A CASE STUDY OF TRAUMATIC STRESS DISORDER IN A 5-MONTH-OLD INFANT FOLLOWING SURGERY

ALETHA SOLTER
The Aware Parenting Institute, Goleta, California

ABSTRACT: This case study of a 5-month-old infant describes the symptoms of trauma following a surgical procedure (cranial remodeling) with short-term hospital stay. The infant showed a symptomatology similar to that found in other studies of hospitalization during the preverbal period, and fit the diagnosis of traumatic stress disorder according to the DC:0-3. The therapy was implemented by the parents in consultation with the author. The approach was based on an exposure therapy model (flooding) using a somatic trauma trigger that occurred spontaneously in the context of a normal caretaking routine. The infant was allowed to have a full-blown emotional response during several treatment sessions. The outcome was positive, with the disappearance of some symptoms of traumatic stress disorder after the first week, and no remaining symptoms after two months. Periodic follow-up evaluations for one year revealed normal development with no return of symptoms. The symptoms, treatment, and outcomes are discussed in the context of behavioral learning theory and emotional processing theory. The role of crying during flooding therapy is discussed, and an emotional release theory emphasizing the therapeutic value of crying is proposed. Six cautionary guidelines are offered for the use of intense exposure therapy with infants.

RESUMEN: El estudio de este caso relacionado con un infante de cinco meses describe los síntomas de trauma que siguieron a un procedimiento quirúrgico (remodelación craneal) con una corta estadía en el hospital. El infante en cuestión mostró una sintomatología similar a la que se da en otros estudios de hospitalización durante el período preverbal, y encaja en el diagnóstico del Trastorno Traumático de Estrés, de acuerdo con DC:0-3. Los padres implementaron la terapia en consulta con el autor. El acercamiento se basó en un modelo de terapia de exposición (a manera de inundación), usando la activación somática de un trauma que ocurrió espontáneamente en el contexto de una rutina normal en que se prestaba cuidado al infante. A dicho infante se le permitió responder emocionalmente llorando en una forma completa durante varias sesiones de tratamiento. El resultado fue positivo, con la desaparición de algunos síntomas del Trastorno Traumático de Estrés después de la primera semana, y sin que quedara ningún síntoma después de dos meses. Evaluaciones periódicas de seguimiento por un año revelaron el desarrollo normal sin que reapareciera ninguno de los síntomas. Se discuten los síntomas, el tratamiento y los resultados, dentro del contexto de la teoría del aprendizaje de conducta y la teoría del proceso emocional. Se discute también el papel del llanto durante la terapia a manera de inundación, y

The author wishes to thank the family that participated in this study. Direct correspondence to: Aletha Solter, The Aware Parenting Institute, P.O. Box 206, Goleta, CA 93116-0206; e-mail: solter@awareparenting.com.

INFANT MENTAL HEALTH JOURNAL, Vol. 28(1), 76–96 (2007)

Published online in Wiley InterScience (www.interscience.wiley.com).
DOI: 10.1002/imhj.20123

se propone una teoría de liberación de las emociones la cual enfatiza el valor terapéutico del llanto. Se ofrecen seis pasos de precaución para el uso de la terapia de exposición intensa en infantes.

RÉSUMÉ: Cette étude de cas d'un nourrisson de cinq mois décrit les symptômes de trauma après une intervention chirugicale (remodélisation du crane) avec un séjour en hôpital court. Le nourrisson a fait preuve d'une symptomatologie similaire à celle trouvée dans d'autres études d'hospitalisation durant la période préverbale, et remplissait les conditions du diagnostic de Trouble de Stress Traumatique d'après le DC: 0-3. La thérapie a été mise en application par les parents en consultation avec l'auteur. L'approche était basée sur un modèle de thérapie d'exposition ("*flooding*") en utilisant un déclencheur de trauma somatique qui s'est passé spontanément dans le contexte d'une routine normale de mode de soin. Le nourrisson a pu avoir une réaction émotionnelle totale durant plusieurs séances de traitement. Le résultat s'est avéré positif, avec la disparition de quelques symptômes de Trouble de Stress Traumatique après la première semaine, et avec aucun symptôme après deux mois. Des évaluations de suivi périodique pendant une année ont révélé un développement normal avec aucun retour des symptômes. Les symptômes, le traitement et les résultats sont discutés dans le contexte de la théorie de l'apprentissage du comportement et la théorie de traitement émotionnel. Le rôle des pleurs durant la thérapie *flooding* est discuté, et une théorie de décharge émotionnel mettant l'accent sur la valeur thérapeutique des pleurs est proposée. Six directives d'avertissement sont offertes pour l'utilisation d'une thérapie intense d'exposition avec des nourrissons.

ZUSAMMENFASSUNG: Diese Fallstudie eines fünf Monate alten Kindes beschreibt die Symptome eines Traumas, dass einem chirurgischen Eingriff (Wiederherstellung der Kopfform) bei einem Kurzaufenthalt im Spital folgte. Das Kind zeigte eine Symptomatologie, die der ähnlich ist, die in anderen Studien bei Spitalsaufenthalten von Kindern in der präverbalen Periode beschrieben werden und passt zu der Diagnose der traumatischen Stressstörung in Übereinstimmung mit DC: 0-3. Die Therapie wurde von den Eltern in Kontakt mit dem Autor gemacht. Der Zugang wurde über ein Modell des Aussetzens gegenüber dem Stressor gemacht (Überschwemmung) in dem ein körperlicher Trraumaauslöser verwandt wurde, der in der normalen Tagesroutine vorkam. Dem Kind wurde erlaubt seine volle Wucht der Emotionen bei mehrerer Therapiesitzungen zu haben. Das Ergebnis war positiv. Einige Symptome der traumatischen Stressstörung verschwanden nach der ersten Woche, nach zwei Monaten gab es keine Symptome mehr. Periodische Nachsorgeuntersuchungen zeigten bis zum Ende des ersten Lebensjahrs keine Symptome mehr. Die Symptome, die Behandlung und die Ergebnisse werden im Kontext der Lerntheorie und der emotionalen Prozesstheorie besprochen. Die Rolle des Weinens während der Überflutungstherapie wird besprochen und die Theorie der Emotionsfreisetzung, die die therapeutische Bedeutung des Weinens betont, wird vorgeschlagen. Sechs Regeln als Vorsichtsmassnahmen werden für die Aussetzungstherapie bei Kleinkindern angeboten.

