developmental trauma

The prominence of fear, shame and anger

Affect regulation

Arousal: state, trait and personality

Neurofeedback models

Protocols

Psychotherapy and neurofeedback

Definition of Terms

Post Traumatic Stress Disorder (1980)

- Acute episode
- BPD as Complex PTSD- Herman et al
- Axis II disorders are complex affect regulation disorders

Relational Trauma

- Neglect; abandonment; emotional abuse; addiction; “no mother/no other”
- Attachment disorder;

Developmental Trauma Disorder –van der Kolk

- Everything bad happened

Dimensions of the Problem

Close to 50% of children in US meet criteria for insecure attachment

One in three girls and one in five boys has been sexually molested before age 18

DSS in MA “screens in” 600 children a week for abuse

3,000 children murdered (2012)

50% - 70% of U.S. veterans have PTSD

More suicides prior to deployment than after tour

Neurodevelopmental Consequences

Impaired brain development

- Decreased functional IQ
 - Doubled learning disabilities
 - Impaired emotional regulation and impulse control
 - Impaired relationships
-

Disregulated stress response systems

- Disregulation of HHPA :(hypothalamus; hippocampus; pituitary; adrenal) i.e. the cortisol stress response (Teicher)
- Increased sympathetic nervous system activation
- Increased parasympathetic activation
- Increased immune system abnormalities

Alterations in physical growth

- Doubled risk for obesity (Putnam)

Developmental Trauma

Soji introduction

19 years of therapy

Dissociative

Daily flashbacks

Self-harm

Unable to work

Insomnia, nightmares

Sobbing

Could not talk about events

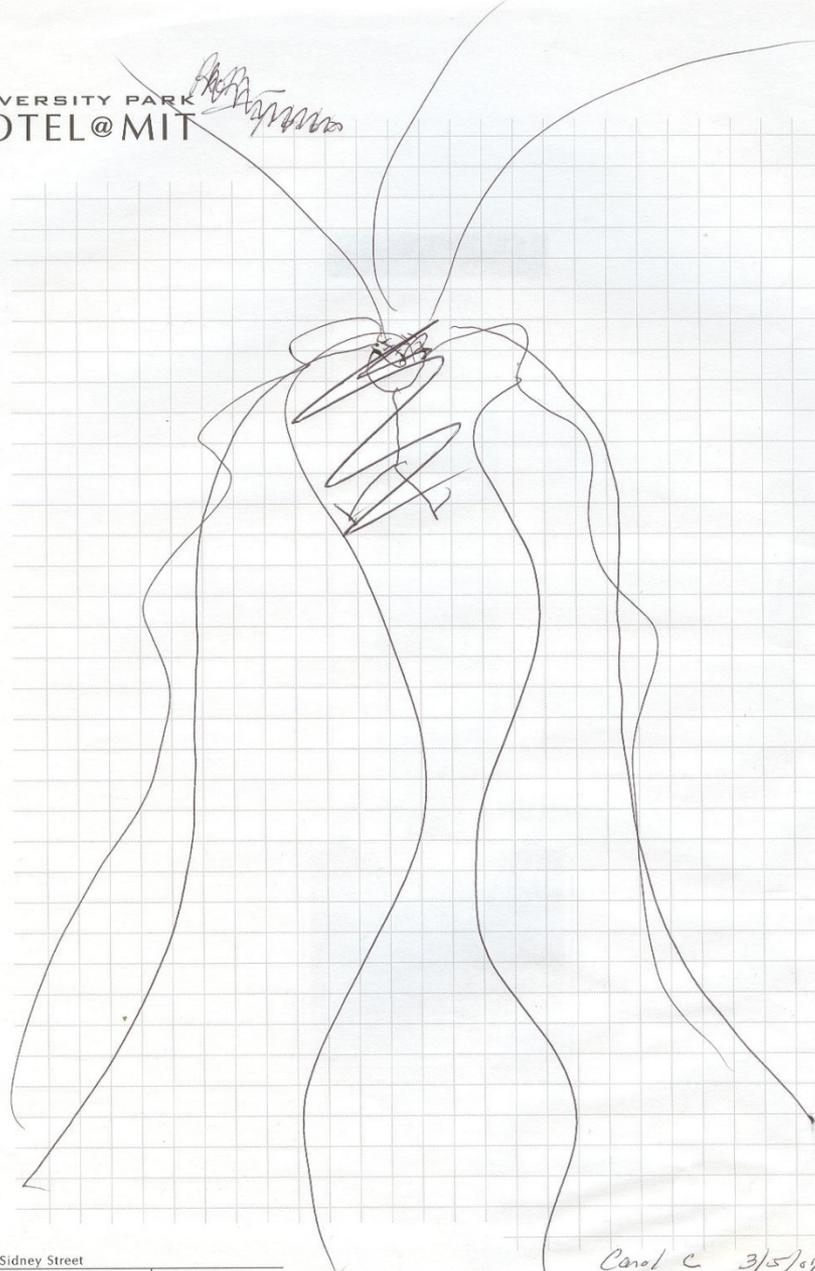
Medication trials on all “Atypicals”,
SSRI, Benzodiazepines and mood
stabilizers (anti-convulsants)

