

Exploring discourse surrounding therapeutic enhancement of veterans and soldiers with injuries

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Abstract.

BACKGROUND: Human enhancement (the enhancement of the abilities of a normative person beyond the norm) of soldiers has been debated for some time. However, therapeutic enhancement of soldiers and veterans with injuries (the enhancement of the abilities of a sub-normative labeled person beyond the norm) is much less discussed.

OBJECTIVE: This article discusses 1) historical examples of policies and views linked to soldiers and veterans that have been injured in the Americas, and perception of injured veterans and soldiers; 2) the science and technology of the therapeutic enhancement landscape and 3) views of veterans on therapeutic enhancements.

METHODS: Three methods were used: a) historical search of policy documents; b) content analysis of the New York Times and c) online delivered exploratory non-probability survey using the Survey Monkey platform.

RESULTS: Researchers found that veterans played a special role in policy developments in the United States, such as disability pension plans, and that veterans who were injured were portrayed more positively than other people with disabilities in the NYT from 1851–2010. However, within the current public discourse around the use of enhancement enabling therapeutic assistive devices, the voices of injured soldiers and veterans are not visible.

CONCLUSIONS: Therapeutic enhancements, especially of injured soldiers and veterans, are an under researched area with various open ethical questions in need of more coverage.

Keywords: Human enhancements, veterans, soldiers, injured veterans, ethics

1. Introduction

So far, the very meaning of health, treatment and rehabilitation is benchmarked to the normal or species-typical body. We expect certain abilities in members of

a species; we expect humans to walk but not to fly, but a bird we expect to fly [1]. However, increasingly a) therapeutic interventions have the potential to give recipients beyond species-typical body related abilities (therapeutic enhancement) and b) so-called healthy people can obtain enhancers, whether they were used as therapeutics before or not, to gain non-therapeutic enhancement.

Human enhancement (the enhancement of the abilities of a normative person beyond the norm) of people outside of the therapeutic arena has been discussed

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for a long time [2–20] whereby many feel it should be legalized [21–34]. Much has also been written about the development and use of and push for human performance enhancement products for ‘healthy’ soldiers and their impact [3,35–49]. However, there are other areas of performance enhancement that are not adequately addressed in the literature, such as therapeutic enhancements (TE) (the enhancement of the abilities of sub-normative labeled people beyond the norm) [50]. TE is enabled by therapeutic assistive devices developed for restorative purposes that as a side effect increasingly allow the wearer to outperform the species-typical body in various functions. For example a brain-computer interface allows the wearer to control certain devices with their thoughts [51,52], which is something that humans are normally not capable of doing. TE increasingly becomes a therapeutic option for people with disabilities in general and for injured soldiers and veterans in particular [3]. The impact of TE in general and for injured veterans and soldiers in particular is however hardly discussed. Such silence might be a problem as a) discourses around TE will impact the discourses around so called non-TE and b) discourse around TE of soldiers and veterans that have been injured will be in particular impactful given that soldiers and veterans that have been injured were often at the forefront of paradigm shifting policy development (see Part 1a).

In this paper the following topics are discussed: 1) historical examples of policies and views linked to soldiers and veterans that have been injured in the Americas, and perception of veterans and soldiers that have been injured in the NYT; 2) the TE science and technology landscape and 3) views of members of one veterans group in Canada on a particular TE. This paper concludes that TE’s especially of soldiers and veterans that have been injured is an under researched area with various open ethical, social and policy questions in need of more coverage.

Part 1a: Historical policies regarding veterans with impairment in the Americas

Injured veterans have often been at the forefront of policy developments. One example is the development of disability pension plans. Injured veterans had a disability pension scheme long before this type of pension system was set up for other veterans [53].

A 2007 report, *A 21st Century System for Evaluating Veterans for Disability Benefits* written by the Commit-

tee on Medical Evaluation of Veterans for Disability Compensation highlights many areas of innovations regarding the treatment of soldiers and veterans that have been injured.

In 1636, the Plymouth Colony enacted the first law in the English colonies in North America providing money to veterans who acquired disabilities because of battles with Pequot Indians [54].

