

Traumatic amputation: Psychosocial adjustment of six Army women to loss of one or more limbs

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Abstract—More than 220,000 U.S. servicewomen fought in Iraq and Afghanistan. In addition, more than 135 gave their lives, more than 600 were injured, and at least 24 lost one or more limbs. With no research on the adjustment of women to amputation or on military women's adjustment to traumatic limb loss, the phenomenological approach was used to gain an in-depth understanding of this life experience. Six Army women shared their personal adjustment experience to limb loss. This experience included personal safety fears, body image issues, grief, and loss. Recovering from traumatic amputation in a military environment promoted a “kick-butt” attitude, with these servicewomen reporting that a positive attitude, social support, personal courage, resiliency, military training, humor, and the belief their loss had meaning most influenced their recovery.

Key words: amputation, body image, military women, OIF/OEF, phenomenology, prosthetics, psychosocial adaptation, resilience, trauma, women.

INTRODUCTION

Servicewomen comprised 14 percent of the military forces deployed in the Afghanistan and Iraq wars [1]. More than 220,000 women served in combat zones and operations: flying helicopters and airplanes; commanding platoons; serving as gunners, medics, military police, and truck drivers; and conducting house-to-house searches [1–2].*

*Alvarez L. GI Jane breaks the combat barrier [Internet]. New York: The New York Times; 2009 Aug 15. Available from: http://www.nytimes.com/2009/08/16/us/16women.html?ref=lizettealvarez&_r=0.

Corbett S. The women's war [Internet]. New York: The New York Times; 2007 Mar 18. Available from: <http://www.nytimes.com/2007/03/18/magazine/18cover.html>.

Elmasry F. Military women take on new roles in Iraq [Internet]. VOAnews.com; 2008. Available from: <http://www.voanews.com/content/a-13-2008-12-01-voa59-66737672/561839.html>.

Independent Lens. Lioness [Internet]. Public Broadcasting System; 2008. Available from: <http://www.pbs.org/independentlens/lioness>.

Norris M. Roles for women in U.S. army expand [radio broadcast]. Washington (DC): All Things Considered, National Public Radio; 2007 Oct 1. Available from: <http://www.npr.org/templates/story/story.php?storyId=14869648>.

Women in military service for America Memorial Foundation [Internet]. Washington (DC): Women in military service for America Memorial Foundation; 2009. Available from: <http://www.womensmemorial.org>.

Honor the fallen [Internet]. Militarytimes.com; 2010. Available from: <http://militarytimes.com/valor>.

Abbreviations: AK = above knee, BK = below knee, EOD = explosive ordnance disposal (technician), OEF = Operation Enduring Freedom, OIF = Operation Iraqi Freedom, WRAMC = Walter Reed Army Medical Center.

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<http://dx.doi.org/10.1682/JRRD.2011.12.0228>

Women now comprise 14 to 15 percent of the U.S. military and serve in over 90 percent of all military occupations.* More than 135 American servicewomen gave their lives, more than 600 were injured, and at least 24 lost one or more limbs.† More than 1,200 U.S. service-members lost limbs in Iraq and Afghanistan [3], resulting in increased research on amputees and prosthetics. However, research that focuses on how traumatic amputation affects the lives of women is scarce. Senator Patty Murray said, “We don’t know whether women have different needs than men, as they go through different traumas, whether it’s PTSD [posttraumatic stress disorder] or traumatic brain injury or even losing a limb” [4, p. 1].

Research on the psychosocial adjustment to limb loss was summarized by Horgan and MacLachlan [4] in their 2004 literature review wherein they concluded that five factors influenced positive adjustment: length of adjustment time, social support, positive attitude, active coping skills, degree of satisfaction with a prosthesis, and lower levels of phantom and residual-limb pain. Rybarzak et al. reported in the *Handbook of Rehabilitation Psychology* that body image, perceived negative attitudes, a heightened sense of vulnerability to personal crime, and positive coping skills influenced the psychosocial adaptation of individuals to amputation [5]. Livneh et al. studied 61 amputees (31 male, 25 female) and reported active problem solving coping skills had a positive correlation with adjustment [6]. They also reported anxiety, depression, and hostility toward others had a negative correlation with adjustment. These researchers all agreed that positive coping skills were critical to a positive adjustment to amputation.

Aamot reported that a sudden traumatic change in body image typically created anxiety: it was interpreted as a distortion of one’s self-image [7]. His research on facial deformities indicated that even when plastic surgery created a socially acceptable body image, individuals often had difficulty adjusting their mental image from before injury with the image in the mirror. Applying this to limb loss, Horgan and MacLachlan suggested that after an

amputation an individual must reconcile three body images: before, with a prosthesis, and without a prosthesis [4]. Thus, it was expected that adjustment to a new body image would be an important psychosocial adaptation female veterans would face after limb loss.

Little published research exists on gender-specific psychosocial adjustment to disability and none specific to traumatic amputation and women. One study by Saradjian et al. reported that men who wore a prosthetic arm felt it helped restore their body image [8], while Murray reported that wearing a prosthesis played a social normalizing role for 35 men and women with limb loss [9]. While a cosmetic prosthesis may create a normal appearance, the loss of a limb limits physical ability and may create personal safety fears along with a fear of criminal victimization [5,8,10].

Losing one or more limbs limits physical functionality and often affects an individual’s ability or desire to work. Hebert and Ashworth studied 88 mostly male amputees and reported the higher the level of a leg amputation, the less likely an individual would return to work, with the exception of those earning more than \$25,000 a year [11]. Whyte and Carroll reported that women amputees were less likely to be employed than male amputees [12]. Huston et al. reported that among Vietnam war veterans, amputees were more likely to be unemployed and earn less money and less likely to complete college than noninjured veterans.‡ While the unemployment rate of Operation Iraqi Freedom (OIF)/Operation Enduring Freedom (OEF) veterans is down from 15.2 percent in 2011, it was still 9.1 percent in February 2012.§ The unemployment rate for post-9/11 female veterans (12.4%) has averaged 150 percent higher than civilian women (8.2%) [13]. While none of the existing research specifically addressed the psychosocial adaptation of women to limb loss, it does suggest that positive coping skills are critical. In addition, servicewomen may find it difficult to adjust to traumatic amputation and may be less likely to pursue a career.

