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BY

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47. An Evaluation of the Feasibility and Safety of a Home-Based Telemental Health Treatment for Posttraumatic Stress in the U.S. Military.
Woods DL, Wyma JM, Yund EW, Herron TJ.

Abstract:
Choice reaction time (CRT), the time required to discriminate and respond appropriately to different stimuli, is a basic measure of attention and processing speed. Here, we describe the reliability and clinical sensitivity of a new CRT test that presents lateralized visual stimuli and adaptively adjusts stimulus onset asynchronies using a staircase procedure. Experiment 1 investigated the test-retest reliability in three test sessions performed at weekly intervals. Performance in the first test session was accurately predicted from age and computer-use regression functions obtained in a previously studied normative cohort. Central processing time (CentPT), the difference between the CRTs and simple reaction time latencies measured in a separate experiment, accounted for 55% of CRT latency and more than 85% of CRT latency variance. Performance improved significantly across the three test sessions. High intraclass correlation coefficients were seen for CRTs (0.90), CentPTs (0.87), and an omnibus performance measure (0.81) that combined CRT and minimal SOA z-scores. Experiment 2 investigated performance in the same participants when instructed to feign symptoms of traumatic brain injury (TBI): 87% produced abnormal omnibus z-scores. Simulated malingers showed greater elevations in simple reaction times than CRTs, and hence reduced CentPTs. Latency-consistency z-scores, based on the difference between the CRTs obtained and those predicted based on CentPT latencies, discriminated malingering participants from controls with high sensitivity and specificity. Experiment 3 investigated CRT test performance in military veterans who had suffered combat-related TBI and symptoms of post-traumatic stress disorder, and revealed small but significant deficits in performance in the TBI population. The results indicate that the new CRT test shows high test-retest reliability, can assist in detecting participants performing with suboptimal effort, and is sensitive to the effects of TBI on the speed and accuracy of visual processing.

KEYWORDS:
aging; concussion; effort; feigning; head injury; reliability; response selection; timing precision.

Leroux TC.

Abstract:
The Department of Defense (DoD) is facing allegations service members were wrongfully discharged for pre-existing personality disorders. From 2001 to 2007, 26,000 enlisted service members were discharged for a pre-existing personality disorder (2.6 % of total discharges). With national media attention of the issue, personality disorder discharges were reduced by 31 % in 2008 with new discharge procedures issued by the DoD. Even with the reduction, a government review found the DoD did not adhere to its discharge protocols. The objective of this paper is to explore personality disorders in the military, analyze various costs to stakeholders, and identify potential policy alternatives.

KEYWORDS:
Military discharge; Personality disorder; U.S. military
When, If Ever, Should Military Physicians Violate a Military Order to Give Medical Obligations Higher Priority?
Howe EG.

Abstract:
Military care providers may face ethical conflicts when they must treat their own and enemy soldiers during combat and their resources are limited. Legally under the Geneva Convention, they are instructed to treat enemy soldiers equally, but in practice, providers still have some discretion. This article discusses this discretion and ethical frameworks and uncertainties that bear on these decisions. A case is presented in which this conflict arose. How the provider resolved this is reported.

OBJECTIVE: We evaluated the efficacy of the Strength at Home Men's Program (SAH-M), a trauma-informed group intervention based on a social information processing model to end intimate partner violence (IPV) use in a sample of veterans/service members and their partners. To date, no randomized controlled trial has supported the efficacy of an IPV intervention in this population.

METHOD: Participants included 135 male veterans/service members and 111 female partners. Recruitment was conducted from February 2010 through August 2013, and participation occurred within 2 Department of Veterans Affairs hospitals. Male participants completed an initial assessment that included diagnostic interviews and measures of physical and psychological IPV using the Revised Conflict Tactics Scales and were randomly assigned to an enhanced treatment as usual (ETAU) condition or SAH-M. Those randomized to SAH-M were enrolled in this 12-week group immediately after baseline. Those randomized to ETAU received clinical referrals and resources for mental health treatment and IPV services. All male participants were reassessed 3 and 6 months after baseline. Female partners completed phone assessments at the same intervals that were focused both on IPV and on the provision of safety information and clinical referrals.

RESULTS: Primary analyses using hierarchical linear modeling indicated significant time-by-condition effects such that SAH-M participants compared with ETAU participants evidenced greater reductions in physical and psychological IPV use (β = -0.135 [SE = 0.061], P = .029; β = -0.304 [SE = 0.135], P = .026; respectively). Additional analyses of a measure that disaggregated forms of psychological IPV showed that SAH-M, relative to ETAU, reduced controlling behaviors involving isolation and monitoring of the partner (β = -0.072 [SE = 0.027], P = .010).