“On August 26, 1776, the first pension legislation for the American colonies as a group was enacted. A resolution of the Continental Congress provided “half pay for life or during disability” was provided “to every officer, soldier, or sailor losing a limb in any engagement or being so disabled in the service of the United States as to render him incapable of earning a livelihood,” and those partially disabled from getting a livelihood were promised proportionate relief (President’s Commission, 1956b:5). The Revolutionary War Pension Act of 1818 (3 Stat. L., 410) moved the pension right beyond people who due to an impairment could not earn a living. “Veterans who had served at least nine months in the Continental Army and who were also “in reduced circumstances” received lifetime pensions at half-pay of the rank held during the Revolutionary War” [54].

Disability payments based on rank and degree of disability (meaning impairment) were provided by the General Pension Act of 1862 (12 Stat. L., 566) (the General Law), and it “applied to the Civil War and to any or all future wars in which the United States might be engaged” (President’s Commission, 1956b:13) [54].

“The Economy Act of March 30, 1933 (P.L. No. 2, 73rd Cong.), which eliminated payments to all veterans without service-connected disabilities except those who were totally disabled and could meet an income test (President’s Commission, 1956b:39), authorized the next version of the Rating Schedule” [54].

According to the Committee, the purpose of the 1945 rating system still used today “is to determine the extent to which impairment reduces earning capacity (work disability) the operational basis for these ratings is an evaluation of the severity of impairments resulting from the service connected injury or disease” [54].

The US Committee on Medical Evaluation of Veterans for Disability Compensation interpreted the compensation schemes for veterans in light of their inabil-

ity to provide for themselves due to anatomical losses. The committee stated:

“The original concern for the sacrifices made by those who serve our nation’s colors had its genesis in the Revolutionary War, when loss of limbs, eyes, or other body parts sharply reduced a person’s ability to support himself. This emphasis on anatomical loss persisted through the 19th century, was codified in the Rating Schedule developed to implement the War Risk Insurance Act of 1917, and retained with modifications in subsequent Rating Schedules, including the current one when it was developed in 1945” [54].

Interestingly the Committee on Medical Evaluation of Veterans for Disability Compensation reported in 2007 [54] that the way the U.S dealt with veterans and soldiers that were injured did not kept pace with the reality,

“As the understanding of what constitutes disability has evolved, so has the ability to recognize and quantify the contributory components. The questions posed by the commission to this IOM committee reflect the uncertainties created by a lack of clear statement of purpose for the program, the use of an evaluation tool that has not kept pace with the changing dynamics of the likely losses incurred by our servicemen and servicewomen, and the changing economics of the workforce in America, as well as the changing social context into which our veterans return” [54].

“With members of the military being injured in combat nearly every day, the system of evaluating and rating disability should be as up to date as medical knowledge of impairment and its effects on a person’s functioning and quality of life permits” [54].

Vietnam veterans that were injured are also seen as a main force behind the push for people with disabilities rights in the USA [55,56] in the 1970’s.

The question remains where the treatment and perception of as impaired evaluated veterans will go in the future.

Part 1b: Historical perception of as impaired perceived veterans and non-veterans through the lens of the New York Times

The NYT is by meaning of others [57] and its self-perception [58,59] important in informing the ‘aver-

age’ person on important issues. Therefore, it was decided to perform a thematic analysis of NYT articles (Table 1) covering perception of impaired veterans. We searched the New York Times archives systematically using (a) the ProQuest search engine (provided by the University of Calgary) for articles from 1851 to 2006 and (b) the archive search engine on the New York Times website for articles from 2006 to 2011 (August 16, 2011) for the perception of veterans with impairment and compared it with perception of non-veteran people with impairments. Another inclusion criterion was that the articles had to cover employment as this is one of the most important issues in regards to people with disabilities, veterans or not. The analysis was limited to articles that had the terms in the title of an article as this indicates a higher focus on the given subject than if just mentioned in the body of the article. This search strategy led to manageable numbers of hits that could be investigated.

The themes present in the NYT articles in regards to people with impairments (Tables 2–4) were quite diverse. The most visible themes were: covering social and government aid, the types of jobs possible for people with impairment, that people with impairment have valuable abilities and that they have to be independent and help themselves. Statistics related to people with impairments were fairly invisible with for example employment statistics of people with impairments only mentioned once for blind people and once for deaf people. Various themes were only present related to veterans with impairments: “Need to improve care system”, “We owe them”, Housing/“national asylum.” “reconstruction of disabled”, persuading industry to hire, “human touch”, “Aid for children of disabled”, “Influencing public opinion” and “Not their fault.”