*Norris M. Roles for women in U.S. army expand [radio broadcast]. Washington (DC): All Things Considered, National Public Radio; 2007 Oct 1. Available from: <http://www.npr.org/templates/story/story.php?storyId=14869648>.

†Corbett S. The women’s war [Internet]. New York: The New York Times; 2007 Mar 18. Available from: <http://www.nytimes.com/2007/03/18/magazine/18cover.html>.

‡Huston C, Dillingham TR, Esquenazi A. Rehabilitation of the lower limb amputee. In: Zajtcuk R, Bellamy RF, Dillingham TR, Belandres PV, editors. Rehabilitation of the injured combatant [Internet]. Washington (DC): Department of the Army, Office of the Surgeon General; 1998. Available from: https://ke.army.mil/bordeninstitute/published_volumes/rehab/RH1ch4.pdf.

§Post-9/11 veterans unemployment drops in Jan [Internet]. Army-Times.com; 2012 Jan. Available from: <http://www.armytimes.com/news/2012/02/military-post-911-veterans-unemployment-falls-in-january-020312w/>.

MILITARY CULTURE

All of the participants in this study were members of either the Army or Army National Guard and recovered within a military culture. The military world is authoritarian, disciplined, tough, masculine, and physically arduous [14–15]. Basic training is designed to convert civilians into soldiers committed to mission focus and team effort,* with allegiance to the values of honor and morality [16]. Servicemembers are taught to put mission first, perform selfless service, and refuse to accept defeat or quit as well as to emphasize the values of self-discipline and physical and mental toughness. As a minority, military women often feel they must prove themselves more than men [17] because many male soldiers still believe warriors should be exclusively male.

The purpose of this research study was to increase our understanding of the psychosocial adjustment issues American servicewomen experience after a traumatic amputation using phenomenological research methodology. Phenomenology is the study of how individuals create their own reality through the attribution of meaning to life experience and is the appropriate methodology when little is known about how individuals experience a life phenomenon [18].

METHODS

While phenomenology does not have one clearly delineated methodology [19], all approaches seek to study the life experience of participants while setting aside preconceived notions [18–21]. Patton states that phenomenology focuses on “how human beings make sense of experience and transform experience into consciousness, both individually and as shared meaning” [20, p. 104]. The purpose of this study was to learn how military women adapted to traumatic limb loss. Phenomenology does not theorize and is reported using the participant’s own words [18–21].

Participants

Phenomenological research uses small purposeful samples to investigate how individuals integrate life experiences into their own reality [18,20,22]. A total of 10 women were invited to participate in the study, and 6 Army/Army National Guard members agreed (**Table 1**). They were recruited by tracking down contact information from published news stories, Facebook, snowball sampling, and individual blogs. Five of the six women lost one or more limbs in combat, and one served a tour of duty in Iraq on a prosthetic leg. These women ranged in age from 20 to 36 (mean \pm standard deviation 24.0 \pm 5.98, median 23) at the time of their injury, and all were Caucasian. Three of the four women who declined to participate were black. At the time of the interview, 3 to 6 years had elapsed since the participant’s traumatic amputation. Participation in this study was voluntary, and all of the participants’ names were changed to provide confidentiality and anonymity according to the institutional review board protocol approved by the University of Arkansas.

Data Collection Procedure

In phenomenological research, the primary source of data is in-depth interviews, wherein each individual is asked to share his or her lived experience of a life phenomenon [18–23]. In phenomenology, the research process is considered to be a shared journey, with participants acting as coresearchers [22]. The first three participants helped shape the research focus by reviewing the original research question and suggesting revisions. This resulted in three open-ended questions that provided textural and structural descriptions of each individual’s experience [18–19]. In-depth interviewing was used to inquire about participants’ military and combat experience in order to provide context to their adjustment to traumatic amputation. Christine stated this was critical because “you need to understand combat first before you can understand how we cope with the injuries. Who I was and how I conducted myself before my injuries was crucial to how I chose to react.” Thus, question one became, “Please tell me a little bit about your background and how you came to join the military.” Question two addressed how becoming an amputee changed each individual’s life. It was, “In what ways, if any, has being injured changed your life?” And question three sought to explore how the participant felt about her loss. It was, “If you were to walk into a hospital today as a peer visitor to visit a servicewoman who had just lost a limb, what would you tell her?” Together these

*10 steps to joining the military [Internet]. Military.com; 2012. Available from: http://www.military.com/Recruiting/Content/0,13898,rec_step09_bootcamp,00.html.

Table 1.

Demographic data on six Army/Army National Guard women who experienced traumatic amputations.

Characteristic	Jessica	Sarah	Christine	Nicole	Amy	Lisa
Military Training	Army National Guard	West Point	Army ROTC in college	Army MP	Army ROTC in college	Army EOD
Military Job	Logistics, road repair, gunner	Commander MP platoon	Helicopter pilot/battle captain	MP gunner	Convoy platoon commander	EOD
Current/Last Rank	Sergeant	Captain	Major	Specialist	2nd Lieutenant	Sergeant
Cause of Amputation	Motorcycle crash	RPG	RPG	IED	IED	IED
Amputation	BK	Right arm disarticulation	BK, AK	Double BK	AK	Both arms above elbow
Prosthetics	Walking & running legs	Cosmetic arm	C- Leg & walking leg	Walking legs	C-leg, running, biking, & swimming legs	Body-powered pulleys & 4-site arm
Career	College student	Businesswoman	Business executive	Some college	Prosthetist	EOD
Marital Status	Single	Single	Married	Single	Married	Married

AK = above knee, BK = below knee, EOD = explosive ordnance disposal (technician), IED = improvised explosive device, MP = military police, ROTC = Reserve Officers' Training Corps, RPG = rocket-propelled grenade.

three questions provided a basic understanding of each woman's experience and allowed the researcher to develop common themes.

