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Pediatric Amputations: PTSD, Behavioral Tendencies and Quality of Life

Adriana Macias Chamorro

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LOMA LINDA UNIVERSITY
Graduate School

Pediatric Amputations: PTSD, Behavioral Tendencies and Quality of Life

by

Adriana Macias Chamorro

A Thesis submitted in partial satisfaction of
the requirements for the degree of
Master of Arts in Psychology

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Each person whose signature appears below certifies that this thesis in his/her opinion is adequate, in scope and quality, as a thesis for the degree of Master of Arts.

Janet L Sonne, Chairperson

Janet L. Sonne, Professor of Psychology

Kelly R Morton

Kelly R. Morton, Professor of Psychology

Joanne Shida, OTR/L

Joanne Shida, Registered Occupational Therapist

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ABSTRACT OF THE THESIS

Pediatric Amputations: PTSD, Behavioral Tendencies and Quality of Life

by

Adriana Macias Chamorro

Master of Arts, Graduate Program in Psychology
Loma Linda University, June 2004
Dr. Janet L. Sonne, Chairperson

The present study examined children and adolescents between 11-18 years of age who had experienced traumatic amputations due to an acute physical injury (burns, severing, and crushing accidents). In order to account for variance which may have impacted the results of the study, evaluations were conducted between a group of children/adolescents with amputations and a comparison group of children/adolescents who had been hospitalized due to a non-head injury, non-death motor vehicle accident. The goal of this study was to assess symptoms of PTSD, provide a description of the internalized and externalized behaviors, and examine the quality of life (QOL)(health habits, school work, physical fitness, social support, emotional feelings, and family communications) expressed by children/adolescents who had experienced an amputation. Findings indicated a significant difference in PTSD symptomatology between groups. While no differences were found between groups in regard to internalizing and externalizing behavioral tendencies and QOL, an interaction between group and gender was evident for externalizing behaviors and QOL. Female amputees reported higher levels of externalized behavioral tendencies and lower levels of QOL in comparison to their male counterparts. An inverse relationship between symptoms of PTSD and QOL

was also demonstrated. In addition, lack of social support and family communication was found to be related to symptoms of PTSD for the amputee sample.

While the generalizability of these results is limited due to the small sample size, findings are of significant clinical importance. Results indicated that a substantial number of children/adolescents who experience the loss of a limb due to an acute physical injury experience unrecognized psychological distress. Although those who had experienced an amputation did not meet a clinically significant elevation, the group mean placed their scores in the mild category of PTSD. As a whole, the comparison group mean for PTSD placed their group mean score in the doubtful category of symptomatology indicating that the reported symptoms of PTSD for the amputees were above and beyond the traumatizing experience of hospitalization and of an accident for this sample.

Introduction

Each year thousands of children are admitted to medical treatment for a range of acute medical injuries (Aaron, Zaglul, & Emery, 1999). Such injuries involve the threat of serious damage and can evoke feelings of intense fear, helplessness or horror, thus fulfilling the definition of a traumatic stressor according to the DSM-IV (1994). Numerous studies have reported psychiatric symptoms including post-traumatic stress disorder (PTSD) in adults who have been physically injured (Blanchard, Hickling, Vollmer, Loos, Buckley, & Jaccard, 1995), but literature regarding the effects of acute injuries and psychological trauma in children is limited. "Children are certainly not immune to the pathogenic impact of traumatic events, although, curiously, they have until recently received scant attention in the published reports of these many syndromes" (Eth, 1990 p. 263).

A medical condition that has been considered a traumatic experience is that of an amputation (Fitzpatrick, 1999; Frierson & Lippmann, 1987). However, research that examines the psychological effects on an individual experiencing the loss of a limb is minimal with adult populations (Mardi & Horowitz, 1982; Viemero & Krause, 1991) and almost non-existent in youth (Varni & Setoguchi, 1992). It is important to understand whether children and adolescents experience the same type of psychological distress that is reported in the adult literature. "Amputation is perhaps the earliest of all major surgical procedures performed routinely. Never the less, psychological or psychiatric aspects of amputation are understudied;" it is important to understand that "an amputation will impact each patient's future and life adjustment" (Fitzpatrick, 1999, p. 98).

Accurate identification of psychological problems can guide the creation of intervention programs to prevent further psychosocial morbidity. Costello and Pantino (1987) summarized the importance of accurately identifying children's psychosocial and psychological problems:

> "It could be argued that many of these problems are transitory and that the child will 'grow out of it', given a course of benign neglect. Such data as exist show that, although there is no evidence that a given disorder in childhood predicts the same disorder in adulthood, disturbed children are much more likely to become disturbed adults than are non-disturbed children. In any case, children's problems demand to be treated for their own sake, irrespective of their long term implications, if they cause the child suffering" (p. 289).

The purpose of this study was to learn more about the psychological and behavioral symptoms of children/adolescents between 11-18 years of age who had experienced the loss of a limb due to an acute physical injury. The goal of this study was to provide information that will lead to better care of individuals who experience similar injuries and subsequent surgery. Those children who had congenital limb deficiencies or had lost a limb due to illness were excluded. Although the participants varied in the type of amputation (upper or lower), the amount of time since their accident, and the age at the time of the incident, the group was analyzed as a whole. In order to account for variance which may have impacted the results of the study, comparisons were made between the group of children/adolescents with amputations and a comparison group of children/adolescents who had been hospitalized due to a non-head injury, non-death motor vehicle accident. This study explored whether children/adolescents who had experienced an amputation suffer from symptoms of PTSD. Behavioral tendencies and the child's/adolescent's perspective on quality of life was also examined.

In an attempt to better understand the proposed relationship, a brief review of the clinical definition, criteria, and etiology of post-traumatic stress disorder will be reviewed. Due to the limited literature which examines pediatric amputees, a brief overview of non-specific pediatric trauma will be presented. This section will discuss the possible psychological and behavioral effects that can occur due to the experience of a traumatic injury. Literature regarding the possible relationship between PTSD symptomatology and a lower level of quality of life will be presented with studies that have examined adults, due to the lack of pediatric research in quality of life and traumatology.

Historical View of PTSD Diagnostic Criteria

Historically, the symptomatology of post-traumatic stress disorder has been described in well-known works of literature such as Homer's *Iliad*, Cicero's *Letters to His Friends* and the *Epic of Gilgamesh* and Shakespeare's *Henry IV* (Trimble, 1981). The symptomatology which was presented at that time is compatible with the current diagnostic criteria for a diagnosis of PTSD. Labels to describe numbing, hyperarousal, intrusive imagery, and nightmares have developed over time. In layman's terms it was referred to as soldier's heart, Da Costa's syndrome, battle fatigue, combat neurosis and shell shock. The expression of symptomatology was also considered by some to be fabricated and the term compensatory neurosis was also utilized (Burges-Watson, 1988). These labels were revised when the symptoms entered psychiatric nomenclature with the development of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) in 1952. A category to describe responses to traumatic events was referred to as "Gross Stress Reaction". After careful consideration of the etiology, the DSM II (1968) eliminated a specific diagnosis and renamed it "Transient Situational Disturbance". Twelve years later, the development of the DSM III (1980) allowed for additional revisions to be made. In 1980 the American Psychiatric Association (APA) delineated post-traumatic stress disorder (PTSD) as a specific clinical syndrome under the category of anxiety disorders. Revisions in the creation of the DSM-IIIR (1987) and the DSM IV (1994) have restructured the definition and criteria of the disorder.

The current definition describes PTSD as "the development of characteristic symptoms following exposure to an extreme traumatic stressor that arouses intense negative emotions in the person involved" (DSM IV, 1994, p. 424). This definition is accompanied by the following six criteria, all of which must be experienced by the individual to meet the diagnosis: a) Have experienced at least one trauma or life-threatening event that had the potential for bodily harm and that the individual responded to with fear, helplessness, or horror; b) Continue to relive the trauma in the form of what are called re-experiencing phenomena, which include nightmares, flashbacks, and intrusive thoughts about the traumatic event; c) Evidence a persistent avoidance of situations reminiscent of the traumatic event and a numbing of emotions (which alternates with criterion D); d) Evidence persistent symptoms of physiological hyperarousal: startle response, irritability, difficulty falling asleep, hyperalertness, and other symptoms (alternates with criterion C); e) Criteria B, C, and D, must persist for at least one month after the traumatic event; f) The traumatic event caused clinically significant distress or dysfunction in the individual's social, occupational, and family functioning or in other important areas of functioning.

This definition includes three distinctive clusters of symptoms: re-experiencing the trauma, avoidance of stimuli associated with the trauma, and increased arousal. There are also three types of PTSD: 1) acute – symptoms last for less than three months, 2) chronic – symptoms last for more than three months, and 3) delayed – onset of symptoms occurs six months after the event. Currently, the lifetime prevalence for this disorder is approximately 10.4% for women and 5.0% for men; the DSM-IV does not provide separate prevalence rates for children and adolescents (DSM-IV, 1994).

Criteria for PTSD

The definition of post-traumatic stress disorder presented in the DSM-IV (1994) is based on a person/environment interaction model; both an extreme situation and a symptom laden response to the situation are required for an individual to be considered traumatized (Lyons, 1987). Controversy as to which elements constitute a traumatic event occurs throughout much of the literature. The DSM-III stipulated that in order for an experience to qualify as a traumatic event, the identified stressor must be outside the range of such common experiences as simple bereavement and chronic illness (Lyons, 1987). Terr (1985) states that the experience should be considered "surprising, unanticipated and piercingly intense and must be real, not imagined" (Lyons, 1987, p. 350). This criteria has been revised and according to the DSM-IV, an individual can meet criteria for PTSD if he/she has been exposed to a traumatic event in which both of the following components were present: 1) "The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others; and, 2) the person's response involved intense, helplessness or horror. In children this may be expressed instead by disorganized or agitated behavior" (1994, p. 427-428). In addition to these two criteria, the individual must experience these symptoms for a period of one month.

The hallmarks of PTSD are the core symptoms of re-experiencing the trauma, psychic numbing, and increased arousal. The traumatic event can be re-experienced in several different ways. The adolescent can experience recurrent, intrusive and markedly dysphoric memories and dreams of the trauma. Psychic numbing refers to a group of related symptoms that may range from psychogenic amnesia (inability to remember an important feature of the trauma) to a pervasive erosion of interest in life (Eth, 1990). The final cluster of symptoms are the indicators of pathologic psychophysiologic arousal. "Irritability, hypervigilance, exaggerated startle reactions, and poor concentration are readily observable and contribute to the visual appearance of nervousness" (p. 264).

There is uncertainty as to whether there exists a typical outcome due to the nature of the stressor and the possible ranges of adaptation. Breslau, Davis, Andreski, and Peterson (1991) suggest that the type of experience may have an impact on the course of the disorder. Research (Norris, 1992) has indicated that somewhat surprisingly, brief and circumscribed traumas such as accidents may have more enduring effects than combat, but the small number of documented cases and the range of traumas that were examined limit the generalizability of the findings.

Moderators of PTSD Outcome

Previous research on the psychological adjustment of children (Koocher, 1973; Koocher, O'Malley, Gogan, & Foster, 1980) and the literature regarding PTSD (Fitzpatrick, 1999; Lyons, 1987) has indicated that it is important to consider the impact of abstract reasoning on an individual's ability to participate in research and report psychological symptoms. According to Koocher and associates (1980) it is important to consider an individual's level of intellectual functioning because of the role it plays in overall psychosocial adjustment, and because some of the study instruments assume a basic level of verbal ability. Research conducted with pediatric cancer survivors (Koocher et. al., 1980) reported that although conclusive statements cannot be made regarding the impact of I.Q. on a child's psychosocial adjustment, findings indicate that cognitive development generally enhances an individual's capacity to cope.

It is variables such as abstract reasoning and a variety of other psychosocial factors that challenge the conceptual origins of PTSD as a syndrome that occurs in normal individuals as a direct result of exposure to trauma (McFarlane & Yehuda, 1996). The argument against existence of specific post-traumatic symptoms hypothesizes that in the absence of vulnerability, individuals who are exposed to traumatic events should not develop the disorder. Although, in general, vulnerability factors are neither necessary nor sufficient to explain the onset of a disorder or helpful in predicting its course; they do place an individual at risk for negative outcomes. The counter argument is presented by the proponents of the original conceptualization of PTSD as a condition that occurs as a direct result of a traumatic event. This perspective indicates that the prevalence of PTSD is impacted by the individual differences in resiliency. The resilience factors minimize the intensity of an individual's acute distress or allow for more rapid modulation of an abnormal reaction.

McFarlane and Yehuda (1996) discuss the evidence for vulnerability and resiliency by presenting factors, other than the nature of exposure to trauma, which contribute to the development of PTSD. The authors developed a conceptual model (see

Appendix A) that presents the longitudinal course of PTSD as a process that is composed of a series of stages. According to McFarlane and Yehuda (1996) a person's reaction and behavior during a disaster and their prior experience of trauma will impact their ability to adapt to the traumatic experience. The proposed conceptual model presents etiological factors that influence the transition from distress to disorder following a traumatic event. The model indicates that PTSD does not develop in the immediate aftermath of a traumatic event. Rather, this disorder emerges out of the pattern of acute distress triggered by the event (Norris, 1992). The typical pattern after experiencing trauma is the resolution of symptoms. Although it is difficult to estimate prevalence due to the variety of possible traumas, Kessler, Sonnega, Bronet, and Nelson (1996) state that only a minority of victims will develop PTSD and with the passage of time, the symptoms in approximately two-thirds of the cases will resolve.

Psychological effects. Researchers (Van der Kolk, 1988; Zimrin, 1986) agree that children react to stress in one of two ways after trauma: hyperresponsive mode with unmodulated anxiety and hyperreactivity or hyporesponsive mode and withdrawal, both socially and emotionally. While some children are more likely to express anger, rage, and irritability (Pynoos & Nader, 1988), others display an emotionally labile capacity to modulate feelings (Nucombe, 1986; Van der Kolk, 1988). "PTSD symptoms may be expected to affect the cognitive, affective, behavioral and physical functioning of the traumatized child; these symptoms often interfere with social, physical and intellectual development and adjustment" (Haviland, Sonne, & Woods, 1995, p. 1058).

Varni and Setoguchi (1992) conducted a study with the parents of 111 children and adolescents with congenital and acquired limb deficiencies. These children, who attended pediatric primary care clinics were 7-11 years of age. The parents completed The Child Behavior Checklist (CBCL) (Achenbach, 1985) in order to facilitate the identification of emotional and social problems. This study supported previous findings in that greater emotional difficulties and lower social competence were found in comparison to the normative community sample. Twenty-three percent of those children with limb deficiencies were reported to be functioning in the clinically significant range for behavioral and emotional problems; fourteen percent were considered socially maladjusted, indicating that they experienced behavioral or emotional problems according to study protocol. The prevalence of behavioral and emotional problems among children in pediatric care was estimated at 16% and the overall prevalence estimates of moderate to severe disorders from epidemiological studies range from 14% - 20%.

Ninety-five percent of the children who were classified as "maladjusted" were given a detailed standardized assessment interview. Based on this assessment, 11.8% of those children were diagnosed with behavioral or emotional difficulties. In contrast, pediatricians diagnosed behavioral and emotional problems in only 5.6% of these children. The pediatrician's clinical assessment was highly specific in that 84% of children assessed as not maladjusted had no psychological disorders; however, these assessments showed low sensitivity in that only 17% of the children with behavioral or emotional problems were identified. Eighty-three percent of the cases were incorrectly diagnosed (Varni & Setoguchi, 1992). According to Varni and Setoguchi (1992), limited training in behavioral pediatrics during residency and the difficulty of assessing psychological maladjustment during a brief office visit (estimated at 10.7 minutes) are factors in the under-identification of behavioral and emotional problems in these children and adolescents.

