Acute Injury Patterns of Intimate Partner Violence Victims

Daniel J. Sheridan and Katherine R. Nash

*Trauma Violence Abuse* 2007; 8: 281
DOI: 10.1177/1524838007303504

The online version of this article can be found at:
http://tva.sagepub.com/cgi/content/abstract/8/3/281
ACUTE INJURY PATTERNS OF INTIMATE PARTNER VIOLENCE VICTIMS

DANIEL J. SHERIDAN  
Johns Hopkins University School of Nursing

KATHERINE R. NASH  
Johns Hopkins University School of Nursing

Although millions of women receive injuries from intimate partner violence (IPV) each year in the United States alone, there has been only limited research of acute injury patterns and the types, locations, and mechanisms of IPV injuries. The mechanism of being punched to the face with a fist resulting in blunt trauma–related injuries is most commonly reported. Strangulation, especially manual strangulation, is a frequently cited mechanism of injury; however, less is known about the types of injuries that result from strangulation. In general, clinicians should assess all patients who present for treatment of head, neck, and face injuries for IPV. There is little consistency between and much inaccuracy with medical terms used to describe types of injuries. To increase the accuracy and generalizability of findings from studies of acute IPV injuries, researchers need to use more standardized medical forensic terminology.

Key words:  acute injury patterns; bruising; domestic violence; forensics; intimate partner violence; location of injury; mechanism of injury; type of injury

EACH YEAR IN THE UNITED STATES alone, several million people, mostly women, receive acute physical injuries from intimate partner violence (IPV). The injuries vary from minor abrasions and bruises to multisystem trauma that can result in death. The purpose of this article is to describe the mechanisms, locations, and types of injury to women who have survived IPV that have been reported in the literature. The goal is to help service providers better understand where to look for IPV-related injuries and to help the providers better differentiate injuries that may have occurred accidentally versus injuries inflicted intentionally.

MECHANISM OF INJURY

Few studies have looked specifically at mechanism of injury in victims of IPV; even fewer have linked mechanism to the type and location of injury. Mechanism of injury can be defined as the exchange of physical forces that result in injury, whether from the force of a fist, a bottle, or a bullet. In general, research into violence-related injury mechanisms has been limited to subjective histories by witnesses and victims of assaults. Bias from relying on such self-reports is unavoidable but acceptable because it is unethical to purposely injure people to study...
mechanisms of injury. Research that examines mechanisms of injury in IPV patients provides health care providers and others an understanding of the locations and severity of injuries patients experience at the hands of their partners.

Obtaining an accurate understanding of mechanisms of injury to IPV victims is difficult because there is not a standardized method of describing or defining how injuries occur. In a recent emergency department chart review study, Biroscak, Smith, Roznowski, Tucker, and Carlson (2006) did not adequately explain how certain E codes (external causes of injury/adverse effect codes) were defined and applied to medical records of more than 1,100 female IPV patients. Biroscak et al. stated the “most common causes of victims’ injuries . . . (as indicated by E Codes) were being struck by/against and battering/maltreatment/neglect, comprising 41% and 25% of reported mechanisms, respectively” (p. 14). These E codes were not defined. It is unclear how battering differs from being struck. The Centers for Disease Control and Prevention (CDC; 2000) included a mechanism of injury called being “beat up” but did not define nor explain how being “beat up” may differ from other mechanisms of injury, such as being “hit with fist.”

**Blunt Force Injury**

Blunt force trauma is caused by crushing impact and/or by a strike from a blunt object (Besant-Matthews, 2006) and can result in the following four distinct injury categories: (a) abrasions, (b) contusions, (c) lacerations, and (d) fractures (Besant-Matthews, 2006; Rooms & Shapiro, 2006). The incidence of blunt force injury among IPV victims has been reported as 31.1% (Celbis, Gokdogan, Kaya, & Gunes, 2006). Being struck with a hand is by far the most common mechanism of injury among IPV victims, whether it be a punch (closed fist) or a slap (open hand) (Brismar, Bergman, Larsson, & Strandberg, 1987; CDC, 2000; Muelleman, Lenaghan, & Pakieser, 1996). It is important for researchers to differentiate between being struck with a fist versus being slapped with an open hand because different amounts of force are generated with greatly varying types of injuries. For example, being slapped may not require medical attention and usually results in transient redness and welts to the body. IPV victims who have been slapped may not seek medical care, police interventions, and/or crisis services and therefore would likely not be included in most IPV studies.