All of the interviews were conducted using Skype or V-Tel teleconferencing. The interviews ranged from 90 to 120 min. Four of the interviews were broken into two or three segments to accommodate the participant's schedule, and two were completed in one session. Four interviews were videoconferences and two were Skype-to-phone, based on the veteran's preference. Skype interviews were recorded using Call Recorder software for Mac computers and were saved as a QuickTime movie or audio recording. V-Tel interviews were recorded on an audio digital recorder. To validate the data, the interview data were triangulated with researcher field notes, individual Internet blogs, recorded Internet interviews posted on YouTube, documentaries, Facebook postings, and published newspaper and magazine interviews.

Data Analysis

In phenomenological research, interviews are transcribed and provided to each coresearcher for verification of accuracy. This is called member checking or triangulation of the data [18–19,21]. After each interview was transcribed, it was crafted into a narrative with minimal editing and comments. In creating each narrative, the researcher wove the interview transcriptions into a cohesive story. As each narrative was completed, it was emailed to the participant for review and correction. Next, the data were organized and analyzed to create a synthesis of textural (“what participants experienced”) and structural (“how they experienced it in terms of the conditions,

situations, or context”) descriptions [18, p. 60].* The final step was to combine the textural and structural descriptions into a composite that expressed the overall essence of these six women's experience [18–19,21].

Data analysis included all transcriptions, journal notations from each interview, and published blogs or interviews with individual participants. After listening to the interview recordings multiple times in order to develop a holistic sense of each individual experience, I made notations in the 1.5 in. left margin of each transcription page. Data were highlighted to discover and identify initial units of meaning [18–19,21]. These initial units of meaning were organized into a spreadsheet for each participant, with the units of meaning listed below each emerging theme. A brief example is provided in **Table 2**.

Next, these units of meaning were gathered into clusters to form common threads within a holistic context [18–19,21]. These clusters became the major themes, with short references to each theme listed by participant. **Table 3** illustrates the clusters gathered on the theme of body image. By creating themes out of the data and organizing them into tables, I was able to see commonalities and differences among the coparticipants (**Table 3**).

From this analysis process, three major themes emerged: physical disability adjustment issues, psychosocial adjustment and coping skills, and protective factors.

*10 steps to joining the military [Internet]. Military.com; 2012. Available from: http://www.military.com/Recruiting/Content/0.13898.rec_step09_bootcamp.00.html.

Table 2.

Example of units of meaning emerging from data collected through in-depth interviews with six female veterans who lost limbs through trauma.

Background	Military Experience	Combat Injury	Recovery	Adjustment
ROTC & MA in International Studies	Army Reserves & Army National Guard.	Blackhawk shot down. Christine & 2 others injured.	Every day is struggle. Phantom pain is daily issue.	Peer visitors gave assurance life would return to normal.
Father: Former Army Captain	Blackhawk pilot & battle captain in Iraq.	At Baghdad hospital, refused medical treatment until given status of team.	Not being able to walk without prosthetics is tough. Uses cane & wheelchair plus legs.	Made close & dear friends among other women amputees at Walter Reed.
Traveled independently from age 16	RPG & small arms. Shot down Blackhawk.	Right arm severed & reattached.	Severe Iraqi bacterial infection resulted in loss of 4 in. of arm bone.	Access to public buildings an ongoing issue.
Unknown	Commissioned Major at Walter Reed.	AK & BK limb loss. Only 2 in. of femur bone left.	Unknown.	Uses wheelchair to commute to prevent falls. Faster than walking.

AK = above knee, BK = below knee, MA = Master of Art, ROTC = Reserve Officers' Training Corps, RPG = rocket-propelled grenade.

Table 3.

Example of how traumatic amputation affected each female veteran's body image.

Participant	Effect
Jessica	Fears of being "dorky" or gross and boys not asking her out on dates. Afraid to wear shorts or skirts. Worried others would not accept her.
Christine	Proud to have lost her legs in service to her country. Not going to hide her legs or wear a cosmetic prosthesis.
Sarah	"At first, I wouldn't look at myself in the mirror. Frightened to see how I really looked. I looked different from everybody and thought everyone was looking at me. Now I think I've been able to adjust really well."
Nicole	"Losing my legs was a definite blow to my self-confidence and self-assurance. Just now starting to go and do things on my own." Leaves gym when people stare. "I don't like myself anymore."
Amy	"I'm always going to have a limp. Sometimes you wish you still had a leg when you see other people running. It's a struggle. For women, more than men, looking in the mirror and realizing you don't have a limb."
Lisa	"For a while, I was scared to go out in public at all because I was afraid the public would see me as a freak."

These are summarized in **Table 4**. In the final step, the emergent themes and their clusters of meaning were integrated into a cohesive summary of the psychosocial adaptation experience of these six Army veterans (**Table 4**).

Thus, the textural and structural descriptions were summarized into cluster units and then used to distill major themes that expressed the *essence* of the phenomenon for the participants in this study. This essence is "how human beings make sense of experience and transform experience into consciousness, both individually and as shared meaning" [20, p. 104]. In this study, the goal was to gain an understanding of the lived experience of female military veterans' adaptation to traumatic limb loss.

Validation of Data

Cresswell listed eight ways to validate qualitative research data and recommended that researchers use at least two [18]. I used five in this study: triangulation, peer debriefing, clarifying researcher bias, member checking, and rich, thick description. Triangulation was achieved by comparing participant responses to personal blogs and other interviews (text and video) posted on the Internet. Peer debriefing was conducted with several professors at the University of Arkansas "to provide an external check of the research process" [18]. Most importantly, I rigorously sought to set aside or bracket my a priori professional knowledge and biases that could influence the interpretation of the data by focusing on the individual narratives and

Table 4.