抄録：この５カ月児の症例研究では、短期間の入院を伴う手術（頭蓋再形成術 cranial remodeling）の後の外傷症状を記述する。乳児は、前言語期の入院についての他の研究で見られたものと類似の症状を示し、DC:0-3 による外傷性ストレス障害に合致した。治療は著者のコンサルテーションを受けながら、両親によって実施された。アプローチ法は、通常の養育のルーチンのコンテクストで自発的に生じる身体的な外傷の引き金を用いる、暴露療法モデル（フラッディング flooding）に基づいていた。乳児は数回の治療セッションで、十分に表現された情緒反応を出すことが許された。結果は肯定的で、

第１週の後には外傷性ストレス障害の症状が消え、２カ月後には残遺症状がなくなった。１年間にわたる定期的なフォローアップ評価では、症状が戻る事なく正常発達していることが明らかにされた。症状、治療、そして結果は、行動学習理論と情緒処理理論 emotional processing のコンテクストで議論される。フラッディング治療の間に泣くことの役割が議論され、泣くことの治療的価値を強調する情緒解放理論 emotional release theory が提案される。乳児との集中的な暴露療法を使用するために、６つの警戒を促すガイドラインが提供される。

* * *

INTRODUCTION

The Impact of Medical Procedures on Infants

There is no doubt that infants, like older children and adults, can become functionally impaired by trauma (Scheeringa & Gaensbauer, 2000). However, the DSM-IV diagnostic criteria for post-traumatic stress disorder (PTSD) have proven to be inadequate for diagnosing the impact of trauma on preverbal infants because of the number of criteria involving subjective experiences, which depend on verbal reports by the individuals being diagnosed (Scheeringa et al., 1995). Alternative criteria have been developed for diagnosing trauma in infants and young children, specifically the diagnostic criteria developed by Zero to Three (DC:0–3) for traumatic stress disorder (TSD) (Zero to Three, 1994).

Among the many sources of trauma for infants, medical procedures and hospitalization rank high on the list (Pynoos, 1990). Following surgery and hospitalization during infancy, researchers found a dramatic, but transient, increase in several stress hormones, including ACTH, cortisol, beta-endorphin and arginine-vasopressin (Rosendahl et al., 1995). Even routine vaccinations can trigger a stress response. Researchers found that approximately 75% of the infants had a significant increase in saliva cortisol levels after receiving routine pediatric vaccinations at 2, 4, and 6 months of age (Lewis & Ramsay, 1995).

For the past 60 years, researchers have been documenting infants' psychological symptoms following surgery and/or hospitalization. For example, in an early study, Levy noted night terrors, fears, and increased dependency in infants following tonsillectomies (Levy, 1945), and researchers in the 1950s noted increased crying, clinging, separation anxiety, sleep disturbances, and fear of strangers in infants following hospitalization (Schaffer & Callender, 1959). More recent observations of infants following hospitalization or medical procedures include avoidance behavior (Koomen & Hoeksma, 1993), heightened sensitivity to pain (Taddio et al., 1997), uncontrollable crying, increased fearfulness, lack of social responsiveness, separation anxiety, exaggerated startle response, and a seeming loss of the ability to babble (Roy & Russell, 2000).

Surgery and hospitalization during infancy can have long-term consequences as well, including impairment in self-regulation of gross motor activity (Saul, 2002) and in cognitive functioning (Newburger et al., 2003).

Separation from attachment figures is one of the primary stressors for infants during

hospitalizations. Researchers have found a protective effect on later cognitive and motor development in infants hospitalized for cancer when the parents are encouraged to remain with their sick infants as much as possible during hospitalizations (Noll & Kulkarni, 1989). More enlightened hospitals now encourage parents to stay with their infants. However, this parental presence does not necessarily protect the infant from being traumatized. There is evidence that medical procedures are frightening and stressful for infants even when there is no separation from the parents. For example, Traumatic Stress Disorder was observed in an infant who was hospitalized for several weeks for cancer at five months of age, even though one or both parents were with him 24 hours a day (Roy & Russell, 2000).

Therapy for PTSD or TSD with infants

Exposure-based paradigms have existed for decades, and are recognized as effective treatments for post-traumatic symptoms in children and adults (Jacob & Pelham, 2005). Two major forms of exposure therapy are systematic desensitization and flooding.

Systematic desensitization is based on the principle of counterconditioning. During desensitization, the goal is to pair the fear-evoking stimulus with an emotional state that is incompatible with anxiety, such as deep relaxation or pleasure. This approach usually involves a gradual exposure to fear-evoking stimuli so as not to overwhelm the patient.

Flooding, on the other hand, is based on the principle of extinction of the classically conditioned emotional response. This approach uses intense and prolonged exposure to the fear-evoking stimulus (without the feared consequence) while escape behaviors are blocked. Flooding is generally associated with high levels of anxiety, which eventually become extinguished because the feared consequences do not materialize. In both desensitization and flooding, the stimuli can be either real (in vivo) or imagined (in vitro or imaginal) (Jacob & Pelham, 2005).

There are no systematic studies comparing different treatment modalities for TSD in infants or young children (Scheeringa & Gaensbauer, 2000). Many studies have documented the success of either systematic desensitization or flooding with young children suffering from posttraumatic symptoms. In these therapies, exposure to the traumatic material is accomplished through the use of verbal, imaginal, or play reenactments for children who have reached the stage of symbolic thought (Saigh, 1986; Drell et al., 1993; Gaensbauer & Siegel, 1995; Keren & Tyano, 2000; Scott et al., 2002).

There is evidence that even preverbal infants can encode and remember salient elements of a traumatic experience over extended periods of time, and that they can communicate these elements through symbolic play enactments, drawings, and thematic preoccupations (and, in some cases, even verbally) during therapy when they are older (Drell et al., 1993; Gaensbauer, 1995). However, treatment during the first year is more difficult because infants under 12 months of age lack the ability to represent and conceptualize their experiences in a symbolic framework. The ability for symbolic representation and dramatic play develops during the second year (Piaget, 1962). Treatment modalities for TSD that rely on exposure to traumatic themes through symbolic representations (such as language, images, or symbolic play) are therefore inappropriate for infants under 12 months of age.

An exposure-based paradigm during the first year requires the use of actual, rather than symbolic, trauma reenactments. Exposure therapy paradigms for preverbal infants therefore need to use direct sensory stimulation (visual, olfactory, auditory, tactile, proprioceptive, or

vestibular) that is reminiscent of the trauma. Systematic desensitization using this kind of direct sensory stimulation has been adapted successfully for infants under 12 months of age (Chatoor, 1991; Gaensbauer & Siegel, 1995).

An example of the use of flooding during the first year is the case of a 7-month-old infant who had been sexually and physically abused before being placed in foster care, and who fiercely resisted physical contact. His foster mother and sister held him almost constantly for several months, even though he protested strongly. Eventually, his strong emotional response diminished, and he was able to relax and smile while being held (Gaensbauer & Siegel, 1995).

Flooding therapy has proven to be highly effective with infants suffering from posttraumatic feeding disorders (resulting from frightening events such as gagging, choking, vomiting, gastroesophageal reflux, or medical procedures). During the treatment sessions, food is placed directly on the infants' lips or in the mouth at regular intervals in spite of the infants' resistance and distress. The first few sessions are characterized by intense crying (Benoit & Coolbear, 1998).

Emerson has reported excellent results with a flooding approach for helping infants heal from the emotional sequelae of obstetric complications. His therapeutic interventions used gentle tactile stimulation to areas of the body that were impacted during the birth process (for example around the temples in the case of a forceps birth, the part of the head that protrudes after the use of vacuum extraction, or the infant's neck in cases where the umbilical cord was wrapped around the neck). This touching was designed to trigger a somatic memory of the birth trauma. While being touched on those specific parts of their body, the infants often had a strong emotional response consisting of intense crying. Eventually, the infants no longer screamed during these somatic trauma reenactments. Infants treated with this exposure therapy soon began to sleep and nurse better, had a longer attention span, and cried less (Emerson, 1989).