CONCLUSIONS: Results provide support for the efficacy of SAH-M in reducing and ending IPV in male veterans and service members.
**Sudden cardiac death associated with physical exertion in the US military, 2005-2010.**

Smallman DP, Webber BJ, Mazuchowski EL, Scher AI, Jones SO, Cantrell JA.

**Abstract:**

**BACKGROUND:**

Sudden cardiac death associated with physical exertion (SCD/E) is a complicated pathophysiological event. This study aims to calculate the incidence rate of SCD/E in the US military population from 2005 to 2010, to characterise the demographic and cardiovascular risk profiles of decedents, and to evaluate aetiologies of and circumstances surrounding the deaths.

**METHODS:**

Perimortem and other relevant data were collected from the Armed Forces Medical Examiners Tracking System, Armed Forces Health Longitudinal Technology Application, and Defense Medical Epidemiology Database for decedents meeting SCD/E case definition. Incidence rates were calculated and compared using negative binomial regression.

**RESULTS:**

The incidence of SCD/E in the Active Component (ie, full-time active duty) US military from 2005 to 2010 was 1.63 per 100 000 person-years (py): 0.98 and 3.84 per 100 000 py in those aged <35 and ≥35 years, respectively. Atherosclerotic cardiovascular disease was the leading cause of death overall (55%) and in the ≥35-year age group (78%), whereas the leading cause of death in the <35-year age group (31%) could not be precisely determined and was termed idiopathic SCD/E (iSCD/E). SCD/E was more common in males than females (incidence rate ratio (IRR) = 5.28, 95% CI 2.16 to 12.93) and more common in blacks than whites (IRR=2.60, 95% CI 1.81 to 3.72). All female cases were black.

**CONCLUSIONS:**

From 2005 to 2010, the incidence of SCD/E in US military members aged <35 years was similar to most reported corresponding civilian SCD rates. However, the leading cause of death was iSCD/E and not cardiomyopathy. Improved surveillance and age-based prevention strategies may reduce these rates.

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**KEYWORDS:**

Death; Defibrillator

Hard is normal: Military families' transitions within the process of deployment.
Yablonsky AM, Barbero ED, Richardson JW.

Abstract:
US military deployments have become more frequent and lengthier in duration since 2003. Over half of US military members are married, and many also have children. The authors sought to understand the process of deployment from the perspective of the military family. After a thorough search of the literature, 21 primary research reports of 19 studies with an aggregate sample of 874 were analyzed using qualitative metasynthesis. The deployment process was experienced in four temporal domains. The military family as a whole shared the pre-deployment transition: all family members felt uncertain about the future, needed to complete tasks to "get ready" for deployment, and experienced a sense of distancing in preparation for the upcoming separation. The AD member went through the deployment transition independently, needing to "stay engaged" with the military mission, building a surrogate family and simultaneously trying to maintain connection with the family at home. In parallel, the home front family was going through a transposition transition, moving forward as an altered family unit, taking on new roles and responsibilities, and trying to simultaneously connect with the deployed member and find support from other military families. In post-deployment, the family went through the "reintegration" transition together, managing expectations, and readjusting family roles, all needing understanding and appreciation for their sacrifices during the recent separation. Effective family communication was important for military family well-being after deployment but unexpectedly challenging for many. Clinical, research, and policy recommendations are discussed. © 2015 Wiley Periodicals, Inc. This article has been contributed to by a US Government employee and her work is in the public domain in the USA.

Keywords:
communication; deployment; family; health; metasummary; metasynthesis; military; qualitative; stress; veterans
Obstetric complications on deployed operations: a guide for the military surgeon.

Faulconer ER, Irani S, Dufty N, Bowley D.

Abstract:
Modern military general surgeons tend to train and then practice in 'conventional' surgical specialties in their home nation; however, the reality of deployed surgical practice, either in a combat zone or on a humanitarian mission, is that they are likely to have to manage patients with a broad range of ages, conditions and pathologies. Obstetric complications of war injury include injury to the uterus and fetus as well as the mother and both placental abruption and uterine rupture are complications that military surgeons may have little experience of recognising and managing. On humanitarian deployments, fetomaternal complications are a common reason for surgical intervention. We report a recent patient's story to highlight the obstetric training needs of military surgeons.

KEYWORDS:
OBSTETRICS; TRAUMA MANAGEMENT

ALS and the Military: A Population-Based Study in the Danish Registries.

Seals RM, Kioumourtzoglou MA, Gredal O, Hansen J, Weisskopf MG.

Abstract:
BACKGROUND:
Prior studies have suggested that military service may be associated with the development of amyotrophic lateral sclerosis. We conducted a population-based case-control study in Denmark to assess whether occupation in the Danish military is associated with an increased risk of developing amyotrophic lateral sclerosis.

METHODS:
There were 3,650 incident cases of amyotrophic lateral sclerosis recorded in the Danish National Patient Registry between 1982 and 2009. Each case was matched to 100 age- and sex-matched population controls alive and free of amyotrophic lateral sclerosis on the date of the case diagnosis. Comprehensive occupational history was obtained from the Danish Pension Fund database, which began in 1964.