Thematic clusters and units of meaning that were developed from phenomenological analysis of in-depth interviews with six female veterans who experienced traumatic amputation.

Cluster	Unit of Meaning
Physical Disability	Pain tolerance & phantom pain
Adjustment Issues	Living without leg(s) Living without arm(s)
Psychosocial Adjustment & Coping Skills	Body image Personal safety fears Grief & loss Coping with attitudes of others
Protective Factors	Positive attitude Social support Military culture, personal courage, & team spirit Sense of humor Recognition it could be worse Meaning making

refraining from interjecting personal thoughts [18–19,21]. A clear focus on providing a true transcription and narrative for each participant was used throughout this process. All participants were given a copy of their transcripts, narratives, and the executive summary for review, correction, and comment. All requested corrections were made. Each servicewoman's narrative included her reasons for joining the military, military training, a brief summary of her military service in Iraq, traumatic injury, and process of recovery. The compiled narratives totaled 78 single spaced pages [24]. In summary, use of five of Cresswell's eight validation strategies gave this study strong validity.

FINDINGS

While every servicewoman's life experience was different, common themes emerged in three major categories: physical disability adjustment issues, psychosocial adjustment and coping skills, and an emerging new sense of self and life purpose.

Physical Disability Adjustment Issues

Amputation of a limb or significant portion of a limb results in functional loss, issues with prosthetic fit, excessive sweating, and medical problems (skin issues, pain, bone spurs) that are secondary to the use of an artificial limb [25–26]. All six women spent a year or longer at Walter Reed Army Medical Center (WRAMC) or the

Center for the Intrepid learning to use their prosthetic limbs. The adoption of a prosthesis into daily life is determined by comfort, function, and appearance.* While all of the women with lower-limb amputation wore their prostheses most of the time, both women with upper-limb amputations rarely used their prostheses. Lisa lost both of her arms above the elbow, but preferred to use her residual limbs whenever possible. She stated the only time she used her prosthetic limbs was when it was the only way she could accomplish a task, for example, driving.

The loss of a significant portion of one or more limbs causes increased sweating from active physical activity. Christine's husband wrote in her WRAMC blog:

One of the issues that amputees often develop is increased sweating or "glistening." Your body cools itself by sweating through all its pores. When a limb is removed, the pores on that limb are no longer available to help cool the body; consequently amputees often find that they overheat and sweat more than they used to.

Jessica reported that while she was in Iraq she had four episodes where sweating created infected heat bumps and blisters on her residual limb so that she could not wear her prosthesis for a week. During those times of disability, she relied on her battle buddy to bring her food and water because she could not make it to the mess tent.

In addition to sweating, phantom pain was an issue for most of the women. Christine said she worked 12 h days while still experiencing phantom pain all the time:

I have phantom limb sensations all the time. For example, right now the balls of my feet and my toes are burning. They've got that really severe pins and needles feeling in them like they are just waking up from being asleep. I can feel them all the time, 100 percent of the time. Every so often, it depends on how long I've been wearing my legs and how tired I am, I will get very severe phantom pains where it may feel like someone is pounding ten penny nails into the bones of my foot, my toenails are being pried off, or beads of molten lava are going down my veins.

Lisa reported that without the drug Lyrica, phantom pain in her arms kept her awake at night. In contrast, Christine said, "I don't take any medications. I try to rub

*Kelly BM. Lower limb prosthetics [Internet]. Medscape; 2009. Available from: <http://emedicine.medscape.com>.

different spots on my residual limb where those nerves [are located]. . . . If I don't find a spot. . . then I just have to suffer through it." None of the women in this study reported that they allowed phantom pain to limit their physical activity or social life. Adopting the military credo of personal courage and never admitting defeat, they persevered despite pain.

Living Without Leg(s)

The loss of one or more lower limbs reduces mobility, creates ongoing issues with prosthesis fit, and creates issues with the residual limb, such as excessive sweating, sores, and pain. Wearing prosthetic limbs is tiring because of the increased energy demand: transtibial (below knee [BK]) prosthetics can require 10 to 20 percent more energy, and transfemoral (above knee [AK]) prosthetics can require 60 to 70 percent more energy per leg.* Thus, Christine, a BK and AK amputee, frequently used her power wheelchair to cover significant distances in a timely manner and to avoid glistening.

The loss of a leg can result in physical barriers. Christine said, "Military amputees can be very obnoxious" because their attitude is:

I fought for this country. I'm entitled to everything that anybody else is entitled to. It's not acceptable that you don't have a ramp for this restaurant. You will put in a ramp for me because I am entitled to it.

Christine noted that New York City provided universal access, whereas many business owners in Chicago were exempt from the Americans with Disabilities Act access requirements, thereby shutting her and other wheelchair users out. Christine was a frequent traveler and wheelchair user, so she was very concerned about access to public buildings, accessible hotel rooms, and transportation.

Each female veteran's experience differed depending on whether she was an AK or BK amputee and the number of limbs lost. Christine and Nicole, who were double leg amputees, said trying to balance on two prosthetic limbs was difficult and created fears of falling. Nicole said:

I've just now started to get to the point where I'm comfortable going and doing things on my own. .

. . I don't like it. [I'm afraid] I [might] fall. Or, that I can't get the groceries in the house, and they have to sit out in the car. Or God forbid, I'm out, and I run into some kind of trouble.

Christine reported she commuted using her electric wheelchair, because she was afraid of being knocked down during rush hour, and used canes to maintain balance when walking on her prosthetic legs. Amy, who was an AK amputee, was concerned about slipping during inclement weather because it was difficult to get back up. On the other hand, Jessica, a BK amputee, said, "I forget that I have a fake leg most of the time." Thus the severity of the limb loss affected each veteran's comfort with and usage of her prosthetic leg(s).

