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Acupuncture in Military Medicine

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1. Introduction

Pain treatment and management remains one of the biggest challenges to modern medicine today. A recent Centers for Disease Control and Prevention (CDC) report found that 25 percent of U.S. adults reported experiencing a full day of pain within the past 30 days and one in 10 said their pain lasted one year or more. The most common complaints were low back pain followed by migraine or severe headache and joint pain[1].

Current research efforts to understand pain mechanisms have revealed a complex picture in which the biological mechanisms of pain reach beyond the nervous system to other areas and systems associated with depression, anxiety, and sleep, areas of the mind and psyche. A recent nationwide survey found that one in five Americans say their pain has resulted in major lifestyle changes in employment, residence, or personal freedom and mobility. Participants viewed the medical community as being only partially successful in helping patients manage their pain[2].

New, multi-disciplinary approaches to pain management have been developed and many therapies exist, however the dominant component of these approaches continues to be prescription and over-the-counter medications. While the use of medications is necessary and often effective, it does present the risk of overreliance, misuse, and abuse. Over the last decade there have been a number of reviews highlighting not only a significant rise in prescription medication, but also a sharp climb in abuse particularly for those between the ages of 18-25[3].

Military medicine is faced with similar challenges to successful pain management and treatment. However, many factors such as work cycles, organizational structure, mission and patient population of the military generate unique issues when formulating a strategy for pain

management[4]. While the adequate and appropriate management of pain is a daunting issue for the military, recent engagements have put the issue of pain front and center.

The Global War on Terrorism and the wars in Iraq and Afghanistan have produced an increasing number of combat veterans returning with complex multi-trauma. Most of these injuries are caused by roadside, vehicle-mounted, and variously concealed improvised explosive devices (IEDs) that cause extensive direct and indirect concussive, blunt and projectile-induced damage. Due to significant improvements in individual body and vehicle armor, more sophisticated and responsive emergency medical and surgical care, and advanced air evacuation system capabilities, these injuries have become more survivable. In some cases, the very body armor that saves lives may contribute to head, neck, and extremity injuries, which in turn often progress to long-term disability and/or pain. Added to the physical wounds of war are the psychological and emotional sequelae associated with civilian and guerilla warfare, mass casualties and asymmetric warfare. As a result, large numbers of combat veterans experience a trauma spectrum response that includes pain, sleep and other somatic disorders, anxiety, post-traumatic stress, and other symptoms.

Due to the stigma associated with being taken out of the fight and away from their battle team, it is common for U.S. combatants to delay seeking medical help unless the injuries are significantly debilitating. It is variously reported that 15 to 20 percent of combat veterans returning without obvious physical injury have some degree of persistent mild traumatic brain injury and post-traumatic stress disorder. For others being treated for life-threatening injuries due to combat trauma, the sometimes hidden symptoms of repetitive concussive injury and combat stress are also present. These multiple overlapping injuries typically lead to chronic, more severe multi-system disorders well after the crisis of initial injury subsides. In many cases, the primary presenting problem is "depression, anxiety, or chronic pain" without other obvious physical manifestations. But upon further investigation, a profile of Wounded Warriors has been identified. These soldiers have had one or more concussive, blunt or projectile-induced injury, seek help several months to years after that injury, and describe persistent, multi-system symptoms of varying degrees and severities. This is reminiscent of "Gulf War Syndrome" or "Chronic Multi-symptom Illness" defined in the first gulf war.

All levels of the U.S. military medical departments and the Department of Defense engaged in a strategic reassessment of how to best respond to the needs of these Wounded Warriors in a way that also helped alleviate delayed deployments due to ongoing medical problems, the rising costs of medical care with fewer positive outcomes, and increasingly adverse and costly effects of drug and procedure-oriented solutions to treatment.

2. The pain experience in the military

To more fully understand the complexity inherent in addressing the pain caused by poly-trauma it is necessary to consider how the expression of pain is dictated by a number of factors in addition to direct tissue injury. Those who have experienced pain of any kind would attest

it is not a pleasant experience and one they would happily do without. However from an ontogeny perspective, pain serves a preservation purpose.

The primary role of pain is aptly summarized by Nikola Grahek in his book titled "Feeling Pain and Being in Pain":

The capacity to feel pain upon harmful external stimulation or upon internal bodily damage is certainly the most precious gift bestowed on us by Mother Nature for self-protective purposes. However, ...when in pain, we dislike it very much, and will do anything to get rid of it or at least alleviate it, especially if the pain is intrusive or severe⁵. (p.7)

Grahek further explains that the pain system, at its fundamental level, can be viewed as serving two purposes – as a system of avoidance and as a system that promotes restoration or repair. As an avoidance system, pain warns us to stay clear of dangerous stimuli by assisting us in detecting the danger before any serious bodily damage befalls us. Its genius is in its preventative capacity which serves to protect and maintain survival. In instances in which damage has already occurred, the restorative system that promotes healing is facilitated by movement-limiting pain.

