Genital Findings of Women After Consensual and Nonconsensual Intercourse

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After a sexual assault, forensic nurses, nurse practitioners, and physicians are called on to collect evidence, document any genital injuries, and testify about the significance of injuries. Recently, the scientific rigor of the research has been challenged in the courts.

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The SANE (Sexual Assault Nurse Examiner) subspecialty of forensic nursing emerged in the 1990s as providers and the legal community recognized a need for compassionate care and better evidence collection (IAFN, 2001; Lynch, 1991). As part of a comprehensive health care evaluation, a qualified forensic nurse examiner can provide the survivor the opportunity to have evidence collected in a sensitive and effective manner, minimizing additional trauma, and increasing the potential for successful prosecution (Gilson, 2000). National interdisciplinary policymaking bodies of advocates and professionals from the health and criminal justice systems have continued to recognize the need for more SANEs to provide these services in the health care system.

Even after approximately 20 years of providing sexual assault examinations and evidence collection for survivors of assault, the amount of scientific data collected on evidentiary genital findings after sexual assault is minimal and has not been viewed collectively to understand if there is statistical significance of certain patterned injuries after a sexual assault. As a result of this gap, admission of evidence by specialty-trained SANEs has recently been challenged in the courts. In Virginia, two noteworthy cases questioned the relationship between injury and whether or not consent occurred (Johnston v. Commonwealth of Virginia, 2000) and the ability of SANEs to discuss the possible causes of an injury found during an evidentiary examination (Velasquez v. Commonwealth of Virginia, 2002) (Canaff, 2004).

Because the judicial system relies on the sexual assault examination record as a critical component in determining the cause of the survivor's injuries, it is imperative that the evaluations of evidentiary findings are based on a strong scientific foundation. Future research using improved data collection instruments, established criteria, and clear guidelines will facilitate a better understanding of injuries related to lack of consent.

Background

According to the United States Department of Justice Web page http://www.ojp.gov/bjs/abstract/cvus/definitions.htm, the term 'rape' is defined as vaginal, anal, or oral penetration through the use of physical and/or psychological force; whereas sexual assault refers to attacks or attempted attacks usually involving unwanted sexual contact between victim and offender (U.S. Department of Justice, 2005). While the laws regarding rape vary from state to state, all are based on three criteria – force, penetration, and lack of consent.

The primary motivation for research to date on the topic of genital injury has been medico-legal rather than medical alone. The potential use of genital injury in relation to allegations of sexual assault as substantiation for the criminal justice system has led to a number of studies over the past 25 years. These studies have set the groundwork for interpreting sexual assault injury (Lincoln, 2001). Ultimately, the question of consent will remain with the courts of law; nevertheless, obtaining corroborative physical data to support the history in a time frame consistent with sexual

activity is an important part of the medical assessment (Slaughter & Brown, 1992).

Review of the Literature

Previously, SANE programs have taught that the theoretical basis for explaining injuries following a sexual assault was the 1966 Masters and Johnson's Human Sexual Response Theory. According to the theory, the human body reacts physiologically to stimuli that "protect" the women from injuries while having consensual intercourse. The female undergoes certain normal physiologic changes that occur to prepare the body for insertion of the penis into the vagina. In a consensual relationship, time is taken for the physiological changes to occur. These changes (increased lubrication, increased muscle tension, constriction, lengthening of the vaginal outlet to guide the penis, and the elevation and backwards tilting of the uterus) coupled with cooperation between consenting partners, were believed to protect the woman from injury (Masters & Johnson, 1966). Based on this theory, experts such as forensic nurses concluded that the lack of the human sexual response could explain genital injuries from lack of consent or nonconsensual intercourse.

Recent challenges to expert witness testimony regarding the human sexual response and injuries following a sexual assault brought to light the lack of scientific evidence supporting the theory in sexual assault cases and any related courtroom testimony (Johnston v. Commonwealth of Virginia, 2000; Velasquez v. Commonwealth of Virginia, 2002). Both cases challenged the limits of medical expert testimony in cases where the issue of consent was being questioned. The outcomes of the appeals addressed the limits of a SANE's testimony to the discussion of the consistency of a certain injury with consensual intercourse (Canaff, 2004).