However, being slapped to the side of the face over one’s ear could result in a ruptured tympanic membrane. Although this is not a commonly reported condition, when it occurs, it is usually very painful and can be very specific for IPV. Being punched can result in severe bruising, lacerations, fractures, and/or internal injuries. Kicking is even less common but can be more injurious to the victim (Brismar et al., 1987; Muelleman et al., 1996). Other nonweapon blunt-like mechanisms of injury reported in the literature include being pushed, shoved, and knocked down, and having one’s head banged against a wall or floor.

Being hit by a fist is the most commonly reported mechanism of injury causing maxillofacial or ocular injuries to IPV victims, with the...
second most common cause being struck by an inanimate object used as a weapon (Beck, Freitage, & Singer, 1996; Le, Dierks, Ueeck-Homer, & Potter, 2001). Seventeen percent of women stated that at some point in their lifetimes they were hit or almost hit with an object by an intimate partner (CDC, 2000). In a study of more than 400 known or probable female IPV victims, 30% of injuries to these IPV victims were caused by being hit with an object (Muelleman et al., 1996).

**Injuries from Weapons and Objects Used as Weapons**

Of 243,000 victims of IPV contained in databases maintained by the Bureau of Justice Statistics and the Federal Bureau of Investigation, Greenfeld et al. (1998) reported gun, knife, or stab wounds accounted for only 0.5% of injuries, which is consistent with other studies (Tjaden & Thoennes, 1998). Sharp injury among IPV victims, caused by a knife or other sharp penetrating object, has been reported as 2.5% in Turkey (Celbis et al., 2006). Weapons (items designed to inflict harm such as a knife or gun) are a far less common source of injuries in IPV as compared to everyday household objects that are used as weapons (Berrios & Grady, 1991; CDC, 2000). There may be two reasons why weapons are a far less common cause of IPV injuries than objects used as weapons. The first is related to study design. If an IPV victim is killed by a weapon, this person would not have been included in most of the studies reviewed for this article. Second, from a more practical viewpoint, common household objects are more readily accessible, hence used during an argument.

**Injuries from Strangulation**

“Choking,” more accurately defined as *strangulation*, is a common mechanism of injury in victims of IPV and is often underassessed and underappreciated by health care professionals. Berrios and Grady (1991) reported nearly one fourth of IPV victims in their study who were seeking emergency department treatment experienced strangulation, whereas, a decade later, the prevalence of strangulation by an intimate partner was reported to be 54% and 68%, respectively (Sutherland, Bybee, & Sullivan, 2002; Wilbur et al., 2001).

In Sweden, the incidence of strangulation among IPV victims was 15% (Brismar et al., 1987). In Turkey, anoxia and/or asphyxia was reported at a rate of only 0.1% among 2,245 women who presented to legal medicine clinics between 1996 and 2000 (Celbis et al., 2006). When strangulation occurs, Strack, McClane, and Hawley (2001) found the overwhelming mechanism of injury used most often by assailants involved compression of structures in the neck by hands (97%) followed by ligatures (3%).

**Sexual Assault–Related Mechanisms of Injury**

Sexual assault has been studied by researchers under the category of a mechanism and/or type/location of injury. For example, Berrios and Grady (1991) described *sexual assault* as a location of injury, whereas Sutherland et al. (2002) described *sexual assault* as a mechanism of injury.