To mention one specific theme, various articles cover public perception of people with disabilities. These articles had the theme of people with disabilities helping themselves [60–67] and these mention contribution to society [62,65,68–72]. We found positive and negative perceptions with the positive outperforming the negative 148 to 36. Readers of the NYT received a diverse picture of people with disabilities although the reporting differed whether the topic was covering the blind, deaf, cripple (term used in the older issues of the newspaper), veterans that were injured or so called cognitively impaired people. Indeed certain positive themes such as “We owe them”, “Not their fault”, “Should get special treatment”, “Positive impacts of disability” “Human Touch is needed”, “Reconstruction of disabled” and “Heroics” were evident exclusively in

Table 1
Keyword hits

Keywords	1850–1950		Work in title keywords 1851–1950	
	Headline	Text	Headline	Text
			134543	1724881
Ability	2,822	269,635	ability	165
disab*	4271	49049	+ disab*	158
Handicapped	1302	22301	Handicapped	122
Blind	6474	97964	Blind	334
Deaf	1663	25556	Deaf	64
Lame	690	88789	Lame	27
Cripple*	4633	43266	Cripple*	257
Feeble	473	22498	Feeble	23
Dumb	534	13949	Dumb	22
Retard*/retarded	571/1716	13261/31598	Retard*/retarded	148/60
Mentally ill	2	15	Mentally ill	2
Moron OR morons	91	2834	Moron	4
Mentally defective	0	41	Mentally defective	0
Learning disab*	0	0	Learning disab*	0
Women	111017	969734	Women	4189
Indian	27546	209020	Indian	585
“the Poor”	2615	74861	“the Poor”	227
Negro	20759	108067	Negro	540
Veteran*	31719	216707	Veteran*	847

Table 2
Themes prevalent in the NYT articles analyzed (1851–1950)

Total	96		95		64		286	
	Blind (hits/%)		Cripple (hits/%)		Deaf (hits/%)		‘Impaired’ Veterans (hits/%)	
Type of disability								
Social/government aid	14	14.6	18	18.9	8	12.5	52	18.2
Valued abilities	10	10.4	11	11.6	11	17.2	1	0.3
Types of Jobs	18	18.8	8	8.4	5	7.8	57	19.9
Need for independence/help themselves	13	13.5	13	13.7	6	9.4	18	6.3
Education	5	5.2	6	6.3	7	10.9	3	1.0
Public perceptions of abilities	9	9.4	2	2.1	5	7.8	0	0.0
Special abilities	8	8.3	0	0.0	6	9.4	0	0.0
Contribution to society	2	2.1	8	8.4	3	4.7	13	4.5
Statistics	2	2.1	7	7.4	4	6.3	0	0.0
Policies and government	4	4.2	4	4.2	2	3.1	30	10.5
Burden to society	2	2.1	5	5.3	2	3.1	1	0.3
Gendered jobs	4	4.2	2	2.1	1	1.6	13	4.5
Aid of technology	0	0.0	3	3.2	1	1.6	5	1.7
Causes	3	3.1	0	0.0	1	1.6	0	0.0
Discrimination	0	0.0	2	2.1	1	1.6	7	2.4
Exploitation	1	1.0	1	1.1	1	1.6	0	0.0
Negative terms	1	1.0	2	2.1	0	0.0	0	0.0
Side-effects of unemployment	0	0.0	3	3.2	0	0.0	0	0.0
Compensation	0	0.0	0	0.0	0	0.0	22	7.7
Need to improve care system	0	0.0	0	0.0	0	0.0	15	5.2
We owe them	0	0.0	0	0.0	0	0.0	15	5.2
Housing/“national asylum”	0	0.0	0	0.0	0	0.0	6	2.1
“reconstruction of disabled”	0	0.0	0	0.0	0	0.0	6	2.1
Employment agencies	0	0.0	0	0.0	0	0.0	6	2.1
Persuading industry to hire	0	0.0	0	0.0	0	0.0	5	1.7
“human touch”	0	0.0	0	0.0	0	0.0	4	1.4
Aid for children of disabled	0	0.0	0	0.0	0	0.0	2	0.7
Influencing public opinion	0	0.0	0	0.0	0	0.0	2	0.7
International efforts	0	0.0	0	0.0	0	0.0	2	0.7
Not their fault	0	0.0	0	0.0	0	0.0	1	0.3