Living Without Arm(s)

The loss of an upper limb affects everyday life activities. Sarah said "When you are dealing with an arm, the level of complexity increases dramatically for every joint you do not have." While fingers with their three joints grasp and manipulate, the wrist allows the hand to swivel and twist, the elbow provides positioning, and the shoulder allows movement forward and back, side to side, up and down, and all around. Since it is difficult for a prosthetic device to replicate all of these movements, most upper-limb amputees discontinue wearing their prosthesis after a year or two [27].

Sarah refused to train on any of the prostheses she was offered at WRAMC, saying, "I don't want to look like a robot, and I don't want to wear a hook." She used a cosmetic arm for the first year, but now only wears it on first dates. She learned to use her one natural arm, knees, feet, and torso to accomplish daily tasks: "I've learned to do all the things I need to do left-handed." However, this decision has resulted in back problems because her upper body is unbalanced.

Lisa lost both arms transhumeral as an explosive ordnance disposal (EOD) technician. She received training on a body-powered prosthetic arm with levers, pulleys, and hooks, but hated it. She said, "They just get in the way more than they help." Lisa primarily uses her residual limbs and feet along with adaptive equipment and a service dog to negotiate daily life:

My residual limbs are long enough that I can grab things. I do a lot of stuff, opening things with my mouth, or I'll hold it with my arms. I do a lot of stuff with my feet. I type with my toes. I use my phone with my nose; I'll hold the phone

*Kelly BM. Lower limb prosthetics [Internet]. Medscape; 2009. Available from: <http://emedicine.medscape.com>.

with my residual limbs and just push the buttons with my nose. So I got really good without the arms, so now the arm is more a tool than an asset. . . something I can use for specific jobs.

The loss of one or both arms created limitations in the ability to carry and manipulate objects. While both women learned ways to adapt, it made simple everyday tasks such as cooking, dressing, driving, typing, and carrying things an adaptive challenge.

Psychosocial Adjustment and Coping Skills

In terms of psychosocial adjustment, there were four central themes: the adjustment to a new body image, personal safety fears, grief and loss, and coping with the attitudes of others. Individual protective factors influenced each woman's psychosocial adjustment and coping skills as well as her adjustment to new physical limitations. These protective factors included maintaining a positive attitude, social support, recovery in a military culture, personal courage, a sense of humor, recognizing that it could have been worse, and finding meaning from the limb loss.

Body Image

All six women in this study had to adjust to a new body image in the mirror. Christine knew two military women who were arm or hand amputees who always wore their prostheses. Sarah commented that the "aesthetic component is more important for women, but I don't think it is fair to say that men do not care." Among these veterans, body image was a bigger issue for the two women who lost upper limbs because it was so visible and affected their ability to perform daily life activities. Sarah said, "I always have to go into situations where I don't know people. . . . I have one arm and being mentally prepared for that is an ongoing challenge." Lisa reported that after she lost both of her forearms she was afraid to go out in public: "People would see me as a freak." She told a reporter she heard whispers from strangers who said, "So ugly." Lisa noted that while she has shrapnel scars on her face, "It's nothing like not having arms. That's what people notice when they see me."

The five women who lost limb(s) in combat derived comfort from the fact that they had given their limb(s) in service to their country. Amy said, "I am really proud of how I lost my leg, and I am proud I wore the uniform." Both Amy and Christine said that wounded warriors who were leg amputees wore their prostheses proudly. "A lot of the women that I know who are military amputees, and

the guys too, would be offended if you suggested that you hide [it]." Amy said it has "almost become a badge of honor." Christine and Amy observed that civilian women who lost a leg were more likely to wear a prosthesis with a cosmetic cover, demonstrating a greater need to appear normal. While these women veterans were concerned about their appearance, they did not feel they needed to camouflage their limb loss to appear normal.

Personal Safety Fears

All of the women in this study were highly trained warriors with combat experience along with training in self-defense. However, when a woman loses one or more legs, she can no longer run without a special running leg. The two women who lost both legs reported difficulty maintaining their balance on double prosthetic legs. Amy requested a service dog for her personal safety when running outdoors, and Nicole always had a large dog for protection and companionship. Lisa stated that living in the community she felt very vulnerable without hands and forearms to defend herself and relied on her service dog for personal protection. Losing a limb, whether an arm or leg, reduces a woman's ability to defend herself and diminishes her sense of personal safety.

Grief and Loss

While three of the women spoke of quickly accepting their loss and moving on, the recollection of time spent in mourning appears to diminish over time. Sarah, Jessica, and Nicole spoke of struggling to accept their loss. Sarah said, "In my mind, I knew my life was changed, but I just didn't want to accept that." Nicole stated she had really horrible mood swings while at WRAMC due to grief, changes in her body, and having to decide whether to go ahead and have her shattered second leg amputated. Jessica said she was depressed, sad, and desperate until she adapted to her prosthetic leg. She says, "Every once in a while I still get sad; I think everybody does."

For each woman, limb loss was followed by a grieving period moderated by individual personal resilience. Christine stated that while "every part of every day is a struggle. . . it is not something that's going to stop me from living my life." Lisa spoke of being determined to stay alive because her husband was still struggling with the death of his younger brother the prior year in Iraq. She told her Landstuhl nurses, "I'll be fine. I lived, I'm all right." Both Lisa and Amy were very positive, upbeat, and reassuring to their families. The women who self-reported

an innate positive outlook and those with the most time in the military demonstrated the highest resilience.

Coping with Attitudes of Others

Many of the women feared their friends would abandon them and it would be difficult to make new friends. Not only did these women have to adjust to new images in the mirror (with and without their prosthesis) but also to a changed perception by others. The perception of others was more important for single women. Sarah said:

At first I thought [being an amputee] would make a difference in dating and social relationships, but it certainly doesn't. . . . Now I realize that whether it is the people I knew before or the people I meet now, it just isn't an issue.

In addition, when a woman loses a limb in combat, she develops sensitivity to two different social attitudes: the first is how others regard her as a female amputee and the second is being recognized as a wounded warrior. Sarah said the public does not understand the jobs women performed in OIF/OEF. Even when she is standing with a group of wounded warriors, she has to tell people she is also a wounded warrior. Lisa stated she constantly encountered disbelief when she told people that she lost her arms working as an Army EOD.