RESULTS:
2.4% (n=8,922) of controls had a history of employment in the military prior to the index date. Military employees overall had an elevated rate of ALS (OR=1.3; 95% CI: 1.1-1.6). A ten-year increase in years employed by the military was associated with an odds ratio of 1.2 (95% CI: 1.0-1.4), and all quartiles of time employed were elevated. There was little suggestion of a pattern across calendar year of first employment, but there was some evidence that increasing age at first employment was associated with increased ALS rates. Rates were highest in the decade immediately following the end of employment (OR=1.6; 95% CI: 1.2-2.2).

CONCLUSIONS:
In this large population-based case-control study, employment by the military is associated with increased rates of ALS. These findings are consistent with earlier findings that military service or employment may entail exposure to risk factors for ALS.
Appl Neuropsychol Adult. 2015 Nov

The role of performance validity tests in the assessment of cognitive functioning after military concussion: A replication and extension.
Armistead-Jehle P, Cooper DB, Vanderploeg RD.

Abstract:
The current investigation is a replication and extension of a previously published study by Cooper, Vanderploeg, Armistead-Jehle, Lewis, and Bowles (2014) demonstrating that performance validity test scores accounted for more variance in cognitive testing among service members with a history of concussion than did demographic variables, etiology of and time since injury, and symptom severity. The present study included a sample of 142 active-duty service members evaluated following a suspected or confirmed history of mild traumatic brain injury. Participants completed a battery of neuropsychological measures that included scales of performance and symptom validity (specifically the Medical Symptom Validity Test, Nonverbal Medical Symptom Validity Test, and Personality Assessment Inventory). Among the factors considered in the current study, performance validity test results accounted for the most variance in cognitive test scores, above demographic, concussion history, symptom validity, and psychological distress variables. Performance validity test results were modestly related to symptom validity as measured by the Personality Assessment Inventory Negative Impression Management scale. In sum, the current results replicated the original Cooper et al. study and highlight the importance of including performance validity tests as part of neurocognitive evaluation, even in clinical contexts, within this population.

KEYWORDS:
Concussion; mild traumatic brain injury; military; neuropsychological testing; performance validity; symptom validity testing; testing
Abstract:

BACKGROUND:

Key performance indicators (KPIs) are metrics that compare actual care against an ideal structure, process or outcome standard. KPIs designed to assess performance in deployed military surgical facilities have previously been published. This study aimed to review the overall performance of surgical trauma care for casualties treated at Role 3 Camp Bastion, Medical Treatment Facility, Afghanistan, in light of the existing Defence Medical Services (DMS) KPIs. The secondary aims were to assess the utility of the surgical KPIs and make recommendations for future surgical trauma care review.

METHODS:

Data on 22 surgical parameters were prospectively collected for 150 injured patients who had primary surgery at Camp Bastion between 1 May 2013 and 20 August 2013. Additional information for these patients was obtained using the Joint Theatre Trauma Register. The authors assessed data recording, applicability and compliance with the KPIs.

RESULTS:

Median data recording was 100% (IQR 98%-100%), median applicability was 56% (IQR 10%-99%) and median compliance was 78% (IQR 58%-93%). One KPI was not applicable to any patient in our population. Eleven KPIs achieved >80% compliance, five KPIs had 80%-60% compliance and five KPIs had <60% compliance. Recommendations are made for minor modifications to the current KPIs.

CONCLUSION:

78% compliance with the DMS KPIs provides a snapshot of the performance of the surgical aspect of military trauma care in 2013. The KPIs highlight areas for improvement in service delivery. Individual KPI development should be driven by evidence and reflect advances in practice and knowledge. A method of stakeholder consultation, and sequential refinement following evidence review, may be the right process to develop the future set of DMS KPIs.

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KEYWORDS:

AUDIT; SURGERY; TRAUMA MANAGEMENT
Prevalence of Professional Burnout Among Military Mental Health Service Providers.
Kok BC, Herrell RK, Grossman SH, West JC, Wilk JE.

Abstract:
OBJECTIVE:
Professional burnout is a well-documented occupational phenomenon, characterized by the gradual "wearing away" of an individual's physical and mental well-being, resulting in a variety of adverse job-related outcomes. It has been suggested that burnout is more common in occupations that require close interpersonal relationships, such as mental health services.

METHODS:
This study surveyed 488 mental health clinicians working with military populations about work-related outcomes, including level of professional burnout, job satisfaction, and other work-related domains.

RESULTS:
Approximately 21% (weighted) of the sample reported elevated levels of burnout; several domains were found to be significantly associated with burnout.

CONCLUSIONS:
Education about professional burnout symptoms and early intervention are essential to ensure that providers continue to provide optimal care for service members and veterans.