When flooding therapy is used for PTSD in children and adults, the following three conditions have been found to lead to a more favorable therapeutic outcome: (1) the patient does not have any psychiatric disorders other than PTSD, (2) the exposure is sustained long enough for the arousal to dissipate, and (3) the exposure situation contains elements that are *different* enough from the original trauma so the patient can form a new memory while the original association becomes extinguished (Foa & Kozak, 1986; Saigh et al., 1996; Littrell, 1998; Zoellner et al., 2002).

The combined evidence from these various sources leads to the conclusion that exposure therapy (both desensitization and flooding), appropriately adapted for preverbal infants, offers a promising approach to therapy for infants suffering from posttraumatic symptoms.

DESCRIPTION OF THE CASE

Michael, a Caucasian male infant living with his parents in California, had cranial remodeling surgery at 5 months of age for non-syndromic craniosynostosis (premature fusing of one or more skull sutures). At his 4-month medical check-up, his pediatrician found him to be normal and healthy except for the shape of his head (scaphocephaly). X-rays confirmed the diagnosis of premature sagittal fissure fusion. The surgery, which lasted about 2 hours, was performed under general anesthesia when the baby was 5 months old. The baby spent one night in an intensive care unit following surgery, and two days in a regular pediatric ward. The only complication was the need for a blood transfusion (one pint). His parents were with him

24 hours a day in the hospital, with the exception of the immediate pre-surgical and post-surgical periods. (He was awake for 10–15 minutes post-surgically before his mother was allowed to see him.) On the third day, his head bandages were removed and he was allowed to go home.

Because of Michael's symptoms after returning home from the hospital, his parents consulted with me. At my suggestion, they compiled the following list of the various emotional and physical traumas that their son had experienced before, during, and after the surgery.

List of emotional and physical traumas

This list was compiled by the parents, and includes some of their subjective interpretations.

During the weeks and days preceding surgery:.

1 Restriction of movement during head x-ray
2 Parental fear and confusion when pediatrician telephoned to confirm diagnosis
3 Pre-op examination by surgeon: being handled by a stranger
4 Physical pain/discomfort: blood drawn from arm, tourniquet on arm

On the day of surgery:.

1 Parental anxiety
2 Hunger (not allowed to nurse for over four hours preceding surgery)
3 Separation from parents when anesthesiologist carried him away
4 Terror when gas mask put on face
5 Terror when woke up from the anesthesia in a strange place without his parents
6 Frustration at inability to cry (hoarse and sore vocal cords from tube used during surgery)
7 Physical pain: throat, head, intravenous tube in arm
8 Discomfort from procedures: throat sprayed, heel sticks, morphine injection

In the intensive care unit:.

1 Physical pain (see above)
2 Inability to hear well because his ears were covered by a head bandage
3 Restriction of movements and discomfort with seven objects attached to his body (two intravenous tubes, a blood pressure cuff, a draining tube from his head, three electrodes attached to his chest, an oxygen saturation monitor on his toe)
4 Parents unable to hold him because of all the tubes
5 Frustration at inability to nurse
6 Discomfort of over-full bladder (before catheterization)

7 Pain during morphine injections, heel sticks, and catheterization
8 Morphine side effects (agitation indicating possible itching, nausea, or hallucinations)
9 One eye swollen shut
10 Pain from accidentally scratched eyelid

In the hospital ward:.

1 Both eyes swollen shut: frustration and terror at being unable to see
2 Discomfort from frequent invasive procedures
3 Fear and confusion from strangers handling him
4 Nausea and vomiting after he finally was able to nurse
5 Gagging and vomiting after oral iron feeding

Behaviors in the hospital

Michael cried at times in the hospital, and he sometimes attempted to resist the medical interventions. However, his crying and resistance were sporadic. He was weak because of the surgery, lack of food, and blood loss, and his throat was probably painful because of the tube used during the surgery.

During one of the catheterization procedures, in which the nurse tried unsuccessfully to use a catheter that was too big, Michael was observed to scream and actively resist at first, but as the painful procedure continued, he suddenly became quiet and passive (but not asleep), as if he had given up attempting to escape.

Symptoms of emotional trauma

After he returned home, Michael showed the following six symptomatic behaviors.

Change in sleep and feeding patterns. Before the surgery, the intervals between night feedings had been as long as 5–6 hours. After the surgery, he began waking up as frequently as every 2 hours at night.

Increase in crying. He cried for at least 2 hours per day, even though he was being held and fed frequently. Some of these crying spells were in the middle of the night. The parents noticed that he would awaken suddenly and cry loudly. This crying occurred in spite of the use of appropriate pain medication for the surgical wound. The amount of crying post-surgically was similar to the amount of crying he had done during the first three months after birth. However, his crying episodes had begun to taper off by the time he was four months old (before the surgery).

Night terrors. On two different occasions during his first week home, he awakened in the night crying hysterically without seeming to be aware of his surroundings. This crying was different from the crying that occurred during his other night awakenings, when he was awake and responsive. These night terrors occurred even though he was being given pain medication.

Regression in motor skills. Before the surgery he rolled over regularly from his back to his stomach. He rolled over only once during the first week he was home from the hospital, and then not at all during the following three weeks.

Terror in the supine position. Before the surgery, he loved being put on his back to have his diapers or clothes changed. After the surgery, he often screamed in terror when he was placed on his back (and he made no effort to roll over to his stomach, as described above).

Fear of strangers. Before the surgery, he had been interested in strangers, and would smile when they interacted with him. After the surgery he cried and turned away when strangers approached him and attempted to interact with him, even though he was being held by one of his parents.

In addition to these behaviors, Michael had quiet, alert times after coming home from the hospital, during which he acted like a normal 5-month-old. The parents were reassured by his behavior during these periods when he seemed content.

THERAPY

The therapeutic interventions were implemented by the parents, with both telephone and in-person consultations with me. The following therapeutic interventions were used: frequent holding, protection from over-stimulation, in-arms crying, and exposure therapy (flooding). Each of these is described below.

Frequent holding

The parents held their baby more than they had before the surgery.

Protection from overstimulation

The parents protected their son from too many new or overwhelming experiences. Unfortunately, the surgery preceded the holiday season, with many family get-togethers, but the parents took their baby to a quiet room whenever he seemed to become overwhelmed. They also discouraged other people from touching or holding him.

In-arms crying

When Michael cried less than 2 hours after a full feeding (during the day or at night), his parents allowed him to cry as long as he wanted while comforting him in their arms. During these crying sessions he actively moved his arms and legs. Afterwards he became relaxed and content, and usually fell asleep peacefully.