While symptoms might not be evident in some children/adolescents, traumatized children/adolescents have also been known to express a heightened sense of vulnerability and sensitivity to environmental threats. Some children tend to re-experience the events emotionally, from reminders, intrusive thoughts, and images of the event (Rosenheck & Nathan, 1985). Holaday and associates (1992) found that traumatized children and adolescents have lower tolerance for stress and may subjectively feel overwhelmed by general life events. Studies conducted by Tong, Oates, and Mc Dowell (1987) documented alterations in self-perception among traumatized adolescents. These feelings include low self-esteem, poor self-concept, and negative body image. Doyle and Bauer (1988) have reported that victims of trauma may become extremely critical of themselves, judging themselves to be worthless and deserving of their fate. However, it is important to note that the literature which reports psychological and emotional tendencies of children with PTSD does not typically make a distinction regarding the type of traumatic incident that has been experienced. Findings (Armsworth & Holaday, 1993; Armsworth, Swank, & Vincent, 1992; Pynoos & Nader, 1988; Van der Kolk, 1988) regarding the emotional and behavioral outcomes for traumatized children and children with PTSD symptomatology vary throughout the literature. The variability of trauma events compromises the generalizability of findings.

Behavioral effects. Wesson, Williams and Spence (1989) examined children who were admitted to a hospital for treatment of blunt injuries and reported that approximately 54% of the sample had persistent physical functioning limitations six months after discharge. Harris (1989) reported that 75% of injured children had either a cognitive or physical impairment, one year after the incident. Although these findings suggest a significant degree of delayed onset morbidity, the results were criticized by Wesson, Scorpio, Spence, Kenney, Chipman, Netley, and Hu (1992) for the lack of control of unexpected illness or hospitalization. It is also important to note that although these studies differentiated the groups according to type of injury (major, minor, or head trauma), the authors did not mention the possible inclusion of children who had experienced physical and/or sexual abuse.

In an attempt to refine this study design and to incorporate objective data on behavior, school performance and the effects of family members, Wesson and associates (1992) more clearly defined the physical, psychological and social costs of severe injuries to children and their immediate families. This study was conducted in a regional pediatric center in Toronto; trauma patients (ages 5-16 years at admission) were included if they had experienced a single life-threatening injury (according to the criteria of the Abbreviated Injury Scale – major, minor, or head trauma). The control group was composed of individuals in the same age range who had undergone an appendectomy for acute appendicitis within 24 hours of admission. Those children who reported psychiatric disorders or child abuse or if their mothers were unable to speak, read and write English were not included. The sample was composed of 92 trauma patients and 59 controls. Demographic data showed no significant differences between the groups regarding the following variables: parent's marital status, mother's age, father's age, number of siblings, or parental employment status. However, the parents of the trauma patients reported having less formal education than the parents of the control group. The findings indicated that both major and minor trauma groups exhibited a higher proportion of behavior problems at the six-month and one year follow-up. Behavioral disturbances among major trauma patients showed a sharp rise to 41% at 12 months and tended to persist in cases with continuing physical limitations. Although the differences were not statistically significant, examinations of the group means indicated that behavioral disturbances were more persistent among patients that experienced physical function limitations. All control families considered themselves to be functioning at their normal baseline six-months after their child's hospitalization. In contrast, 71% of the minor trauma families and 50% of the major trauma families described themselves as back to normal at the six-month mark. Research which was previously presented by Varni and Setoguchi (1992) also examined behavioral problems in children/adolescents with congenital and acquired limb deficiencies. Their findings indicated a higher incidence of behavioral difficulties in comparison to the normative sample. This study supported previous research which had indicated that children and adolescents with histories of trauma demonstrate maladaptive behaviors; they often display increased hyperactivity, impulsivity and inattentiveness (Salzinger, Kaplan, Pelcovitz, Samit, & Krieger, 1984). Their tendencies to aggressively act out may also interfere with their ability to establish friendships, interact appropriately with peers, and adequately perceive social cues (Frederich & Luecke, 1988). These children and adolescents also reported feeling unpopular as they were rejected by their peers (Friedrich & Reams, 1987) due to poor communication skills and social competence (Perry, 1983).

School aged children display a diversity of behavioral alterations in the aftermath of trauma. Family members and teachers complain that children afflicted with symptoms of PTSD often become irritable, rude and provocative (Eth, 1990). Children who have experienced trauma are more likely to exhibit aggression toward peers, parents, teachers, and authority figures (Burke, Borus, Burns, Millstein, & Beasley, 1982), to show cruelty toward animals (Friedrich & Reams, 1987), and to be more belligerent and demanding of attention (Zimrin, 1986). Studies have also reported that these children may be more self-abusive and self-destructive than their peers (Green, 1983) and experience adjustment difficulties (Farber & Joseph, 1985). Many are more likely to become chemically dependent (Cavaiola & Schiff, 1988), to engage in runaway behaviors (Rimza & Berg, 1988), and to participate in delinquent, antisocial or criminal activities (Frederick, 1985). Although these studies provide a diverse range of emotions and behaviors, it is important to note that different stressors and samples were examined. It is due to the variety of traumatic stressors and methodological differences that findings remain inconsistent and, again, should not be generalized.

Amputation

Trauma is the primary cause of amputation in the Unites States (Dullingham, Pezzin, & MacKenzie, 1998); approximately 40% of limb deficiencies in children are due to traumatic amputations (Smith, Griner, Mutual, & Guidera, 1996) and these injuries represent an important source of permanent impairment and functional limitation among children and adolescents. The impairments are at a minimum permanent-partial, but often are significant enough to impact quality of life for the 40 to 50 years of remaining life of the young amputee patient (Dillingham, et. al., 1998). Research conducted by Dillingham, Pezzin, and MacKenzie (1998) examined patterns of trauma-related amputations by age and gender of the patient and also by level and type of amputation.

The goal of the research was to explore the factors that affect acute care length of stay and discharge to inpatient rehabilitation. The researchers examined discharge data (N=6,069) of patients who had received (1) either a principal or secondary diagnosis of a trauma related amputation to an upper or lower extremity or (2) a procedure code for a lower or upper limb amputation in combination with a principal diagnosis of an extreme injury or injury-related complication. The discharge records were obtained from acute care hospitals in the state of Maryland from 1979 to 1993.

Findings suggested a substantial decline in incidence rates for both upper and lower limb amputations over the 15-year period. Upper extremity amputations declined 3.4% ($p < .05$) annually from 1.88 per 100,000 in 1979 to 1.07 per 100,000 in 1993. Incidence of lower limb amputations declined 4.8% ($p < .05$) annually from 10.8 per 100,000 in 1979 to 4.7 per 100,000 in 1993 (Dillingham, et. al., 1998). According to the gender analysis, less than one fifth of all amputations involved females. Seventy-three percent of individuals sustaining upper extremity amputations and 86% of individuals with lower extremity amputations were males (Dullingham, et. al., 1998). An estimated 60% of amputations in males occurred between ages 15 and 44. More than 40% of major amputations in females occurred among those aged 65 and older. The leading causes of trauma-related amputations were due to injuries involving machinery (40%), power tools and appliances (27.8%), firearms (8.5%), and motor vehicle accidents (8%). For those 0 to 24 years of age, injuries involving firearms were the principal cause of both upper and lower limb trauma related amputations.

Acute care length of stay for trauma related amputations declined 40% over the study period. This was significantly affected by the patient's payer source, amputation level, and injury characteristics. Of those individuals who experienced an amputation, 15% were discharged to inpatient rehabilitation; 60% were discharged directly home. The analysis did not report the outcome of the remaining 25%. The authors stated that due to the lack of information regarding the types or intensity of outpatient rehabilitation services and information on the level of functional restoration achieved after the hospitalization, the long-term outcomes of these individuals and the effectiveness of the inpatient rehabilitation program in enhancing their progress could not be assessed. The researchers also stated that due to the lack of information from military and VA hospitals and the exclusion of those individuals who died before an admission or in emergency room procedures, the results may have underestimated the true incidence rates of trauma-related amputations.

Amputation and psychological reactions. Shukala, Sahu, and Tripathi (1982) documented psychiatric symptoms in 60% of individuals (aged 10 years or older) after experiencing a traumatic amputation. According to Frierson and Lippmann (1987) some of the psychological reactions to amputations include, denial, revisualization, fixation on the amputated part (often augmented by phantom limb sensations), displaced anger, body-image distortions, and eventual acceptance of the loss. Most patients' reactions to their amputation include flashbacks to the accident, body-image disturbances and a sense of helplessness and grieving. In many cases, symptoms of depression and anxiety were accompanied by crying spells. Empirical research (Fitzpatrick, 1999; Frierson & Lippman, 1987) reported that reactions to this type of injury depend on a number of factors, including age, sex, personality traits, life long patterns of coping with stress, type of amputation performed, value placed on the lost part, and formed expectations. Frank, Kashani and Kashani (1986) examined the relationship between the patient's age and adjustment to the amputation and found that long term psychological complications were more frequently reported in older than younger patients. Possible factors which may account for this finding were not presented.

Research which has focused on psychological stressors associated with adult amputations reported that grief over the loss of a limb was believed to be comparable to the emotions experienced in regard to the loss of a spouse. However, Parkes (1975) reported that post amputation grief, which was initially comparable in intensity to widowhood, proved to be more persistent and unchanged over a one year period. Studies which have examined the emotions of children and adolescents indicate that the expressions of grief varied. "Feeling may be expressed verbally through crying, angry silence, depression, protest, and acting out behavior" (Setoguchi & Rosenfelder, 1982, p. 217). These findings were obtained by assessing both traumatic and congenital groups.

A study conducted by Frierson and Lippmann (1987), which reviewed referrals of amputees to a psychiatric consultation service over a ten-year period found that the primary reason for referral was for assistance in coping, but other causes for referral included depression, unrealistic demands for pain medication, behavioral problems and suicidal ideations. Anger is also a common emotion and in most cases it was displaced toward nurses, physicians and family members (Frierson & Lippmann, 1987). The authors of this study reported that occasional reactions to amputations included mutism, screaming and assault on family members. Of the 86 participants, the majority of the group was diagnosed with psychiatric disorders, ranging from adjustment disorders to borderline personality and schizophrenia. It is unclear as to whether or not the mental health disorders had been diagnosed prior to the amputation.

Fitzpatrick (1999) presented the following as the most common reasons for psychiatric consultations following an amputation: depression (23%-35%), states of anxiety, sexuality issues, and chemical abuse and dependency. He defined PTSD as "a major disorder which is often overlooked" due to the fact that accidental trauma is considered a "commonplace event" (p. 101). Fitzpatrick (1999) cautioned physicians who work with this population. He stated that although the onset of an acute stress disorder may begin while the patient is still hospitalized, there may also be a delay in the development of the syndrome.

As with acute PTSD, flashbacks can be triggered by an environmental stimulus and often produce somatic symptoms of anxiety. Flashbacks were commonly reported by the traumatic amputees in the study conducted by Frierson and Lippmann (1987); many patients described re-experiencing the trauma with accompanying signs of hyperarousal. Few of the 86 patients examined by these researchers had been referred because of alterations in body image alone; however, this state was manifested by such behavior as reclusiveness, hypervigilence, and delusions. Research (Fitzpatrick & Lippmann, 1987) reported that patients who had not seen their wound or stump invariably described the area as much worse than its actual appearance. Reactions to alterations in appearance are influenced by the value that the individual places on the lost part, preoperative preparation and the previous extent of emotional stability. Many patients projected their own disgust with their appearance, thereby reinforcing their feelings of isolation. The authors stated that it is important to educate the families of those individuals who have experienced the loss of a limb because learned helplessness, which is a common feature in this population, is often reinforced by family members.

Limb Loss and Psychological Reactions in Children

Although research with pediatric amputees is minimal, the following findings have been reported utilizing theoretical work and clinical observations. Svoboda (1992) presented a series of stages, which follow Kubler Ross' framework for death and dying, that represent the emotional turmoil of children who experience limb loss. According to the author, the first feeling is shock. "This emotion is felt intensely, but generally not for long" (Svoboda, 1992, p. 207). Buscaglia (1981) describes this initial emotion as fear, "which incorporates confusion, a sense of unreality or emotional numbness" (Svoboda, 1992, p. 207). The second stage is a period of denial. Svoboda states that the amputee and/or the family may become defensive when discussing the situation and/or the end result. Family members may also acknowledge the amputation, but deny the subsequent prosthetic or surgical intervention. The third stage is referred to as bargaining. In this stage, the amputee and/or family acknowledges the situation and may become extremely compliant in hopes that in return for their good behavior, the lost limb will be replaced (Svoboda, 1992). It is after the realization that the limb will not be salvaged that some patients develop symptoms of depression. The final stage encompasses feelings of emotional reaction; both the child and his/her family understand and accept the experience. They are able to continue with daily responsibilities despite the disability. In reference to the stage models of grief, Fitzpatrick (1999) presents an opposing view: "The process of acceptance is not accomplished once and for all, nor does it march through fixed stages to ultimate acceptance" (p. 102). He prefers to refer to grief as a process which is influenced by developmental factors and the individual's life experiences.

Mediators of the Effects of Amputation

Clinical observations have described children and adolescents who have suffered an amputation as a result of disease or trauma as manifesting depression, anxiety, and loss of self-esteem. As a group, children with chronic, physical handicaps have been found to be at risk for psychological and social adjustment problems (Varni & Setoguchi, 1991). Although these findings have been noted, research has indicated that there is considerable variability in individual children's adaptation to their physical handicap. While some children adapt, others exhibit psychological and social maladjustment.

Based on previous findings which utilized the CBCL on pediatric chronic handicap samples (Cadman, Boyle, Szatmari, & Offord, 1987; Wallander, Varni, Babani, Banis, & Wilcox, 1988), a greater number of behavioral and emotional problems and lower social competence was expected in adolescents with limb deficiencies, in comparison to the standardized normative community sample. Findings from this research indicate that there are mediating predictors of the psychological adaptation to the loss of a limb. "These empirical investigations further underscore the value of screening for behavioral and emotional problems by suggesting the potential modifiable nature of the observed psychosocial morbidity seen in these children" (p. 106). According to the authors, these mediators are the following dynamic social/environmental variables: daily stress, parental marital discord, social support from different individuals in the child's life, and child perceived competence/adequacy.