While typically functioning as it should – prevention and repair – the pain system has the potential to be overwhelmed. Instead of being triggered by painful stimuli, the system becomes overly sensitive to non-harmful stimuli (allodynia) or it may register an increased sensitivity to stimuli (hyperesthesia) or register pain sensation in non-damaged tissue (hyperalgesia). When this occurs, the perceived pain is no longer directly tied to the injury, and is thus maladaptive.

Recent scientific research indicates that a patient's psychological state may significantly influence their experienced pain, and that the perception of pain involves multiple factors beyond the direct physiological injury. Such factors contribute to the persistence of pain experience even after an injury has healed, and to the sensation of pain in an area devoid of any injury. Pain is now understood as a bio-psycho-social phenomenon rather than a strictly physiological one[6]. [See Gatchel for a more complete summary of the changing theories of pain]

The interplay of psycho-social factors and biology is strikingly on display in poly-trauma injuries. The persistent and chronic nature of pain associated with traumatic injuries has been well documented[7]. Additionally, there is a high incidence of concurrent Post-Traumatic Stress Disorder (PTSD), depression, and anxiety with these injuries. The overlapping and multi-component nature of traumatic injuries, both psychological and physical, has been recently characterized by Jonas et al. as war-related, trauma spectrum response (wrTSR). They propose mind-brain/body injuries, such as traumatic brain injury (TBI), are more appropriately addressed by a constellation (whole systems) view of the impact of that injury[8]:

Triggered by combined mind-brain/body injuries (MBIs), the various manifestations of wrTSR share many common pathophysiological and recovery mechanisms....environmental and/or psychosocial insult can induce a core constellation of common symptoms that includes: (1) psychological and emotional distress (e.g., depression, anxiety, or anger); (2) cognitive impairment; (3) chronic and

*often refractory pain of organic and psychosomatic origins; (4) drug/opioid desensitization (with abuse potential); and (5) somatic (sleep, appetite, sexual, and energy) dysfunction.*⁸

The assessment of these components in complex interaction with each other and not as separate problems provides a more comprehensive picture of traumatic injury, and one that is more in line with the actual bio-psycho-social experience of the pain caused by the injury. To the extent that this is true, combat related pain has the potential to be exacerbated by the psychological aspects of war fighting. Addressing this constellation with approaches that impact them collectively will provide a more logical and likely efficient and effective framework than isolating them as “co-morbidities” each with their own specific treatments.

Combined physical, psychological, and social injury is not limited to injuries that are a result of a blast or combat. The majority of injuries from Operation Iraqi Freedom (OIF), Operation Enduring Freedom (OEF), and Operation New Dawn (OND) are not directly related to battle injuries. An evaluation of medical evacuations over the course of the nine years of OIF/OEF/OND found that most medical evacuations were not directly related to battle injuries. Instead, musculoskeletal disorders and mental disorders accounted for more than half[9]. This data is also supported by another evaluation that found non-battle injuries as the single largest category responsible for medical evacuations (approximately 36 percent) with fracture, inflammation/pain, and dislocation as the leading diagnosis. The leading body regions where the injury occurred were back, knee, and wrist/hand[10].

There is evidence suggesting that injury severity and functional recovery are similar across all groups – combat injury related to a blast exposure, injury due to combat, and injury in a noncombat zone. Not surprisingly blast exposure is associated with broader physical injuries, use of oral analgesics, and higher rates of PTSD and other psychiatric diagnoses when compared to non-blast injuries[11]. Whether blast related, combat related, or non-combat related, the majority of injuries resulting from OIF/OEF/OND are associated with psychological and social injuries that further complicate the successful management of pain regardless of its etiology.

Most clinicians and investigators find that pain, when viewed as a constellation of traumatic physical, psychological, and social injury, is quite different from that of multi-system trauma sustained in civilian circumstances and unrelated to combat operations. The additional significant family, relationship, and community factors are also aggravated as a result of the increased operational tempo of multiple combat-related deployments. The stress of repetitive deployments and rigorous training schedules even in the absence of combat-related trauma takes service members away from the family, and the family away from their normal support systems.