Exposure therapy (flooding)

The parents were concerned about the fact that their baby frequently screamed in terror when they laid him on his back for care taking routines such as diaper changes. After consulting with me, they decided to use a flooding approach, which I explained to them. One week after

the surgery, they felt it was time for a first flooding session, making use of the supine position as a spontaneous somatic trauma trigger. The father reported to me that he did not pick Michael up right away after a diaper change. Instead, he stayed close, touched him lovingly, and spoke to him reassuringly while Michael screamed, frantically flailed his arms, and kicked his legs. After about 20 minutes, he calmed down. His father then picked him up and held him and Michael fell asleep in his father's arms.

After this session, Michael no longer screamed when his parents laid him on his back to change his diaper and his night terrors disappeared. Encouraged by the positive changes in their son's behavior after the first flooding session, the parents decided to continue with the flooding approach. They therefore allowed Michael to have several more intense crying sessions in the supine position. I witnessed and coached two of these sessions, described below, which occurred spontaneously during consultations with me.

On the tenth day after returning home from the hospital, after a diaper change, the parents left him on his back but stayed close. At first he responded joyfully to them, but then he suddenly started to cry, and continued to scream hard for 45 minutes. His father was on one side and his mother on the other, close enough for him to touch their faces. The parents touched him, looked at him lovingly, and spoke gently. They periodically picked him up to cradle him in their arms, and then gently laid him down again. (He continued to cry whether they held him or not.) While lying on his back screaming, he looked alternately at his father and his mother, reaching out his hand to touch their faces. When he turned to look at his father (on his left), he reached out his left arm to touch his father's face, and when he turned to look at his mother (on his right), he reached out his right arm to touch her face. He repeated these head and arm movements every few minutes while crying hard for 45 minutes. He then spontaneously stopped screaming, calmed down, and indicated that he wanted to nurse. His mother nursed him, and he fell asleep and slept calmly for about an hour, after which he awakened bright and alert.

On the seventeenth day after his return home, he had another spontaneous intense crying session on his back with his parents on either side of him, similar to the one that had taken place a week previously. He again looked from one parent to the other and reached out to touch their faces. I encouraged the parents again to pick him up and hold him from time to time (even though he continued to scream while they held him). On one occasion, he stared at the ceiling and seemed disconnected from reality, while screaming in terror. When his parents spoke reassuringly to him and touched him, he reconnected with them visually, looking from one to the other, and began touching their faces again while continuing to scream. After about an hour of continuous screaming, he began to calm down. His father held him and he fell asleep peacefully in his arms. He awakened after about 10 minutes indicating a desire to nurse. His mother nursed him, after which he was alert, cheerful, and responsive.

In between these two sessions, as reported to me by his parents, he had two other similar sessions of terrified screaming on his back, as well as three afterwards, with one or both parents close by. Typically, while still in the supine position after a diaper change, he would suddenly burst into tears for no apparent reason. Thus there were eight sessions in the supine position, each one lasting between 20 and 60 minutes, all of which occurred during the first month after his hospitalization. The sessions were not always followed by immediate sleep. Sometimes he became calm and smiled at his parents after crying (*while still in the supine position*), and at other times he indicated a desire to nurse.

OUTCOME

Michael was evaluated at periodic intervals for one year after the surgery by means of observations and parental reports.

*One-month follow-up (***6 months** *old)*

One month after returning home from the hospital, three of the original six symptoms had completely disappeared. Michael's night terrors had disappeared after the first week, and by the end of the first month he no longer seemed terrified in the supine position, and he had no more crying spells in that position. He had regained his previous delight at being on his back for long periods of time to have his diapers changed, interact with his parents, and reach for objects. In addition, one month after returning home, he regained the ability to roll over from his back to his stomach (although he did not do so as frequently as he had before the surgery). Furthermore, he had acquired the ability to sit without support, and seemed to be developing normally in all other aspects, including normal weight gain.

Three of the original six symptoms remained. He still cried more than before the surgery, he still awakened frequently at night, and he was still afraid of strangers. The parents attributed the continued crying in part to the fact that he had recently started wearing a helmet. The purpose of the helmet was to help his head grow into a normal shape following surgery. He began wearing the helmet about three weeks after coming home from the hospital, and he was required to wear it for 23 hours a day. During his crying spells he would bat at the helmet with his hands and shake his head back and forth as if trying to remove the helmet. They also felt that the continued night awakenings were due partly to discomfort from the helmet and partly to thirst, because the helmet caused him to sweat considerably on his head. The mother therefore continued to nurse him during the night when he seemed to want this, and also to allow him to cry in arms during the night when the crying occurred soon after a feeding and seemed to be caused by frustration or discomfort, rather than by hunger or thirst.

The third symptom that remained, a fear of strangers, became evident when the parents took him to a restaurant with people whom he had never met. He did not interact freely with them, but seemed wary and tense, even though he was being held by one of his parents.

*Two-month follow-up (***7 months** *old)*

Two months after his return home from the hospital, Michael had no remaining symptoms. The amount of crying was similar to what it had been before the surgery, although his pattern of crying was different than it had ever been. He no longer seemed to need to cry every day, and sometimes went for several days at a stretch with very little crying. Although he still awakened a few times in the night, the parents observed that his sleeping had improved and was similar to his pre-surgery sleeping pattern. His motor skills continued to progress normally and he had begun to babble. His fear of strangers had subsided. However, he had begun to show signs of separation anxiety, protesting when his parents left the room and showing delight at their return.

*Three-month follow-up (***8 months** *old)*

At 8 months of age, Michael continued to develop normally. A new behavior was a reappearance of fear of strangers, although milder than the fear that had occurred during the first month following the surgery. When a stranger approached and attempted to interact, Michael would stare soberly and sometimes turn away. He did not appear to be tense or stressed, however, and did not cry at the sight of strangers, as he had done at 5 months of age.

*Four-month follow-up (***9 months** *old)*

At 9 months of age, Michael began to crawl and showed normal cognitive, motor, and social development. He still awakened occasionally at night, although less frequently than before the surgery.

*Seven-month follow-up (***12 months** *Old)*

At 12 months of age, Michael continued to show normal development, and was a delightful, normally active, happy infant. At $12\frac{1}{2}$ months of age he no longer needed to wear the helmet, and he began regularly sleeping through the night at that point. Michael's attachment status to his parents was evaluated informally, and he was found to be securely attached. He used his parents as a "safe base" when in a strange place, showed normal and appropriate separation anxiety, and sought his parents' comfort when he was hurt or frightened.

*One-year follow-up (***17 months** *old)*

At 17 months of age (one year after the surgery), Michael was a bright, cheerful toddler who regularly slept through the night and was developing normally in all respects. His language development was above average, with a vocabulary of several hundred words and the beginning of two-word utterances.

DISCUSSION

Discussion of the symptoms

There is no doubt that Michael was emotionally traumatized by the hospital experience. Following the surgery he had at least one symptom from each of the four categories listed under Traumatic Stress Disorder (TSD) in the diagnostic criteria developed by Zero to Three, commonly known as DC: 0–3 (Zero to Three, 1994). The diagnostic categories and symptoms that fit under them are as follows:

Category 1*d*. Distress at exposure to reminders of the trauma. Two of Michael's symptoms met this criterion: his intense distress in the supine position, and his sudden new fear of strangers.

Category 2*c*. Temporary loss of previously acquired developmental skills. Michael's inability to roll over from his back to his stomach meets this criterion.