In an attempt to account for the impact that different types of amputation have on the life of an individual, Varni and associates (1989) developed the Degree of Limb Loss Scale (DLLS). Upper body limb loss was scored as follows: forequarter = 8, shoulder disarticulation = 7, above elbow = 6, elbow disarticulation = 5, below elbow = 4, wrist disarticulation = 3, transcarpal or metacarpal = 2, partial hand = 1. Lower body limb loss was scored as: hemicorporectomy = 9, hemipelvectomy = 8, hip disarticulation = 7, above knee = 6, knee disarticulation = 5, below knee = 4, ankle disarticulation = 3, transtarsal = 2, partial foot = 1. Utilizing this scale, total limb loss was calculated as the sum of the upper and lower limb loss ratings. This scale was implemented in the following study conducted by Varni and Setoguchi (1993) which examined the effects of parental adjustment on the adaptation of children with congenital or acquired limb deficiencies. The findings were presented in terms of the risk and protective effects of parental distress, marital discord, and social support on the psychological adaptation of children with visible chronic physical disorders. The findings indicate that demographic variables (age, sex, SES, and degree of limb loss) are not significant predictors of depressive symptomatology, trait anxiety, and general self-esteem in children with congenital or acquired limb deficiencies. Potentially modifiable familial (parental distress, marital discord, parent social support, family support), and non-familial (classmates, friends, and teachers) factors accounted for a significant amount of variance in the psychological adaptation of the amputee. Marital discord as perceived by both parents was associated with higher child depression, anxiety, and lower self-esteem. Higher levels of paternal depression and anxiety were associated with higher levels of child anxiety and depression; maternal depression and anxiety were not associated with the child’s adaptation. Paternal depression, paternal anxiety, and both paternal and maternal perceived marital discord accounted for 30% of the variance in child depression; these same variables accounted for 59% of the variance in child anxiety. The child’s perceived level of marital discord accounted for 27% of the variance in child self-esteem. One prominent factor, which was found to predict psychological adaptation, was the child’s perceived level of social support. Analysis of the factors which promoted psychological/ psychosocial recovery revealed a variety of protective factors: higher classmate, parent, teacher, and friend social support were associated with lower child depression and higher self-esteem and higher parent social support, family support, and classmate support were associated with lower anxiety. Parent, teacher, classmate, and friend social support accounted for 68% of the variance in child depression. The percentage accounted for by these variables in regard to child anxiety was not reported. These same variables accounted for 37% of the variance in child self-esteem.

Fitzpatrick (1999) emphasized the importance of psychosocial issues in those patients who have or will experience an amputation. He stated that those individuals who experience an amputation due to trauma report higher levels of post-operative physical and psychosocial morbidity because they do not have the opportunity to participate in preoperative counseling. Fitzpatrick (1999) suggested that the disability after the amputation is “often far more the result of individual and social attitudes than it is due to the loss of the limb” (p.100). According to his perspective, it is the loss of the ability to relate psychologically, vocationally, avocationally, socially and sexually that inhibits most individuals.

Quality of Life

According to Lawton (1991), quality of life (QOL) is the "multidimensional evaluation by both intrapersonal and social normative criteria of the person/environment system of the individual" (p. 6). This definition asserts that quality of life is not a dimension, but rather a collection of dimensions. According to Frisch (1992), QOL refers to an individual's subjective evaluation of the degree to which his/her most important needs, goals and wishes have been fulfilled. These statements will be utilized to provide a general definition for this term. At this time, an interdisciplinary consensus has not been reached. Currently, QOL is considered a subjective phenomenon in need of formal, operationalized definitions (Deb, 1996).

In a study conducted by Viemero and Krause (1998) which examined the QOL in individuals with physical disabilities, social approval was found to be a significant predictor of positive affect. "Uneasiness and uncertainty about other people's attitudes toward the disability rather than the actual experiences have been found to create many problems for the persons with disabilities" (Viemero & Krause, 1998, p. 318). The results indicated that satisfaction with life was highly dependent upon occupational status or meaningful activities, social integration and psychological resources to cope with the stressful situation caused by the disability.

Psychological symptoms and QOL. The following sections will refer to studies which have examined adult populations. Research exploring the patients' perspective on quality of life in the aftermath of a traumatic event has not assessed a pediatric sample. This section will be utilized as a foundation which can provide a general overview of the relationship between trauma and QOL. In accordance with earlier studies (Mardi &

Horowitz, 1982; Viemero & Krause, 1991), those individuals who have experienced trauma report being generally dissatisfied. They are more depressive, anxious and negative; they also report more psychological and somatic stress symptoms in comparison to the normative sample. These individuals have low self-esteem and self-worth and report feelings of loneliness. They were fixated on their diagnosis or accident, seeking succour from family and friends, used more medication and needed more help in everyday situations (Viemero & Krause, 1983). Individuals with physical disabilities are at high risk of experiencing depressive symptoms (Turner & Beiser, 1990) and these individuals report more pessimism, passivity, immaturity and aggression than able-bodied individuals (Mardi & Horowitz, 1982). The social integration of individuals with physical disabilities is often limited; many disabled individuals prefer to live in social isolation (Helwig & Holicky, 1994).

Similar to the impact of a physical disability, the disturbance of PTSD symptomatology is known to cause clinically significant distress or impairment in both social and occupational areas of functioning (Lawton, 1991). Awareness that psychiatric disorders can have a profound impact on quality of life has increased in the past few years (Warshaw, Fierman, Pratt, Hunt, Yonkers, Massion, & Keller, 1993). Studies of both epidemiological (Weissman, 1991) and clinical (Massion, Warshaw, & Keller, 1993) samples have found decrements in psychosocial functioning among patients who have been diagnosed with mental health disorders. Although Warshaw and associates (1993) state that little research has been conducted on the impact of trauma history or PTSD on quality of life, higher rates of suicide, depression, substance abuse, and dissociation have been found among patients diagnosed with PTSD (Warshaw, et. al., 1993).

Research conducted by Warshaw and associates (1993) examined the effects of trauma and PTSD on the general well being of subjects with anxiety disorders. Three groups were compared; subjects with: no history of trauma, with history of trauma, but not PTSD, and with PTSD, on the following variables: role function, social life, and emotional health (including suicide attempts or gestures, psychiatric hospitalization, alcohol or other substance abuse, depression and dissociation). Findings indicated that those participants who had been diagnosed with PTSD had the worst functioning on all of the examined variables except social life. The authors concluded that PTSD has severe effects on quality of life in virtually all spheres of life. The high levels of depression, suicide attempts, or gestures and alcohol abuse are of particular concern and show that trauma can have long lasting effects (Warshaw, et. al., 1993).

Zatzick and associates (1997) investigated the relationship between post-traumatic stress disorder, functioning, and quality of life with an archival analysis of data of male Vietnam Veterans from the National Vietnam Veterans Readjustment Study (N=1200). PTSD was assessed with the Mississippi Scale for Combat-Related Post-traumatic Stress Disorder. Diminished well-being, physical limitations and compromised physical health were some of the outcomes under investigation. Adjustments for demographic characteristics were calculated. The risks of poorer outcomes were significantly higher in subjects with PTSD than in subjects without PTSD. The significantly higher risk of impaired functioning and diminished quality of life uniquely attributable to PTSD suggests that PTSD may well be the core problem in this group of difficult to treat and multiply afflicted patients (Zatzick, Marmar, Weiss, Browner, Metzler, Golding, Stewart, Schlenger, & Wells, 1997).

In an attempt to make a gender comparison, Zatzick and associates (1997) also conducted the same analysis with a nationally representative sample of female Vietnam veterans (N = 432). A sub-sample of 87 participants was diagnosed with PTSD. The results indicated that PTSD was associated with significantly poorer functioning. From this research the authors concluded that similar to the male sample, the female Vietnam veterans also reported impaired functioning and diminished quality of life, which was also associated with the diagnosis of PTSD.

Conclusion and Hypotheses

Psychological trauma "occurs when an individual is exposed to an overwhelming event that renders him/her helpless in the face of intolerable danger, anxiety and instinctual arousal" (Eth & Pynoos, 1985, p. 90). Psychological issues ensuing from amputation have received inadequate attention in psychiatric studies. Amputations produce a series of losses and indelibly affect the patient's future. Frierson and Lippmann (1987) encourage the psychological investigation of individuals who have experienced the loss of a limb. Research in this area would likely provide insight as to the different interventions that may benefit these individuals.

In order to investigate pediatric amputees, their possible symptoms of PTSD, and how these symptoms may affect their behavioral tendencies and quality of life, the following hypotheses have been developed:

1) Children/adolescents who have experienced an amputation will demonstrate clinically significant levels of PTSD.

    1A) After groups are compared on basic demographics and found comparable, amputees will report a higher incidence of PTSD symptomatology than the comparison group.

2) After groups are compared on basic demographics and found comparable, amputees will report a higher incidence of behavior problems than the comparison group.

    2A) PTSD symptomatology will positively correlate with level of behavior problems within the amputee group.

3) Amputees will report a lower level of quality of life than the comparison group after groups are found comparable on basic demograohics.

    3A) Within the amputee group, level of PTSD symptomatology will be inversely related to quality of life.

Method

Participants

The participants for this study included a group who experienced a traumatic amputation (N=16) and a comparison group (N=9).

Amputee sample. The traumatic amputation group consisted of children/adolescents who had experienced the loss of a limb due to an acute physical injury. Of the amputee sample, 81% (N=13) were male and 19% (N=3) were female. The mean age for the males was 13.76 (SD=1.88; range=11 to 18 years), while the mean age for the females was 12.67 years (SD=1.15; range=12 to 14 years). The overall group mean age was 13.56 years (SD=1.79; range=11 to 18 years). Approximately 12.5% of the 16 amputee children/adolescents identified themselves as Caucasian (N=2), 12.5% as African American (N=2), 62.5% as Hispanic (N=10), and 12.5% as other (N=2). All 3 females with amputations had lower body amputations. Of the males, 46.2% (N=6) had upper body amputations, 46.2% (N=6) had lower body amputations, and 7.7% (N=1) had both an upper and lower body amputation. Children/adolescents were excluded if they had experienced other traumatic injuries, child abuse, or a psychiatric condition (see Appendix D for screening questionnaire).

Comparison group. The comparison group was composed of 9 patients who were hospitalized after experiencing a non-head injury motor vehicle accident in which no one died. This group was composed of 33% male (N=3) and 67% female (N=6). The mean age for the males was 13.33 years (SD=2.08; range=11 to 15 years), while the mean age for the females was 12.17 years (SD=1.17; range=11 to 14 years). The overall group mean was 12.56 years (SD=1.51; range=11 to 15 years). Approximately 22.2% of the 9 comparison group children/adolescents identified themselves as Caucasian (N=2), 22.2% as African American (N=2), 44.5% as Hispanic (N=4), and 11.1% as other (N=1). Children/adolescents were excluded if they had experienced other traumatic injuries, child abuse, or a psychiatric condition (see Appendix D for screening questionnaire).

Measures

Demographic questionnaire. Included among the measures was a brief demographic questionnaire (see Appendix E). This questionnaire was a 20-item measure for the amputee group and an 18-item measure for the comparison group that obtained the participant's sex, age, primary language and ethnicity. The questionnaire also included items regarding the participant's accident, who was with him/her at the accident, what type of traumatic injury and loss was experienced, and how much time had elapsed since the incident.

Child Post Traumatic Stress Reaction Index (CPTSD-RI). The CPTSD-RI (Frederick, Pynoos, & Nader, 1992) is a 20-item measure used to examine PTSD symptoms in children who have experienced a traumatic event. This instrument is a self-report questionnaire (interview format), which takes 20-45 minutes to complete and is designed for children ages 6-17 (Carlson, 1997). Items on this instrument are rated on a 5-point Likert scale, ranging from 0 (none of the time) to 4 (most of the time). The measure yields a total scale score, which reflects the frequency or severity of symptoms ranging from 0 to 80. Cutoff scores for level of severity are as follows: doubtful PTSD, [less than] 12; mild, 12-24; moderate, 25-39; and severe symptoms, [greater than] 39. The participants in this research were not diagnosed, but placed on a continuum of PTSD symptom severity.

This instrument has demonstrated acceptable internal consistency. A Cronbach's alpha of .78 was reported (Nader, 1996, as cited in Carlson, 1997). Evidence for inter-rater reliability includes correlations for a total score of r=.94 and r=.97 in studies conducted by Nader (1996, as cited in Carlson, 1997) with children exposed to disasters and violence. The same studies have also reported construct validity. According to the author, the following statistics support his argument for construct validity: 44% of participants in one study who were rated as experiencing a moderate degree of distress according to the CPTSD-RI scores met DSM-IIIR criteria for PTSD compared to 92% of those who were rated as very severe (Nader, 1996, as cited in Carlson, 1997).

Youth Self Report (YSR). This checklist (Achenbach, 1985) was used to assess the externalized and internalized behaviors of the participants. The first section was not completed since this portion of the measure analyzes the child's social competence. The second section which consisted of 112 questions that required the child to rate his/her behavior problems was completed. This measure requires that the participant respond with one of three responses: 0=not true, 1=somewhat or sometimes true or, 2=very true or often true. The measure takes approximately 30 to 40 minutes to complete and although the measure is lengthy, the questions are short and require minimal effort and concentration. Measures were computer scored with the Achenbach Scoring System (ADM – Assessment Data Manager) and T scores were utilized for the statistical analyses. The scoring system provides three categories: normal range (T scores below 60), borderline range (T scores of 60 to 63), and clinical range (T scores above 63).

Scores for major psychological factors, which are termed broad-band syndromes, and for more specific factors, regarded as narrow-band syndromes, are obtained from the second section of this instrument. Two broad-band syndromes are isolated: externalizing and internalizing. The externalizing syndrome represents more extroverted, acting out behavior such as delinquency and aggressive behavior. The internalizing category includes psychological components such as withdrawal, anxiety/depression, and somatic complaints (Zippen, 1994). Broadband T-scores for externalized and internalized behavior were utilized for the statistical analyses in the present research.

Martin (1988) reported that test-retest analyses over a one-week period for the social competence and behavior problem scales are in the r=.80 to r=.95 range. Test-retest reliabilities are also reported for 3, 6, and 18-month stabilities for clinical samples. These correlations were considered satisfactory with average correlations across scales for the 18-month retest period ranging from r=.47 to r=.76. Elliot and Busse (1992) assessed the validity of the instrument. This examination reported that adolescents who were referred for treatment had lower social competence and higher behavior problem scores than non-referred adolescents.

Dartmouth COOP Measures of Functional Status (adolescent version). Utilized to measure quality of life, this health questionnaire (interview format) was developed by the Dartmouth Primary Care Cooperative Information Project (Beaufait, Nelson, Landgraf, Hays, Kirk, Wasson, & Keller, 1992), to examine how an individual feels, functions and perceives his/her health. Pictorial charts measure health status for the following six dimensions: a) health habits, b) school work, c) physical fitness, d) social support, e) emotional feelings, and f) family communication. Each chart has a question and five possible response categories that are illustrated by small pictures, which represent different health statuses. The measure takes approximately 5 to 10 minutes to administer. Scores per chart range from one to five; domain scores were added to obtain an overall score. The authors do not provide a clinically significant cut-off score; To ease interpretability, the items were reverse-scored for this study. Low scores are interpreted as indicating a lower level of quality of life.

Test-retest reliability and the calculation of correlations with questionnaire measures of the same dimensions were calculated by Wasson and associates (1994). The responses of 199 adolescents who completed the six charts on consecutive days were analyzed. The charts were completed as part of a battery in an attempt to minimize recall. "The average test/re-test correlation of the six charts was r=.77; correlations ranged from r=.71 to r=.80 for the family communication, emotional feelings and social support charts, to over r=.80 for the remaining three charts" (Wasson, 1994, p. 490). All six pictorial charts met the minimum reliability recommended for group comparisons (r=.50) (Nunnaly, 1978, as cited in Beaufait et al., 1992).

Similarities Sub-scale Wechsler Intelligence Scale for Children (WISC-III). The similarities sub-scale is a series of 19 items that consist of orally presented pairs of words for common objects or concepts for which the child explains the similarities. This subscale is individually administered and is utilized as a measure of verbal concept formation, abstract reasoning, and general intellectual level for children ages 6-16. Scores per item range from 0-2; the subscale has a mean of 10 and a standard deviation of 3. Item scores were added to obtain a total raw score for the subscale. Raw scores were then converted to scale scores based on the child/adolescent's age and the scale scores were utilized for the statistical analyses.