Mother was trauma ‘survivor’

Father was alcoholic PTSD vet

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*Carol C 3/5/07
Urgent by down at beginning
of lesson*

Soji video

Despite the numerous studies over the past 30 years that have clarified the devastating effects on mental and physical health, the role of trauma within the caregiving system remains unrecognized both in our diagnostic systems and in our dominant treatment paradigms. Research of people with histories of caregiver abuse and neglect consistently demonstrates problems with concentration, anger, panic, depression, food intake, drugs, and sleep, as well as decreased Heart Rate Variability, higher levels of stress hormones, and reduced or impaired immune response. Their relationship between documented brain changes and psychopathology is complex. Traumatic life experiences during childhood and adolescence are far more common than expected. The Centers for Disease Control and Prevention estimates that child maltreatment may be the most costly public health issue in the United States, 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. The current practice of applying multiple distinct comorbid diagnoses to traumatized children prevents a comprehensive treatment approach. Approaching their problems from a framework of memories of discreet traumatic ignores the fact that the damage affects the brain's neural circuitry and goes well beyond dealing with discrete painful events. Our great challenge is to learn to utilize the brain's neuroplasticity to reorganize defective brain circuits.

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Developmental trauma

PTSD and RAD inadequate diagnoses

Children experience and witness abuse and neglect in the context of their most important relationships

Their nervous systems form in response to absence of caretaker and to unrelenting threat all too often from caretaker or other in the home

Adult personality disorders; dissociative disorders

No internalized experience of safety (9/11)

No self; no other

Fear-based Traits

High arousal as a base line

Chronic vagally mediated illnesses

- IBS; diarrhea; constipation
- Stomach pain; heart burn; reflux; hiccups

High levels of emotional reactivity

Poor affect regulation

Difficulties in relationships

Seen in DTD, RAD, PTSD, DID, BPD and APD

Traits are inherent to Axis II diagnosis

Axis II Fear

BPD and APD arise from neglect and/or abuse (both once DTD)

Lacking self, people identify with powerful sub-cortical affects.

They are their feelings

They have fear and shame based identities

Axis II- Disorders of high sub-cortical arousal, poor affect regulation and self-definition

Ongoing and/or quick, overly learned kindling of fear circuits

What fires together, wires together

Pattern recognition

The trauma field

Trauma as an attractor site

Coded in the infinite complexity of the quantum universe that is the brain

Serves survival

Creates reenactment that may have little if anything to do with the unconscious (a phenomenon of mind)

The Center for Repetition Compulsion

DEVELOPMENTAL TRAUMA

- Neglect
- Abuse: emotional; harsh discipline; domestic turmoil
- Assault: sexual; physical; sadistic
- Parental mental illness
- Primary insecurity
 - Parental absence
 - Food; malnutrition
 - Home/shelter
 - Domestic conflict, threats
 - Drugs
- Major impact on the developing brain and nervous system
- ACE study
- Major societal impact

Adverse Childhood Experiences (ACE) Study

- V.J. Felitti (Kaiser Permanente), R.F. Anda (CDC) et al, 1998.
- Ongoing study based on data from Kaiser Permanente Health Plan members conducted in conjunction with the U.S. Centers for Disease Control (CDC).
- Study cohort of >17,000, largely middle class.
 - 50/50 male/female.
 - 80% White (inc. Hispanic); 10% Black; 10% Asian.
 - Average age of 57.
 - All had good health insurance.
- The study originally dealt with obesity.