Category 3*a*. Night terrors. Michael had night terrors after his return from the hospital.

Category 3*c*. Repeated night waking. Michael woke up much more frequently at night after the surgery than he had before the surgery. This was in addition to his night terrors.

Category 4*i*. Other new symptoms. Michael cried much more after the surgery for no apparent reason, even when he was not in the supine position.

At least one symptom from each category is sufficient for a diagnosis of TSD. Michael's symptoms therefore fit the diagnosis of TSD according to DC: 0–3. As opposed to the diagnostic criteria for PTSD in the DSM-IV, a duration of at least one month of symptoms is *not* a necessary criterion for the diagnosis of TSD in the DC:0–3 classification system. It is also important to note that these symptoms were all present *before* the infant began wearing a helmet, so they cannot be attributed to that additional stressor.

The implication of these symptoms is that surgery followed by a fairly short hospital stay can be emotionally traumatizing to an infant under 6 months of age, even when there is very little separation from the parents. Parents and medical professionals do not necessarily recognize the emotional impact of medical procedures. The parents in this case study were not given any information by the medical personnel about expected changes in their baby's behavior after returning home from the hospital, and they did not know what to expect. It would be useful for pediatric surgeons to warn parents of the possible emotional and behavioral sequelae in their infants following surgery.

As mentioned in the description of this case, during one of the painful hospital procedures in the supine position (attempted catheterization with a catheter that was too big), Michael was observed to switch suddenly from active screaming to passivity, although he was not asleep. The sudden change in behavior could be interpreted according to Perry's model of hyperarousal and dissociation (Perry et al., 1995). Perry has postulated that physiological hyperarousal, with the tendency to scream, flee, or fight, is the primary adult human response to threatening experiences. However, this fight or flight response is not the only response to threat in infants and young children. In cases when crying or resistance would entail further trauma or pain, when the child is too ill to scream or move, or when crying or movement does not bring immediate relief (as in cases of abuse or medical procedures), infants and young children have a tendency to switch from the hyperarousal response to a set of behaviors called the "surrender" response, first becoming immobile and compliant, and eventually entering a state of psychological numbing or dissociation (Perry et al., 1995). These two very different states (hyperarousal and dissociation) are accompanied by measurable physiological and biochemical changes. There is a risk that, in the absence of therapy, these temporary physiological states can become chronic traits, especially if the trauma is repetitive (Perry et al., 1995). There may have been additional instances of dissociation by Michael in the hospital, which were not observed or not recognized as such.

Dissociation is considered a biologically adaptive response because the production of endogenous opioids serves to protect the infant from feeling pain (Perry et al., 1995). However, it has been hypothesized that later psychopathology is more likely to occur when a person enters a physiological state of dissociation during trauma (Schore, 2001). Furthermore, chronic dissociation has been associated with chronic PTSD in adults (Foa & Hearst-Ikeda, 1996). If there is indeed a causal relationship between dissociation and PTSD (or TSD), it would be advantageous to train medical personnel to notice signs of dissociation in infants

during medical procedures, and to stop or modify the painful procedure if possible.

The regression in Michael's motor skills after surgery is not surprising in view of the fact that temporary loss of previously acquired developmental skills is a common symptom of trauma in young children (and is listed as a symptom of TSD in DC:0–3, as mentioned above). His seeming inability to roll over from his back to his stomach after the surgery can be interpreted in the context of behavioral learning theory. Michael was subjected to a variety of painful medical procedures in the supine position from which it was impossible for him to escape. This loss of the ability to roll over after the surgery was similar to a phenomenon observed in animal studies. Animals that have experienced unavoidable shocks no longer make use of the ability to escape when it again becomes possible for them to do so. This phenomenon has been termed "learned helplessness" (Maier & Seligman, 1976). The retrieval of Michael's motor skills after one month would indicate that he had learned that it was once again possible and safe to roll over.

It is interesting that being touched on the head did not seem to be a trauma trigger for Michael, even though the surgery left a long scar on his scalp. During the surgery itself, he was under general anesthesia and presumably did not experience any pain. During his hospital stay, his head was completely bandaged and was not touched by anyone until his bandages were removed on the third day. All of the post-surgical procedures in the hospital involved other parts of his body. The pain from the incision and from any possible headaches was controlled by pain medication. Although being touched on the head did not upset Michael, he strongly resisted having to wear a helmet three weeks after returning home from the hospital. He cried and batted his hands at the helmet during the first few days. The helmet, aside from being uncomfortable, may therefore have played the role of a somatic trauma trigger, reminding Michael of the head bandages worn in the hospital. On the other hand, it is likely that any 6-month-old infant would strongly resist having to wear a helmet.

The need for Michael to wear a helmet both day and night complicated interpretation of two of the post-traumatic symptoms: the night awakenings and the increased crying. Both of these symptoms existed before he began wearing a helmet, but the fact that they persisted longer than some of the other symptoms leads to the hypothesis that the helmet may have contributed to their continuation. The fact that he regularly began to sleep through the night after the helmet was removed (at $12\frac{1}{2}$ months of age) suggests that he might have slept better at a younger age if he had not been wearing a helmet.

The interpretation of the symptoms in this case study is further complicated by two developmental considerations. First, fear of strangers and separation anxiety both normally begin sometime during the second half of the first year (Tennes & Lampl, 1964), but it is unusual for an infant to cry at the sight of a stranger as early as 5 months of age (Etaugh & Rathus, 1995). Michael showed a strong fear of strangers immediately after his hospital experience at 5 months of age. This fear subsided after two months, when he began showing signs of separation anxiety (at 7 months of age). However, a fear of strangers was again apparent, although milder, at 8 months of age. Based on the timing of the appearance of these various fears, the most likely interpretation is that the transient fear of strangers during the first month following surgery was a symptom of trauma, whereas the separation anxiety at 7 months, as well as the milder fear of strangers reappearing at 8 months, probably both represented a normal developmental phase typical of infants during the second half of the first year.

Secondly, the possibility of a growth spurt complicates the interpretation of the night

awakenings following surgery. Michael's increase in night awakenings could have been caused partly by increased hunger. He seemed to want to nurse more frequently, and he also eagerly accepted solid foods, which were offered for the first time after his hospitalization.

In view of these various considerations, it is important to be cautious when interpreting posttraumatic symptoms during infancy. For example, the appearance of separation anxiety and fear of strangers might be an indication of a normal developmental stage rather than a symptom of trauma. Likewise, an increase in night awakenings in a breastfed infant could reflect an infant's growth spurt with a need for more frequent feedings until the mother's milk supply increases to meet the infant's demand. It has been suggested that the DC: 0–3 diagnostic criteria for TSD in infants and young children may need to be refined by incorporating normal developmental changes (Stafford et al., 2003). The results from the present case study support that recommendation.

Discussion of the therapy

A major trauma trigger for Michael was being in the supine position (on his back). Another trauma trigger was the sight of a stranger nearby. The therapy could have been based on exposure to strangers. For example, the parents could have held Michael in their arms while allowing a stranger to approach gradually. However, because of the need to change Michael's diapers and his clothes, the parents felt that helping Michael overcome his resistance to the supine position was an immediate therapeutic goal. Hence, the therapy was based on the trauma trigger of the supine position.