Clinical Markers Associated with Metabolic Syndrome Among Military Aviators.

Abstract:
BACKGROUND:
Due to the recent increase of metabolic syndrome (MetS) in the Korean population, this study was performed to investigate the prevalence of MetS among Republic of Korea (ROK) Air Force military aviators and its relationship with clinical markers.

METHODS:
A cross-sectional study was performed among 911 aviators who filled out the lifestyle questionnaire and underwent medical examinations at the ROK Air Force Aerospace Medical Center. Clinical markers of aviators with MetS were investigated and odds ratios were calculated.

RESULTS:
Among the 911 aviators, 90 (9.9%) were found to have MetS and the prevalence of subcomponents were: 31.7% elevated blood pressure, 25.3% elevated waist circumference, 19.0% impaired glucose tolerance, 16.6% elevated triglycerides, 7.9% reduced high density lipoprotein (HDL) cholesterol. Among aviators, a significant statistical association was found between the diagnosis of MetS with the highest quartile of uric acid, white blood cell (WBC) count, and alanine transaminase (ALT) level. Adjusted odds ratio of MetS was 8.88 (3.16 ~24.99) if all three clinical markers were at highest quartile range.

DISCUSSION:
Despite the relatively low prevalence of MetS in ROK Air Force aviators, further preventive measures are required as the prevalence is expected to increase in the future. Aviators with high levels of WBC count, uric acid, and ALT should be examined for MetS. Further comprehensive cohort study is required to link the elevation of clinical markers and development of MetS.
Modern Air Combat Developments and Their Influence on Neck and Back Pain in F-16 Pilots.
Thoolen SJ, van den Oord MH.

Abstract:
INTRODUCTION:
Neck and back pain in fighter pilots remains a serious occupational problem. We hypothesized that recent advances such as the joint helmet mounted cueing system (JHMCS) in modern air combat might contribute to the development of spinal complaints in F-16 pilots.

METHODS:
Surveyed were 59 F-16 pilots of the Royal Netherlands Air Force who were compared to 49 F-16 pilots who filled in a similar questionnaire in 2007. The prevalence of neck and back pain, work situations, and capacity of the pilot were analyzed.

RESULTS:
The self-reported 1-yr prevalence of regular or continuous neck and lower back pain in 2014 were 22% and 31%, respectively, compared to both being 12% in 2007. Age, military flying experience, total number of flying hours, flying hours on the F-16, and total number of hours flown with night vision goggles (NVG) were significantly higher in 2014. In 2014, 95% flew with JHMCS, compared to 0% in 2007. Flying with JHMCS (88%), NVG (88%), type of flight (63%), and sitting posture (50%) were the most reported causes of flight-related neck pain. Sitting posture (89%), duration of flight (56%), and seat (44%) were among the reported causes of back pain.

DISCUSSION:
The increasing trend of neck and lower back pain might be caused by multiple changes in both the work situation and capacity of the pilots since 2007. Future innovations will increase the load on the pilot's spine. To successfully address their spinal problems in the future, fighter pilots must be monitored continuously.
**J Hazard Mater. 2015 Nov**

**Cerium oxide for the destruction of chemical warfare agents: A comparison of synthetic routes.**


**Abstract:**

Four different synthetic routes were used to prepare active forms of cerium oxide that are capable of destroying toxic organophosphates: a sol-gel process (via a citrate precursor), homogeneous hydrolysis and a precipitation/calcination procedure (via carbonate and oxalate precursors). The samples prepared via homogeneous hydrolysis with urea and the samples prepared via precipitation with ammonium bicarbonate (with subsequent calcination at 500°C in both cases) exhibited the highest degradation efficiencies towards the extremely dangerous nerve agents soman (O-pinacolyl methylphosphonofluoridate) and VX (O-ethyl S-[2-(diisopropylamino)ethyl] methylphosphonothioate) and the organophosphate pesticide parathion methyl. These samples were able to destroy more than 90% of the toxic compounds in less than 10min. The high degradation efficiency of cerium oxide is related to its complex surface chemistry (presence of surface OH groups and surface non-stoichiometry) and to its nanocrystalline nature, which promotes the formation of crystal defects on which the decomposition of organophosphates proceeds through a nucleophilic substitution mechanism that is not dissimilar to the mechanism of enzymatic hydrolysis of organic phosphates by phosphotriesterase.

**KEYWORDS:**

Cerium oxide; Chemical warfare agents; Decontamination; Organophosphate compounds

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**Ergonomics. 2015 Nov 7:1-5.**

**The effect of flexible body armour on pulmonary function.**

Armstrong NC, Gay LA.