Due to the age range in both the sample and the comparison group and because the literature regarding PTSD emphasizes the impact of abstract reasoning (Fitzpatrick, 1999; Lyons, 1987), this study utilized the similarities sub-scale of the Wechsler Intelligence Scale for Children – WISC III (Wechsler, 1991) to obtain an estimate of verbal intelligence/abstract reasoning. Intellectual functioning is an important variable both because of the role it plays in overall psychosocial adjustment and because some of the study instruments assume a basic level of verbal ability (Koocher, O'Malley, Gogan, & Foster, 1980).

Procedure

Records from two Southern California children's hospitals were reviewed in an attempt to identify children/adolescents who met the proposed criteria. The primary treatment staff reviewed records to identify potential participants. Eligible families were initially contacted by the staff who briefly informed the family of the research project and scheduled an appointment for the family to meet with the graduate student researcher. Parents of the pediatric amputees and the comparison group were then introduced to the study by the graduate student researcher; guidelines for research were presented along with a consent form (see Appendix B). Upon the parent's authorization, the child/adolescent was presented with the assent form (see Appendix C) and introduced to the graduate student researcher. The parents were then asked to leave the room and the child/adolescent began the evaluation, which consisted of an assessment regarding the child's/adolescent's possible symptoms of PTSD, behavioral tendencies, level of quality of life, and abstract reasoning ability. The child completed the CPTSD-RI, the YSR, the

COOP Measures of Functional Status, and the similarities sub-scale of the WISC-III. The time for completion of the assessment ranged from 45-90 minutes.

Design

This study was a cross-sectional quasi-experimental comparison of two groups on four dependent variables. The independent variable was composed of two groups – Group 1: Amputee children/adolescents age 11-18 who had experienced the loss of a limb due to an acute physical injury (burns, severing, and crushing accidents) and Group 2: Children/adolescents age 11-15 who had been hospitalized due to a non-head injury motor vehicle accident in which no one died. Exclusion criteria for both groups included previous traumatic injury, child abuse (emotional, physical, or sexual) or a psychiatric condition. Inclusion criteria was an age appropriate scale score on the similarities subscale of the WISC-III no more than two standard deviations from the norm (subscale has a mean of 10 and a standard deviation of 3). The dependent variables were: 1) Child Post-traumatic Stress Reaction Index (CPTSD-RI) score, 2) Youth Self Report (YSR) internalizing behavioral tendencies 3) Youth Self Report (YSR) externalizing behavioral tendencies and 4) score on the COOP Measures of Functional Status (QOL). The covariates were 1) time since amputation or accident and 2) age at time of the incident.

Operationalized Hypotheses

1) It is predicted that children/adolescents who had experienced an amputation will demonstrate clinically significant levels of PTSD. A bar graph will be used to plot the scores for the amputee group on the CPTSD-RI. The reference line (40 points) will indicate the cut-off mark for clinically significant levels of PTSD.

1A) After groups are compared on basic demographics and found comparable, it is predicted that amputees will report a higher incidence of PTSD symptomatology than the comparison group. An analysis of covariance (ANCOVA) will be conducted utilizing the scores on the CPTSD-RI as the dependent variable. Possible demographic differences will be utilized as independent variables or covariates.

2) Once any demographic differences are controlled, it is predicted that amputees will report a higher incidence of behavior problems (both internalizing and externalizing behaviors) than the comparison group. An analysis of covariance (ANCOVA) will be used to compare behavioral problems between the experimental group and the comparison group. The broadband T-scores for internalized and externalized behavior from the YSR will be the dependent variables for these analyses. As in the previous hypothesis, demographic differences between groups will be utilized as independent variables or covariates.

2A) It is predicted that PTSD symptomatology will positively correlate with the level of internalizing and externalizing behavior problems within the amputee group. One-tailed Pearson correlations will be calculated to investigate the proposed positive relationships between PTSD symptomatology (covariate corrected scores on the CPTSD-RI) and the level of internalizing and externalizing behavioral problems (covariate corrected broadband T-scores from the YSR).

3) It is predicted that amputees will report a lower level of quality of life than the comparison group after any demographics are controlled. A one-way analysis of covariance (ANCOVA) will be calculated to examine the difference in QOL between the

amputee group and the comparison group. The dependent variable utilized for this analysis will be the total score on the adolescent version of the COOP Measures for Functional Status. Demographic differences will serve as independent variables or covariates for this analysis.

> 3A) It was predicted that within the amputee group, level of PTSD symptomatology would be inversely related to quality of life. A one-tail Pearson correlation between the scores on the CPTSD-RI (covariate corrected scores) and the scores on the adolescent version of the COOP Measures of Functional Status (covariate corrected) will be calculated within the amputee group in order to examine the proposed inverse relationship.

Results

Data Screening

The sample was composed of 16 amputee children/adolescents and 9 comparison participants. All screened participants met the exclusion requirements. Parents of all participants denied previous trauma, a history of abuse, and psychiatric condition. The screening procedure was a 10-minute session with the graduate student researcher. No complaints or concerns regarding the possible difficulty of answering these questions in particular those related to abuse (sexual, physical, and emotional) were reported. All 25 subjects responded to all interview questions, all questionnaires were appropriately completed, and all items were endorsed. All participants completed their full session with the investigator. No complaints or concerns were indicated. The assessment session ranged from 45-90 minutes.

The study initiated in May of 2001; however, legal contracts were required between the two hospitals. This process was finalized approximately one year later. Once approved, data collection was obtained over a period of approximately one and a half years. The delay in collection was due in part to lack of compliance within the amputee group regarding their medical appointments. However, once present, all individuals participated openly with the graduate student researcher.

In preparation for analyses, demographics were examined to assess for possible differences between the groups. Chi square tests and independent sample t-tests were calculated to compare the groups on gender, age, ethnicity, age at the time of incident, time since the amputation/accident, and the scale score on the similarities subscale of the WISC-III. Age at the time of incident and time since amputation/accident were significantly different between the groups. While gender was not found to be statistically significant, it will be utilized as a fixed factor for all analyses in order to examine possible differences between males and females. Age at the time of incident and time since accident/amputation will be further investigated to examine the assumption of multicolinearity.

As previously stated, a scale score of no more than 3 standard deviations from the age corrected norms on the WISC-III similarities subscale was used as an inclusion criteria. Two of the amputee children did not meet this criteria as they both obtained a scale score of 4. However, these children were bilingual Spanish speakers who resided in Mexico and while they spoke English, Spanish was their primary language. These scores were included due to the language difference for these participants.

Outliers

One case from the comparison group had a notably higher T-score for the externalizing scale of the Youth Self Report. Upon examination, the score was found to be less than three and a half standard deviations, which is the recommended cut-off for defining an outlier and removing the data point (Tabachnick & Fidell, 1996). Thus, this case was not removed from the analyses (see Appendix F).

Statistical Assumptions

Prior to conducting the primary analyses, the dependent and covariate variables were screened to confirm the assumptions required for the proposed statistical procedures.

Normality. Histograms were created to examine the distribution of the continuous dependent variables (scores on the CPTSD-RI, the COOP QOL, and the YSR). The graphs indicated that the scores were slightly positively skewed for scores on the

CPTSD-RI, and internalizing and externalizing behaviors on the YSR (skewness=.572; skewness=.141; skewness=.566, respectively) . Scores for the COOP measure were slightly negatively skewed (skewness=-.882). While the kurtosis for the scores on the CPTSD-RI were slightly leptokurtic (peaked on one side), the scores on the other three measures were slightly platykurtic, indicating a flat distribution of scores. Thus the assumption of normality was not approximated. However, analyses of variance are considered relatively robust analyses to non-normality; the slight skews should not significantly affect the results (Tabachnick & Fidell, 1996). Appendix G contains all the histograms for the dependent variables.

Multicolinearity and Linearity. Multicolinearity was examined with the use of Pearson correlations among the predictors. The analyses indicated that time since incident (predictor) and age at the time of incident (predictor) were significantly correlated (r=-.893). Due to this redundancy, the superior predictor (time since incident) was used in further analyses and the second predictor (age at the time of incident) was removed. All other predictors met the assumption. Refer to Appendix H for correlation matrix.

A scatterplot of the relationships between the predictor variable (time since incident) on the criterion variables (score on the CPTSD-RI, YSR, and COOP Measure) was created. Examination of the plots did not indicate a deviation from linearity for any of the relationships. However, given the small sample size, findings will be conservatively interpreted. Appendix I contains the scatterplots of the predictor on the criterion variables.

Homogeneity of Variance. Homogeneity of variance of the dependent variables (CPTSD-RI, YSR, and COOP measures) was examined with the use of the Levene test. Results indicated a statistically significant difference between the groups on the CPTSD-RI. However, inspection of the descriptive statistics for the continuous variables by sample (Table 2) show that the standard deviations did not violate the assumption for homogeneity of variance (differences between standard deviations are not more than 4 times greater) according to Tabachnick and Fidell (1996).

Ratio of Cases to Variables. The ratio of participants to predictors was low, resulting in a possible overfit. The overfit also increased the effect size, which must be considered when examining the results.

Descriptive Statistics

Statistical analyses were performed using SPSS 10.0. Comparison of the amputee group (n=16) and the comparison group (n=9) in frequency and percentages of demographic variables and covariates (Table 1) and the descriptive statistics for the continuous dependent variables (Table 2) is presented.

Table 1

Demographic Differences Between Groups - Amputee Group (N=16) and Comparison Group (N=9).

		Frequency or Mean		**p**
Demographics		Amputee Group	Comparison Group	
Gender	Male	13 (81.3%)	3 (33.3%)	
	Female	3 (18.8%)	6 (66.7%)	ns
Age (SD)		13.56 (1.79)	12.56 (1.51%)	ns
Ethnicity	Caucasian	2 (12.5%)	2 (22.2%)	
	African American	2 (12.5%)	2 (22.2%)	
	Hispanic	10 (62.5%)	4 (44.5%)	
	Other	2 (12.5%)	1 (11.1%)	ns
Covariates				
Time since incident in months		66.00 (42.48)	1.22 (.67)	<.001
Similarities Scale Score (SD)		8.31 (2.44)	9.22 (1.92)	ns

Table 2

Descriptive Statistics for Continuous Variables by Group

		Frequency or Mean		**p**
Dependent Variables		**Amputee Group**	**Comparison Group**	
CPTSD-RI Total Score*	PTSD Symptoms	19.84 (2.77)	8.25 (3.48)	.042
Youth Self Report*				
	Internalized Behaviors	58.67 (3.47)	47.60 (4.36)	ns
	Externalized Behaviors	56.88 (2.31)	56.43 (2.91)	ns
COOP Measure QOL Domains *				
	Health Habits	4.64 (.41)	4.53 (.52)	ns
	School Work	3.45 (.33)	3.87 (.42)	ns
	Physical Fitness	3.43 (.47)	3.80 (.60)	ns
	Social Support	4.10 (.33)	4.35 (.42)	ns
	Emotional Feelings	3.80 (.23)	3.72 (.29)	ns
	Family Communication	2.76 (.36)	3.93 (.45)	.081**
	Quality of Life Total Score	22.18 (1.18)	22.85 (1.49)	ns

* Covariate Corrected (Time since incident)
** Trend toward significance

Statistical Analyses of Stated Hypotheses

Hypotheses 1

Hypothesis 1 stated that children/adolescents who have experienced an amputation will demonstrate clinically significant levels of PTSD. The mean of the CPTSD-RI (covariate corrected) for the amputee group was compared to the cut-off score for the clinically significant level of PTSD, which is an elevation of 40 points (Frederick, et, al., 1992). Findings indicated that the amputee group, on average did not meet this level of symptoms. The covariate corrected mean for the amputee group on this measure was 19.84 with a 95% confidence interval. Scores ranged from 0 to 36; thus no child/adolescent individually reached or exceeded the clinical cut-off (See Figure 1). Although these children/adolescents did not meet a clinically significant elevation, the group mean placed their scores in the mild category of PTSD (12-24 points; Frederick et. al., 1992); the scores ranged from doubtful PTSD to moderate PTSD symptom severity.

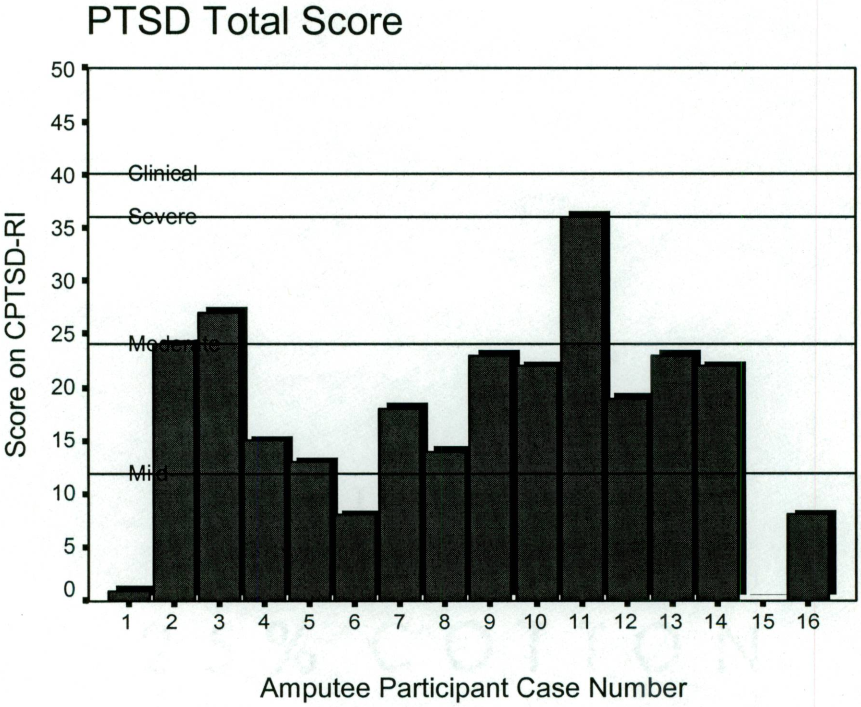


Figure 1. CPTSD-RI Total Score (level of PTSD symptomatology) by amputee participant.

Hypotheses 1A

Hypothesis 1A stated that after groups are compared on basic demographics and found comparable, amputees will report a higher incidence of PTSD symptomatology than the comparison group. An analysis of covariance (covariate was time since) was conducted to determine the main effects of gender and the experience of an amputation. Findings resulted in a statistically significant group difference on the CPTSD-RI scores

(F [1,20]=5.62; p=.028; [corrected amputee group mean=19.85, SD=2.77; corrected comparison group mean=8.25, SD=3.48]).

Hypotheses 2

Hypothesis 2 stated that after correcting for demographic differences, amputees will report a higher incidence of behavior problems than the comparison group. Another two-way analysis of covariance (gender x group) was conducted. The difference in internalized behavioral tendencies between groups was not statistically significant; however a trend toward significance was evident (F [1,20]=3.27; p=.086; [corrected amputee group mean=58.67; corrected comparison group mean=47.60]) (see Figure 2).