Sexual assault is a very broad category and can include possible injury to the vagina, anus and/or rectum, oral cavity, penis, or scrotum. The mechanism of injury from sexual assault is dependent on the object(s) used to touch or penetrate the victim. It is important to note many sexual assaults result in no visible physical injury. Injuries to the genitalia were found in only one third of victims (Anderson, McClain, & Riviello, 2006). Injuries to the genitalia occurred less often when the assailant was known to the victim (Jones, Wynn, Kroeze, Dunnuck, & Rossman, 2004). Injuries to areas of the body other than the genitalia can result from sexual assault, especially injuries to the lower extremities (Jones et al., 2004).

As a mechanism of injury, the incidence of sexual assault among IPV victims was reported to be 3% in Sweden and 7.2% in Turkey (Brismar et al., 1987; Celbis et al., 2006, respectively). Statistics in the United States vary greatly from 6% to 32% (Greenfeld et al., 1998; Sutherland et al., 2002).
Miscellaneous Mechanisms of Injury

Biting is a specific mechanism of injury that can occur in almost all locations of the body resulting in several types of injury such as avulsions, bruising, lacerations, abrasions, amputation, or partial amputation of a body part and/or transient teeth impressions. Although we have provided clinical care to numerous women who have been bitten by intimate partners, the literature is almost silent on bites as a mechanism of injury from IPV. Le et al. (2001) assessed for bite injuries and found only 3 of 236 domestic violence patients presenting to a Level I trauma center reported being bitten.

A burn is a mechanism and type of injury. In IPV cases, burns are relatively rare. Most studies of injuries from IPV do not specifically address burns, with a few exceptions. In Berrios and Grady’s (1991) sample of 218 women, only 3 women (1%) were burned. Tjaden and Thoennes (2000) found 1.3% of their sample of 602 IPV physical assault victims were burned.

Only one of the reviewed articles discussed hair pulling as a mechanism of injury. None of the reviewed articles discussed the types of injuries that can result from having one’s hair pulled. Tjaden and Thoennes (1998) found a lifetime prevalence rate for hair pulling of 9.1% for women and 2.3% for men. Hair pulling is painful and can result in minor traumatic alopecia (hair loss) to traumatic scalping of skin and hair. Severe hair pulling can also cause trauma to the cervical spine. Hair pulling has been reported clinically as occurring frequently and is used to exert control over women (Sheridan, 2001).

Multiple Mechanisms of Injury

The large study of Muelleman et al. (1996) found nearly 65% of victims of IPV suffered multiple mechanisms of injury. Similar findings were noted in a recent study in the Netherlands (Reijnder, Van der Leden, & De Bruin, 2006). It is not surprising that some studies found that with the use of multiple mechanisms of violence, multiple injuries, and locations are more likely (Amar & Gennaro, 2005).

LOCATION OF INJURY

Several studies have looked specifically at the location of injuries received among victims of domestic violence. According to research, areas of the head, neck, and face (HNF) are the most common reported sites of injury, ranging in frequency from 50% to 80% (Berrios & Grady, 1991; Birosca et al., 2006; CDC, 2005; Fonseka, 1974; Greenfeld et al., 1998; Petridou et al., 2002). This area has been significantly associated with IPV (Muelleman et al., 1996; Ochs, Neuenschwander, & Dodson, 1995). Specifically, the middle third of the face has been found to be the most at risk (Le et al., 2001). This is followed by upper extremity injuries, which is consistent with the likelihood of receiving defense injuries. The least common sites of injury are to the abdomen and back (Brismar et al., 1987). These studies, however, were limited to patients with nonfatal injuries.

Nearly 10% of IPV victims experience genital injury, which may be a result of sexual assault (Amar & Gennaro, 2005). Wadman and Muelleman (1999) found an even higher number among IPV victims (13.3%) who were eventually killed in IPV-related homicides. Wadman and Muelleman noted that this “may indicate a higher homicide risk for this type of injury” (p. 690).