**Abstract:**

The additional mass and fit of current military in-service body armour (ISBA) can reduce pulmonary function in a way that is characteristic of a restrictive respiratory impairment. This could ultimately impair exercise capacity and military performance. This study compared pulmonary function (forced vital capacity [FVC] and forced expiratory volume in 1 s [FEV1]) in UK ISBA (15.3 kg) and three flexible body armours (BAs) (FA1: 10 kg; FA2: 7.8 kg; FA3: 10 kg) in eight male soldiers. The design of the ballistic plates differed between the BAs to improve the flexibility. FVC and FEV1 were reduced by 4-6%, without reduction in FEV1/FVC for ISBA, FA2 and FA3, when compared to NoBA (p < 0.05). No difference was observed between FA1 and NoBA. As expected, wearing BA caused a mild restrictive ventilatory impairment; however, modifications to BA design can reduce the degree of this impairment. Practitioner Summary: This study showed that wearing body armour caused a mild restrictive ventilatory impairment. However, the design of the armour can be modified to reduce the degree of this impairment. This may lead to improvements in soldier performance during tasks that require body armour.

**KEYWORDS:**

Protective armour; chest wall restriction; load carriage; lung function; respiratory function.
Depression in military medicine cadets: a cross-sectional study.
Nasioudis D, Palaiodimos L, Dagiasis M, Katsarou A, Ntouros E.

Abstract:
BACKGROUND:
Military medicine cadets undergo strenuous military training alongside demanding medical studies. This stressful and complex educational environment can lead to the emergence of depressive symptoms. We investigated the prevalence of depressive symptoms in a cohort of military medicine cadets.

METHODS:
We conducted a descriptive questionnaire-based cross-sectional study among Greek military medicine cadets in the undergraduate program of the Hellenic Military School of Combat Support Officers. The Greek translation of the Zung self-rating depression scale questionnaire was used to screen for the presence of depressive symptoms. In addition, demographic, academic and dietary information was collected. The Shapiro-Wilk test of normality, Pearson correlation test, Chi-square test, t-test and Mann Whitney U test were employed for statistical analysis.

RESULTS:
We enrolled 55 female and 91 male military medicine cadets with a mean age of 19.84 years (SD = 0.99). The mean Zung crude score was 43.32 (SD = 4.55): 42.8 (SD = 4.3) for female cadets and 43.64 (SD = 4.6) for male cadets. Cadets were further subdivided into low and high risk groups for the presence of depressive symptoms. We identified 57 (39 %) cadets with a total Zung crude score of 45 or above: 21 females and 36 males. Statistical analysis did not reveal any significant differences between the two groups based on gender, year of training, academic performance, alcohol consumption, smoking status, vitamin supplementation, dietary habits or BMI.

CONCLUSIONS:
We report a high prevalence of depressive symptoms in a cohort of military medicine cadets that underscores the need for effective screening and appropriate and timely interventions. We did not identify any related risk factors. Military medicine cadets are exposed to a challenging military and medical training environment, and thus represent a group at risk for development of depression.

KEYWORDS:
Depression; Medical education; Medical students; Military medicine; Military training
Abstract:
Medical evidence hints that asymptomatic recruits with a history of childhood asthma, quiescent since their 13th birthday, are still at risk for adverse changes in their clinical status following unfavorable environmental exposures during military deployment or combat. Asthmatic persons, claiming none or few symptoms, may still manifest airflow obstruction and display biomarkers of airway inflammation even when they are relatively asymptomatic and experience few if any respiratory complaints. The occupational medicine model offers a credible foundation for acknowledging the importance of personal susceptibility in the pathogenesis of military-associated asthma. It is appropriate to re-explore the current military standard for recruits with asymptomatic childhood asthma (≥12 months) not prescribed antiasthma medications. Raising the acceptance age for these recruits may be a consideration. Unfortunately, there is no effectual screening test that recognizes such susceptible soldiers at risk for future asthma attacks. Nevertheless, there is general support for evidence-based, scientifically valid medical screening that judges fitness for military service. Screening tests comprising asthma biomarkers and genetic indices may better verify vulnerable soldiers destined to suffer future asthma reactivation.

Abstract:
The protective role of resilience in attenuating emotional distress and aggression associated with early-life stress in young enlisted military service candidates.
Kim J, Seok JH, Choi K, Jon DI, Hong HJ, Hong N, Lee E.

Abstract:
Early life stress (ELS) may induce long-lasting psychological complications in adulthood. The protective role of resilience against the development of psychopathology is also important. The purpose of this study was to investigate the relationships among ELS, resilience, depression, anxiety, and aggression in young adults. Four hundred sixty-one army inductees gave written informed consent and participated in this study. We assessed psychopathology using the Korea Military Personality Test, ELS using the Childhood Abuse Experience Scale, and resilience with the resilience scale. Analyses of variance, correlation analyses, and hierarchical multiple linear regression analyses were conducted for statistical analyses. The regression model explained 35.8%, 41.0%, and 23.3% of the total variance in the depression, anxiety, and aggression indices, respectively. We can find that even though ELS experience is positively associated with depression, anxiety, and aggression, resilience may have significant attenuating effect against the ELS effect on severity of these psychopathologies. Emotion regulation showed the most beneficial effect among resilience factors on reducing severity of psychopathologies. To improve mental health for young adults, ELS assessment and resilience enhancement program should be considered.