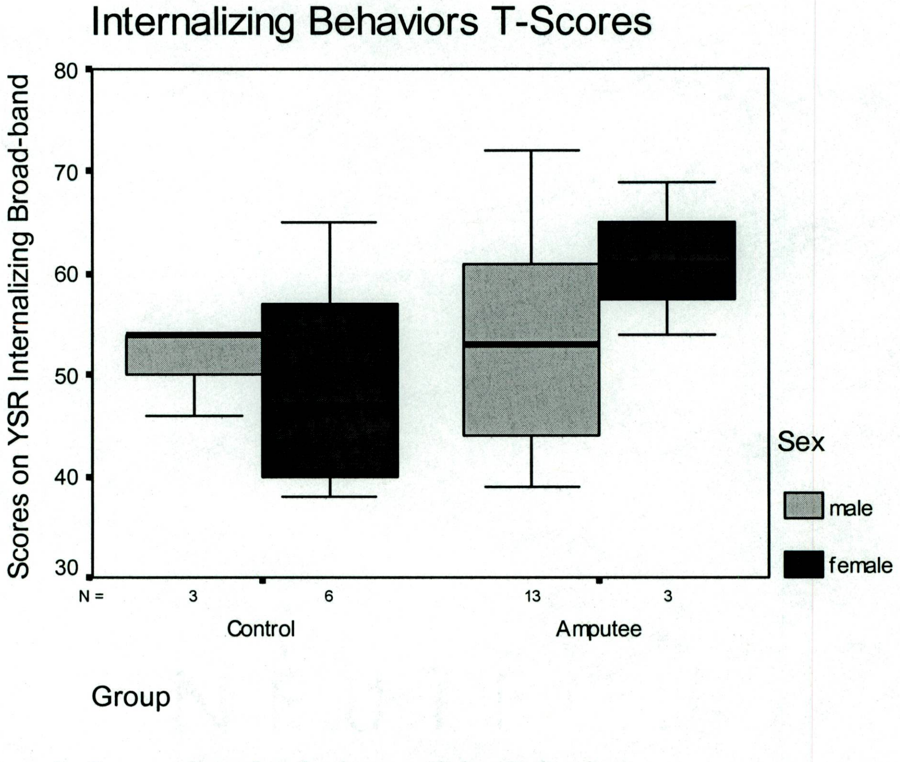


Figure 2. Interaction plot for internalizing behaviors.

The result for the comparison of the externalizing score also was not significant (F [1,20]=.013 ; p=.911; [corrected amputee group mean=56.88; corrected comparison group mean=56.43]). A significant interaction between gender and group on the externalizing behaviors was found (F [1, 20]=5.65; p =.028) (see Figure 3). While externalizing behaviors were expected from the males of the sample, the female amputees averaged the same score in comparison to the males who experienced the MVA (mean for male comparison group=60.84; mean for female amputee group=60.07; mean for female comparison group=52.01; mean for male amputee group=53.71). However, the small sample size must be considered when interpreting these findings.

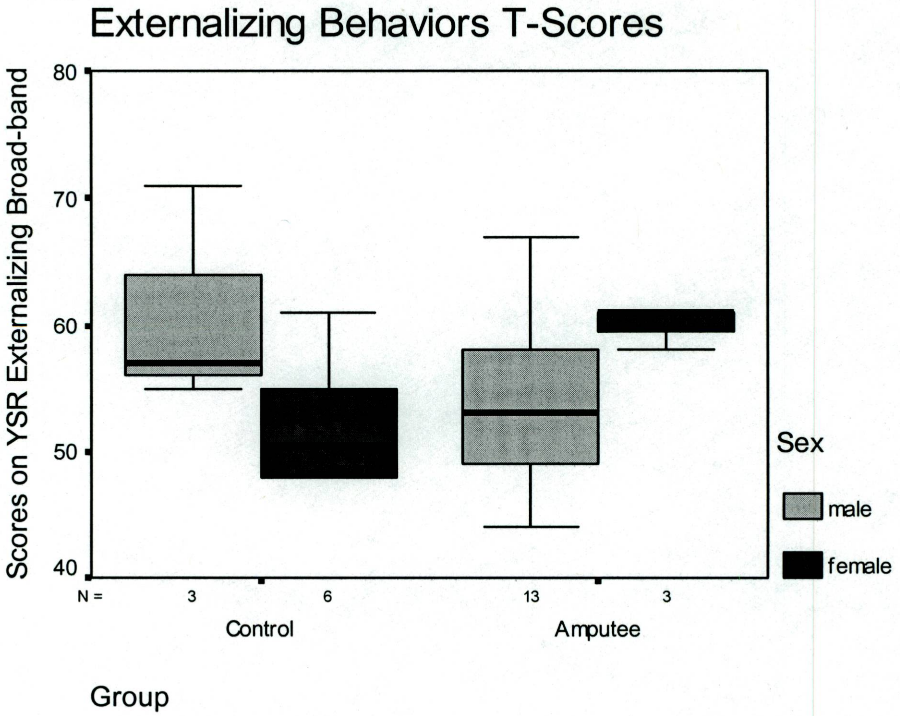


Figure 3. Interaction plot for externalizing behaviors.

Hypotheses 2A

Hypothesis 2A stated that within the amputee group, PTSD symptomatology will positively correlate with the level of internalizing and externalizing behavior problems. Utilizing one-tailed Pearson correlations, results indicated significant positive correlations between covariate corrected scores on the CPTSD-RI and the covariate corrected T scores for both the internalizing (r=.739; p=.01) and externalizing (r=.621; p=.01) scales of the YSR.

Hypothesis 3

Hypothesis 3 stated that amputees will report a lower level of quality of life than the comparison group after correcting for demographic differences between the groups. A two-way analysis of covariance (gender x group; covariate = time since incident) was calculated to determine possible differences in quality of life between the groups. Findings for this analysis were not statistically significant (F [1, 20]=.103; p =.752). No differences were noted between the covariate corrected group means (amputee group mean=22.18; comparison group mean=22.85). However, a significant interaction resulted between gender and group (F [1, 20]=7.51; p=.013). This analysis indicated that female amputees reported a decrease in QOL compared to their male counterparts and vise versa for the comparison group (mean for female amputee=20.61; mean for female comparison group=25.78; mean for male amputees=23.75; mean for male comparison group=19.93).

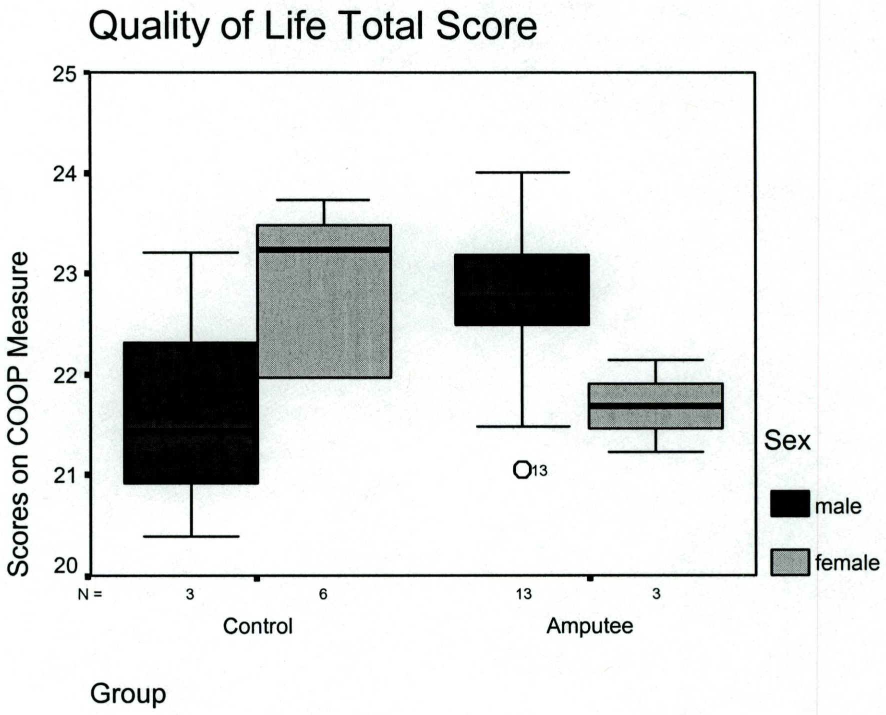


Figure 4. Interaction plot for quality of life.

Hypotheses 3A

Hypothesis 3A stated that within the amputee group, level of PTSD symptomatology will be inversely related to quality of life. Utilizing a one-tailed Pearson correlation, the relationship between symptoms of post-traumatic stress disorder and QOL was investigated. A significantly negative correlation was found between covariate corrected scores for QOL and level of PTSD symptoms (r =-.624; p=.01), indicating that children/adolescents amputees who reported greater symptoms of PTSD also reported a lower level of QOL.

Exploratory Analyses

The relationship between symptoms of PTSD and QOL was expected. However, given the ambiguity of the term 'quality of life", one-tailed Pearson correlations were calculated to investigate possible inverse relationships between symptoms of PTSD and the different domains measured by the COOP Measures of Functional Status. These analyses were calculated within each group. Findings resulted in significant negative correlations between covariate corrected PTSD symptoms and the covariate corrected domain referred to as social support (r=-.719; p=.01) and covariate corrected PTSD symptoms and the covariate corrected family communication domain (r= -.532; p=.05) for the amputee group. Findings yielded no significant relationships between symptoms of PTSD and the domains of the COOP Measure of QOL for the comparison group.

Further, a two-way analysis of covariance was calculated to examine family communication between groups. This analysis resulted in a trend toward significance for a main effect (F[1,20]= 3.38; p = .081). In addition, a statistically significant interaction (group x gender) was also found (F[1,20]=6.28; p=.021) (see Figure 4). These findings indicate that female amputees reported a lower level of QOL in regard to family communication in comparison to male amputees (group mean for female amputees=1.93; group mean for male amputees=3.59; group mean for female comparison=4.34; group mean for male comparison=3.51).

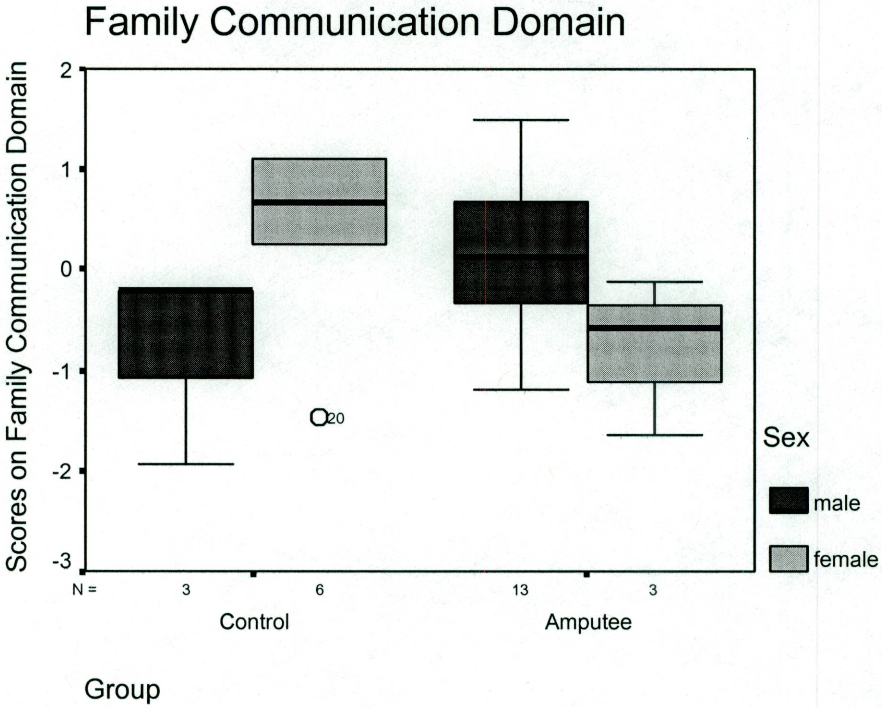


Figure 4. Interaction plot for family communication QOL domain

Discussion

PTSD

Although on average the amputee group scored in the mild range of PTSD symptomatology, this finding should be considered of significant clinical importance, considering that 56% of these children/adolescents experienced their amputation 5-12 years prior to this investigation (time since accident ranged from 1 to 12 years). Furthermore, 10 amputee participants (62.5%) scored in the moderate range of symptom severity. As a whole, the comparison group mean for PTSD placed their group means scores in the doubtful category of symptomatology indicating that the reported symptoms of PTSD for the amputees were above and beyond the traumatizing experience of hospitalization and of an accident for this sample. While 43% of the amputee sample reported participating in counseling services, their time in a therapeutic intervention was short term, ranging from 1 to 6 months and only one child reported a 24 month intervention. Those in counseling reported a slightly higher severity of symptoms although still in the mild range (mean for amputees in counseling [N=9]=17.33; mean for amputees not in counseling [N=7]=16.71). This level of severity in a small sample size warrants a screening of PTSD symptomatology in such cases.

The variance in scores for symptoms of PTSD within the amputee group was significantly variable. The scores varied more within the male amputees. In addition, it is interesting to note that the three female participants reported higher scores in comparison to their male counterparts. Results indicated the importance of accounting for gender and time since the amputation. The reported symptoms of PTSD within the amputee group are of clinical importance, especially since more than half (56%) of the group experienced their amputation at least 5 years prior to this study. While research in the area of grief has indicated that feelings of loss ameliorate over time, the amputee participants in this study reported symptoms of PTSD. Thus, the number of children/adolescents who continue to experience psychological distress years post amputation is significant. These findings highlights the need for individualized assessment and treatment.

Since the participants in this study were not receiving psychological/psychiatric services at the time of data collection, it may be inferred that their distress was not identified by the health care professionals with whom they interacted. The evidence of symptom severity may be masked by other factors as it is difficult to disentangle the influence of additional factors, such as socio-economic status and culture. One of the hospitals serves families of low income or those who can be classified as near poverty level. Approximately 63% of the amputee group was composed of Hispanic children/adolescents and the influence of culture on psychological distress (in this case, the possibility of not openly acknowledging distress or mental health difficulties) must be considered. Further, staff may not be trained to recognize symptoms and/or may fail to recognize symptoms due to other factors (e.g. medical hospital bias, etc). In addition, on average the female amputees reported a higher level of symptoms. This was an interesting finding since there were only 3 female amputee participants. These results highlighted the clinical importance of explicitly assessing for symptoms of PTSD, even after considerable time has lapsed since the traumatic event.

Behavioral Tendencies

Incidence of behavior problems (internalizing and externalizing tendencies) did not significantly differentiate the groups; however, these findings may be due to the small sample size. The results did indicate a trend (p=.08) in the expected direction for internalizing behaviors. Further, in the amputee group, 12.5% (N=2) scored higher than a T score of 60, placing their internalizing behavior scores in the borderline range; 18.7% (N=4) scored higher than a T score of 63, placing their scores in the clinical range. In regard to externalizing behaviors, 12.5% (N=2) had scores in the borderline range and 12.5% (N=2) had scores in the clinical range. In comparison, those who experienced the motor vehicle accident scored as follows: 11.1% (N=1) in the clinical range for internalizing behaviors and 11.1% (N=1) in the borderline range and 11.1% (N=1) in the clinical range for externalizing behavioral tendencies.

While symptom difference between groups were not significant, an interaction between gender and group (amputee versus comparison group) was significant. Traditionally, males are expected to display more externalizing behaviors than their female counterparts; however the small sample of female amputees reported a range of externalizing behaviors similar to the males in the comparison group.

Although significant differences in behavior problems between the groups were not shown, findings indicated a significant relationship between symptoms of PTSD and both internalizing (e.g. problems within the self – withdrawal, anxiety, and depression) and externalizing (e.g. conflicts with others – aggression and delinquency) behaviors within the amputee group as hypothesized. As symptoms of PTSD increased so did the level of behavior problems in each of the investigated broad-band categories.

Overall, participants in this study demonstrated internalizing and externalizing behaviors within age appropriate levels; this is of clinical relevance. It is important to note that problematic behavioral tendencies which are presented in the literature regarding children and PTSD should not be relied upon as identifying marker when assessing for symptoms of trauma. As previously presented, children/adolescents with symptoms of PTSD may display a normative level of problematic behaviors. However, this is a conservative interpretation which may be sample specific and a better understanding of common tendencies which are linked to symptoms of PTSD in this population is needed.