During the month following the surgery, Michael had several spontaneous, intense crying sessions on his back while his parents were close by. The supine position acted as a proprioceptive trauma trigger during these flooding sessions, and each session continued until the emotional arousal was reduced (20–60 minutes). His intense emotional response in that position disappeared after one month of treatment. After the first flooding session on his back (with his father close by), he showed remarkable progress, as he no longer protested being in the supine position for diaper changes after that session. In fact, he wiggled joyfully and interacted normally with his parents during diaper changes, as he had done before the surgery. Furthermore, his night terrors disappeared after that first session. The subsequent sessions occurred spontaneously, usually right after a diaper change.

Two well-documented frames of reference have been postulated to account for the effectiveness of flooding therapy: behaviorist theory and emotional processing theory (Saigh et al., 1996). Behaviorist theory explains the positive outcomes of flooding therapy in terms of the extinction of a conditioned fear response through repeated and prolonged exposure to the anxiety-producing trauma trigger without the expected painful outcome (Jacob & Pelham, 2005). In other words, Michael's fear subsided because he no longer associated the supine position with pain or danger.

Emotional processing theory is an information-processing model that postulates more hidden mental processes than behaviorist theory, namely the existence of a cognitive fear structure, which contains information about stimuli, responses, and their meaning. Emotional processing of fear refers to "the ongoing course of change in a fear structure" during the activation of fear in exposure therapy (Foa & Kozak, 1986). According to emotional processing theory, anxiety must be fully experienced before it can be reduced (Rachman, 1980). There is some evidence that extinction of a fear response during flooding therapy is not

permanent if the patient was taking tranquilizing medication during the therapy. The fear often reemerges when the medication is stopped (Jacob & Pelham, 2005). This finding supports the hypothesis that, at least in adults, a strong emotional response is necessary for flooding therapy to lead to permanent results.

During the flooding sessions, when he was screaming, Michael repeatedly looked from one parent to the other while touching their faces. Emotional processing theory would explain this behavior by hypothesizing that he was reliving the separation times and also the presumably terrifying experience of not being able to see his parents when both of his eyes were swollen shut. He would have felt the need to look at and touch his parents' faces because he was not able to do so during those times in the hospital. This reliving of the trauma with a new response would provide him with new information with which to restructure his memory of the trauma. Behaviorist theory would explain the looking and touching behavior by claiming that Michael simply relearned that he could see his parents and touch their faces while in the supine position. This would have helped to create a new, pleasant association with the supine position while the fear response was being extinguished.

Any theoretical framework would need to explain the fact that Michael's fear of strangers disappeared without any specific treatment for it. A possible interpretation for the disappearance of this fear is that gradual desensitization to strangers occurred naturally as a result of being exposed to new people in everyday life. However, if the flooding treatment was a crucial factor in helping Michael overcome his fear of strangers, behaviorist theory would not readily predict such a generalization. According to behaviorist theory, each fear would need to be treated separately (either by desensitization or flooding).

On the other hand, emotional processing theory more easily accounts for the disappearance of all symptoms related to the hospital experience, even those not directly addressed during therapy. This generalization can be explained if one assumes the existence of a cognitive fear structure consisting of the entire hospital experience. However, one could also hypothesize the existence of smaller, specific cognitive fear structures, each of which would require its own independent processing and restructuring. In this interpretation, emotional processing theory, like behaviorist theory, would not predict a generalization of the results to other fears.

These two theories both offer plausible, but different, explanations for the results in this case study. However, these theories are not mutually exclusive, and together they provide a more complete explanation of flooding than does either theory alone.

An alternative interpretation of the results from this case study is that Michael would have recovered spontaneously without any therapeutic intervention at all. The simple passage of time may have been sufficient to help him overcome his fears and other symptoms.

If the therapeutic intervention did play a role in Michael's healing, emotional release theory offers a third possible interpretation for the success of the therapy. This case study is strikingly similar to certain forms of therapy for adults in which emotional release (crying) is considered to have therapeutic value because it presumably allows people to release blocked emotions (Jenson, 1995; Janov, 1996; Berger, 2000). (See Jackson, 1994, for a historical review of these therapies.)

A key question is whether crying is necessary for flooding therapy to be successful with infants. In this case study, as in the three studies of the use of flooding with preverbal infants discussed in the introduction, the treatment sessions were characterized by intense crying (Emerson, 1989; Gaensbauer & Siegel, 1995; Benoit & Coolbear, 1998). Neither behaviorist

theory nor emotional processing theory specifically mentions crying as a necessary component of flooding therapy. In behaviorist theory, crying is an outward indication that the infant was experiencing intense emotional arousal (which was eventually extinguished). However, the crying itself is considered an incidental side effect rather than an essential feature of the treatment. Emotional processing theory postulates a more central, therapeutic value of re-experiencing painful emotions, as measured by increased heart rate and other physiological indices. However, the theory does not emphasize the therapeutic value of crying per se. In many studies of flooding therapy with children and adults, the authors do not indicate whether "emotional arousal" included actual crying or not, so it is difficult to draw conclusions from these studies about the role of crying.

Several authors have theorized that crying during infancy can serve the purpose of releasing tensions resulting from stress, trauma, or over-stimulation. For example, Brazelton considers crying spells to be an important way for infants to "blow off steam" because of information overload to their immature nervous system (Brazelton, 1992). In Solter's model of healing, crying is considered to be a healthy release of tension resulting, not only from daily over-stimulation, but also from past trauma, including birth trauma (Solter, 1995, 1998, 2001).

If emotional release (crying) during flooding therapy in infants is necessary for the therapy to be successful, it can be understood in the context of Perry's theory of hyperarousal and dissociation, discussed previously (Perry et al., 1995). Crying is the natural response to pain and terror in infants, and it is possible that Michael would have cried more in the hospital if he had been able to do so. Michael's intense crying during the therapy can be considered a natural completion of the hyperarousal process that was prevented from occurring in the hospital.

Several factors may have prevented Michael from crying in the hospital. One factor may have been the endogenous opioids produced during dissociation, which have an analgesic and calming effect. As stated previously, he was observed to become suddenly calm and to stop crying during a difficult medical procedure, and it is possible that there may have been other instances of dissociation. Additional factors preventing him from crying freely may have been exhaustion and throat pain. He was quite weak from blood loss and lack of nourishment following the surgery, and his throat may have been painful from the tube used during surgery. In addition to these various factors, the use of analgesic medication (morphine) may have further diminished the spontaneous vocalizations and movements of the hyperarousal response. Morphine is chemically similar to the endogenous opioids.

According to emotional release theory, the opportunity to "relive" the trauma, and respond to it as an infant would normally respond (by crying and screaming), is necessary for healing to occur. This interpretation of crying would predict that Michael would not have healed completely or permanently without some crying, either in the supine position or at other times (perhaps following nightmares or exposure to strangers).