In a Dutch study, 85% of IPV victims had injuries to multiple sites of the body (Reijnder et al., 2006). However, in a U.S. study, Le et al. (2001) found one half of the 236 female IPV victims they studied had injuries only to the maxillofacial area as compared to women who had injuries to the face and other sites (31%). Fourteen percent of their sample had injuries that did not involve the face.

A study done in Greece found that women with multiple injuries were 15 times more likely to present with a history of IPV as the cause of their injuries when compared to women with a single injury (odds ratio [OR] = 15.15; 95% confidence interval [CI] = 11.61–19.77) (Petridou et al., 2002). One study found 79% of IPV injuries were located in areas of the body readily visible to casual observers (Reijnder et al., 2006).

Crandall, Nathens, and Rivara (2004) found women who received intentional injuries were
at increased risk to receive facial trauma when compared to women who experienced unintentional injuries from such mechanisms as motor vehicle crashes or falls. However, violence by nonintimates has been found to produce a similar number of HNF injuries as compared to IPV, when both genders of the victim are considered (Greenfeld et al., 1998). When looking specifically at orbital fractures among female patients, it has been reported that one third resulted from sexual assault or IPV and another one third from motor vehicle accidents (Hartzell, Botek, & Goldberg, 1996).

Injury location has been studied to determine whether it is predictive of IPV, specifically HNF injuries. Carey, Perciaccante, and Dodson (1999) reported HNF injuries to female trauma patients were associated with an increased risk of being a victim of IPV (relative risk [RR] = 9, \( p < .001 \)). Ochs et al. (1995) found patients presented to the emergency department (ED) for treatment of HNF injuries were 11.8 times more likely to be victims of IPV as compared to patients with traumas to other parts of the body. This resulted in a high sensitivity (95%) but a lower specificity (45%). In other words, 95% of persons known to be victims of IPV had injuries involving the HNF, with 45% of persons presenting with no injuries to the HNF not being IPV victims. A subsequent study noted similar results with sensitivity (91.2%) and a slightly higher specificity (59.1%) (Perciaccante, Ochs, & Dodson, 1999).

**TYPES OF INJURIES**

Many studies about IPV injuries made either no attempt to classify IPV injuries by the type of injury or were not thorough in defining types of injuries with a few notable exceptions. Two studies combined various types of injuries into a generic category called “soft tissue injuries or lesions” (Balci & Ayranci, 2005; CDC, 2005) that combined such injury types as bruises, abrasions, lacerations, and punctures but separated cuts into a different injury type.

Amar and Gennaro (2005), in their study of 132 college women, made an effort to classify injuries by type; however, they blended in their analysis medical forensic wound types that have very distinct and different mechanisms of injury. They reported 13 women received injury from “lacerations/cuts,” injuries caused by different mechanisms.

Lacerations to the skin or underlying organs are caused by significant blunt or shearing forces. Theses forces to the skin, usually over a bony surface, or other internal organs splits and/or tears apart the tissue whereas cuts (incisions) are caused by a sharp object that slices through the skin or internal organ (Brockmeyer & Sheridan, 1998; Rooms & Shapiro, 2006; Sheridan, 2001, 2003).

Although the medical treatment of cuts versus lacerations is similar, the wounds look much different externally and internally. In addition, when lacerations occur from blunt trauma to the body there is a greater likelihood of additional trauma to underlying structures and organs as compared to cuts that usually only involve the area actually touched by a sharp object (Besant-Matthews, 2006).

Berrios and Grady (1991) reviewed injuries to 218 women and reported 86 (39%) had lacerations. They did not have as a reporting category cuts and/or incisions; however, in their description of types of weapons used, they reported 23 (11%) of the women were injured with a knife.

None of the studies defined the specific injury types that were reported. In clinical practice, there is much misuse and confusion among health professionals of common forensic terms such as bruising and ecchymosis and the afore-discussed differences between lacerations and cuts (Brockmeyer & Sheridan, 1998; Sheridan, 2001, 2003). A bruise and a contusion are synonyms and are defined as discoloration under the skin from blunt or compression forces that result in bleeding from vessels (Merriam-Webster’s Medical Desk Dictionary, 1996).