Table 3
Themes around public perception of NYT articles (1851–1950) analyzed

Public perceptions									
Total	36		31		18		80		
	Blind (hits/%)		Cripple (hits/%)		Deaf (hits/%)		'Impaired' veterans (hits/%)		
Positive									
Independence/Help themselves	13	36.1	13	41.9	6	33.3	18	22.5	
Need to contribute to society	2	5.6	8	25.8	3	16.7	13	16.3	
We owe them	0	0.0	0	0.0	0	0.0	15	18.8	
Not their fault	0	0.0	0	0.0	0	0.0	1	1.3	
Disability does not hinder ability	5	13.9	1	3.2	3	16.7	0	0.0	
Should get special treatment	0	0.0	0	0.0	0	0.0	14	17.5	
Positive impacts of disability	0	0.0	0	0.0	0	0.0	1	1.3	
"Human Touch" is needed	0	0.0	0	0.0	0	0.0	4	5.0	
"Reconstruction of disabled"	0	0.0	0	0.0	0	0.0	6	7.5	
Heroics	0	0.0	0	0.0	0	0.0	3	3.8	
Negative									
Burden on society	2	5.6	5	16.1	2	11.1	1	1.3	
Negative imaging	1	2.8	2	6.5	0	0.0	4	5.0	
Jobs limited by disability	7	19.4	1	3.2	3	16.7	0	0.0	
Helplessness	2	5.6	0	0.0	0	0.0	0	0.0	
Need to prove themselves	4	11.1	1	3.2	1	5.6	0	0.0	

the articles covering veterans that were injured. At the same time the negative images evident in the coverage of blind people, deaf people and cripples "Burden on society" "Jobs limited by disability", "Helplessness" "Need to prove themselves" were not present in the articles covering veterans that were injured.

Part 2: Contemporary perception outside New York times

The Committee on Medical Evaluation of Veterans for Disability Compensation concluded in 2007 [54] that the way the US dealt with soldiers and veterans that were injured did not keep pace with the reality. A 2011 Pew Research Centre Survey *For many injured veterans, a lifetime of consequences* [73] found that "one out of every ten veterans alive today was seriously injured" and "many of these 2.2 million wounded warriors, the physical and emotional consequences of their wounds have endured long after they left the military." Some of the other findings were "Veterans who suffered major service-related injuries are more than twice as likely as their more fortunate comrades to say they had difficulties readjusting to civilian life", "they are less likely in later life to be in overall good health or to hold full-time jobs", "Fully half (52%) of all veterans badly injured while serving say the government has not given them, as a veteran, "all the help you think it should." Of soldiers wounded that served 67% believe that the government has NOT given them all the

help they needed and 44% judged the care to be only fair or poor [73].

On the US Medicine.com webpage an article outlined the thesis that lifetime cost of treating the latest generation of veterans is higher than predicted [74]. Veterans that were injured are seen as a drain on health care [75] and society [76] because of their long term medical treatment needs. Alan Simpson, former Republican Senator from Wyoming, made it clear that he believes the health care benefits plan extended to American war veterans does little more than aggravate the US's fiscal trouble, at an estimated national cost of \$42 billion USD per year [75].

According to an article in Army Times "Tea party favorite Rep. Michele Bachmann, R-Minn, has unveiled a plan for cutting \$400 billion in federal spending that includes freezing Veterans Affairs Department health care spending and cutting veterans' disability benefits" [77].