Initiated by combined “mind-brain-body” injury the array of wrTSR manifestations and behaviors probably share common pathophysiological and recovery mechanisms. One would therefore expect the need for an integrated, patient and family-centered, multi-disciplinary (body, mind, spirit, social, professional, and community), co-located team approach to evaluation, collaborative problem prioritization, intervention, monitoring, reconditioning, and reintegration back to military duty or to a productive civilian lifestyle.

However, the traditional approach to helping service members and their families recover and reintegrate into functional and meaningful military or civilian lifestyles is focused on pathology, disease and illness identification. Treatment is sought at separate medical departments and clinics (medical, mental health, and surgical specialties), military installations, and community programs. Each program independently evaluates and treats individuals (usually service and family members separately) in an asynchronous, non-integrated process. And, each typically deconstructs each separate problem affecting a particular body part or system in isolation, and prescribes a particular medication or procedure for that specific problem. Frequently these various and separately prescribed treatments interact and cause additional adverse effects. Even when chronic pain is managed as the primary problem, traditional measures focus on poly-pharmacy and localized procedures.

Although physical therapy, ultrasound, cold and heat applications, electrical stimulation, and chiropractic adjustment are applied, these modalities are usually added to a traditionally heavy medication load. This adds to the complexity of management and further increases risks of adverse or counterproductive interactions. When employed, psychological evaluations and counseling occur separately, and may add other drugs and treatments to the load.

Pharmacological agents go a long way in addressing acute pain and, when properly used, potentially preventing the development of chronic pain[12]. However, the use of pain medication comes at a high cost to the patient[13]. Recent studies and media reports have documented the risks (drug addiction, abuse, and overuse) associated with addressing the bio-psycho-social manifestations of pain with a poly-pharmacological approach[14][15]. A 2008 Department of Defense (DoD) survey of health-related behaviors among active duty personnel revealed approximately 25 percent reported abusing prescribed medications within 12 months prior to the survey. Pain relievers were reported to be the most abused medication. The report also highlighted that prescription drug abuse within the military is significantly higher than among civilians[16].

The military has recently begun to recognize the limitations and risks associated with a primarily pharmacological approach to pain and psychological injury.

"When the kids leave for school in the morning, Dad's on the couch. The pain is controlled, victory for us and medicine – we did a good job. But when the kids come home from school in the afternoon, Dad's still on the couch. Medicine is still saying it's doing its job because the pain is controlled, but this person's quality of life is probably not what they want it to be, definitely not what the spouse wants it to be, [and] not what their family wants it to be." 17

COL Galloway, Chief of Staff, U.S. Army's Pain Management Task Force

Spurred by the challenges of treating complex, overlapping physical and psychological injuries the military has begun to open the door to non-traditional approaches to pain management particularly acupuncture.

3. A Holistic approach to pain

Complementary and integrative (CI) therapies have existed for centuries albeit more so among consumers than the medical community. However, the shift of CI therapies from the periphery to a more mainstream position in conventional medicine began in the U.S. in the 1960s and 1970s and has continued ever since[18]. Spurred by compelling effectiveness evidence and documentation of its popularity among the public[19] CI therapies have increasingly become integrated into traditional medical care. More than other CI therapies, acupuncture has undergone a significant integration particularly as a complement to traditional pain management approaches.

The preferred use of acupuncture for pain can be explained by a number of factors including its underlying theory, evidence base, and delivery. The theory and approach of acupuncture is guided by a different underlying assumption than conventional medicine. In conventional medicine it is assumed the expression of symptoms such as pain is directly tied to a disease or dysfunction in the physiological system. However in acupuncture, all aspects of a patient – physical, psychological, symptoms, and other characteristics – are understood to contribute to a pattern of imbalance[20]:

The Chinese method is based on the idea that no single part can be understood except in its relation to the whole. A symptom, therefore, is not traced back to a cause, but is looked at as a part of a totality. If a person has a complaint or symptom, Chinese medicine wants to know how the symptom fits into the patient's entire being and behavior. Illness is situated in the context of a person's life and biography20 (p.7)

The theories that guide acupuncture are precisely what make it an ideal complement to the bio-psycho-social model of pain management. The resolution offered in an acupuncture treatment not only acknowledges the interplay of the internal and external factors involved in the manifestation of pain in the patient, but it utilizes those factors to generate a holistic, healing approach that goes beyond symptom management. Note, however, that this holistic framework means that simply adding acupuncture as another add-on, asynchronous modality in the same manner other isolated treatments are provided may not optimize its effectiveness for the entire spectrum of illness in wrTSR.