None of the studies discussed the term ecchymosis that is often erroneously used as a synonym for a contusion and/or bruise (Sheridan, 2001, 2003). Ecchymosis is best defined as the oozing or leakage of blood (extravasation) from vessels under the skin not directly caused by blunt or squeezing force injury (Merriam-Webster’s Medical Desk Dictionary, 1996; Sheridan, 2001, 2003). Ecchymosis is most often a result of a medical problem or condition and not directly related to trauma and abuse.
Although many of the reviewed studies listed bruises as a type of injury, no study addressed how the researchers differentiated if the discoloration under the skin was actually a bruise or an ecchymotic lesion.

Amar and Gennaro (2005) included in their count of bruises such things as “swelling,” “welts,” and “busted lip(s)” without defining these terms. Swelling is not the same as a bruise and can be caused by mechanisms other than trauma. Welts usually refer to a raised, usually reddened area that may be very transient in nature or resolve fairly quickly leaving no bruise-like discolorations. Based on clinical experience, the term busted lip refers to a splitting or tearing of the lip from blunt injury. Hence, victims who received “busted lips” would have been best counted as having a laceration.

Fractures and joint dislocations from IPV, including facial fractures, were frequently described in the literature (Amar & Gennaro, 2005; Balci & Ayranci, 2005; Beck et al., 1996; Birosckak et al., 2006; CDC, 2005; Le et al., 2001).

Le et al. (2001) found 30% (n = 70) of their sample of 236 abused women had facial fractures with nasal fractures being the most common (n = 28) followed by a variety of other facial bones. Muelleman et al. (1996) found 7 (3%) of 280 abused women had facial fractures. Le et al. found rib fractures and fractures to arms and hands to be relatively common (n = 12 and n = 8, respectively). Two studies found 11% of female IPV victims had fractures (Sutherland et al., 2002; Tjaden & Thoennes, 2000).

Strangulation can cause a variety of types of injuries such as bruising, abrasions, petechia, and ligature marks (Strack et al., 2001; Wilbur et al., 2001). In addition, strangulation can result in a variety of symptoms not usually classified as injuries such as shortness of breath, difficulty swallowing, headaches, sore throat, voice change, loss of consciousness, involuntary loss of bladder and bowels, and memory loss.

Differentiating Accidental From Intentional Injuries

There have been no studies that have empirically addressed the location of injuries to women to determine if the injuries were accidental in nature versus being caused intentionally from assaults. Clinically, it has been observed that, in general, accidental injuries tend to be more distal whereas intentional injuries tend to be more proximal or central. For example, injuries to one’s fingers and toes, hands and feet, and wrists and ankles tend to occur more often from accidental causes (Brockmeyer & Sheridan, 1998; Sheridan, 2003; Sheridan, Nash, Hawkins, Makely, & Campbell, 2005). Injuries to boney prominences, such as knees, hips, chins, and elbows, can often be accidental and consistent with falls. However, being pushed or thrown to the ground during an abusive event can result in injuries that mimic accidental fall injuries.

Clinically, one should have an increased suspicion of IPV if there are blunt-force injuries to the forearms including bruising and lacerations. These can occur as one raises one’s arms to block being struck and/or kicked. Cuts to the palm of the hands can occur from grabbing a knife during an assault. Injuries in various stages of healing without a good causative history should be suspicious for intentional injuries (Sheridan, 2003; Sheridan et al., 2005).

CLINICAL IMPLICATIONS

The research on acute injury patterns of IPV victims clearly supports that clinicians should have an increased suspicion IPV has occurred anytime a woman presents with facial injuries, especially in the absence of a known specific cause such as a motor vehicle crash. Although facial injuries are the most common injuries in IPV, they have low specificity, and therefore, all injured women should be screened for IPV regardless of the location of their injuries.