Senator Tom Coburn, Republican of Oklahoma did hold up the Veterans' Caregiver and Omnibus Health Benefits Act of 2009, (S 1963) over concern about creating new and unfunded benefits [78]. On the other hand, it seems that society in general overlooks the fact that the health care benefits of veterans are extended to them because of the stresses of working in a combative environment. Psychologically one of the most common afflictions among veterans is PTSD (Post Traumatic Stress Disorder). Veterans living with PTSD are often highly stigmatized and even ostracized as a social group [79]. In general the coverage around Veterans

Table 4
Themes around public perception NYT 1851–2011

Themes	NYT 1851–1950 impaired veterans <i>n</i> = 80		NYT 1950–2011 impaired veterans <i>n</i> = 196		
	# of Hits	% of Hits	# of Hits mentioning theme	# of Doc. (Total = 196 Doc.)	% Doc. mentioning theme
Positive					
Independence/Help themselves	18	22.5	8	4	2.04
Need to contribute to society	13	16.3	1	1	0.51
We owe them	15	18.8	15	12	6.12
Not their fault	1	1.3	1	1	0.51
Disability does not hinder ability	0	0.0	3	2	1.02
Should get special treatment	14	17.5	47	31	15.8
Positive impacts of disability	1	1.3	2	1	0.51
“Human Touch” is needed	4	5.0	2	2	1.02
“Reconstruction of disabled”	6	7.5	0	0	0
Heroics	3	3.8	15	10	5.1
Job Creation			30	21	10.7
Alternative Employment			13	10	5.1
Tribute			94	48	24.5
Gratitude			35	17	8.67
Reintegration			4	3	1.53
Compensation			213	91	46.4
Accessibility			41	14	7.14
Health Care Improvements			2	2	1.02
Psycho-Social Support			15	12	6.12
Negative					
Burden on society	1	1.3	8	6	3.06
Negative imaging	4	5.0	23	12	6.12
Jobs limited by disability	0	0.0	7	6	3.06
Helplessness	0	0.0	3	3	1.53
Need to prove themselves	0	0.0	0	0	0
Restrict Employment Opportunities			19	18	9.18
Understanding of Veteran Needed			14	11	5.61
Poor Health Care Access			14	9	4.59

that were injured in the public domain is quite inconsistent. Some say that veterans that were injured should use all rehab technologies possible/available [80–83]; should feel well taken care of [80]; deserve to be taken care of by the nation [84–89]. On the other hand veterans that were injured are stigmatized [88, 90–94]; are often unemployable [86,91]; aren’t worth as much [93–95]; should be productive [92] and should integrate back into society well [96].

Part 3: The Science & Technology landscape

Despite the perceived “drain” on the health care systems of North America [75], many rehabilitative interventions are being specifically designed for soldiers and veterans that have been injured [3] many of which could lead to TE. Due to the protection of soldiers, the fatality to impairment ratio changed in recent times dramatically with a decrease in fatality and increase in so called impairment. According to [97] important strides in providing vehicle and body armor, innova-

tive changes in doctrine, tactics, techniques and procedures, and advances in military medical technology are having profound impacts on how many of our soldiers, sailors, airmen, Marines, and special operations warriors are surviving their wounds. “Since the war in Iraq began in 2003, Americans have suffered more than 3,000 Deaths and about 23,000 Casualties” [98]. According to the Defense Advanced Research Projects Agency (DARPA), more than 300 soldiers from the war in Iraq alone have returned home with major amputations [99]. DARPA has developed programs in conjunction with public and private medical research institutions looking at novel technologies allowing for soldier self-aid [100–104]. In 2004, an article outlined a soldier self-care vision [105]. “Future Soldiers may operate in encapsulated, climate-controlled, powered fighting suits, laced with sensors and boasting chameleon-like ‘active’ camouflage while ‘skin-patch’ pharmaceuticals help regulate fears, focus concentration and enhance endurance and strength” [104, 106]. These technologies are aimed at enabling the injured warfighter to address minor to moderate injuries

without relying on outside support. This represents a paradigmatic shift from medic-centric to warfighter-centric medical care [105]. Performance enhancing ‘medication’ is also on the radar screen of the military. The Navy has addressed “performance enhancement” medications [107], although some feel that this is not done extensively enough [104]. Various therapeutic programs exist that can move toward therapeutic enhancements such as DARPA’s Cutting-Edge Programs Revolutionize Prosthetics [98,99,108,109]. The Telemedicine and Advanced Technology Research Center (TATRC) US Army Medical Research and Materiel Command has an advanced prosthetics and human performance program [110,111] a medical sensor system [112–114] an exoskeleton for human performance augmentation program [115–118] and various regenerative medicine program [119–122].