Emotional release theory provides an explanation, not only for the crying that occurred during the flooding treatments, but also for the crying spells that occurred at other times. In addition to the flooding sessions in the supine position, Michael had many crying spells after coming home from the hospital. During the day he would become increasingly agitated and nothing seemed to satisfy him. At night he would awaken and cry. His parents responded to these emotional outbursts by comforting him in their arms while allowing the crying to run its course. This crying could have indicated a form of spontaneous flooding during which a

sensory cue or a nightmare triggered a memory of the hospital trauma. Emotional release theory would explain these crying spells as efforts to "catch up" on the crying that he was unable to do in the hospital.

If crying was not necessary for healing to occur, it is possible that a systematic desensitization approach (based on the principle of counterconditioning) would have been a viable alternative approach for helping Michael recover from his fears. Using a gradual exposure approach, the parents could have placed him in the supine position for short periods of time while attempting to establish pleasant associations in that position and keeping his distress at a minimum. For example, the mother could have tried to nurse him while he was in the supine position. (He did not yet drink from a bottle.) Gradually, he may have become desensitized to that particular trauma trigger, although the process may have taken longer than the flooding therapy that was actually used. However, if crying *was* necessary for healing to occur, such a desensitization approach would not have led to complete or permanent recovery.

The fact that desensitization (without crying) has proven to be successful with infants in other case studies leads to the conclusion that crying is not always a necessary prerequisite for healing during infancy. A possible hypothesis is that crying is necessary for complete healing to occur in cases where an infant was not able to cry sufficiently during the original trauma because of dissociation, throat pain, fatigue, analgesic medication, or other factors. Emotional release theory, with its emphasis on the therapeutic value of crying, merits further investigation.

Cautionary guidelines

Parents and therapists who use intense exposure therapy (flooding) with infants should be careful to distinguish therapeutic interventions from those that are potentially re-traumatizing to the infant. As mentioned in the description of the therapy, during one of the flooding sessions that I witnessed and coached, Michael momentarily seemed to "disconnect" emotionally from his parents. He stopped looking at them and touching them, while screaming in terror. It is possible that the situation was no longer therapeutic at that moment, but had instead become re-traumatizing. When the parents helped their infant reconnect with them and feel safe, he soon began to look at, and touch, them again (although he continued to cry).

To avoid re-traumatizing an infant, it is of paramount importance to ensure the infant's sense of emotional safety and trust. I propose the following six guidelines.

1. Use flooding only for cases in which the trauma is very specific and relatively minor. In cases of more severe or long-lasting trauma, a gradual desensitization approach is recommended in order to avoid the risk of re-traumatization.
2. Obtain medical advice before implementing flooding therapy with infants who have a heart condition, breathing problem, or other condition making it dangerous for them to cry hard.
3. Never subject a traumatized infant to anything that an un-traumatized infant of the same age would resist (such as forcing the infant into strangers' arms). All interventions should be loving and gentle. Spontaneous trauma triggers in the context of care taking routines are likely to be more beneficial than artificially contrived interventions. With spontaneous trauma triggers, the parent/therapist role becomes one of facilitating a natural process. (However, gentle therapist-initiated reenactments may be needed for

infants who persist in avoiding trauma reminders while continuing to show symptoms of trauma.)

4 Use the *minimum* amount of stimulation needed to trigger an emotional response while ensuring that the therapeutic situation is *different* enough from the original trauma so the infant can form a new memory while the fear response is being extinguished. For example, being confined in a hospital-type infant bed may be too similar to a hospital trauma and may therefore be re-traumatizing. On the other hand, being placed in the supine position on the floor with plenty of surrounding space and with parents close by may provide the necessary therapeutic balance between the trauma trigger and a sense of safety.

5 Implement all interventions with at least one parent present who maintains visual and physical contact with the infant. (An exception to this would be if the parent is the source of the trauma, as in cases of abuse.) Monitor the infant's reactions carefully, and be sure that the infant is actively connecting with the parent, both visually and physically.

6 When the parents themselves have also been traumatized, they may need individual therapy before being able to facilitate their infant's healing process. It would be difficult for parents to accept calmly their infant's screaming when they themselves may need to cry or express anger, guilt, or fear. Likewise, it would be difficult for infants to feel safe with parents who are harboring strong, pent-up emotions.

SUMMARY AND CONCLUSION

This case study describes the successful use of intense exposure therapy (flooding) in a 5 -month-old infant suffering from Traumatic Stress Disorder caused by surgery and hospitalization. A major component of the therapy was the fact that the parents refrained from "rescuing" their infant from the supine position, but instead stayed close and allowed him on several occasions to have an intense emotional reaction in that position, accompanied by crying and screaming. They knew that he was physically able to roll over from his back to his stomach, although he did not do so.

Several possible explanations account for the infant's recovery, including behaviorist theory, emotional processing theory, and emotional release theory. As in all case studies, an alternative explanation is that the mere passage of time would have been sufficient for the infant to heal from the trauma. The only definite conclusion that can be drawn from this study is that the use of flooding therapy did not appear to be harmful for the infant, and was possibly helpful. The judicious use of flooding for posttraumatic symptoms in infants merits further study, and the role of crying needs clarification.

Because of the promise of quick and permanent results, I recommend the use of flooding therapy for infants with posttraumatic symptoms that could lead to serious health problems if left untreated (such as a refusal to eat or sleep). However, parents and therapists should be careful not to retraumatize infants during intense exposure therapy. In cases of severe or long-lasting trauma, or with infants suffering from additional emotional or health problems, a gentler desensitization approach would be recommended because of a lower risk of retraumatization. With multiple treatments each day, a desensitization approach would have the potential to yield rapid improvements in symptom reduction, and might therefore be just as

effective as flooding. An additional recommendation is that all exposure treatments should be supplemented with medical and social interventions, if necessary, with the goal of creating safety and physical well being for traumatized infants.

REFERENCES

Benoit, D., & Coolbear, J. (1998). Post-traumatic feeding disorders in infancy: Behaviors predicting treatment outcome. Infant Mental Health Journal, 19, 409–421.

Berger, J. (2000). Emotional Fitness. Toronto: Prentice-Hall.

Brazelton, T.B. (1992). Touchpoints. New York: Perseus.

Chatoor, I. (1991). Eating and nutritional disorders of infancy and early childhood. In J. Wiener (Ed.), Textbook of child and adolescent psychiatry (pp. 351–361). Washington, DC: Academy of Child and Adolescent Psychiatry Press.

Drell, M.J., Siegel, C.H., & Gaensbauer, T.J. (1993). Post-traumatic stress disorder. In C.H. Zeanah (Ed.), Handbook of Infant Mental Health (pp. 291–304). New York: Guildford Press.

Emerson, W.R. (1989). Psychotherapy with infants and children. Pre- and Perinatal Psychology Journal, 3, 190–217.

Etaugh, C., & Rathus, S.A. (1995). The World of Children. New York: Holt, Rinehart & Winston.

Foa, E.B., & Hearst-Ikeda, D. (1996). Emotional dissociation in response to trauma: An information processing approach. In L.K. Michelson & W.J. Ray (Eds.), Handbook of dissociation: Theoretical, empirical, and clinical perspectives (pp. 207–224). New York: Plenum.