The underlying theory of acupuncture makes it an ideal candidate for inclusion into an integrative approach to pain management and the current effectiveness evidence goes even further in strengthening the justification of its integration. Over the past decade and a half there has been a significant increase in both the quantity and quality of acupuncture studies. A number of significant findings and consensus statements have confirmed and further elucidated the effectiveness of acupuncture and its mechanistic underpinnings[21][22].

More recently a number of reviews summarizing and evaluating the evidence of acupuncture for chronic pain conditions have been conducted. A systematic review evaluating 51 randomized controlled trials (RCT) for varying pain conditions found that the majority of high-quality studies

that produced positive findings involved musculoskeletal pain[23]. A meta-analysis, examining systematic reviews of acupuncture for chronic pain from 2005-2008, found acupuncture to be effective for chronic osteoarthritis of the knee and headache. Improvement was maintained for both short term (defined as less than three months after randomization) and long term (three months or longer). Consistent with previous literature, the results for back pain were mixed – true acupuncture was superior to sham in the short term, but the evidence for the long term was mixed[24]. Further, a review evaluating and summarizing Cochrane reviews of acupuncture for chronic pain conditions found that four reviews concluded acupuncture was effective for neck disorders, tension-type headaches, and peripheral joint osteoarthritis[25].

While the current evidence of acupuncture for depression and anxiety remains mixed due to many factors[26] it is still regarded as a promising therapy. A number of RCTs evaluating acupuncture for generalized anxiety disorder or anxiety neurosis have demonstrated positive results[27]. Additionally acupuncture, particularly ear acupuncture, has shown benefit in addressing peri-operative anxiety[27]. Regarding depression, a recent systematic review concluded that while the quality of studies examining acupuncture for depression had improved, there was still insufficient evidence to draw a firm conclusion either in support for or against acupuncture[28]. Although the research evaluating acupuncture for PTSD is still in its infancy, the evidence so far indicates acupuncture could be very effective. In 2007 a three-arm RCT comparing acupuncture to cognitive behavioral therapy (CBT) to a wait-list control found that acupuncture provided treatment effects similar to CBT that were maintained three months post-treatment. Additional studies are needed to confirm these initial findings.

A discussion of acupuncture effectiveness would not be complete without mention of the non-specific effects of acupuncture. Much attention has been given to the fact that in many cases the effectiveness of true acupuncture has been found to be no greater than sham or placebo acupuncture. While often viewed in a negative light, this observation only serves to further illuminate the effects of acupuncture. From a reductionist, disease treatment framework, non-specific effects are to be isolated and minimized in favor of specific effects. However from a more holistic and healing oriented framework being suggested here, they become core mechanisms to enhance and maximize – facilitating the self-healing mechanisms not associated with a single disease or illness syndrome. Acupuncture is more than the act of needle insertion. It is embedded in a ritual that includes a narrative interaction and trusting relationship between the patient and acupuncturist. This interaction and relationship have been shown to activate immune markers and specific neurotransmitters associated with symptom improvement[29]. In many cases, especially for patients with a wide spectrum of problems, as in wrTSR, these effects may be just what are needed.

Taken together, the underlying theory of acupuncture and the current evidence of its effectiveness support its inclusion into an integrative pain management strategy and the adoption of a holistic model similar to one on which it is based. The U.S. military has come to a similar determination and through a number of recent initiatives has made significant strides in integrating acupuncture into its pain management paradigms.

4. Military medicine initiatives — Creating a path for integration

Each of the United States Armed Forces provides the manpower, equipment, and facilities to organize and sustain required capabilities, including health readiness, in order to maintain a ready force across a range of military operations. By doctrine the Army, Navy and Air Force are responsible for the force health protection, health service delivery, and health systems support in alignment with Department of Defense policy and guidance.[30] The Navy is the primary health readiness provider for the Marine Corps. The U.S. Coast Guard under the Department of Homeland Security is the fifth armed service and, when directed by the appropriate authority, deploys with the U.S. military. The uniformed U.S. Public Health Service supports the Coast Guard for health readiness and it receives additional support from other branches of the Department of Defense when deployed with them.

Traditionally the United States Army, Navy/Marine Corps, Air Force and Coast Guard (when assigned to the Department of Defense) have approached health readiness somewhat differently because of differences in mission capabilities, practices, and culture. In 2007 the medical departments of the armed forces, under the purview of the Assistant Secretary of Defense for Health Affairs, developed the Joint Force Health Protection Concept of Operations to improve joint war fighting capabilities.[31] This was the first time the health and medical requirements for U.S. troops irrespective of branch of service were codified.