KEYWORDS:
Aggression; Anxiety; Depression; Early-life Stress; Emotion Regulation; Interparental Violence; Optimism; Resilience
A Retrospective Review of Screening Labs for Medical Clearance in a Military Population.
Schauer SG, Goolsby CA.

Abstract:

STUDY OBJECTIVE:
We determine the incidence of clinically significant findings within mandatory screening studies during medical clearance of patients for psychiatric care.

METHODS:
This is a retrospective review of emergency department patients medically cleared for psychiatric care over 11 months. All patients evaluated for behavioral health-related issues are recorded on a daily report which was used to locate subjects. Laboratory studies were reviewed during that visit for the presence of abnormalities. If abnormalities were noted, the individual chart was reviewed. Our primary outcome was the incidence of clinically significant findings that warranted admission to a medical or surgical unit.

RESULTS:
204 psychiatric patient reports were reviewed. 191 of these patients had screening studies performed. Seven patients were admitted to a nonpsychiatric unit. These admissions were all for elevated ethanol levels. These patients were admitted until their ethanol level decreased, and then transferred to a psychiatric facility. The total screening lab cost during this study period was $27,893.

CONCLUSIONS:
Routine screening has limited utility in this population and comes at significant cost. Further research should be directed to determine which patients may benefit from screening studies.

The Cost of Deploying a Role 2 Medical Asset to Afghanistan.
Childers R, Parker P.

Abstract:

OBJECTIVES:
The costs of military assets, including medical resources, are necessary for military planners when determining their force make up. The monetary cost of operating a Role 3 unit, the most comprehensive medical asset in the combat theater, has been determined. The cost of operating a Role 2 (R2) facility-the less comprehensive but more common asset-has not been assessed. Here we estimate the cost of operating an R2 medical asset in Afghanistan.

METHODS:
Personnel costs were assessed by combining the U.S. Department of Defense estimate for personnel cost with the replacement costs for deployed staff. Manning was for a U.S. Marine Corps Shock Trauma Platoon and Forward Resuscitative Surgical System.

RESULTS:
It costs $2,956,873 a month to operate an R2 medical facility in Afghanistan. It also takes the place of a rifle platoon and disrupts the domestic military health care mission.

CONCLUSION:
The costs of operating an R2 medical facility are significant and should be considered when the medical benefits of an R2 are unclear.
Renninger CH, Kuhn K, Fellars T, Youngblood S, Bellamy J.

Abstract:
BACKGROUND:
The optimal management of Achilles tendon ruptures continues to be a subject of debate in orthopedics. These injuries are common in the active duty military population. The purpose of this study was to retrospectively compare the results of operative and nonoperative management of Achilles tendon ruptures in the active duty military population following the publication of a landmark level I study that has influenced practice patterns.

METHODS:
All Achilles tendon injuries in active duty patients were identified at a single military institution from January 1, 2011, to January 1, 2014. Inclusion and exclusion criteria were applied and charts were reviewed. Demographic and treatment information were recorded along with return to duty status, deep vein thrombosis (DVT), rerupture, and other complication data. Rates of DVT, rerupture, other complications, and return to duty (including time to return) were then compared. Demographic data were described. Fifty-seven male patients met inclusion criteria with an average age of 31 years. There were 27 in the operative group and 30 in the nonoperative group. There were no significant differences in group demographics.

RESULTS:
There were no DVTs in either treatment group. There were no wound complications in the operative group. There were no significant differences in the rates of rerupture, return to duty, or other complications. There were 2 reruptures in the nonoperative group. Both were treated nonoperatively. There was one rerupture in the operative group that was treated nonoperatively. All reruptures were partial tears. Two patients underwent repair with flexor hallucis longus augmentation. Both of these patients were initially managed nonoperatively. When available data on time to return to duty was analyzed, patients who underwent operative management returned to duty on average approximately one and a half months earlier (6.7 vs 8.2 months) than nonoperative patients (P = .04). In 2011, 12% of injuries were treated nonoperatively; in 2012, 57%; and in 2013, 84%.

CONCLUSIONS:
Similar to previously published work, this retrospective analysis found no significant difference in complication, DVT, or rerupture rates. The rate of rerupture in this study was slightly higher than previously published work in the era of functional rehabilitation, but the sample size was small. The data were limited with respect to functional outcome for comparison; however, the rate of return to active duty was not significantly different. The data also demonstrate a shift in institutional treatment pattern for Achilles injuries in this population over the 3-year study period. Operatively treated patients did have a statistically significant reduction in the time required to return to active duty of approximately one and a half months, which may represent a clinically significant difference in highly active workers or highly active people.