The likelihood of dropping out related to the number of *Adverse Childhood Experiences the subjects encountered* – This Effect Turned Out to Generalize to Other Health Problems.

- Originally identified eight categories (stressors) when reviewing first wave of data: Before the age of 18 did you experience:
 - Abuse:
 - Emotional/recurrent threats/humiliation.
 - Physical (beating).
 - Sexual (with “contact”).
 - Dysfunctional home:
 - Mother treated violently.
 - Family member = alcoholic / drug user.
 - Imprisoned household member.
 - Chronically mentally ill with or without psychiatric hospitalization.
- Added categories of neglect with second wave:
 - Neglect:
 - Physical neglect.
 - Emotional neglect.
- One of more instances of any one category counts as **one** ACE score.
 - ACE score range is zero to ten (0-10).

ACE cont.

They were *quantitative measures*:

- Did you ever experience...

In essence, it is just a simple checklist.

- The more boxes you checked, the higher your ACE score, the more likely you were to encounter a range of mental & physical health problems.

ACE and Developmental Trauma

Kids and adults who suffer from conditions related to developmental trauma will have high ACE scores

Their qualitative experience would also be terrible

Rarely if ever one instance of incest or beating or humiliation

The symptoms are never as bad as the conditions that gave rise to them

ACE data

Women are 50% more likely to have an ACE score of 5 or above

Men who have an ACE score of 6 are 4600% more likely to become IV drug abusers than men with ACE score of 0

ACE score 5 predicts 20 year shorter life span in both men and women

For those with up to a maximum of 4+ ACEs, the following risk factors and disease conditions were found to be substantially more common (compared to those persons with 0 ACEs):

Cigarette Smokers to 2+ times (x) those with no ACEs.	IHD 2.2 x
Severe obesity 1.6 x	Cancer 1.9 x
No leisure time physical activity 1.3 x	Stroke 2.4 x
Depressed 2 weeks 4.6 x	COPD 3.9 x
Suicide attempt 12.2 x	Diabetes 1.6 x
Alcoholic 7.4 x	Broken bones 1.6 x
Illegal drug use 4.7 x	Hepatitis/jaundice 2.4 x
Injected drugs 10.3 x	Fair/poor health 2.2 x
Had an STD 2.5 x	50+ intercourse partners 3.2 x

Developmental trauma

Motherlessness:

Acute states of terror; chronic ambient background fear

Lack of development of pre-frontal cortex , DMN and cerebellum

Lack of affect regulation

No cause and effect- the basis of all learning

Lack of a “self” and an “other”

Attachment, Fear and Self-Organization

Unrepaired attachment disruption is at the core of most serious psychopathology

Unrepaired attachment disruption and/or trauma leave the disorganized infant in a state of baseline survival fear

When fear and its amygdaloid neighbors, shame and rage, rule we see psychopathology

The greatest of these is fear

These are the drivers in developmental trauma

Limbic circuitry

Fear, shame and rage/anger are primary affects of the limbic brain

We are always “treating” the limbic brain

Highly aroused, reactive nervous systems driven sub- cortically, particularly in the non verbal right hemisphere

Talk therapies focus on the cortical, verbal and frontal left hemisphere

Geographically the furthest away from non verbal, sub cortical center of the problem: RH survival amygdala

Faulty circuits

Fight, flight and/or freeze

Porges- Polyvagal theory

- Reptilian freeze response =dissociation
- Mammalian fight or flight
- Social vagus

Dissociation is parasympathic but beneath it is terror, rage and shame;
sympathetic activation

These patients are unable to quiet arousal or regulate affect

Babies and small children have no capacity for flight of fight

Default mode network

Breakdown in cortical timing

Flashback slide

The Primacy of Fear

Fear is the core emotion in
psychopathology

Joseph LeDoux, The Emotional Brain

Schore: Fear and Psychopathology

Affect regulation depends on adequate brain structure and function in the right hemisphere, particularly the ROC (Right Orbital Frontal Cortex-Schore)

Mothering builds ROC *and the cerebellum (sensory processing and early inhibition of temporal lobes)*

The cerebellum, the insula, the ACC and then the ROC inhibit the amygdala, i.e. control fear, shame and rage

To the extent they are developmentally or structurally compromised, fear, shame and rage rule

Development of Amygdala Inhibition

RH amygdala fully developed in utero (5-6 months, coincident with fetal movement) (Treat the mother?)