Foa, E.B., & Kozak, M.J. (1986). Emotional processing of fear: Exposure to corrective information. Psychological Bulletin, 99, 20–35.

Gaensbauer, T.J. (1995). Trauma in the preverbal period. Symptoms, memories, and developmental impact. Psychoanalytic Study of the Child, 50, 122–149.

Gaensbauer, T.J., & Siegel, C.H. (1995). Therapeutic approaches to posttraumatic stress disorder in infants and toddlers. Infant Mental Health Journal, 16(4), 292–305.

Jackson, S.W. (1994). Catharsis and abreaction in the history of psychological healing. Psychiatric Clinics of North America, 17(3), 471–491.

Jacob, R.G., & Pelham, W.E. (2005). Behavior Therapy. In B.J. Sadock & V.A. Sadock (Eds.), Comprehensive Textbook of Psychiatry (8th ed., pp. 2498–2548). Philadelphia: Lippincott, Williams and Wilkins.

Janov, A. (1996). Why You Get Sick and How You Get Well: The Healing Power of Feelings. West Hollywood, California: Done Books.

Jenson, J.C. (1995). Reclaiming Your Life: A Step-by-Step Guide to Using Regression Therapy to Overcome the Effects of Childhood Abuse. New York: Dutton.

Keren, M., & Tyano, S. (2000). A case-study of PTSD in infancy: Diagnostic, neurophysiological, developmental and therapeutic aspects. The Israel Journal of Psychiatry and Related Sciences., 37(3), 236–246.

Koomen, H.M., & Hoeksma, J.B. (1993). Early hospitalization and disturbances of infant behavior and the mother infant relationship. Journal of Child Psychology and Psychiatry and Allied Disciplines, 34(6), 917–934.

Levy, D.M. (1945). Psychic trauma of operations in children. American Journal of Diseases of Children, 69, 7–25.

Lewis, M., & Ramsay, D.S. (1995). Developmental change in infants' responses to stress. Child Development, 66, 657–670.

Littrell, J. (1998). Is the reexperiencing of painful emotion therapeutic? Clinical Psychology Review, 18, 71–102.

Maier, S.F., & Seligman, M.E. P. (1976). Learned helplessness: Theory and evidence. Journal of Experimental Psychology, 105, 3–46.

Newburger, J.W., Wypij, D., Bellinger, D.C., du Plessis, A.J., Kuban, K.C., Rappaport, L.A., Almirall, D., Wessel, D.L., Jonas, R.A., & Wernovsky, G. (2003). Length of stay after infant heart surgery is related to cognitive outcome at age 8 years. Journal of Pediatrics, 143, 67–73.

Noll, R.B., & Kulkarni, R. (1989). Cognitive and motor development of infants coping with cancer: Longitudinal observations. Infant Mental Health Journal, 10, 252–262.

Perry, B.D., Pollard, R., Blakely, T., Baker, W., & Vigilante, D. (1995). Childhood trauma, the neurobiology of adaptation and 'use-dependent' development of the brain: How "states" become "traits." Infant Mental Health Journal, 16, 271–291.

Piaget, J. (1962). Play, Dreams and Imitation in Childhood. New York: W. W. Norton.

Pynoos, R.S. (1990). Post-traumatic stress disorder in children and adolescents. In B. Garfinkel, G. Carlson, & E. Weller (Eds.), Psychiatric disorders in children and adolescents (pp. 48–63). New York: Academic Press.

Rachman, S.J. (1980). Emotional processing. Behavior Research and Therapy, 18, 51–60.

Rosendahl, W., Schulz, U., Teufel, T., Irtel von Brenndorf, C., & Gupta, D. (1995). Surgical stress and neuroendocrine responses in infants and children. Journal of Pediatric Endocrinology and Metabolism, 8, 187–194.

Roy, C.A., & Russell, R.C. (2000). Case study: Possible traumatic stress disorder in an infant with cancer. Journal of the American Academy of Child and Adolescent Psychiatry, 39(2), 257–260.

Saigh, P.A. (1986). In vitro flooding in the treatment of a 6-yr-old boy's posttraumatic stress disorder. Behavior Research and Therapy, 24, 685–688.

Saigh, P.A., Yule, W., & Inamdar, S.C. (1996). Imaginal flooding of traumatized children and adolescents. Journal of School Psychology, 34, 163–183.

Saul, D.L. (2002). Behavioral and academic difficulties in children with hospitalizations. Dissertation Abstracts International: A. The Humanities and Social Sciences, 62(9-A).

Schaffer, H.R., & Callender, W.M. (1959). Psychological effects of hospitalization in infancy. Pediatrics, 24, 528–539.

Scheeringa, M.S., & Gaensbauer, T.J. (2000). Posttraumatic stress disorder. In C.H. Zeanah, Jr. (Ed.), Handbook of infant mental health (2nd ed.) (pp. 369–381). New York: Guilford Press.

Scheeringa, M.S., Zeanah, C.H., Drell, M.J., & Larrieu, J.A. (1995). Two Approaches to the Diagnosis of Posttraumatic Stress Disorder in Infancy and Early Childhood. Journal of the American Academy of Child & Adolescent Psychiatry, 34, 191–200.

Schore, A.N. (2001). The effects of early relational trauma on right brain development, affect regulation, and infant mental health. Infant Mental Health Journal, Vol. 22, 201–269.

Scott, J.R., Morris, T.L., Ruggiero, K.J., & Wolfgang, J. (2002). Posttraumatic stress disorder. In M. Hersen (Ed.), Clinical Behavior Therapy: Adults and children (pp. 361–382). New York: John Wiley and Sons, Inc.

Solter, A. (1995). Why do babies cry?" Pre- and Perinatal Psychology Journal, 10(1), 21–43.

Solter, A. (1998). Tears and tantrums: What to do when babies and children cry. Goleta, CA: Shining Star Press.

Solter, A. (2001). The Aware Baby (Rev. ed.). Goleta, CA: Shining Star Press.

Stafford, B., Zeanah, C.H., & Scheeringa, M. (2003). Exploring psychopathology in early childhood: PTSD and attachment disorders in DC:0–3 and DSM-IV. Infant Mental Health Journal, 24, 398–409.

Taddio, A., Katz, J., Hersich, A.L., & Koren, G. (1997). Effect of neonatal circumcision on pain response during subsequent routine vaccination. Lancet, 1:349(9052), 599–603.

Tennes, K.H., & Lampl, E.E. (1964). Stranger and separation anxiety in infancy. Journal of Nervous and Mental Diseases, 139, 247–254.

Zero to Three: National Center for Infants, Toddlers and Families (1994). Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood. Washington, DC: Zero to Three.

Zoellner, L.A., Foa, E.B., & Fitzgibbons, L.A. (2002). Cognitive-behavioral treatment of PTSD. In M.B. Williams & J.F. Sommer, Jr. (Eds.), Simple and Complex Post-Traumatic Stress Disorder: Strategies for Comprehensive Treatment in Clinical Practice (pp. 75–98). Binghamton, NY: Haworth Maltreatment and Trauma Press/The Haworth Press, Inc.