



## Review article

## Pain in an era of armed conflicts: Prevention and treatment for warfighters and civilian casualties

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## ABSTRACT

Chronic pain is a common sequelae of military- and terror-related injuries. While its pathophysiology has not yet been fully elucidated, it may be potentially related to premorbid neuropsychobiological status, as well as to the type of injury and to the neural alterations that it may evoke. Accordingly, optimized approaches for wounded individuals should integrate primary, secondary and tertiary prevention in the form of thorough evaluation of risk factors along with specific interventions to contravene and mitigate the ensuing chronicity. Thus, *Premorbid Events* phase may encompass assessments of psychological and neurobiological vulnerability factors in conjunction with fostering preparedness and resilience in both military and civilian populations at risk. *Injuries per se* phase calls for immediate treatment of acute pain in the field by pharmacological agents that spare and even enhance coping and adaptive capabilities. The key objective of the *Post Injury Events* is to prevent and/or reverse maladaptive peripheral- and central neural system's processes that mediate transformation of acute to chronic pain and to incorporate timely interventions for concomitant mental health problems including post-traumatic stress disorder and addiction. We suggest that the proposed continuum of care may avert more disability and suffering than the currently employed less integrated strategies. While the requirements of the armed forces present a pressing need for this integrated continuum and a framework in which it can be most readily implemented, this approach may be also instrumental for the care of civilian casualties.

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## Contents

1. Introduction	26
1.1. Epidemiology of pain in soldiers and civilians during war	27
1.1.1. Peripheral nerve injury	28
1.1.2. Spinal cord	28
1.1.3. Brain injury	28
2. The temporal march of pain chronification: from 'angry' nerve fibers to the altered brain states	28
2.1. Nerve damage and spontaneous activity	28
2.2. Central sensitization and amplification of peripheral signals	29
2.3. Centralization of pain and complex changes in sensory and emotional processing	29
3. A new approach: integrated emersion (see Figs.3 and 4)	29
3.1. Defining premorbid risk factors that focus on pain resilience	30

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3.1.1.	Genetic risk factors	30
3.1.2.	Psychological risk factors	30
3.1.3.	Immunological risk factors	31
3.1.4.	Poor sleep quality as a risk factor	31
3.1.5.	Sex as a risk factor	32
3.1.6.	Stress status as a risk factor	32
3.1.7.	Premorbid pain as a risk factor	32
3.2.	Implementing currently known and developing new preventive measures during the peri-traumatic and initial (surgical) treatment times	32
3.2.1.	Enhance resilience through psychological training	32
3.2.2.	Educate on the evolution of chronic pain	32
	Figure 6 should be removed.Perhaps consider Figure 6 as a cover option?3.2.3 “Immunization” enhancement	32
3.3.	The critical event—immediate blockade of the incident afferent nociceptor barrage	32
3.3.1.	Stop or limit the ongoing afferent nerve barrage	32
3.3.2.	Protect against deleterious inflammatory molecules	33
3.3.3.	Support endogenous pain modulatory processes	33
3.3.4.	Minimize stress and anxiety	33
3.3.5.	Abnormal hormonal status	33
3.4.	Aggressive early post-injury treatment	33
3.4.1.	Anti-inflammatory drugs that target peripheral and central nervous system	33
3.4.2.	Novel pain fiber blockade	33
3.4.3.	Limit or remove use of drugs that may contribute to pain chronification	33
3.4.4.	Implement multidimensional treatments	34
3.5.	Brain biomarkers of chronic pain and treatment efficacy	34
3.5.1.	Neuro-measures of nociception/pain	34
3.5.2.	Predictive biomarkers	34
3.6.	Rational support and use of novel treatments	34
3.7.	Modifying neural networks—taking advantage of neural plasticity	35
3.7.1.	Neurostimulators	35
3.7.2.	Light induced brain modification through photomedicine	35
3.8.	Targeting the brain systems for reversal of chronic pain	35
3.8.1.	Ketamine	35
3.8.2.	Electroconvulsive and other electrical stimulation therapies	36
3.8.3.	Aggressive behavioral (exercise and psychological) treatments	36
3.8.4.	Deep brain stimulation	36
4.	Complexities of co-morbidities	36
5.	Operationalizing and implementing short-term and long-term approaches for an integrated program for the continuum of care of pain	37
5.1.	Elements of program implementation	37
5.1.1.	Clinical	37
5.1.2.	Neurobiological	37
5.1.3.	New thinking—going beyond the obvious	37
5.1.4.	Invoking processes that take into account the nerve-brain continuum	38
5.1.5.	Pharmacological	38
5.1.6.	Entrepreneurial	38
5.1.7.	Devolving the new: thinking out of the box	38
5.1.8.	Creation of a virtual science and clinical development center	38
5.1.9.	Integrating with DOD centers	38
5.2.	Implications/benefits of program	38
5.2.1.	Clinical implications	38
6.	Conclusions	38
	Acknowledgements	39
	References	39

## 1. Introduction

Warfare and armed conflict, unfortunately, injure both soldiers and civilians, and it is not surprising that chronic pain is a common challenge in Veterans and in non-combatant survivors alike. Historically, lessons gleaned from military medicine often carry over to the care of non-combatants. Here we review the insights gained from armed conflicts, and propose an integrated program for pain prevention and treatment in the military that may also be applicable to both warfighters and civilian populations. In the military, both in forward and rear echelons of care, creative processes are continually being evaluated and adapted, including early treatment (e.g., anesthetic blockade) for injured nerves (Allcock et al., 2010; Wu et al., 2011), aggressive assessment and treatment of the wounded in transition to higher level care centers

(White and Cohen, 2007), as well as pain treatment and rehabilitation programs at the Veterans Affairs (VA) hospitals (Management, 2016). While the implementation of these processes has contributed to the improved standard of care, there is still a need for integration of preventive/therapeutic efforts across the entire ‘pre-wounded to the rehabilitated’ continuum. In addition, the involvement of psychological factors (premorbid or co-morbid) is conspicuously evident in a strong link between neuropathic pain, and psychological distress of combat soldiers (Duffy et al., 2015). For example, chronic pain, reported in over 80% of the Operation Iraqi Freedom Veterans subjected to polytrauma, also developed comorbid post-traumatic stress disorder (PTSD; Lew et al., 2009).

Based on its inherent structure and organization, the military provides a unique forum to design a program that integrates the

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