The Department of Defense revised this policy in 2010 and 2011 expanding Joint Force Health Protection into a hierarchy of health and medical requirements documents. At the topmost level was the new overarching Health Readiness Concept of Operations policy that spelled out the optimal health service that would go “anytime, anywhere” in support of military operations consistent with the then newly expanded Military Health System Strategic Plan composed of four mission elements: casualty care and humanitarian assistance/disaster response; fit, healthy, and protected force; healthy and resilient individuals, families, and communities; education, research, and performance improvement.[30] While some capabilities critical for military medical operations are explicitly delineated, complementary and alternative medicine (CAM), integrated medicine and acupuncture are not mentioned.

In the United States and on permanent overseas bases and stations, in-garrison medical and preventive health services are generally provided to service members by their own military medical department. Under United States Code, Title 10, Chapter 55, family members, retirees, and in special cases others are entitled to receive a broad-based healthcare benefit that is part of the Defense Health Program under the policy direction of the Assistant Secretary of Defense for Health Affairs in the Military Healthcare System.

In 2011 the Department of Defense provided a medical benefit to 9.7 million people for a total cost of \$52 billion. The vast majority of the money covered the cost of actual care. In 2011, 17,476 active duty medical personnel medically supported 321,751 service members deployed overseas, and medically evacuated 6,943 casualties including 221 amputees. “TRICARE” is the military medical system for the health care of its active and retired service members and families. The Department of Defense Health Service Delivery Concept of Operations describes an ability “to build

healthy communities by managing and delivering the health benefit, through the use of military treatment facilities, and the TRICARE network of healthcare providers.”[32]

The former Army Surgeon General, LTG Eric B. Schoomaker, chartered the Army Pain Management Task Force in August 2009 to develop and recommend strategies for “comprehensive pain management that is holistic, multidisciplinary, and multimodal in its approach, utilizes state of the art/science modalities and technologies, and provides optimal quality of life for Soldiers and other patients with acute and chronic pain.” The Task Force included a variety of medical specialties and disciplines predominantly from the Army but included representatives from the Navy, Air Force, TRICARE Management Activity, and Veterans Health Administration (VHA) as well.

The Task Force reviewed pain management in the United States, concluding that variability is common depending on provider and medical care delivery system factors. The report found that pain can be effectively managed by over the counter and prescription medications but that there are unintended consequences to the overreliance on them, with abuse highest in the 18-25 year old age demographic that encompasses many war casualties. The report acknowledged patients’ interest in treatments other than or in addition to medication, with CAM a popular option.

Many of the Military Health System’s (MHS) challenges with pain management are very similar to those faced by other medical systems, but the MHS also faces some unique issues because of its distinctive mission, structure and patient population. For example:

- The nation expects the MHS to provide the highest level of care to those carrying war’s heaviest burdens.
- The transient nature of the military population, including patients and providers, makes continuity of care a challenge for military medicine.
- Pain management challenges associated with combat polytrauma patients require integrated approaches to clinical care that cross traditional medical specialties, not all of which are universally available across the MHS.

[The Army Medical Command] and MHS lack a comprehensive pain management strategy that addresses current deficiencies. As a result, pain management initiatives are fragmented - often driven by local champions and subject to retirements, changes of command, and annual budget priorities for their continued existence.[33] (page E-2)

The Army Pain Management Task Force concluded that “improving pain management across the DoD will require a significant reorganization, education, and training effort that will be most effective if pursued as a part of a DoD and [Veterans Health Affairs] partnership.” Additional pain medicine specialists would be needed as would support teams. The teams would manage pain employing a biopsychosocial model of care evolving the standard of care pain management to one not excessively rely on medication and creates a collaborative interdisciplinary approach among providers from differing specialties.

The Task Force encouraged the DoD to responsibly explore safe and effective use of advanced and non-traditional approaches to pain management and to “support efforts to make these modalities covered benefits once they prove safe, effective and cost efficient.”⁵ (page E-2)

The Army urged DoD to “establish pain as a priority, with an urgency that leads to practice changes” with attention of prevention, prompt and appropriate treatment to relieve acute pain and eliminate progression to chronic pain when possible. Cooperation between the DoD and VHA would lead to shared common educational materials, venues, protocols, and formularies providing “a standardized DoD and VHA vision and approach to pain management to optimize the care for Warriors and their Families.”⁵ (page E-3)

In the body of the Task Force Report, acupuncture is specifically identified among 109 recommendations. The recommendation for standardized minimum training, skill attainment and credentials includes acupuncture, spinal manipulation and an expansion of treatment modalities to include CAM and integrative medicine.⁵ (page 19). Training, skills and credentials are necessary preconditions to a holistic integrative multi-modal patient-centered care plan. Acupuncture, Yoga/Yoga Nidra, non-allopathic chiropractic care, therapeutic massage, biofeedback, and the mind-body techniques of meditation and mindfulness, combined active and passive modalities, are recommended Tier 1 modalities: the highest level of supporting scientific evidence.⁵ (page 44).