Cerebellum (inion ridge)

Right Insula (FP8)

ACC (FZ)

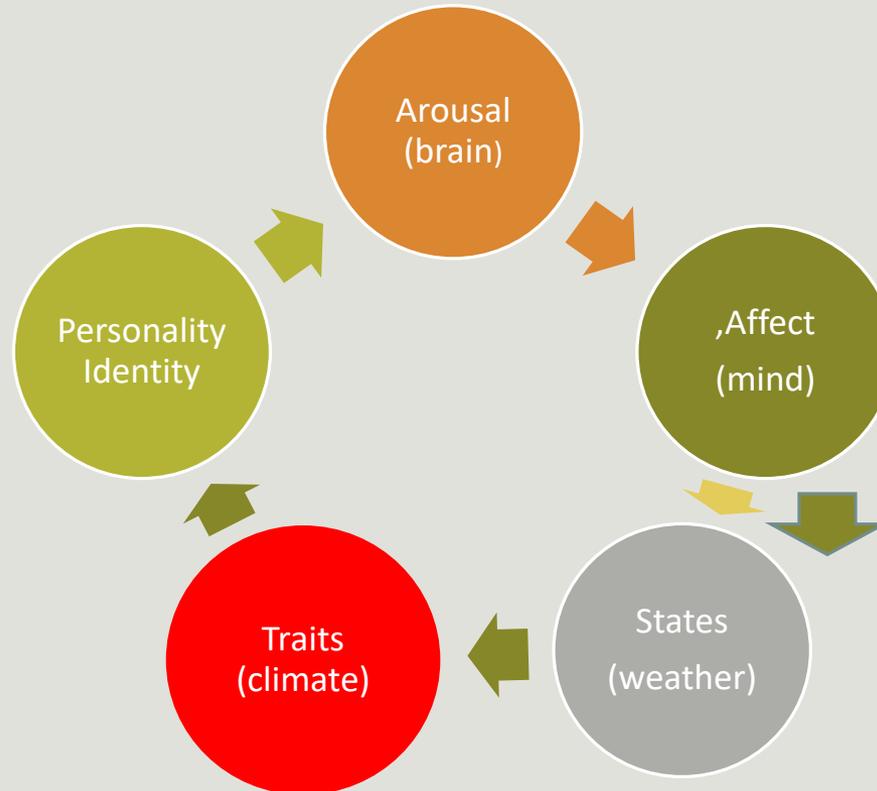
Right Orbital Cortex/ right pre-frontal cortex (FP2? ; FPO2)

DMN (PZ and AFZ)

Quieting Fear (the Arousal Model)

By addressing frequencies that give rise to over arousal, neurofeedback helps to quiet fear. With DTD this is our primary goal.

Thesis



Thesis

Neurons fire

Arousal (brain)

Affect (mind)

State (weather)

Justifying narrative (“syntonic”)

Trait (climate)

Personality- This is just who I am

Identity- Identification with all this

Fear-based States

Sympathetic arousal: scared all the time or never

CNS in constant over drive

Reactivity

Hyper vigilance

Impaired empathy

Reduced capacity for self and other

Problems with trust: too little or too much

Vagally mediated illnesses

State dependence

We believe our states

All states come with justifying narratives

The more fear driven the more compelling

They appear to relate to survival

We are all state dependent

Fear states disregulate

These are the states most known to people with DTD –often called severe depression

State to Trait

Traits can be understood as states rehearsed repeatedly and reinforced by experience

“What fires together, wires together” –Hebb

Weather (states) transforms into weather patterns which over time become the climate (traits, personality)

In DTD, the “amygdala storms” become the stormy climate a place no one wants to live and few want to visit

Axis II Fear

BPD and APD arise from neglect and/or abuse (both once DTD)

Lacking self, people identify with powerful sub-cortical affects.