Forensic examination following sexual assault has two main purposes: to document injuries and collect evidence for law enforcement.

Once an initial medical screening is done to ensure the victim does not have any life-threatening injuries, a forensic examination includes:

- Interviewing the victim (focused interview includes past medical history and the assault)
- Performing a psychological assessment of mental status and safety issues (suicidal ideations or thoughts of self-harm)
- Examining the victim (physical exam)
- Collecting and preserving evidence
- Documenting findings
- Collecting urine and blood samples for suspected drug-facilitated sexual assault
- Initiating treatment and/or referral for any injuries
- Administering medications for prophylaxis against pregnancy and sexually-transmitted diseases
- Referring to outside agencies for follow-up medical care and counseling

(Littel, 2001)

In recent years, the ability to document injuries has been greatly aided by the use of colposcopy and tissue-staining dyes (Jones, Dunnuck, Rossman, Wynn, & Nelson-Horan, 2004; Lauber & Souma, 1982). All the studies in the literature involving sexual assault victims were retrospective chart reviews done in a hospital setting (most often in the emergency department) by physicians or physician/nurse teams. The studies included several different methods to identify and document injuries observed after sexual assault. The methods used were direct visualization, colposcopy, and/or skin-staining dye.

A large number of the earlier studies used only direct visualization. These studies (Amir, 1971; Biggs, Stermac, & Divinsky, 1998; Bowyer & Dalton, 1997; Cameron, 1983; Cartwright & Sexual Assault Group, 1987; Everett & Jimerson, 1977; Hayman, Lanza, Fuentes, & Algor, 1972; Lloyd & Walmsley, 1973; Manser, 1992; McGregor, Le, Marion, & Wiebe, 1999; Olusanya, Ogbemi, Unuigbe, & Oronsaye, 1986; Rambow, Adkinson, Frost, & Peterson, 1992; Ramin, Satin, Stone, & Wendel, 1992; Riggs, Houry, Long, Markovchick, & Felderhaus, 2000; Solola, Scott, Severs, & Howell, 1983; Tintinalli & Hoelzer, 1985) found injury rates for nonconsensual intercourse to range from 1% (Tintinalli et al., 1985) to 52.7% (Riggs et al., 2000). The large variation in injury rates was related to many of the differences between studies. These studies used different age inclusion criterion, ranging from the youngest age of 0 (Everett et al., 1977) to the oldest age of 100 (Ramin et al., 1992). They used different injury categorizations (ranging from minor to severe or just a total number of injuries), and varying definitions for inclusion as an injury.

As the medical profession has become more involved in sexual assault evidence collection, different means of injury identification have come into practice. Colposcopy and tissue-staining dye play an important role in evaluating sexual assault survivors by documenting injuries not seen by the naked eye. Colposcopy, which is used in gynecologic examinations to help identify abnormal cells on the cervix through magnification, has become a standard for evidence collection in sexual assault cases (Lincoln, 2001). Another standard of practice for examining sexual assault cases is the use of a skin-staining dye to differentiate acute injuries from skin discoloration along with enhanced photographic ability to highlight injuries (Jones et al., 2004; Lauber & Souma, 1982; McCauley et al., 1987).

In the studies that used either colposcopy or a tissue-staining dye to record injuries, the injury rate detection increased to 60% with colposcopy alone (O'Brien, 1997) and to 40% (Lauber & Souma, 1982) and 58% (McCauley et al., 1987) using a tissue-staining dye. With these studies, there were again large differences in age inclusion criteria, length of time from assault to exam, and injury description techniques.

Colposcopy and tissue-staining dye, such as toluidine blue, play an important role in evaluating sexual assault survivors by documenting injuries not visible to the naked eye. Using the colposcope in combination with dye enhancement, the study found an injury rate as high as 94% in the women who had been sexually assaulted when examined within 48

hours (Slaughter et al., 1997).

To date, only four studies (Jones, Rossman, Hartman, & Alexander, 2003; Jones, Wynn, Kroeze, Dunnuck, & Rosson, 2004; Slaughter & Brown, 1992; Slaughter, Brown, Crowley, & Peck, 1997) have used both colposcopy and dye to describe genital injuries in adult women following sexual assault, with two of the studies adding a comparison with a group of women who had consensual intercourse (Slaughter et al., 1997; Jones et al., 2003) and comparing stranger to acquaintance sexual assaults (Jones et al., 2004).