The Army Medical Command issued a directive to the Army direct medical care system to engage in a comprehensive pain management campaign plan. The issuance took the format of an Army operational order.[34] The campaign plan included acupuncture and yoga as modalities to reduce overreliance on medication. The operational order provided the mechanism and authority to make acupuncture available in Army military treatment facilities, for credentialing acupuncturists and or other providers to add acupuncture as a privilege when trained and skilled.

In a June 2011 meeting to discuss improving pain management for Warriors and Veterans through the use of integrative medicine General Schoomaker remarked, “This is a unique, historic moment to capitalize on what we know works to effectively treat pain. It marks the beginning of a cultural shift in how health care is practiced in the military.”[35]

The Army Surgeon General’s establishment of the Pain Management Task Force coincided with the U.S. Congress’ passage of the National Defense Authorization Act for 2010. The final version of that bill, signed into law by the President, included Section 711, which required the Secretary of Defense to develop and implement a comprehensive pain management policy for the Military Health System and to report on its progress to Congress.

While each service has introduced integrative medicine therapies into their pain management paradigm, the U.S. Army Medical Command currently has the strongest mandate for integration with unequivocal support in terms of policy, procedures and resources for acupuncture, yoga, and other alternative pain management modalities that have an adequate base of evidence. The goals of the Army campaign are to meet patient demand for complementary and alternative medicine that is integrated holistically into the lives of Soldiers and family members, and to reduce excessive use, or supplement judicious use of pain medications. The

Army Task Force recommended changing the paradigm of pain management to include patient activities in addition to therapy delivered passively by a provider.

The military health benefit continues to evolve, and is based on evidence of efficacy and cost effectiveness. Traditional Chinese Medicine and acupuncture are not yet covered benefits of the TRICARE military health system, but acupuncture in one form or another is available to some beneficiaries on a limited basis within some military treatment facilities. The challenge for proponents of acupuncture and those who seek its benefits is that access is dependent on local factors: i.e., acceptability of the practice in the eyes of local military medical leaders, local credentials and privileging policies, referral mechanisms, and most importantly the availability of acupuncture practitioners.

The challenge of access to acupuncture services is also a challenge of training. Increasing the number of providers trained in acupuncture will in turn increase the availability of acupuncture. Within the last decade, the U.S. Air Force has committed a number of resources to increasing acupuncture availability and training.

The impetus for increased acupuncture availability began with establishment of the first ever, full-time, medical acupuncture clinic at Andrews Air Force Base, Maryland in 2002. Through the efforts of two medical acupuncturists Col (Ret) Richard Niemtzw, MD, PhD, MPH and Col (Ret) Stephen M. Burns, MD the clinic offered acupuncture treatments aimed at addressing pain in a more holistic way. The clinic, due to growing demand for acupuncture and reported benefits [36] recently transitioned into an Acupuncture Center (AC).

In addition to the direct offering of acupuncture through the AC, and because of the success of the AC, the Air Force in 2009 sponsored the training of 44 active duty military physicians in medical acupuncture. Representatives from all three services – Army, Navy, Air Force, and a variety of medical specialties participated in the training. The Navy's Bureau of Medicine and Surgery offered a similar training program in 2009-2010 to Navy participants [37].

These training programs generated a cadre of military physicians now capable of offering acupuncture services. However the time constraints of current clinical practice (approximately 10 to 20 minutes per patient) presents a challenge to physicians offering a more traditional acupuncture treatment that includes a comprehensive diagnostic evaluation and treatment [37]. Additionally, military physicians practice in a number of austere training and combat-operational environments that are not always conducive to a traditional acupuncture treatment; and the frequent deployments and military household moves render a transitory nature to patients, making follow-up more difficult. In response to these clinical challenges, a number of simple, standardized acupuncture protocols have been developed [37]. While these approaches may not take advantage of the complete holistic models needed, they do offer new, non-drug and non-stigmatizing options for pain and are scalable to a large population. The Samueli Institute is currently testing the effectiveness of this standardized approach compared to a more holistic acupuncture model and conventional care on pain in service members with TBI. This research will help determine the "dose" and framework needed for delivery of acupuncture in the most efficient manner.