Sarah said, in her experience, that adults did not know how to react so they typically looked away. Lisa said most people were really hesitant when they first met her, because most of her arms are missing. However, once they realized she was willing to talk about her experience, they would ask how she lost her arms and were respectful. Amy said that being an amputee meant having to "adapt to everyday life, going out in public and dealing with the reactions of people on the street." Jessica said when she served in Iraq, her prosthetic leg gave her extra respect, because it was assumed she lost her leg in the war. However, stateside all of the women reported enduring stares from a public that was uncomfortable with female amputees. The universal theme among these female veterans was a desire for respect as an individual and as a wounded warrior.

Protective Factors

Protective factors contribute toward personal resilience or the capacity to adapt to change [36]. Among these women, the protective factors included a positive attitude, social support, recovery in a military culture, psychological resiliency, recognition it could have been

worse, a sense of humor, and making meaning out of their loss. Amy said, "Staying optimistic and having a good attitude are the most important things. . . . Mentally, I think it's all about the attitude." While Amy and Lisa stated they were optimistic by nature, Christine gave credit to her years of military training. All agreed that a positive attitude was essential to their recovery.

Social support was also vital. All of the women stated that they woke up from surgery to find their parent(s), spouse, or National Guard buddies there. Amy said, "Surrounding yourself with family and friends. . . your support system is huge." WRAMC patients had constant visitors. Amy found the veteran visitors who were amputees the most helpful because they encouraged her: "Okay, I can hope. I'm going to be like him, be independent, and if I don't want people to know, they don't have to know." Christine felt the support of the OIF/OEF veterans was critical because they provided role models—assurance that she would be fine and that life would return to normal.

All of the women spent a year or more at WRAMC or the Center for the Intrepid with other combat amputees. Christine said:

When you recover as a military amputee around other military amputees, you're still in a military culture. It's still one of "I can do this, I can kick ass, and I'm going to do what I need to do. So what I don't have legs."

This mental toughness is instilled through military training [28–29]^{*} and is expressed in the Soldier's Creed and Army values of discipline, self-control, and personal courage.* Nicole summarized basic training as instilling the belief that "Yes, you can do this. You don't have to second-guess yourself anymore." This belief gave these women the resiliency needed to persevere through physical and occupational therapy. This therapy was especially challenging for upper-limb amputees because they had to constantly repeat the same movements over and over to regain mastery over simple daily tasks. Lisa said, "You know, every now and again it does get to you. You try to do something, and you keep failing at it. It's really frustrating, because it's something simple." Thus, mental toughness was a critical factor in their adjustment.

^{*}Soldier life: Living the Army values [Internet]. GoArmy.com; 2010. Available from: <http://www.goarmy.com/soldier-life/being-a-soldier/living-the-army-values.html>

In addition to mental toughness, a sense of humor helped ease awkward situations. According to Smedema et al., humor is a positive coping strategy that reframes distressful situations and increases self-concept and vitality [30]. Five of the women reported using humor to adjust to their new body image. Jessica stated that being able to joke about her leg was one of the four factors in her recovery:

The four key factors in my healing process were actually having a leg to walk on, my belief in God, being able to joke about it, and support from my family and National Guard fellow servicemembers.

Lisa stated she constantly used humor to help people relax in her presence. Thus, humor helped these women heal, reduced stress, and increased their coping skills.

In 1962, Victor Frankl wrote in *Man's Search for Meaning* that humans have a psychological need to find or create a sense of meaning and purpose after suffering and loss [31]. Frankl believed every person must undertake his or her own journey and find his or her own individual meaning. The five women who lost a limb or limbs in military combat found comfort in having lost their limb in service to their country. Several women stated that surviving the loss of a limb gave them new courage. Jessica said, "After I lost my leg, you learn you can do anything." The experience "made me a stronger person" and she no longer took anything for granted. Overall, the loss of her leg was a "positive, transformative experience." Christine said, "I should be dead, and I'm not." This gave her a "freedom to be brave and try things I never would have thought about doing" and "life is a gift." Amy said she gained "a new outlook. . . life is short. . . do what you want to do with every day." Losing her leg brought Amy many new opportunities. Amy said, "I've accomplished more with one leg that I ever would have with two." Sarah said her loss put her on "a completely different path" by exposing her to new opportunities. She says, "There [are] a lot of things that I can't control; all I can control is my response." Thus, each of the women in this study developed her own personal meaning from her limb loss.

DISCUSSION

For each of these women, the loss of one or more limbs required them to build a new, reconstructed self.

This included a new self-image, new career aspirations, and adjustment to how others view them. Losing a limb is life changing, and the process of building a reconstructed self required each woman to let go of her past and create a new future. Recovery in a military culture enhanced their resiliency and stressed perseverance. In addition, a positive outlook, social support, psychological resiliency, humor, and the belief their loss had a purpose facilitated the development of a new sense of self.

The findings of this study are consistent with research findings that social support [4] and a positive attitude [4–5] are important factors in positive adjustment to amputation. These findings also correspond with research indicating that active coping skills correlate with a positive adjustment to amputation [4–6]. While these women discussed adjusting to the image in the mirror [4,7], they expressed greater concern about how other people viewed them. Sarah and Lisa, who lost upper limb(s), were very affected by public perception. Sarah spoke about having to draw on personal courage when meeting new people, and Lisa spoke of coping with hurtful comments from others. Even Amy, who was very comfortable showing off her prosthetic limb, spoke about the challenge of going out into public and "getting the looks." This concern about the perception of others adds a fourth dimension to the three dimensions reported by Aamot.

While all of these women had a reduced ability to defend herself, several women expressed specific concerns with their loss of personal safety. This supports research by Rybarzak et al. [5] and Behel et al. [10].