Quality of Life

Differences between the groups in regard to the overall score for quality of life were not significant. However, an interaction between gender and group was found. This was an unexpected finding given the small number of female amputee participants (N=3). Female amputees reported a lower level of QOL in comparison to male amputees. More specifically, female amputees also reported a lower level of QOL in regard to family communication, compared to male amputees. Further analyses with female amputees are warranted given their low scores. As previously stated, the scores for the female amputees were truncated due to the small female amputee sample (N=3); while they are interpreted with caution, it is important to note the significant gender differences between the groups. In addition, female amputees were also the ones who showed more externalizing behaviors than expected. It may be that acting out behaviors are associated with more difficulties with life functioning in the QOL domains (e.g. family communication and social support). The possibility of concern regarding body image and sexuality given that the average age for this group was in the early years of adolescence should be considered.

A significant relationship between overall quality of life and symptoms of PTSD was evident in both groups. As the severity of symptoms increased, QOL decreased. A closer examination of the different domains (health habits, school work, physical fitness, social support, emotional feelings, and family communications) indicated a significantly inverse relationship between symptoms of PTSD and both the social support and family communication domains for the amputee group. Children/adolescent amputees who reported a higher severity of symptoms also indicated that they experienced a lack of social support and poor family communication ("having no one to listen to them or help them and being unable to talk about their feelings, problems, or opinions with someone in their family"). However, such domain specific correlations, were not statistically significant for the comparison group. These findings support those presented by Wallander, Varni, Babani, Banis & Wilcox (1988) which state that children who experience limb loss in comparison to the normative sample experience a greater number of behavioral and emotional problems and lower social competence. Wallander, et. al., suggested that dynamic social/environmental variables such as social support and family communication can be considered mediating predictors of the psychological adaptation to the loss of a limb.

Limitations and Advantages

While the generalizability of these results is limited due to the small sample size, findings are of significant clinical importance. Results indicated that a substantial number of children/adolescents who experience the loss of a limb due to an acute physical injury experience unrecognized psychological distress. The reported interaction between group and gender are also of clinical importance as these findings indicate that a child can demonstrate atypical types of behavior and that the traditional links between gender and behavioral tendencies do not always exist. The difference in reported levels of QOL between groups and genders have also highlighted the influence of additional factors. In addition, the utilization of a comparison group assisted in accounting for the trauma experienced as a result of hospitalization and the symptoms of PTSD reported by this group were considered above and beyond that experience.

Clinical Intervention

Findings indicate the need for individualized interventions for children/adolescents who experience traumatic injuries that result in limb loss. Results indicated that a substantial number of children/adolescents who experienced the loss of a limb due to an acute physical injury experience potentially unrecognized psychological distress even after a significant period of time has elapsed since the amputation. It is also important to note that children/adolescents who fail to exhibit problem behaviors may not be identified as being at risk or experiencing psychological sequela. Clinicians and health care professionals also need to consider the child's/adolescent's cognitive ability/abstract reasoning as this may not only impede the patient from being cognitively able to label or describe symptoms. Further, the impact of experiencing an amputation during different stages of cognitive development (i.e. pre-operational) may also influence the child's ability to understand the loss.

The relationship of PTSD symptom severity and the lack of social support and communication with family members reported by the amputee sample supports previous research and this information should be utilized in the creation of psycho-educational components that may aid not only the patient, but the caregivers and family members of those who experience traumatic amputations. This information can also be utilized to create awareness within the professional health care community of the possible distress that can be experienced after traumatic limb loss.

Future Research

Due to the small sample size, findings are sample specific and may not be generalizable. Additional research with a larger sample is recommended. The amputee children/adolescents who participated in this study were 1–12 years post incident at the time of this study. This was a significant lapse in time since incident and future evaluations conducted closer to the time of accident and with less variability are warranted. The possibility of mediating variables such as religion and coping mechanisms, which were not identified in this study should also be considered. It is possible that cultural beliefs and traditions influenced participant's expressions of symptoms. Additional demographic variables such as socio-economic status, level of parental education, compliance with medical regimes, access to medical care, and level of acculturation may lead to additional findings regarding this population. Further research which considers these variables is warranted.

References

Aaron, J., Zaglul, H., & Emery, R. (1999). Posttraumatic stress in children following acute physical injury. Society of Pediatric Psychology, 24, 335-343.

Achenbach, T. (1985). Assessment and Taxonomy of Child and Adolescent Psychopathology. Newbury Park, CA: Sage Publications.

American Psychiatric Association. (1952). Diagnostic and Statistical Manual of Mental Disorders. Washington, DC: Author.

American Psychiatric Association. (1968). Diagnostic and Statistical Manual of Mental Disorders. (2nd ed.). Washington, DC: Author.

American Psychiatric Association. (1980). Diagnostic and Statistical Manual of Mental Disorders. (3rd ed.). Washington, DC: Author.

American Psychiatric Association. (1987). Diagnostic and Statistical Manual of Mental Disorders. (3rd revised ed.). Washington, DC: Author.

American Psychiatric Association. (1994). Diagnostic and Statistical Manual of Mental Disorders. (4th ed.). Washington, DC: Author.

Armsworth, M., & Holaday, M. (1993). The effects of psychological trauma on children and adolescents. Journal of Counseling and Development, 72, 49-56.

Beaufait, D., Nelson, E., Landgraf, J., Hays, R., Kirk, J., Wasson, J., Keller, A. (1992). COOP measures of functional status. In Stewart, M., Tudiver, F., Bass, M., Dunn, E., & Norton, P. Tools for Primary Care Research. London: Sage Publications, pp. 151-167.

Blanchard, E.B., Hickling, E.J., Vollmer, A.J., Loos, W.R., Buckley, T.C. & Jaccard, J. (1995). Short-term follow-up of post-traumatic stress symptoms in motor vehicle accident victims. Behavior, Research and Therapy, 33, 369-377.

Breslau, N., Davis, G., Andreski, P., & Peterson, E. (1991). Traumatic events and posttraumatic stress in an urban population of young adults. Archives of General Psychiatry, 48, 216-222.

Burges-Watson, I., Hoffman, L., & Wilson, G. (1988). The neuropsychiatry of post-traumatic stress disorder. British Journal of Psychiatry, 152, 164-173.

Burke, J.D., Jr., Borus, J.F., Burns, B.J., Millstein, K.H., & Beasley, M.C. (1982). Changes in children's behavior after a natural disaster. American Journal of Psychiatry, 139, 1010-1014.

Buscaglia, L. (1981). The Disabled and Their Parents: A Counseling Challenge. Thorofare, New Jersey: Charles Slack Inc.

Cadman, D., Boyle, M., Szatmani, P., & Offord, D. (1987). Chronic illness, disability, and mental health and social well-being: Findings of the Ontario Child Health Study. Pediatrics, 79, 805-813.

Carlson, E. (1997). Trauma Assessments: A Clinician's Guide. New York, NY: The Guilford Press.

Cavaiola, A.A. & Schiff, M. (1988). Behavioral sequelae of physical and/or sexual abuse in adolescents. Child Abuse and Neglect, 12, 181-188.

Centers, L., & Center, R. (1963). Peer group attitudes toward the amputee child. The Journal of Social Psychology, 61, 127-132.

Costello, E.J. & Pantino, T. (1987). The new morbidity: Who should treat it? Journal of Developmental Behavioral Pediatrics, 8, 288-291.

Deb, P. (1996). Journal of Etiological Community Health, 50, 391-396.

Dullingham, T., Pezzin, L., & MacKenzie, E. (1998). Incidence, acute care length of stay and discharge to rehabilitation of traumatic amputee patients: An epidemiological study. Archives of Physical Medical Rehabilitation, 79, 279-287.

Elliot, S. & Busse, R. (1991). Review of the TRF and YSR. In O.K. Buros (L.L. Murphey Ed.), Eleventh Mental Measurements Yearbook. Lincoln, NE: Buros Institute.

Eth, S. (1990). Post-traumatic stress disorder in childhood. In Hersen, M., & Last, C. (Eds.). Handbook of Child and Adult Psychopathology. New York: New York, Pergamon Press.

Eth, S., & Pynoos, R.S. (Eds.). (1985) Post Traumatic Stress Disorder in Children. Washington, DC: American Psychiatric Press.

Farber, E.D., & Joseph, J.A. (1985). The maltreated adolescent: Patterns of physical abuse. Child Abuse and Neglect, 9, 201-206.

Fitzpatrick, M. (1999). The psychological assessment and psychosocial recovery of the patient with an amputation. Clinical Orthopaedics and Related Research, 361, 98-107.

Frank, R., Kashani, J., & Kashani, S. (1986). Psychological response to amputation as a function of age and time since amputation. British Journal of Psychiatry, 144, 493-498.

Frederick, C., Pynoos, R. & Nader, K. (1992). Child Post-Traumatic Stress Disorder Reaction Index. Unpublished (Available from: Robert S. Pynoos, M.D., Adult Psychiatry, 300 UCLA Medical Plaza, Los Angeles, CA 90024-6968).

Frederick, C.J. (1985). Children traumatized by catastrophic situations. In Eth, S., & Pynoos, R. (Eds.). Post-traumatic Stress Disorder in Children. Washington, DC: American Psychiatric Press, pp. 71-100.

Frierich, W.N., & Luecke, W.J. (1988). Young school age sexually aggressive children. Professional Psychology: Research and Practice, 19, 155-164.

Frierich, W.N., & Reams, R.A. (1987). Course of psychological symptoms in sexually abused children. Psychotherapy, 24, 160-170.

Frierson, R., & Lippmann, S. (1987). Psychiatric consultation for acute amputees. Psychosomatics, 28, 183-189.

Frisch, M., Cornell, J., Villanueva, M., Retzlaff, P. (1992). Clinical validation of the quality of life inventory: A measure of life satisfaction for use in treatment planning and outcome. Psychological Assessment, 4, 92-101.

Fukunishi, I. (1999). Relationship of cosmetic disfigurement to the severity of PTSD in burn injury or digital amputation. Psychotherapy and Psychosomatics, 68, 82-86.

Glover, H. (1984). Themes of mistrust and the posttraumatic stress disorder in Vietnam Veterans. American Journal of Psychotherapy, 37, 445-452.

Green, A. (1983). Psychological trauma in abused children. Journal of the American Academy of Child Psychiatry, 22, 231-237.

Green, B., Wilson, J., & Lindy, J. (1985). Conceptualizing post-traumatic stress disorder: A psychosocial framework. In C.R. Figley (Ed.). Trauma and its wake: The Study and Treatment of Post-traumatic stress disorder. New York: Brunner/Mazel.

Harris, B., Schwaitzberg, S., & Seman, T. (1989) The hidden morbidity of pediatric trauma. Journal of Pediatric Surgery, 24, 103-112.

Harper, D., Wacker, D., & Cobb, L. (1986). Children's social preferences toward peers with visible physical differences. Journal of Pediatric Psychology, 11, 323-342.

Haviland, M., Sonne, J., & Woods, L. (1995). Beyond Posttraumatic Stress Disorder: Object relations and reality testing disturbances in physically and sexually abused adolescents. Journal of the American Academy of Child and Adolescent Psychiatry, 34, 1054-1059.

Helwig, A., & Holicky, R. (1994). Substance abuse in persons with disabilities: Treatment considerations. Journal of Counseling Development, 72, 227-233.

Holaday, M., Armsworth, M., Swank, P., & Vincent, K. (1992). Rorschach responding in traumatized children and adolescents. Journal of Traumatic Stress, 5, 119-129.

Horowitz, M. (1979). Psychological response to serious life events. In V. Hamilton and D.M. Warburton (Eds.). Human Stress and Cognition. New York: Wiley.

Lawton, M. (1997). Measures of quality of life and subjective well-being. Generations, 21, 45-48.

Kessler, R., Sonnega, A., Bromet, E., & Nelson, C. (1996). PTSD in the National Comorbidity Survey.

Koocher, G., O'Malley, J., Gogan, J., & Foster, D. (1980). Psychological adjustment among pediatric cancer survivors. Journal of Child Psychology and Psychiatry, 21, 163-173.

Lyons, J. (1987). Posttraumatic Stress Disorder in Children and Adolescents: A review of the literature. Developmental and Behavioral Pediatrics, 8, 349-356.

Massion, A., Warshaw, M., & Keller, M. (1993). Quality of life and psychiatric morbidity in panic disorder and generalized anxiety disorder. American Journal of Psychiatry, 150, 600-607.

Mardi, J., Horowitz, L. (1982). Psychological processes induced by illness, injury and loss, In Millon, T., Green, C., Meaghes, R. (Eds.). Handbook of Clinical Health Psychology, New York: New York, Plenum Press, pp. 53-67.

Martin, R. (1988). Assessment of Personality and Behavior Problems: Infancy Through Adolescence. New York, NY: The Guilford Press.

Nader, K. (1996). Psychometric review of Child PTS Reaction Index (CPTS-RI). In B.H. Stamm (Ed.), Measurement of Stress, Trauma, and Adaptation (pp. 83-86). Lutherville, MD: Sidran Press.

Norris, F. (1992). Epidemiology of trauma: Frequency and impact of different potentially traumatic events on different demographic groups. Journal of Counseling Clinical Psychology, 60, 409-418.

Nurcombe, B. (1986). The child as witness: Competency and credibility. Journal of the American Academy of Child Psychiatry, 25, 473-480.

Parks, C. (1975). Psychosocial transitions: Comparisons between reactions to loss of limb and loss of a spouse. British Journal of Psychiatry, 127, 204-211.

Perry, M.A. Doran, L.D. & Wells, E.A. (1983). Developmental and behavioral characteristics of the physically abused child. Journal of Clinical Child Psychiatry, 12, 320-324.

Peterson, K., Prout, M., & Schwarz, R. (1991). Post-traumatic Stress Disorder. New York: Plenum Press.

Rimza, M.E., & Berg, R.A. (1988). Sexual abuse: somatic and emotional reactions. Child Abuse and Neglect, 12, 201-208.

Rosenheck, R. & Nathan, P. (1985). Secondary traumatization in children of Vietnam veterans. Hospital and Community Psychiatry, 36, 538-539.

Salzinger, S., Kaplan, S., Pelcovitz, D., Samit, C., & Krieger, R. (1984). Parent and teacher assessment of children's behavior in child maltreating families. Journal of the American Academy of Child Psychiatry, 23, 458-464.

Setoguchi, Y. & Rosenfelder, R. (1982). The Limb Deficient Child. Springfield: Thomas C Publishers.

Shukala, G., Sahu, C., Tripathi, R. (1982). A psychiatric study of amputees. British Journal of psychiatry, 141, 50-54.

Smith, S., Griner, D., Mutual, P., & Guidera, K. (1986). The spectrum of pediatric traumatic amputations. Pediatrics, 98, 569-573.

Svoboda, J. (1992). Psychosocial considerations in pediatrics: Use of amputee dolls. Journal of Prosthetics and Orthotics, 4, 207-212.

Terr, L. (1985). Children traumatized in small groups. In S. Eth & R.S. Pynoos (Eds.). Post-traumatic stress disorders in children (pp. 45-70). Washington, DC: American Psychiatric Press.

Trimble, R. (1981). Post-traumatic Neurosis. New York: John Wiley and Sons.

Tong, L., Oates, K., & Mc Dowell, M., (1987). Personality development following sexual abuse. Child Abuse and Neglect, 11, 371-383.