In addition, the military is using other acupuncture approach models. These include the Helms Medical Institute auricular trauma protocol (ATP) [38] which is an ear acupuncture protocol in which needles are administered sequentially to the following points: hypothalamus, amygdala, hippocampus, Master Cerebral, and Point Zero. The needles are typically left in for 30-120 minutes. The rationale for this protocol is based on the concept that the three affected neurological structures in traumatic stress – amygdala, hippocampus, and prefrontal cortex – are correlated with somatotopic reflex zones found on the ears. The “Koffman Cocktail” is a bilateral, 4-point acupuncture protocol developed by U.S. Navy Capt Robert L. Koffman, MD which has been suggested to be a calming and centering treatment [37]. The best known of these standardized protocols is battlefield acupuncture (BFA). BFA is a bilateral, 5-point ear acupuncture protocol aimed at addressing a number of pain conditions [39]. The following acupuncture points are sequentially administered: Cingulate Gyrus, Thalamus point, Omega 2, Point Zero, and Shen Men. Either the left or right ear is chosen for the placement of the needles, or the needles are administered bilaterally until pain attenuation is reached. BFA was developed by Dr. Niemtow and has demonstrated preliminary success for a number of refractory pain conditions [40], and has been associated with improved quality of life [36].

The additional expressed appeal of these simple, standardized acupuncture protocols lies in the ability to teach a variety of providers who have no formal acupuncture training. The Air Force Medical Service, through the Acupuncture Center, has begun to teach “mini-courses” in BFA. The course is conducted by medical acupuncturists who have been trained in BFA and have used it extensively in their own practice. The BFA course is typically conducted over a one or two day time period and instruction includes background on the mechanistic theory of BFA and a supervised clinical practice [37].

While these initiatives represent a profound change in military medicine in terms of approach and delivery, how they are affecting acupuncture availability and utilization across the military is unclear. Currently there has been no formal analysis of acupuncture availability or utilization. However a number of media reports have documented the availability and use of acupuncture throughout the military. These reports detail stories of both the front line and state side use of acupuncture for PTSD, mild TBI, and pain.

On the front line, acupuncture has been used to treat PTSD and mild TBI at the Concussion Restoration Care Center (CRCC), Camp Leatherneck, Afghanistan. The CRCC is part of a joint Navy-Marine Corps effort, Operation Stress Control and Readiness Program, in which psychiatrists and psychologists are placed within combat teams to provide mental health care to troops in Afghanistan[41]. The former director of CRCC reported that, of the troops he personally treated, a majority of them experienced improvements in sleep and decreases in anxiety levels and frequency of headaches. Another story details acupuncture being used by a military physical therapist to treat service members at the Courage Clinic, Camp Victory, Iraq[42]. More recently acupuncture has begun to be offered to patients and crewmembers aboard the Military Sealift Command hospital ship USNS Mercy in Vietnam for pain and associated ailments[43]. Acupuncture was also used for pain management and stress relief aboard the hospital ship USNS Comfort as part of a humanitarian and civic assistance mission[44].

In the U.S. acupuncture has been used at a number of military treatment facilities (MTFs) as a part of holistic, multi-disciplinary programs. As mentioned earlier, the Acupuncture Center at Joint Andrews Base has utilized acupuncture for a number of pain conditions, sleep, and psychological issues[36]. At Walter Reed National Naval Medical Center (WRNNMC) acupuncture has been used for phantom limb pain and it is used in the Specialized Care Program (SCP) at the Deployment Health Clinical Center. The SCP is a three-week, multidisciplinary, therapy program for service members with post-deployment health concerns[45]. At the National Intrepid Center of Excellence in Bethesda, Maryland acupuncture is used for treating stress and psychological disorders such as TBI and post-traumatic stress[46]. In Texas acupuncture is part of the medical care offered to the Warrior Transition Brigade at Ft. Hood for pain management and stress relief[47] and it is part of the Integrative Medicine Center (IMC) at Ft. Bliss. The IMC was the first physical health and integrative medicine clinic in the Department of Defense when it opened its doors approximately six years ago[48]. Also, the Naval Medical Center San Diego (NMCSO) has been offering acupuncture since 1999 for the treatment and management of pain[49] and just this year acupuncture was reported to be one of the complementary therapies offered in the Wounded Warrior Program at Naval Hospital Camp Pendleton[50].