Part 4: Views of veterans on therapeutic enhancements

What are the views of veterans? Will they resist or embrace TE? To answer these questions, non-injured members of a Canadian veteran group called Veteran Voice were asked the following question:

“If you acquired an injury which led to the removal of your legs and you had the choice between a) artificial legs that behave like a ‘normal’ leg therefore do not outperform ‘normal’ legs; b) artificial legs that are better than the ‘normal’ legs and c) no artificial legs but something like a wheelchair, which would you chose?”

This question (q46) was the last one of a set of questions that were tailored to explore whether veterans’ perceive the New Veterans’ Charter (Canada) as sufficient to ensure a full continuum of client centered services and to gauge their perception regarding level of satisfaction with service provisions. An online delivered exploratory non-probability survey was administered using the Survey Monkey platform consisting of a combination of simple yes or no questions, a Likert scale, opinion self-rating scales, as well as open-ended questions. The preliminary draft survey was presented to five military affiliated organizations for feedback. The revised online survey was inputted into a previously activated Survey Monkey account, an online service provider that ensures that all data remains aggregate and encrypted for security purposes. The survey received ethics approval by University of Calgary

Health Research Ethics board. After ethics approval the survey links were activated and the link emailed to the group ‘Veterans Voice forum’ that had previously indicated that they would host the link creating an opportunity for data to be gathered via convenience sampling. As this is a non-probability sample no tests of significance were performed [123].

252 respondent responded to the survey of which 153 (60.7%) filled out the complete survey. As to question 46 that is reported on in this paper, 28.1% ($n = 43$) of the veterans would prefer legs that do not outperform the ‘normal’ legs and 35.3% ($n = 54$) legs that out performs ‘normal’ legs. Only 1.3% ($n = 2$) would choose no artificial legs but something like a wheelchair and 35.3% ($n = 54$) did not know what they would go for.

2. Discussion

Given the focus of science and technology on soldiers and veterans that were injured and the increasing feasibility of therapeutic enhancement of soldiers and veterans that were injured, the question arises: what is the discourse so far around this topic? In short, the answer is very little to none which is a problem. Data presented in Part 1 highlights the impact veterans that were injured had on policies that in the end impacted society. Data presented in Part 1b showed that veterans that were injured are covered differently in the New York Times than other people with disabilities and different sentiments are linked to them than non-military related people with disabilities. Part 2 shows that the contemporary view of veterans that were injured is more ambivalent. For many, veterans injured or not are a social group to be honored and revered, a group that members of society owe their gratitude to for serving to protect the citizens of their country, keeping the peace, or otherwise. Thus, this group sees it as appropriate that members of society pay them their respects by extending benefits exclusive to them, including but not limited to health care and educational benefits. However data presented in Part 2 also shows that there are others, who see veterans injured or not in a much dimmer and less glamorous light. Veterans often feel stigmatized for various reasons and veterans and soldiers that were injured especially in the post 9/11 era feel they do not receive the help they need and that they have a high problem with integration into society [73]. Both groups of sentiments influence the behavior of veterans that were injured. The question

remains whether the negative perception veterans and soldiers that were injured have of their living situation makes them more open to using enhancement technologies.

In 2002, Donovan, Egger, Kapernick and Mendoza investigated what might generate a climate of achieving Performance Enhancing Drug Compliance in Sport [124] meaning that these drugs are not taken. They postulated that six major inputs that shape the behavior of an athlete are a) threat appraisal; b) benefit appraisal; c) reference group influences; d) personal morality; e) legitimacy and f) personality factors [124].