Being struck with a fist followed by being struck with an object are the most common reported mechanisms of injury. Clinicians need to have an increased level of suspicion and assess all patients who present with injuries that can result from blunt-force mechanisms such as patterned bruises, lacerations, and abrasions. Strangulation, especially manual strangulation, by perpetrators of IPV is also very common. Women who are assessed to be victims of IPV need to be asked specifically about strangulation, even in the absence of visible
injury. Weapons such as knives and guns are not used very frequently, however when used increase the likelihood of serious and potentially fatal injuries.

**FUTURE RESEARCH**

To better understand the acute injury patterns experienced by IPV victims, there are many future research needs. First, it would be helpful for researchers to use more standardized definitions of common medical forensic terms. For example, when terms such as *cut* and *laceration* are used interchangeably, it is impossible to get a true understanding of exact mechanisms of injury. When researchers cluster a variety of mechanisms of injury into one category such as *beat up* there is no way to get a clear understanding of acute injury patterns. There are a growing number of publications that contain descriptions and definitions of acute injuries that are forensically accurate (Besant-Matthews, 2006; Brockmeyer & Sheridan, 1998; Rooms & Shapiro, 2006; Sheridan, 2001, 2003).

More research is needed on previous IPV injuries of women who later are killed by their abusers to explore if specific types and mechanisms of injury are precursors to domestic homicide. Prior use of weapon and prior strangulation attempts have already been linked to increased risk of domestic homicide (Campbell et al., 2003). Other risk factors for domestic homicide include leaving the relationship for another relationship, having a child fathered by another man, stalking, forced sex, and abuse while pregnant (Campbell et al., 2003).

Further research is needed as to acute injury locations to victims of IPV. For example, are perpetrators of IPV injury selective in where they are inflicting injury. Is there science to support the belief that if a perpetrator wants to further isolate his victim, he will inflict injury to the face versus if he just wants to effect control he may hit areas of the body more readily hidden by clothing.

The overwhelming majority of studies on injury-related IPV have looked only at female victims and male perpetrators. More research is needed on men physically abused by female intimates and on violence resulting in physical injury in same-sex relationships.

Clinicians routinely render opinions as to the approximate age of bruises, however, there has been little research into dating bruises to adult women in general and especially to women abused by intimate partners. There is a growing body of literature supporting the inaccuracy of trying to date bruises in children and the elderly by either looking at pictures of the injuries or by a direct visual assessment (Bariciak, Plint, Gaboury, & Bennett, 2003; Langlois & Gresham, 1991; Mosqueda, Burnight, & Liao, 2005; Stephenson & Bialas, 1996).

There have been some preliminary efforts to determine if instrumentation may be helpful in providing a more accurate estimate of aging bruises (Vanezis, 2001). Further research is needed in using instrumentation to provide a more accurate assessment of the age of bruises.

None of the studies reviewed made any effort to compare injuries from assaults from nonintimate partners versus injuries from intimate partners. Further research is needed to explore the commonalities and possible differences in the location, type, and mechanisms of injuries between partner and nonpartner assault-related injuries.

**IMPLICATIONS FOR PRACTICE, POLICY, AND RESEARCH**

- Health care professionals should suspect intimate partner violence (IPV) whenever head, neck, or facial injuries are present and the injuries are not easily attributed to other mechanisms (i.e., motor vehicle collisions).
- All IPV victims should be assessed for history or signs of strangulation.
- Researchers and health care professionals need to be consistent in thoroughly documenting IPV-related injuries using correct forensic terminology.
- Further research is needed on all topics related to IPV injury, including such areas as
  - examining the association between mechanism of injury and domestic homicide;
  - documenting the locations of injuries with emphasis on those injuries visible to the public;
  - examining injuries to male victims of IPV from female assailants;
  - examining injuries to male and female victims in same sex intimate partner relationships.
REFERENCES


SUGGESTED FUTURE READING