LEVEL OF EVIDENCE:
Level III, retrospective comparative series.

KEYWORDS:
Achilles; functional rehabilitation; rerupture.
Military Neurosurgery: A Range of Service Options.


Abstract:
The pathway to military neurosurgical practice can include a number of accession options. This article is an objective comparison of fiscal, tangible, and intangible benefits provided through different military neurosurgery career paths. Neurosurgeons may train through active duty, reserve, or civilian pathways. These modalities were evaluated on the basis of economic data during residency and the initial 3 years afterwards. When available, military base pay, basic allowance for housing and subsistence, variable special pay, board certified pay, incentive pay, multiyear special pay, reserve drill pay, civilian salary, income tax, and other tax incentives were analyzed using publically available data. Civilians had lower residency pay, higher starting salaries, increased taxes, malpractice insurance cost, and increased overhead. Active duty service saw higher residency pay, lower starting salary, tax incentives, increased benefits, and almost no associated overhead including malpractice coverage. Reserve service saw a combination of civilian benefits with supplementation of reserve drill pay in return for weekend drill and the possibility of deployment and activation. Being a neurosurgeon in the military is extremely rewarding. From a financial perspective, ignoring intangibles, this article shows most entry pathways with initially modest differences between the cumulative salaries of active duty and civilian career paths and with higher overall compensation available from the reserve service option. These pathways become increasingly discrepant over time as civilian pay greatly exceeds that of military neurosurgeons. We hope that those curious about or considering serving in the United States military benefit from our accounting and review of these comparative paths.

ABBREVIATIONS:
FAP, Financial Assistance Program
NADDs, Navy Active Duty Delay for Specialists
TMS, Training in Medical Specialties.
**Drug Test Anal. 2015 Nov 2.**

*Self-reported side-effects associated with use of dietary supplements in an armed forces population.*

*Austin KG, Farina EK, Lieberman HR.*

**Abstract:**

Approximately 60-70% of Armed Forces personnel consume a dietary supplement (DS) at least once a week and there have been numerous reports of severe adverse events among DS users. This study assessed patterns of DS use and self-reported side-effects among 4400 Armed Forces personnel using a paper-and-pencil survey. Multivariable logistic regression was used to examine associations between patterns of DS use and self-reported side-effects. Sixty-nine percent of personnel surveyed reported using a DS. Seven percent of DS users reported experiencing abnormal heart beats, 6% tremors, 5% stomach pain, 3% dizziness, and 3% numbness/tingling and they believed these symptoms were associated with the use of DS. After adjustment for use of other DS classes, total supplement use, and demographic characteristics, protein supplement users were more likely than non-users to report numbness/tingling; combination product users were more likely to report experiencing abnormal heart beats, stomach pain, dizziness, tremors, and numbness/tingling; and users of purported steroid analogues were more likely to report dizziness. Use of more than one DS per week was associated with an increased likelihood of reporting side-effects. Respondents with a higher body mass index were more likely to report side-effects. Further research is necessary to determine whether self-reported side-effects associated with multiple DS use and some DS classes impact the long-term health or performance of service members. Surveillance of military populations using surveys like this one may provide a method for detecting adverse health events of DS before they are apparent in the civilian population.

**KEYWORDS:**

body mass index; combination products; physical fitness; protein supplements.

**Psychol Serv. 2015 Nov;**

*The role of cognitive processing therapy in improving psychosocial functioning, health, and quality of life in veterans with military sexual trauma-related posttraumatic stress disorder.*

*Holliday R, Williams R, Bird J, Mullen K, Surís A.*

**Abstract:**

Although research has identified evidence-based treatments (EBTs) for military sexual trauma (MST)-related posttraumatic stress disorder (PTSD), few studies have examined the effect of such treatments on psychosocial functioning, health or quality of life in individuals with MST-related PTSD. Male and female veterans (N = 45) with MST-related PTSD took part in a randomized clinical trial that included either 12 weeks of an evidence-based psychotherapeutic treatment (cognitive processing therapy; [CPT]) or a standard control condition (present centered therapy) and 6 months of follow-up. To assess quality of life and psychosocial functioning, each participant was administered the Quality of Life Inventory and the Short Form (36) Health Survey. Using a hierarchical linear modeling approach, results demonstrated that participants treated with CPT reported significantly higher physical functioning over time than did participants treated with PCT. Implications are discussed with regard to the role of psychotherapy in improving a patient's psychosocial and health functioning. (PsycINFO Database Record)
Revision Anterior Cruciate Ligament Reconstruction in Military Personnel.
Balazs GC, Grimm PD, Donohue MA, Keblish DJ, Rue JP.