Turner, R., & Beiser, M. (1990). Major depression and depressive symptamotology among the physically disabled: Assessing the role of chronic stress. Journal of Nervous and Mental Disease, 178, 343-350.

Van der Kolk, B.A. (1988). The trauma spectrum: The integration of biological and social events in the genesis of the trauma response. Journal of Traumatic Stress, 1, 273-290.

Varni, J., Rubenfeld, L., Talbot, D., & Setoguchi, Y. (1989). Family functioning, temperament, and psychologic adaptation in children with congenital or acquired limb deficiencies. Pediatrics, 84, 323-330.

Varni, J., & Setoguchi, Y. (1991). Psychosocial factors in the management of children with limb deficiencies. Physical Medicine and Rehabilitation Clinics of North America, 2, 395-404.

Varni, J., & Setoguchi, y. (1992). Screening for behavioral and emotional problems in children and adolescents with congenital or acquired limb deficiencies. American Journal of Disease of Children, 146, 103-107.

Varni, J. & Setoguchi, Y. (1993). Effects of parental adjustment on the adaptation of children with congenital or acquired limb deficiencies. Developmental and Behavioral Pediatrics, 14, 13-20.

Viemero, V., & Krause, C. (1998). Quality of life in individuals with disabilities. Psychotherapy Psychosomatics, 67, 317-322.

Wallander, J., Varni, J., Babani, L., & Wilcox, K. (1988). Children with chronic physical disorders: Maternal reports of their psychological adjustment. Journal of Pediatric Psychology, 13, 197-212.

Warshaw, M., Fierman, E., Pratt, L., Hunt, M., Yonkers, K., Massion, A., & Keller, M. (1993). Quality of life and dissociation in anxiety disorder patients with histories of trauma or PTSD. American Journal of Psychiatry, 150, 1512-1516.

Wasson, J., Kairys, S., Nelson, E., Kalishman, N., & Baribeau, P. (1994). A short survey for assessing health and social problems of adolescents. The Journal of Family Practice, 38, 489-494.

Weissman, M. (1991). Panic disorder: Impact on quality of life. Journal of Clinical Psychiatry, 52 (Feb. suppl.), 6-8.

Wesson, DE., Scorpio, R., Spence, L., Kenney, B., Chipman, M., Netley, C., & Hu, X. (1992). The physical, psychological, and socioeconomic costs of pediatric trauma. Journal of Trauma, 33, 252-255.

Wesson, DE. Williams, J., & Spence, L. (1989). Functional Outcome in Pediatric Trauma. Journal of Trauma, 29, 589-597.

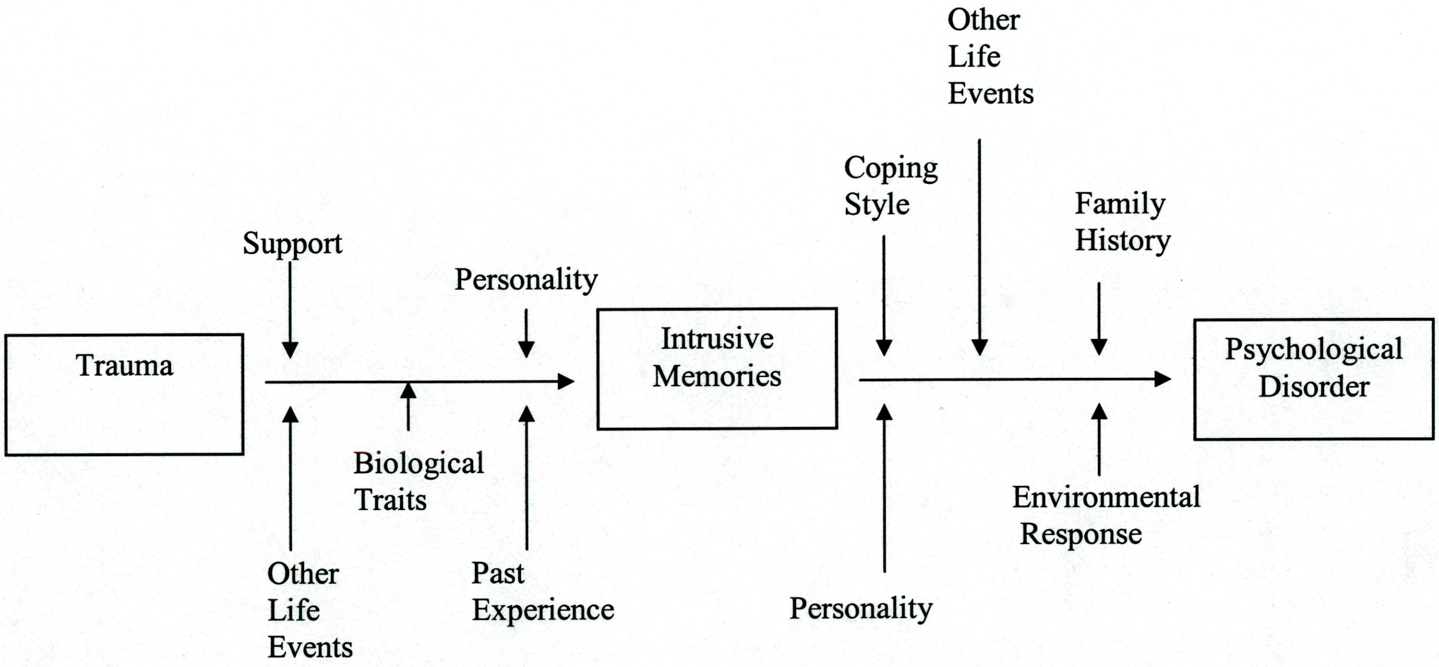
Wilson, J. & Kraus, G. (1985). Predicting post-traumatic stress disorder among Vietnam Veterans. In W.E. Kelly (Ed.). Post-traumatic Stress Disorder and the War Veteran Patient. (pp. 102-147). New York: Brunner/Mazel.

Zatzick, D., Weiss, D., Marmar, C., Metzler, T., Wells, T., Golding, K., Stewart, J., Schlenger, W. & Browner, W. (1997). Posttraumatic stress disorder and functioning and quality of life outcomes in a nationally representative sample of male Vietnam veterans. Journal of Clinical Psychiatry, 154, 1690-1695.

Zatzick, D., Weiss, D., Marmar, C., Metzler, T., Wells, T., Golding, K., Stewart, J., Schlenger, W. & Browner, W. (1997). Posttraumatic stress disorder and functioning and quality of life outcomes in female Vietnam veterans. Military Medicine, 162, 661-665.

Zippen, D. (1994). Overview of Achenbach Behavior Checklists. Published by Los Angeles County – Department of Mental Health Children and Family Services Bureau.

Appendix A



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Appendix B

Informed Consent: English Version

Pediatric Amputations: PTSD, Behavioral Tendencies and Quality of Life

We are asking your permission to invite your child to participate in this study because he/she has experienced a physical injury that caused him/her to be hospitalized. Before you give permission for your child to participate, please read the following description of the study and feel free to ask any questions.

Purpose

The purpose of this study is to learn more about the emotions and behaviors of children and adolescents between 11-16 years of age who have experienced an injury that led to hospitalization. Approximately 60 participants will be in this study, half of whom will be amputees. Little is known about this group of children; the goal of this study is to provide information that will allow for better care of individuals who experience similar injuries.

Procedure

If your child participates in this study, you will be asked to bring your child to the hospital for him/her to participate in an interview and complete a questionnaire. You will be asked to wait for your child while he/she participates so that your presence does not influence his/her answers. Your child will be asked questions about the accident, his/her injury, his/her feelings after the injury and questions regarding his/her behaviors. This will take approximately 60 minutes to complete. Your child's answers will not include his/her name. All information will be confidential and used only for this research project. The original data will be locked in Dr. Sonne's lab in the Department of Psychology at Loma Linda for a minimum of 3 years. This would change to a maximum of 5 years if the study is published. After this time, the data will be destroyed by either Ms. Macias or Dr. Sonne.

Risks/Discomforts

It may be uncomfortable for your child to answer certain questions about the accident or injury. Please understand that your child is free to refuse to answer any questions or to end the interview at any time. Your child is unlikely to experience any physical risk and the possibility of emotional distress is minimal.

Benefits of the Research

While there is no direct benefit in having your child participate in this study, he/she may appreciate the opportunity to share details and feelings about the experience. In the future, other children who experience similar injuries may be better served by increased awareness of medical caregivers.

Participants' Rights

Your child's participation in this study is completely voluntary. You have the right to refuse your permission or to withdraw your child from this study at any time without negative consequences. There will be no change in your child's status as a patient if you decide that he/she will not participate in this research.

Confidentiality

No information, which identifies your child or family, will be released.

Additional Costs/Reimbursements

There will be no cost for your child's participation in this study. As an expression of appreciation, for his/her participation, your child will receive a three-dollar gift certificate to Mc Donald's.

Who To Contact With Questions

If you have general questions regarding the study, please ask Ms. Adriana Macias or contact her supervisor Dr. Janet Sonne at Lorna Linda University - Department of Psychology (909) 558-8710.

For questions regarding medical treatment at Shriner's Hospital, please contact Dr. Yoshio Setoguchi at (213) 387-7528. If you are interested in obtaining referrals to mental health services or have other inquiries regarding community programs/resources, please contact Ms. Leigh Gegenberg who is the social worker for Shriner's Hospital of Los Angeles at (213) 387-7528.

If you wish to contact an impartial third party, who is not associated with this study, regarding any questions, concerns, or complaints you may contact the patient representative office at Loma Linda University Medical Center. Please call (909) 558-4647 for assistance.

Informed Consent

Once you have read the contents of this form, your signature will indicate that you have given your voluntary permission for your child to participate. This consent does not waive your rights, nor does it release the investigators, institution, or sponsors from their responsibilities. You may call the graduate student investigator, Adriana Macias or the faculty advisor, Janet Sonne, Ph.D., at Loma Linda University, Department of Psychology during routine office hours at (909) 558-8710 if you have additional questions or concerns. You will be given a copy of this form.

______________________________ ______________________________

Name of Participant (minor) Date

______________________________ ______________________________

Parent/Guardian Signature Date

Informed Consent: Spanish Versión

Amputaciones en Niños y Adolescentes: Trastorno por Estres Postraumatico, Comportamientos y Cualidad de Vida

Estamos pidiendo su permiso para invitar a su hijo(a) a participar en este estudio porque él (ella) a tenido una lesión física la cual ha ocasionado que haya sido hospitalizado(a). Antes que de su permiso para que su hijo(a) participe por favor lea la siguiente descripción del estudio y siéntese libre de hacer cualquier pregunta.

Propósito

El objetivo de este estudio es de aprender mas acerca de las emociones y comportamientos de niños y adolescentes entre 11-16 anos de edad, quienes han sufrido una lesión física la cual lo(a) a llevado a ser hospitalizado(a). Aproximadamente 60 participantes estarán en este estudio. La mitad de ellos serán individuos que han tenido una amputación. Se sabe muy poco acerca de este grupo de niños y adolescentes, la meta de este estudio es de proveer información que permitirá que individuos que han pasado por experiencias similares puedan recibir mejor cuidado.

Procedimiento

Si su hijo(a) participa en este estudio se le pedirá que traiga a su hijo(a) al Hospital para que el(ella) participe en una entrevista y complete un cuestionario. Se les pedirá a los padres que esperen mientras que su hijo(a) participe para que su presencia no afecte las respuestas de su hijo(a). A su hijo(a) se le preguntara acerca del accidente, sus heridas, sus sentimientos después del accidenté y su comportamiento. Esto tomara aproximadamente 60 minutos. Las respuestas de su hijo(a) no tendrán su nombre. Toda la información será confidencial y usada solo para este proyecto. La información será archivada en el laboratorio de la Dra. Sonne por un mínimo de 3 anos. Si el estudio es publicado, la información será guardada por un máximo de 5 anos. Después de este tiempo, la información será destruida por la Señorita Adriana Macias o la Dra. Sonne.

Riesgos

Responder a ciertas preguntas acerca del accidentes 0 de sus heridas puede ser incomodo para su hijo(a). Por favor entienda que el (ella) es libre de negarse a responder a cualquier pregunta 0 de negarse en cualquier momento a terminar la entrevista. Es improbable que Su hijo(a) experimente un riesgo físico y la posibilidad de estrés emocional es mínima.

Beneficios del estudio

Por el momento no abra un beneficio directo para su hijo(a) al participar en este estudio. Él (ella) puede beneficiarse de la oportunidad de compartir detalles y sentimientos acerca de su experiencia. En el futuro, niños que han experimentado lesiones similares pueden tener mejor cuidado medico.

Derechos del Participante

La participación de su hijo(a) en este estudio es totalmente voluntaria. Usted tiene el derecho de negar su permiso 0 de retirar a su hijo(a) de este estudio en cualquier momento sin que esto resulte en consecuencias negativas. No habrá ningún cambio en él estatus de su hijo(a) como paciente si usted decide que él (ella) no participara en el estudio.

Confidencial

Ninguna información que identifique a su hijo(a) 0 a su familia será dada a conocer.

Costos y Reembolsos

No habrá ningún costa por la participación de su hijo(a). Como una expresión de agradecimiento, su hijo(a) recibirá un vale de tres dólares para McDonald's por su participación.

A quien llamar con preguntas

Si tiene preguntas generales acerca del estudio, por favor pregúnteselas a Adriana Macias o comuníquese con su supervisora, la Doctora Janet Sonne a la Universidad de Loma Linda en el Departamento de psicología (909) 558-8710.

Para preguntas acerca del tratamiento medico que recibe su hijo(a) en el Hospital Shriner's por favor llame al Doctor Yoshio Setoguchi al (213) 387-7528. Si usted esta interesado en obtener referencias para servicios de salud mental 0 si tiene algunas otras preguntas acerca de programas comunitarios o de recursos, por favor llame a la Señorita Leigh Gegenberg quien es la trabajadora social para el Hospital Shriner's de Los Ángeles. Se puede comunicar con ella al (213) 387-7528.

Si gusta comunicarse con un grupo neutral el cual no es asociado con este estudio para hacer preguntas 0 si tiene alguna queja, puede llamar a la oficina de representación para el paciente al Centro Medico de Loma Linda. Por favor llame al (909) 558-4647.

Consentimiento

Al terminar de leer esta forma, su firma indicara que usted a dado su permiso voluntariamente para que su hijo(a) participe en el estudio. Este permiso no significa que renuncie a sus derechos ni libera a los investigadores, la institución o los patrocinadores de sus responsabilidades. Usted puede llamarle a la investigadora Adriana Macias 0 a su profesora encargada del proyecto, la Dr. Janet Sonne al Departamento de Psicología en la Universidad de Loma Linda durante horas de oficina al (909) 558-8710 si tiene preguntas adicionales o cualquier duda.

Se le dara una copia de esta forma.

______________________	______________________
Nombre del Participante (menor)	Fecha
______________________	______________________
Firma del Padre/Guardian	Fecha

Appendix C

Informed Assent: English Version

Would you help some of your doctors learn more about what the best way is to help children and teenagers who have had an accident like yours? You are invited to be in a study that will ask you to tell us about your feelings, your daily activities and how your life is going after your accident and stay in the hospital.

If you agree to help us do this study, here is what will happen: you will meet with Adriana Macias who will ask you some questions and then you will also be asked to complete a short survey. It will take you about 60 minutes to finish all the questions. If you feel uncomfortable in any way while you are doing these things, you can tell her so. You can even stop at anytime if you are really bothered by the questions.

You do not have to help with this study in order for your doctors to continue taking care of you. They will not feel bad if you choose not to answer the questions.