An unpublished paper[51] examining the differences in the amount of services utilized between non-acupuncture and acupuncture patients for the same diagnosis within the DoD provides information, albeit preliminary and limited, on acupuncture availability and impact on cost from the perspective of a military treatment facility (MTF). The paper reports that in 2008 the DoD had more than 40 licensed acupuncturists and that acupuncture was offered at 40 different MTFs. Data on acupuncture utilization revealed that in 2008 there were 12,209 clinical encounters that received an acupuncture code (Common Procedural Terminology (CPT) code). The majority of this patient population was between the ages of 20 and 49 and active duty personnel. The top three diagnoses accompanying acupuncture codes were for low back pain, fibromyalgia (myalgia), and neck pain. The author highlighted possible reasons for the increased encounters by patients receiving acupuncture: 1) those who receive acupuncture usually do so as part of a program of other therapies that would result in more encounters and 2) patients who elect to utilize acupuncture usually tend to do so as a last resort therefore their conditions are usually more difficult to treat and are associated with increased encounters.

The paper concluded that patients who received acupuncture had more encounters resulting in an increase of "revenue" for MTFs of approximately \$2 million as calculated in the study[51]. The fact that the study did not address per patient per year government costs or opportunity cost for the MTF prevents definitive conclusions to be drawn. While the limited analysis reported in this paper sheds some preliminary light on the cost impact of acupuncture on the military health system, there has yet to be a rigorous, comprehensive assessment of cost analyses of acupuncture across the DoD. Recent economic analyses of acupuncture within civilian health care systems have found it to be cost-effective for chronic pain[51], low back pain[52][53], headache[54], and neck pain[55].

The integration of any new therapy into an existing system of care requires continued evaluation and assessment. While there has been a considerable amount research examining

the effectiveness of acupuncture conducted in the civilian population, there has been a paucity of acupuncture research conducted in the military population. A review conducted to assess the quantity and quality of acupuncture research within the military and veteran populations found a total of only two RCTs, two observational studies, and four descriptive studies[56]. The mixed quality of these studies did not allow the authors to draw any definitive conclusions regarding the effect of acupuncture. However the review did note that there are indicators pointing to an increase in acupuncture research within these populations. A quick search of the clinicaltrials.gov database (a database that provides the public with information about current ongoing clinical research studies) found approximately a dozen trials examining the effectiveness of acupuncture for a wide range of conditions including sleep, quality of life, sore throat, gastro-esophageal reflux disease (GERD), Gulf War Illness, and acute pain.

Additionally the review highlighted a select number of completed or ongoing studies that examined acupuncture for pain and stress disorders. Studies included an observational trial conducted in 2005 evaluating the benefits of acupuncture offered through the Acupuncture Center at the Joint Andrews Base for acute and chronic pain in active duty military personnel, dependents, and retirees. Significant reductions in pain and improved quality of life scores were reported[36]. A number of studies have been completed however the results have yet to be published. They include a pilot study evaluating the feasibility of integrating BFA into the aeromedical evacuation system from Ramstien Air Base, Germany to Joint Andrews Base and another pilot study examining acupuncture for phantom limb pain that yielded promising preliminary data. In 2006 a RCT evaluated acupuncture for PTSD in a cohort of service members and the results were presented at a symposium in 2008. Finally the review mentioned an exploratory, randomized study to examine the effectiveness of acupuncture for TBI related headache in an active duty population at Walter Reed National Naval Medical Center that began in 2011[56]. Of particular interest is the design of this study which will compare a standardized ear acupuncture technique (developed by a medical acupuncturist) to an individualized, semi-standard acupuncture protocol (developed by a licensed acupuncturist and psychiatrist)[57]. While headache is the primary outcome of this study additional secondary measures examining sleep, stress, depression, and anxiety will be collected.

While these reports of current and ongoing research will add valuable information in terms of acupuncture effectiveness, a significant gap remains between how acupuncture is being utilized and the amount of acupuncture research that has been conducted in military populations. An increase in research efforts will be required to determine if these military initiatives are successfully being translated into improved health outcomes and cost savings.

5. Conclusion

The initiatives discussed in this chapter represent recognition by the military health system that successful pain management requires a more comprehensive, holistic approach. They also represent a clear commitment by the military to augment the current health care system to allow for the inclusion of these therapies as complements to conventional pharmacological and multi-disciplinary approaches.

As it has been noted here and elsewhere [58] many barriers still exist and will need to be addressed before full integration is realized. They include increasing the availability of acupuncture through changes in credentialing and privileging policies for those already trained and increasing acupuncture training opportunities; developing curricula to educate medical students and current providers in integrative therapies; and to develop assessment tools that capture effectiveness outcomes and impact outcomes (utilization and cost/benefit analyses). As of August 2012 evidence-based complementary modalities are not yet a TRICARE (health care program for Uniformed Service members, retirees and their families worldwide) benefit.

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