Horgan and MacLachlan reported that the degree of satisfaction with a prosthesis and reduced levels of phantom and residual-limb pain increased positive adjustment to amputation [4]. All of the women in this study reported a high tolerance to pain and indicated that their determination to persevere enabled them to cope with any pain associated with their loss. While phantom and residual limb pain are ongoing issues for most amputees, only three women specifically discussed phantom and/or residual limb pain. For all of these women, pain simply was a fact of life that did not keep them from achieving their life goals.

Contrary to the findings of Saradjian et al., both upper-limb amputees rejected their prosthetic arms and rarely used them [8]. In doing so, they rejected the idea that a prosthetic arm had a social normalizing role in everyday life. However, all of the women reported that limb loss affected their self-confidence and required

them to draw on their personal courage when facing strangers. As they became more adjusted to their limb loss, they sought to keep this loss from diminishing their self-esteem. All reported that their loss made them stronger, increased their willingness to take certain risks, and resulted in each woman setting higher goals than before her limb loss.

While unemployment was reportedly higher among civilian women amputees [11–12] and among Vietnam war amputees,^{*} not one woman in this study was willing to settle for a disability check. Christine and Jessica continue to serve in the Army National Guard. Two women work as business executives, Amy became a certified prosthetist, and Jessica, Lisa, and Nicole are college students. These women are determined to contribute to society despite limb loss.

Implications for Medical and Mental Health Professionals

Military women experience an environment in which mental toughness is expected and it is not acceptable to show weakness. Professionals lacking a military history can build rapport by asking about a woman's military experience before asking questions about her disability [32]. Amy made it very clear that only another veteran amputee could understand her life experience:

You can go and watch all the war movies you want or pretend you lost your leg, but it's never going to be the same. . . . I think it is really, really hard for someone to relate if they haven't gone through it.

Christine stated the men and women who were injured in OIF/OEF do not consider themselves to be disabled: they are wounded warriors. The term "wounded warriors" was adopted by the U.S. Army in 2005 and is used in all military publications since that date.[†]

^{*}Huston C, Dillingham TR, Esquenazi A. Rehabilitation of the lower limb amputee. In: Zajtchuk R, Bellamy RF, Dillingham TR, Belandres PV, editors. Rehabilitation of the injured combatant [Internet]. Washington (DC): Department of the Army, Office of the Surgeon General; 1998. Available from: https://ke.army.mil/bordeninstitute/published_volumes/rehab1/RH1ch4.pdf.

[†]Information Papers: U.S. Army Wounded Warrior Program [Internet]. 2008. Available from: http://www.army.mil/aps/08/information_papers/sustain/US_Wounded_Warrior_Program.html.

All of the women agreed that losing a limb should not be limiting. Jessica said, "You can do anything. You just have to give us a chance. If you don't give us a chance, you take away our livelihood and quality of life." Jessica spent a year in Iraq working 12 h days 6 days a week on her prosthetic limb training Iraqi military and police. While upper-limb amputees may be more functionally limited, Sarah is chief executive officer of her own business and has been honored by the Reserve Officers Association for her wounded warrior transition program. Lisa is a college student. She types and plays video games with her toes and uses adaptive equipment, a service dog, and Dragon Naturally Speaking to negotiate everyday life. Each woman recognized her limitations and developed work-arounds. Both upper-limb amputees emphasized that medical and prosthetic professionals should not dictate but listen and respond to the concerns of patients with amputation.

Limitations of Study

This was an exploratory research study with six participants. Limitations included possible researcher and participant biases, the representation of only one racial group (Caucasian), and a small sample size. Also, all six women served in the Army or Army National Guard and were deployed to only one combat zone: Iraq.

In addition, the use of the Internet rather than face-to-face interviews may have affected responses. While the researcher felt excellent rapport was established, participants may have been more or less disclosing because of the format. An unknown factor is the role of social desirability in the responses received. It is possible these women felt the need to project the Army wounded warrior image. It is also possible that the women who volunteered to participate in this study differ from other military women who experience a traumatic amputation.

CONCLUSIONS

While phenomenological research results cannot be assumed to be indicative of the psychosocial adaptation of all or even other servicewomen who experience traumatic amputation, it does suggest that military women have increased resiliency to traumatic limb loss, particularly when they recover in a military culture. This study also supports earlier research indicating [4] social support and a positive attitude [5–6] were important factors in adjustment. In addition, servicewomen seem to have less need to

camouflage their limb loss with lifelike prosthetic limbs. Whether women who join the military have higher resiliency or military training builds resiliency, this study indicates that female veterans' resiliency helped them to successfully adapt to limb loss. Each woman took a different journey to adaptation, but all are building new lives determined to contribute to society.

ACKNOWLEDGMENTS

Financial Disclosures: The author has declared that no competing interests exist.

Funding/Support: This material was unfunded at the time of manuscript preparation.

Institutional Review: Each participant provided verbal informed consent at the beginning of each interview. Participation in this study was voluntary, and all of the participants' names were changed to provide confidentiality and anonymity according to the institutional review board protocol approved by the University of Arkansas.

Participant Follow-Up: Participants will be notified of publication of this article. All participants were provided with a copy of their narratives during the research process to review, comment, and request changes.