The authors (Jones et al., 2004) compared women who had been sexually assaulted by a stranger to those women who had been sexually assaulted by an acquaintance. Injury rates were 77% (stranger) and 71% (acquaintance). Among these studies, injury rates in sexually-assaulted women were found as high as 94% (Slaughter et al., 1997).

Similarities between the studies included the fact that all three were retrospective chart reviews of forensic examinations performed by trained medical professionals; the use of colposcopy and tissue-staining blue dye was used in all cases; injuries were classified using the pneumonic "TEARS:" tears (lacerations), ecchymosis, abrasions, redness (erythema), and swelling (edema); and the same anatomical genital sites (posterior fourchette, fossa navicularis, labia minora, labia majora, vaginal walls, periurethral area, clitoral hood, perineum, and cervix).

All of the studies reported a mean number of genital injuries in the nonconsensual groups of 2.0 or greater (Jones et al., 2003; Jones et al., 2004; Slaughter & Brown, 1992; Slaughter et al., 1997). One study (Jones et al., 2003) reported anogenital injury rates in the consensual group at 73% and the nonconsensual group at 85%. Of the 255 subjects, 125 reported no prior sexual intercourse before the event with 91% of both subgroups having injuries. The mean number of injuries in subgroup was 2.7 + 2.4.

Unfortunately, there were many differences between the studies that could have explained the variations and inconsistencies in the findings. The studies used different inclusion criteria for age (age range varied between 13 to 85 (Slaughter & Brown, 1992); 11 to 85 (Slaughter et al., 1997); 13 to 17 (Jones et al., 2003) and 13 to 82 (Jones et al., 2004), type of sexual assault (oral, vaginal penile penetration, anal penile, and/or attempted penile penetration), along with differences in the time between assault and exam (within 48 hours, more than 72 hours, or up to 72 hours).

In Slaughter & Brown (1992), the study reported 87% of the women had injury findings (chart review of 131 cases) within 48 hours of the assault. The Slaughter et al. (1997) study was a chart review of 311 cases over 10 years of women examined after a sexual assault (vaginal, rectal, and oral) where no penile penetration was reported in 20% of the women with physical findings, and 55% of the women had no physical findings. In addition, 11% of the women were seen after 72 hours. One of the strengths of the Slaughter 1992 and 1997 studies included a large sample size along with protocols for re-examination of patients with unclear injuries. An important issue of how to discriminate between whether redness is due to injury or if it is normal skin coloration was addressed by Slaughter et al., 1997.

Jones et al. (2004) reviewed 849 cases with almost half the women having a prior history of sexual assault (stranger 39% vs. acquaintance 48%), with 90% of the women reporting vaginal penetration. In addition, 46% of the women also had nongenital injuries, with 24% reporting the use of physical force during the sexual assault.

Although these studies identified genital injuries in nonconsenting women, the prevalence and total numbers of injuries and types were different and the studies were difficult to compare. Differences in age and types of injuries made comparisons difficult. Another major difference between these studies is the length of time between the assault and the exam. Currently, between 48 and 72 hours is the time limit used for performing an evidentiary exam (Ledray, 1998; Lincoln, 2001; Weise, Armitage, Delaforce, & Welch, 2005). The time is based on the likelihood of collecting DNA evidence on the human body along with the chance of finding genital injuries that have not healed.

The ability to document injuries has been greatly aided by the use of colposcopy (an instrument used to magnify the skin and view microscropic injuries). Using the colposcope in combination with dye enhancement allows the examiner to detect microscopic genital injury in 94% of rape survivors seen within 48 hours (Slaughter et al., 1997). To date, only two studies (Slaughter et al., 1997; Jones et al., 2003) have used colposcopy and tissue-staining dye to compare genital injury findings in women following sexual assault to women who have had consensual intercourse. These two studies (Slaughter et al., 1997; Jones et al., 2003) identified genital injuries in both groups, the prevalence and locations of injuries varied greatly.