They are their feelings

They have a fear-based identity

Axis II- Disorders of high sub-cortical arousal

Unrelenting activation of fear circuits in DT

Personality

Collection and interplay of traits

Reinforced overtime by experience

Wiring together and firing together/ pattern recognition

Traits we identify as “me”

In DTD and subsequent Axis II conditions, the personality is overtaken by shame, rage and terror.

Identity

Parents, siblings, peers, culture, gender, race, class, body, genetics, epigenetics all contribute to our sense of identity

Nature, nurture and fate

- Temperament?

Arousal, affect and self-regulation

Ambient fear is “self”; it is at the core of their identity

Trauma Identity

Fear-based

Shame-based

Anger is there somewhere

Self-describe as depressed- over aroused

Rage-driven –both BPD and APD

No sense of self separate from affects

No self; no "other"

Trauma Identity, 2

Identity is highly unstable

Cannot trust their own minds

Cannot perceive the other

Lack a theory of mind

Often do not trust the motivations of the other

Limited understanding and access to what drives them

Profoundly motherless

Motherlessness

The extent to which one can regulate their affective states correlates highly with how well their mother could regulate her (his) own in this person's early childhood

Good-enough mothering= affect regulation

The more motherless, the more fear

What happens when you quiet fear

The NF Healing Paradox

Your goal is to reduce fear

When you reduce fear, you challenge fear-based identity

Many will cling to fear as if it were life itself.

It is. It is who they are

Fear has also been the primary validation of a traumatic past

“Amygdala resistance”

The Healing Crisis

- There is no other path: we must reduce fear
- We also must reduce fear of no fear/no self
- 1. Recognize the dilemma
- 2. Help them recognize the dilemma
- 3. Prepare them for it
 - Neurofeedback
 - Therapy
 - Meditation
 - Breathing
 - Tapes, relaxation exercises
 - Exercise
- There will be many rounds- both the brain and the mind gravitate toward the familiar

What is Possible

- Neurons fire : regulated and quieted sub cortically
- Arousal : Lowered and regulated
- Affect : Full range of affective states available; calm prevails
- State : Flexible, calm, often happy, even peaceful
- Narrative: As it arises and seen for what it is
- Trait : Begin to give way
- Personality: Reorganizing sense of self; pro-social
- Identity: No fear means a new identity

Placements: Triangulate the Amygdala

Temporal lobe focus:

Initially, T4-P4 or T3-T4 (Othmer)

T4-F8, T4-FZ

Cingulate focus:

FZ-A2 and or PZ-A2

FZ-CZ; CZ-PZ Precuneus

Prefrontal focus:

FPO2 (Fisher)

Rewards and Inhibits

10.5-13.5, up or down as needed, guided by person's response

Usually lower, to 0-3 or beneath 1 HZ

The temporal lobe/slow-wave concern

Case vignette of FPO2

Inhibit through spectral

Default inhibit in DTD: 1-6 HZ

Fear seems encoded in these slow frequencies

Overlapping rewards and inhibits

Alpha Suppression

Lanius and Ros (Mind over Chatter)

PZ: 8-12 down

Alpha rebound after tx

Organizes the default mode network

Improvement in self-system; more coherent sense of self

Significant decreases in dissociation

Left hemisphere training

Always keeping your awareness on raising arousal beyond what's helpful

Left hemisphere can be trained quite low

Will be required in most people with DT, but add only as symptomatically indicated

Temporal focus

Default Mode Network Protocols- Kaiser

Disconnections in the DMN may be biomarker for developmental trauma- Lanius, et al.

Q based looking at the cingulate or the DMN, the self system

Amplitude synchrony or comodulation at PZ and AFZ

T3 and T4 and other sites as well depending on the map

Ohio story

My story

Consider the Cerebellum

Teicher and Anderson: Limbic instability

The vermis and abuse

The need for holding/rocking to organize the brain

- Harlow and Heath
- Training at the back of the brain

- The cerebellum always shows up in scans of DT (Lanius and van der Kolk)

Cerebellum Protocols?

O1-O2

TPO-TPO (Temporal parietal occipital junction)

PZ

Inion- does it regulate the vermis?