REFERENCES

- Street AE, Vogt D, Dutra L. A new generation of women veterans: stressors faced by women deployed to Iraq and Afghanistan. *Clin Psychol Rev*. 2009;29(8):685–94. [PMID:19766368] <http://dx.doi.org/10.1016/j.cpr.2009.08.007>
- Holmstedt K. *The girls come marching home*. Mechanicsburg (PA): Stackpole; 2009. 325 p.
- Karmarkar AM, Collins DM, Wichman T, Franklin A, Fitzgerald SG, Dicianno BE, Pasquina PF, Cooper RA. Prosthesis and wheelchair use in veterans with lower-limb amputation. *J Rehabil Res Dev*. 2009;46(5):567–76. [PMID:19882491] <http://dx.doi.org/10.1682/JRRD.2008.08.0102>
- Horgan O, MacLachlan M. Psychosocial adjustment to lower-limb amputation: a review. *Disabil Rehabil*. 2004;26(14–15):837–50. [PMID:15497913] <http://dx.doi.org/10.1080/09638280410001708869>
- Rybarzak B, Syzmanski L, Nicholas J. Limb amputation. In: Frank RG, Elliot TR, editors. *Handbook of rehabilitation psychology*, 2nd ed. Washington (DC): American Psychological Association; 2002. 727 p.
- Livneh H, Antonak RF, Gerhardt J. Psychosocial adaptation to amputation: the role of sociodemographic variables, disability-related factors and coping strategies. *Int J Rehabil Res*. 1999;22(1):21–31. [PMID:10207748] <http://dx.doi.org/10.1097/00004356-199903000-00003>
- Aamot S. Reactions to facial deformities: Autonomic and social psychological. *Eur J Soc Psychol*. 1978;8(3):315–33. <http://dx.doi.org/10.1002/ejsp.2420080305>
- Saradjian A, Thompson AR, Datta D. The experience of men using an upper limb prosthesis following amputation: positive coping and minimizing feeling different. *Disabil Rehabil*. 2008;30(11):871–83. [PMID:17852212] <http://dx.doi.org/10.1080/09638280701427386>
- Murray CD. The social meanings of prosthesis use. *J Health Psychol*. 2005;10(3):425–41. [PMID:15857872] <http://dx.doi.org/10.1177/1359105305051431>
- Behel JM, Elliot TR, Nicholas JJ, Nyenhuis D. The role of perceived vulnerability in adjustment to lower extremity amputation: a preliminary investigation. *Rehabil Psychol*. 2002;47(1):92–105. <http://dx.doi.org/10.1037/0090-5550.47.1.92>
- Hebert JS, Ashworth NL. Predictors of return to work following traumatic work-related lower extremity amputation. *Disabil Rehabil*. 2006;28(10):613–18. [PMID:16690573] <http://dx.doi.org/10.1080/09638280500265219>
- Whyte AS, Carroll LJ. A preliminary examination of the relationship between employment, pain and disability in an amputee population. *Disabil Rehabil*. 2002;24(9):462–70. [PMID:12097215] <http://dx.doi.org/10.1080/09638280110105213>
- Institute for Veterans and Military Families. The employment situation of veterans [Internet]. Syracuse University; 2012 February. Available from: <http://vets.syr.edu/employment/resources>
- Morris M. By force of arms: rape, war and military culture. *Duke Law J*. 1996;45(4):651–781. <http://dx.doi.org/10.2307/1372997>
- Burke C. *Camp All-American, Hanoi Jane, and the high-and-tight*. Boston (MA): Beacon Press; 2004. 264 p.
- Bacevich AJ. *The new American militarism*. New York (NY): Oxford University Press. 2005. 270 p.
- Yeager H. *Soldiering ahead*. Wilson Q. 2007;31(3).
- Creswell J. *Qualitative inquiry and research design: choosing among five approaches*. Thousand Oaks (CA): Sage Publications; 2007. 393 p.
- Groenewald T. A phenomenological research design illustrated. *Inter J Qualitative Methods*. 2004;3(1):1–23.
- Patton MQ. *Qualitative research and evaluation methods*. Thousand Oaks (CA): Sage; 2002. 598 p.
- Moustakas C. *Phenomenological research methods*. Newbury Park (CA): Sage; 1994. 192 p.
- Jones S, Torres V, Armino J. *Negotiating the complexities of qualitative research in higher education*. New York (NY): Routledge; 2006. 213 p.

23. Hatch JA. Doing qualitative research in education settings. Albany (NY): State University of New York Press; 2002. 299 p.
24. Cater JK. A phenomenological study of female military servicemembers' adjustment to traumatic amputation [dissertation]. [Fayetteville, AR]: University of Arkansas; 2010. 238 p.
25. Levy W. Skin Problems of the Amputee [Internet]. O & P Library; 2002. Available from: <http://www.oandplibrary.org>.
26. National Limb Loss Information Center. Skin care and stump hygiene [Internet]. Knoxville (TN): Amputee Coalition of America. Available from: <http://www.waramps.ca/nac/health/skin.html>.
27. Adee S. Dean Kamen's "Luke Arm" prosthesis readies for clinical trials [Internet]. IEEE Spectrum; 2008 Jan 1. Available from: <http://spectrum.ieee.org>
28. Meredith LS, Sherbourne CD, Gaillot S, Hansell L, Ritschard HV, Parker AM, Wrenn G. Promoting psychological resilience in the U.S. Military [Internet]. Rand Center for Military Health Policy Research; 2011. Available from: <http://www.rand.org/pubs/monographs/MG996.html>
29. Bartone P. Resilience under military operational stress: can leaders influence hardiness? *Mil Psychol*. 2006;18(Suppl): S131–48.
http://dx.doi.org/10.1207/s15327876mp1803s_10
30. Smedema SM, Catalnao D, Ebener D. The relationship of coping, self-worth and subjective well-being: A structural equation model. *Rehabil Couns Bull*. 2010;53:131–42.
<http://dx.doi.org/10.1177/0034355209358272>
31. Frankl V. Man's search for meaning. Boston (MA): Beacon Press; 2000. 196 p.
32. Cater JK, Koch LC. Veterans, military sexual trauma and PTSD: rehabilitation planning implications. *J Appl Rehabil Counsel*. 2011;42(2):33–41.

Submitted for publication December 11, 2011. Accepted in revised form April 3, 2012.

This article and any supplemental material should be cited as follows:

Cater JK. Traumatic amputation: Psychosocial adjustment of six Army women to loss of one or more limbs. *J Rehabil Res Dev*. 2012;49(10):1443–56.
<http://dx.doi.org/10.1682/JRRD.2011.12.0228>

ResearcherID: Janet K. Cater, PhD, CRC: H-1286-2011