If you decide to participate, you will receive a three-dollar gift certificate to Mc Donald's.

Do you have any questions about helping with this study? If so, please feel comfortable asking the person who gave you this form. If you want to say "yes" to being part of this study, just sign on the line below.

Thank you for this chance to explain our study to you.

_____________________________ _____________________________

Participant Signature Date

Informed Assent: Spanish Version

Le ayudarías a tu doctor a aprender mas acerca de cual seria la mejor manera de ayudar a niños y adolescentes que han tenido un accidente como el tuyo? Estas invitado a participar en un estudio que te preguntara acerca de tus sentimientos, tus actividades diarias y como es tu vida después de tu accidente.

Si nos ayudas con este estudio, tu conocerás a Adriana Macias quien te hará unas preguntas y luego te pedirá que llenes un cuestionario. Te tomara 60 minutos para terminar todas las preguntas. Le puedes decir a ella si te sientes incomodo al estar haciendo esto.

Puedes dejar de participar a cualquier momento si te sientes molesto. No tienes que ayudar en este estudio para que tus doctores continúen tu cuidado medico. Ellos no se sentirán mal si tu decides no contestar alas preguntas.

Si decides participar, recibirás un vale de tres dólares para McDonald's.

Tienes preguntas acerca de este estudio? Si tienes alguna duda por favor pregúntale a la persona que te dio esta forma. Si quieres participar en el estudio, por favor firma sobre la línea que aparece abajo.

Gracias por la oportunidad de explicarte nuestro proyecto.

______________________________	______________________________
Firma del Participante	Date

Appendix D

Screening Questionnaire

1) History of previous trauma?
2) History of abuse (emotional, physical, or sexual)?
3) History of psychiatric condition?

Appendix E

Demographic Questionnaire: Amputee Group

1. ID #: __________
2. Sex: ____Male ____Female
3. Age: ____ Birthdate: _________________
4. Ethnicity: ____Caucasian ____African American ____Hispanic ____Other
5. Primary Language: ____English ____Spanish ____Other
6. Who did you live with at the time of the accident?

   ____

7. Who do you live with now?

   ____

8. What type of injury did you have?

   ____

9. How old were you at the time of the accident? _______________________
10. Time since loss: ___ Less than 1 year ___ 1-2 years ___ 2-3 years ___ 3-4 years

    ___ 4-5 years
11. Who was with you during the accident? ____________________________
12. Type of limb Loss: ____ Upper – what part __________________________

    ____ Lower – what part ___________________________
13. Do you wear a prosthesis? _________
14. Did you receive any type of counseling services after your amputation? ______

    If yes, for how long? _________
15. Are your parents married, separated or divorced? ____________
16. How old is your Mother? ______
17. How old is your Father? ______
18. Does your Mother have a job? ____________
19. Does your Father have a job? ____________
20. How many brothers and sisters do you have? ______

Demographic Questionnaire: Comparison Group

1. ID #: __________
2. Sex: ____Male ____Female
3. Age: ____Birthdate: _________________
4. Ethnicity: ____Caucasian ____African American ____Hispanic ____Other
5. Primary Language: ____English ____Spanish ____Other
6. Who did you live with at the time of the accident?

   ____

7. Who do you live with now?

   ____

8. What type of injury did you have?

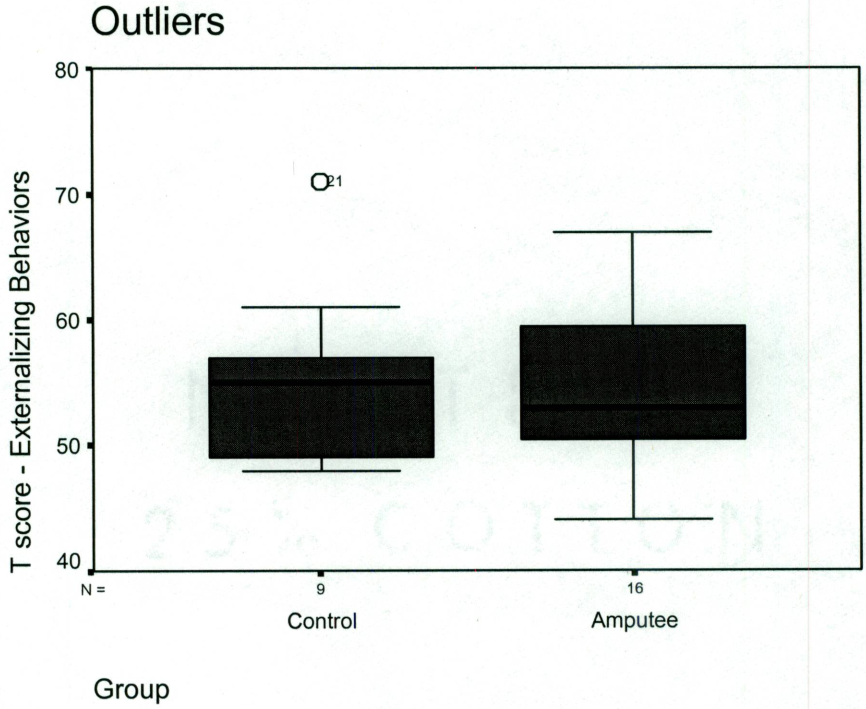
   ____

9. How old were you at the time of the accident? ______________________
10. Time since accident: ___ Less than 1 year ___ 1-2 years ___ 2-3 years

    ___ 3-4 years ___ 4-5 years
11. Who was with you during the accident? ___________________________
12. Did you receive any type of counseling services after your accident? ______

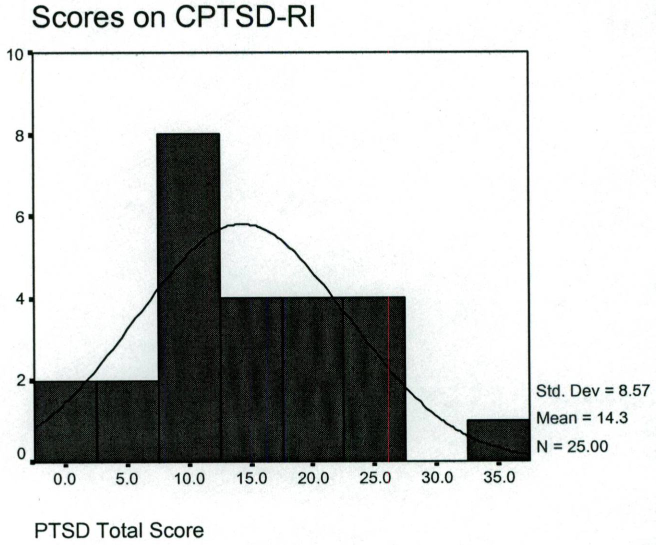
    If yes, for how long? _________
13. Are your parent married, separated or divorced? ____________
14. How old is your mother? ______
15. How old is your father? ______
16. Does your mother have a job? ____________
17. Does your father have a job? ____________
18. How many brothers and sisters do you have? ______

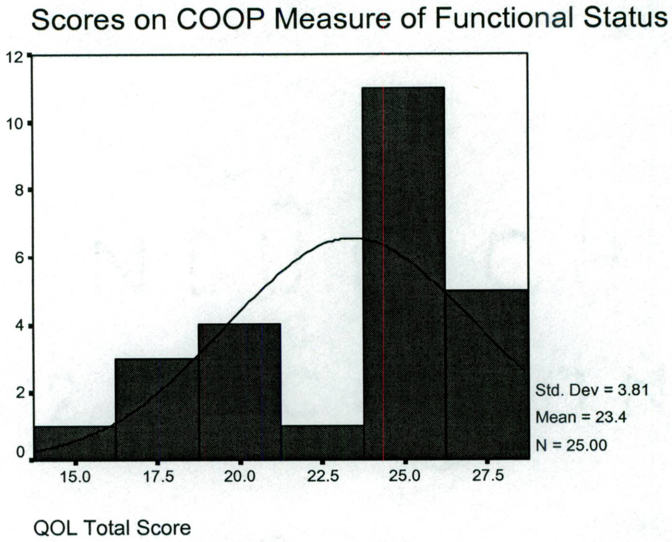
Appendix F


Outliers
T score - Externalizing Behaviors
80
70
60
50
40
21
N =
9
16
Control
Amputee
Group

Appendix G

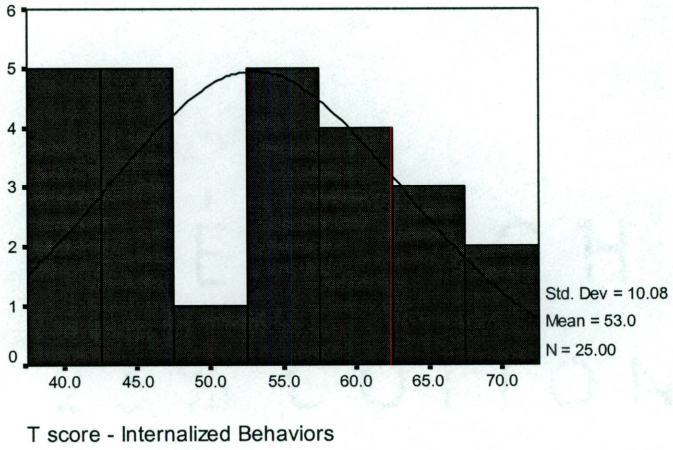
Histograms





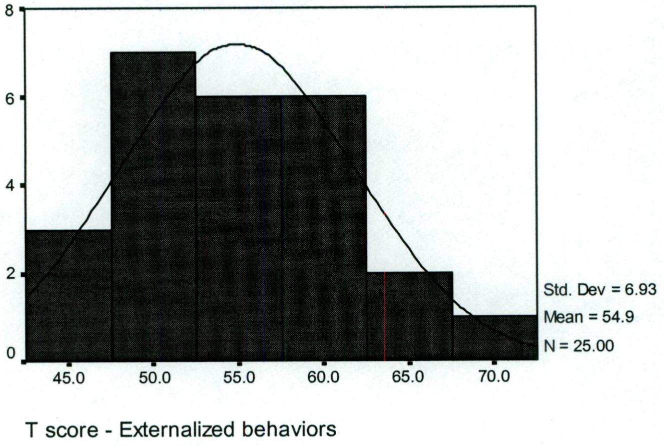
T-Scores on YSR

Internalizing Broad-Band



T-Scores on YSR

Externalizing Broad-Band



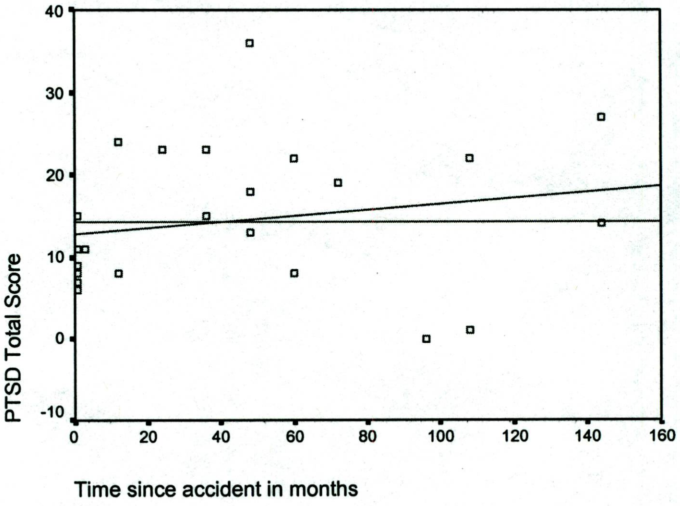
Appendix H

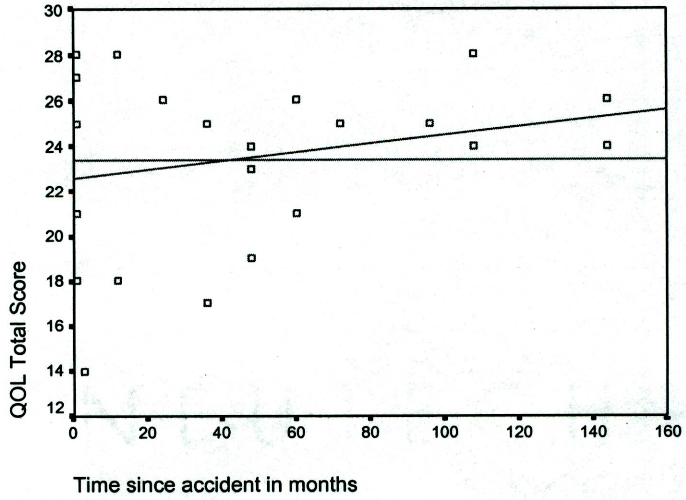
Correlation Matrix

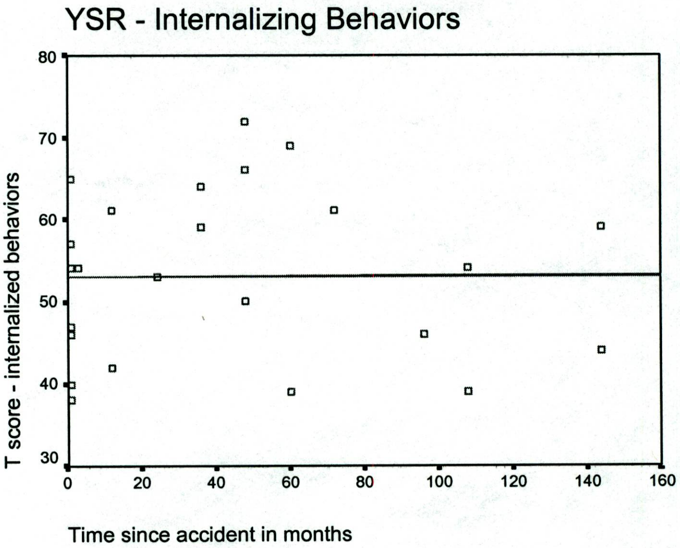
	Time since incident (months)
Age at the time of accident/amputation (years)	-.893**

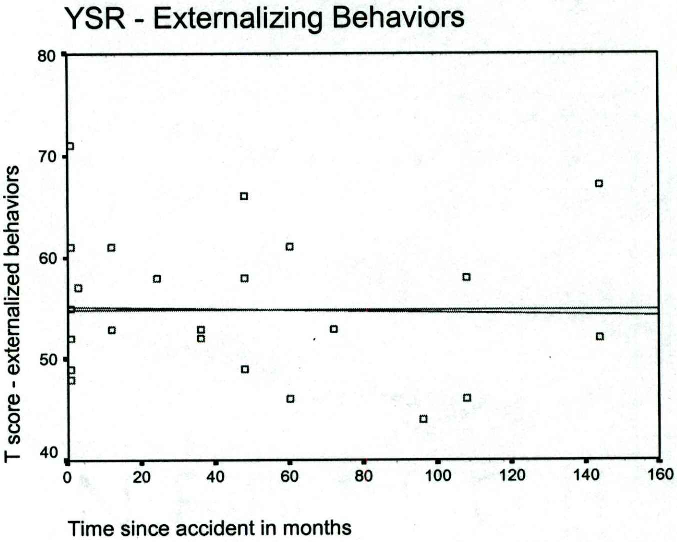
**Correlation is significant at the .01 level (1 tailed).

Appendix I


CPTSD-RI


COOP Measure of Functional Status


YSR - Internalizing Behaviors
T score - internalized behaviors
30
40
50
60
70
80
0
20
40
60
80
100
120
140
160
Time since accident in months


YSR - Externalizing Behaviors
T score - externalized behaviors
40
50
60
70
80
0
20
40
60
80
100
120
140
160
Time since accident in months