Evidentiary Findings in Women After Consensual and Nonconsensual Intercourse

The aim of this study was to compare the number, location, and type of genital injuries seen in women following consensual intercourse compared to those seen following nonconsensual intercourse through the use of colposcopy, tissue-staining dye, and photography. The hypothesis was that there would be a difference between the consensual and nonconsensual groups in the types, locations, and numbers of injuries.

Methods. Prior to initiating the study, the University of Virginia Human Subjects Investigation Committee approved the study, which was conducted in two parts. The consensual group subjects were recruited prospectively over a 3-month period through advertisements in a university-based newsletter and flyers placed in the community. Consensual intercourse subjects were healthy, nonpregnant, premenopausal/pubertal female volunteers who completed a survey and underwent colposcopic examination including the application of toluidine blue tissue-staining dye and pho-

Table 1.
Demographics

	Consensual n = 46	Nonconsensual n = 56	Results
Age	21 – 45 (29.3 ± 6.0)	16 – 54 (26.3 ± 10.3)	Mann-Whitney U 818.5 p = .002*
Race			
Black	7 (15%)	12 (21%)	
Caucasian	36 (78%)	37 (66%)	$\chi^2$4.3913, df=4
Hispanic	1 (2%)	5 (9%)	p = .356
Asian	1 (2%)	2 (4%)	
Unknown	1 (2%)	0	
Time to Examination (hours)	1.5 – 23.5 (12.1 ± 5.2)	1 – 48 (12.9 ± 12.3)	Mann-Whitney U 1040.0 p = .218
Lubricant Use	16 (34.8%)	2 (3.7%)	χ^2 16.255, df=1 p < .000*
Condom Use	9 (19.6%)	5 (9.4%)	χ^2 2.082, df=1 p = .149

* p < .05

tography within 24 hours of consensual sexual intercourse. The nonconsensual subjects were obtained through a retrospective chart review of healthy, nonpregnant, premenopausal/pubertal women who presented to the emergency department (ED) for evaluation following a reported sexual assault over a 1-year period.

The study was conducted at a rural university hospital emergency department with approximately 60,000 patient visits per year with an ED-based SANE program. Prior to the start of the study, the SANEs received training using the University of Virginia's Forensic Nurse Examiner Team Standards of Practice. There were five trained SANEs who conducted all examinations for subjects in both groups.

The standard sexual assault genital examination procedure, according to The University of Virginia's Forensic Nurse Examiner Team Standards of Practice, includes an external examination using magnification (Med Scope) and digital photographs taken at 6 and 3 inches.

Prior to the study, the distances were predetermined so that the 6-inch photograph (photograph A) would be a 1:1 representation of what the examiner was seeing and the 3-inch photograph (photograph B) would be a set magnified version of photograph A. Toluidine blue dye was applied to the external genitalia and wiped with a cotton ball with surgical lubricant followed by photographs of highlighted areas (photograph C). A speculum examination was performed and photographs of the cervix were taken (photograph D). After the speculum was removed, external genitalia were re-examined and photographed looking for speculum-induced trauma (photograph E). The location and types of injury were documented using diagrams and written descriptions. Injuries identified during data collection included tears, ecchymosis, abrasions, redness, and swelling (TEARS). The genital sites examined for potential injuries included labia minora/majora, posterior fourchette, fossa navicularis, hymen, vaginal walls, and cervix. Three members of the research team reviewed all the photographic documentation to the written record of injuries found by the actual examiner.

All data collected was entered into the Statistical Package for the Social Sciences (SPSS) Version 11. Descriptive statistics (mean, standard deviation, confidence intervals, odds ratio) were used to describe the demographic data, the location of injuries, and the types of injuries. The continuous variables were analyzed using a nonparametric Mann Whitney U due to skewness of the time to exam and age variables with a Chi Square analysis for the discrete variables. Statistical significance was determined if the p value was < = .05. Data analyzed included the following types of injuries; tears, ecchymosis, and abrasions, and the following genital sites: labia minora/majora and posterior fourchette.