Soldiers and veterans that were injured experience above average unemployment rate and stigmatization. They feel that they do not receive the care they deserve and they experience problems with integrating back into society. Given this, it seems obvious that veterans if injured would not only choose to regain their normal functioning (artificial leg preference over wheelchair) but if available would choose enhancement enabling therapeutic devices (artificial legs with beyond the normal abilities) [125]. The choice of enhancement enabling therapeutic devices over non enhancement enabling devices one can predict will be seen as highly beneficial and not immoral. They will have a high support level in the relevant support groups and laws and regulations will be seen as having no legitimacy to prevent these kinds of enhancements. Indeed results of two recently performed exploratory studies (one covering members of the World Federation of the Deaf and the other covering members of the National Council of Rehabilitation Educators) reveal very little resistance toward therapeutic enhancement [125,126]. Furthermore the former general secretary of the World Transhumanist Association, a group that pushes for the enhancement beyond the normal in general, believes that people with disabilities, in general, are trailblazers for enhancements as they are seen to embrace these enhancements readily [127].

Indeed given today's reality of soldiers and veterans that were injured, obtaining enhancement enabling therapeutic devices not only would make living in the community easier but might allow them to return back to their life as soldiers and even back to active duty [128–130]. The narrative around and purpose of obtaining prosthetic limbs by soldiers and veterans that were injured seems to change by adding to the therapeutic aspects as the desirable endpoint a narrative and desire to enhance the wearer's abilities beyond what a human being is naturally capable of on the battlefield. These types of assistive devices might

be the best chance for a soldier that was injured to be allowed back into active duty as these 'fixed' soldiers would have a combative advantage which would make it more likely that the 'fixed' soldier will be allowed to go back to a life they have known before. Starting with World War II and continuing on through history to Vietnam, Korea, the Gulf and more contemporarily Iraq and Afghanistan wars, veterans have been made to feel liberated by being enabled to become active again, through competing in sport and more specifically the Paralympics [131,132]. Of competition, Kortney Clemons said "Being competitive is a good thing because you can do it the rest of your life. We even compete with ourselves" [133]. In the belief of veterans to be highly competitive above the normal standard [134], also recognized by Guttmann: the will to win is always strongest amongst "the paralyzed" during national and international contests (Guttmann 1976, 33), veterans continue to be considered as tactical athletes [134].

This changing narrative has various ethical angles that are not really explored yet. One being that all kinds of injuries are inflicted onto soldiers, some physical and some mental; for some there might be assistive bodily devices to go back to active duty, but for others there are not. It seems a two tiered system of injuries with different reintegration potential is appearing.

The trickle down of therapeutic enhancements to non-soldiers and veterans that were not injured is another ethical issue and an area not much debated as of yet. Lin in his piece about Robotics, Ethics and war [135] addresses consequences stemming from the fact that every enhanced soldier "is a potential veteran, returning to society from their military Service" [135]. He highlights that "approximately 23 million veterans today live in the US, accounting for about one in 10 adults, plus three million active and reserve military personnel" [135]. However the consequences are just as real for the 2.2 million veterans that were injured [73] existing today. Even more, as many of these therapeutic enhancements can also be performed on non-veterans that were injured the impact will increase by 10 fold given the numbers of disabled people in the US. People with disabilities [126], rehabilitation educators [125] and others [127] expect that many of these enhancement enabling therapeutic devices will also be sought out by so-called healthy people.

Lin concluded that various questions must be asked in regards to enhancing soldiers, such as whether these effects have to be reversed upon moving back to civilian life and if not reversible whether they should be

allowed to return to civil life; what might be the social disruption of the return of the enhanced soldier into civilian life onto the non-enhanced and how do we evaluate issues of access, fairness and equity [135]?

Similar questions can be asked around therapeutically enhanced veterans that were injured. In sport these kinds of questions are asked already as the time seems to be near where a bionic leg outperforms the normal leg which raises all kinds of issues of expectation of disabled athletes and their relationship to non-impaired labeled athletes [136] and expectations of sponsors, governments and spectators [137].

However, a public discourse around the impact of the availability of enhancement enabling therapeutic assistive devices for soldiers and veterans that were injured does not exist, nor does a discourse exist around the role of the technology developers, the rehabilitation professionals, the veteran and soldier that was injured, officials from veteran affairs, politicians involved in the discourse around the health care of veterans and soldiers that were injured, and academics involved in enhancement and healthcare policy. Furthermore, no discourse exists among people with disabilities and their organizations as to the impact of enhancement enabling therapeutic assistive devices. Many unexplored areas related to veterans and soldiers that were injured and therapeutic enhancements are in need of exploration.

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