Beta Reset (Gisburne)

- Are we reaching the cerebellum?
- These sites have EEG and are trainable

Psychotherapy and Neurofeedback

Therapy

All therapy is about regulation

If you disregulate either with NF or inquiry, recalibrate

The therapeutic relationship is there to contain training issues

The training should serve the therapeutic relationship as well

Abreaction reinforces fear circuits

Avoid cathartic or exposure therapies

Lack of progress is not resistance

Dual track listening-the brain and the brain's owner

DSM and neurofeedback

Yoked to discreet disorders

The human connectome Jan 2013

Common factors: working memory, fear circuits

NIMH- Finally open to researching neurofeedback!

Psychopharm:

- No new psychotropic since 1990s
- 2 billion to bring new med to market
- No evidence that they have been useful across the population
- Insel 2013 TED talk

Diagnosis

We have been attempting to tailor our research to discreet diagnoses

To make a claim of efficacy for any of these with the FDA costs a minimum of 1 million dollars

“If you could drain trauma from the DSM, it would be a pamphlet”

Disregulation vs. disease

Every mental illness involves problems with self-regulation

The core question in all treatment is how do help our patient learn to regulate themselves

“You do not have a disease, you had a childhood!”

Neurofeedback helps the brain to find its path toward regulating itself

Symptoms

I look at all symptoms as manifestations of dysregulation/arousal, attempts to manage dysregulation and arousal or both

In DT they relate most directly to overarousal: fear, toxic shame and rage

What kind of therapy to use?

Depends on the capacity for mind

The more the disregulated brain presents as the issue the more I rely on behavioral approaches

As mind develops, the more I work psychodynamically

As complicated as training the disregulated brain can be it is nothing compared to treating the mind it creates

Somatic Experiencing

The body keeps the score

Attachment focused

We are built for relationship

By definition, developmental trauma is the disruption of primary attachment relationships

Therapy has to focus on the establishment of the capacity for attachment

The core problem here is that these patients lack core self

The problem with inter-subjectivity

Affect Regulation and the Origin of Self

Schore, Siegel and many others talk about relying on inter-subjectivity of the patient's field and the therapist's field

Depending on how much self has developed, this can be vital

However...

Default mode network

Motherlessness

Two common factors in my DT patients- motherlessness and fear

We need our mothers

Adults are typically ashamed of their yearning and mother hunger

The gift of a “good enough” mother is good enough affect regulation

All of our therapy is about regulation

Motherlessness and neurofeedback

The gift of neurofeedback is also the gift of affect regulation

When we accomplish this the motherless begin to feel mothered and they can feel this back in time

This will not happen in a room alone with a machine

This can happen within the therapy relationship

Transference

Negative transference is sub-cortical event

This over arousal and the distortion it brings can rarely be mitigated by talk therapy or by neurofeedback alone

With DTD, I work to minimize transference

Stress the partnership

The difficult balance: Profound motherlessness (an unbearable yearning) and minimizing transference

Affect regulation=mother

Transference and counter transference in DTD

Transference dimensions of motherlessness are vast

So too the counter-transference

We will try to meet them and they are unmeetable

We will deny them- skills training, analysis equally problematic

We will spurn them- “attention getting”

Managing the transference

We expect that NF will come on board to regulate wild states of fear, shame and rage.

If not, the patient, the therapist and the therapy are held hostage to these affects

Most patients hope if not expect that we, our persons or the process of therapy will “do something” (regulate them)

The transference expectations are either very high or hopelessly low understandably

The balancing act

Pragmatics

Touch

Time

Talking

Office set up

Insurance

Summary

The primacy of fear

Fear-based or “trauma identity”

Training goal is fear reduction

Find the protocol(s) that accomplish this

Success creates therapeutic crisis

Anticipate this-fear of loss of self and loss of you

Befriend the emerging identity

Summary, cont.

Developmental trauma promotes repetitive firing of fear circuitry in the brain

These patterns are rehearsed over time and become trauma identity

These patterns can be addressed by training the brain

This happens best, most wholly, within a therapy relationship

Neurofeedback is a relational technology

Thank you!

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Carolyn video

Mother and baby video