Results. There were a total of 102 women examined, 46 (45.1%) in the consensual group (CONS) and 56 (54.9%) in the nonconsensual group (N-CONS). The mean age for the consensual group was 29 + 6.0 years (range 21 to 45 years) and for the N-CONS group was 26.3 + 10.3 years (range 16 to 54 years) (p = .002). Lubricant was less frequently used in the N-CONS group (3.7% vs. 34.8%, χ^2 16.255, df = 1, p <.000) (see Table 1). The frequency of laceration or tears was greater in the CONS group than the N-CONS group but not statistically significant (23.9% vs. 21.4%, χ^2 .089, df = 1, p = .765). The participants who had the presence of ecchymosis were 5.4 times more likely to be in the N-CONS group than the CONS group (χ^2 22.882, df = 1, p = . 090) (see Table 3).

Similarly, the participants with

Table 2.
Frequency of Injuries

	Consensual n = 46	Nonconsensual n = 56	Results	Odds Ratio ** [95% CI]
Number of subjects with injury present	14 (30.4%)	18 (32.1%)	χ^2.034, df=1 p = .853	1.083 [.466, 2.513]
Number of subjects with tears	11 (23.9 %)	12 (21.4 %)	χ^2 .089, df=1 p = .765	.868 [.342, 2.201]
Number of subjects with ecchymosis	1 (2.2%)	6 (10.7%)	$\chi^2$2.882, df=1 p = .090	5.400 [.626, 46.589]
Number of subjects with abrasions	2 (4.3%)	9 (16.1%)	$\chi^2$3.608, df=1 p = .058	4.213 [.862, 20.584]
Number of subjects with 2 or more injuries	1 (2.2%)	11 (17.9%)	$\chi^2$6.456, df=1 p = .011*	9.783 [1.202, 79.592]

* $p < .05$
** The odds ratio is explaining the likelihood of a subject to be in the nonconsensual group based on the frequency of injuries found.

abrasions were 4.2 times more likely to be in the N-CONS group (χ^2 23.608, df = 1, p = .058). As for the location of injuries, of the consensual group 14 of the 46 women (30.4%) had a total of 15 injuries identified. Of the N-CONS group, 18 of the 56 women (32.1%) had a total of 34 injuries identified. Participants with two or more injury types present (χ^2 26.456, df = 1, p = .011) were 9.7 times more likely to be in the N-CONS group (see Table 2).

Discussion. In this study, genital injuries were identified following both consensual and nonconsensual intercourse. These results are consistent with previous research (Slaughter & Brown, 1992; Slaughter et al., 1997) using colposcopy and tissue-staining dye that reported the presence of genital injuries following both consensual and nonconsensual intercourse.

Although the research by Slaughter and Brown (1992) and Slaughter et al. (1997) demonstrated an increased prevalence of injury in the nonconsensual group, the current study found no statistical difference in the presence of injury between the two groups. The differences in the findings of this study and other somewhat similar studies may be explained by further examination of the methods of the studies. One possible explanation for the difference in the injury detection rate between groups is related to our decision to exclude redness and swelling from data analysis. This decision was based on the potential for differences between how each examiner visualizes the redness or swelling without a comparison examination. The pictorial documentation of redness and swelling was not adequately depicted in the photographs taken.

The current study found no statistical difference in the presence of injury between the consensual and nonconsensual groups.

Ecchymosis was more commonly seen following nonconsensual intercourse. This finding has both clinical and research implications. Ecchymosis may not be clearly visible if initial genital examinations are performed immediately following the assault. Therefore, in clinical practice, it may be necessary to consider re-examination of the genital area to allow for more clear visualization of ecchymosis that may develop following the assault. Additionally, the delayed visualization of ecchymosis may explain why, in the present study, it was identified more frequently in the nonconsensual group. The consensual group data collection was limited to the first 24 hours following intercourse with a mean of 12.1 hours, while the mean time to exam for the nonconsensual group was 12.9 hours. Although there was no statistical difference between the times to exam, in future studies cases should be carefully matched to avoid missing genital findings due to delayed presentation or wound healing.

Historically, SANEs have been taught that the posterior fourchette is the area that is frequently the site of injuries following sexual assault. Again, comparing the findings of the Slaughter et al. (1997) study to the present study, it appears that the posterior fourchette is the most vulnerable to injury following intercourse regardless if there is consent. In the present study, the investigators identified no statistical difference in the frequency of injuries to the posterior fourchette between the two groups. However, there was a statistically significant group difference in the injuries to the labia minora with injuries identified only to subjects in the nonconsensual group (see Table 3). Findings such as these reinforce the importance of a thorough, careful genital examination including the external and internal genitalia as part of a standardized evidentiary exam.

The proportion of subjects in the

Table 3.
Number of Injuries by Location

Location and Injury	Consensual n = 46 (total of 15 injuries)	Nonconsensual n =56 (total of 34 injuries)	Results	Odds Ratio ** [95% CI]
Posterior Fourchette	14 (28.3%)	22 (28.6%)		
Tears	12	13	χ^2 .001 df = 1 p = .972	1.015 [.428, 2.411]
Abrasions	2	6		
Ecchymosis	0	3		
Labia Minora	0	11 (10.7%)		
Tears	0	5	χ^2 5.237 df = 1 p = .022*	.893 [.815, .978]
Abrasions	0	4		
Ecchymosis	0	2		
Labia Majora	1 (2.2%)	1 (1.8%)		
Tears	0	0	χ^2.020 df = 1 p = .888	.818 [.050, 13.450]
Abrasions	0	0		
Ecchymosis	1	1		

* $p < .05$
** The odds ratio is explaining the likelihood of a subject to be in the nonconsensual group based on the location of the injury and type of injury.

nonconsensual group with two or more injuries (.179) differed significantly from that of the subjects in the consensual group (.022) (p = .003). The subjects in the nonconsensual group were 8.2 times more likely to have two or more injuries as the consensual group (see Table 2). The identification of multiple genital injuries following nonconsensual intercourse has been demonstrated by previous research using colposcopy and tissue-staining dye (Slaughter et al., 1997). Findings such as these indicate that there may be a potential pattern of injuries that can be identified following nonconsensual intercourse, and suggest further research.

Limitations

The study had several limitations. There were statistical differences between the age of the participants and the usage of lubrication during intercourse (the nonconsensual group was less likely to use lubrication). During future studies, it will be important to limit the ages of the participants in both groups to the same age range along with matching the consensual group to the nonconsensual group in relation to age and the use of lubrication.

Another limitation in this study included the number of types of injuries and locations of injuries; the study was underpowered especially when addressing injuries to areas other than the posterior fourchette and tears. Although there was no statistical difference between the groups on the time delay between intercourse and exams (Mann-Whitney U 1040.0 p = .218), the length of time for the N-CONS group was up to 48 hours as compared to the control group which was less than 24 hours. Future studies comparing consensual and nonconsensual groups should include consensual patients examined 0 to 72 hours after intercourse since this is the time frame that sexual assault victims are usually seen for a forensic examination. Based on the limitations and other critical issues related to sexual assault injuries, future studies need to include the measurement and quantification of injuries, the nature of injury detection, and the effect of time since intercourse on the types of injuries identified.

Conclusion

Based on the recommendations by Gaffney, 2001, following the Virginia court case (Johnston v. Commonwealth of Virginia, 2000) challenging the scientific merit of expert testimony in a court of law, the SANE must remember that, "...associations, correlations, or causal explanations cannot be made without the scientific evidence that established these relationships" (Gaffney, 2001, p. 81). Currently, many experts and laypersons alike believe that if women do not consent to intercourse, they are more likely to have injuries to their genital area. Based on the findings of this study and several other studies, there is evidence to suggest that injuries can be identified on examination after both nonconsensual and consensual intercourse. Therefore, scientific research in the field of forensic science should include future studies using standardized protocols, with trained investigators, establishing inter-rater reliability for examinations,

addressing potential confounding variables such as prior sexual history, condom and lubrication usage, rough intercourse, and marital rape cases.

Before the knowledge base of forensic experts including SANEs can be established, rigorous scientific studies examining the numerous potential variables following both consensual and nonconsensual intercourse must be conducted. Applying scientific knowledge of evidentiary findings in sexual assault cases will set a precedent for SANE testimony, allowing judges and juries to hear expert testimony that will allow them to make decisions based on facts rather than myths or opinions. ■

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