Abstract:

Purpose
This study aims to report the clinical and functional outcomes of revision anterior cruciate ligament (ACL) reconstruction in a young, active duty military population.

Methods
Patients undergoing revision ACL reconstruction were enrolled in an institutional clinical database and followed prospectively. The primary outcomes were patients' scores on a timed run, as compared with recorded scores before reinjury. Secondary outcomes included scores on the Knee Injury and Osteoarthritis Outcome Score (KOOS), the Western Ontario and McMaster Universities Arthritis Index (WOMAC), the International Knee Documentation Committee subjective (IKDC subjective), the Short Form -36 health survey (SF-36) version 2, the Single Assessment Numeric Evaluation (SANE), and the Tegner activity scale.

Results
A total of 13 patients were identified who met the inclusion criteria and had complete follow-up. The mean age at revision ACL reconstruction was 20.5 years (range, 19-22 years), and mean follow-up was 40.2 months (range, 13-66 months). All patients underwent a single stage revision ACL reconstruction with ipsilateral bone-patellar tendon-bone autograft, ipsilateral hamstring autograft, or bone-tendon-bone allograft. Mean physical readiness test (PRT) score at final follow-up was not statistically different than documented preinjury PRT score (77.9 vs. 85.5, p > 0.05), nor was the mean run time (7:12 vs. 6:43/mile, p > 0.05). Significant improvements exceeding published minimal clinically important differences were seen in SANE score, SF-36 physical component summary score, KOOS sports and recreation, KOOS quality of life, WOMAC pain score, and WOMAC function score.

Conclusions
Patients undergoing revision ACL reconstruction at our facility show good recovery of baseline physical performance as measured by the semiannual PRT and timed run test, and significant improvements in patient-reported outcome scores.

Level of Evidence
Level IV, case series.
Psychiatr Serv. 2015 Nov


Wicken C, Nevin R, Ritchie EC.

Abstract:

OBJECTIVE:

Feature articles in the Medical Surveillance Monthly Report (MSMR) reflect the U.S. military's health surveillance priorities. This study examined whether the recent rise in the number of ambulatory encounters for mental disorders in the U.S. military associated with the Iraq and Afghanistan wars was reflected in a proportional increase in MSMR feature articles on this topic.

METHODS:

Articles published in the MSMR from January 1998 to December 2013 were examined to categorize feature articles according to health outcome. The proportion of articles by topic of outcome was compared with the proportion of all ambulatory encounters by category of disorder.

RESULTS:

Mental disorders constituted 13% of ambulatory encounters and were the topic of 11% of 329 feature articles during the period, a statistically nonsignificant difference.

CONCLUSIONS:

The increased number of encounters for mental disorders has been met with a proportional but delayed increase in the number of MSMR feature articles focusing on these disorders.

J Strength Cond Res. 2015 Nov.

Novel Cooling Strategies for Military Training and Operations.

Lee JK, Kenefick RW, Cheuvront SN.

Abstract:

Lee, JKW, Kenefick, RW, and Cheuvront, SN. Novel cooling strategies for military training and operations. J Strength Cond Res 29(11S): S77-S81, 2015-The deleterious effects of environmental heat stress, combined with high metabolic loads and protective clothing and equipment of the modern Warfighter, impose severe heat strain, impair task performance, and increase risk of heat illness, thereby reducing the chance for mission success. Despite the implementation of heat-risk mitigation procedures over the past decades, task performance still suffers and exertional heat illness remains a major military problem. We review 3 novel heat mitigation strategies that may be implemented in the training or operational environment to reduce heat strain and the risk of exertional heat illness. These strategies include ingestion of ice slurry, arm immersion cooling, and microclimate cooling. Each of these strategies is suitable for use in different scenarios and the choice of cooling strategy is contingent on the requirements, circumstances, and constraints of the training and operational scenario. Ingestion of ice slurry and arm immersion cooling are practical strategies that may be implemented during training scenarios; ice slurry can be ingested before and during exercise, whereas arm immersion cooling can be administered after exercise-heat exposure. In the operational environment, existing microclimate cooling can be implemented with retrofitted vehicles and as an unmounted system, and it has the potential for use in many military occupational scenarios. This review will discuss the efficacy, limitations, and practical considerations for field implementation of each strategy.
**U.S. Army Research on Pharmacological Enhancement of Soldier Performance: Stimulants, Anabolic Hormones, and Blood Doping.**

**Friedl KE.**

**Abstract:**

Friedl, KE. U.S. army research on pharmacological enhancement of soldier performance: stimulants, anabolic hormones, and blood doping. J Strength Cond Res 29(11S): S71-S76, 2015-The level playing field of competitive sports is an irrelevant concern in asymmetrical warfare. However, there is a common theme of pressure to use performance-enhancing drugs because athletic or military opponents may be using them to advantage. This interest is fueled by personal anecdotes, misconceptions, and myths, and decisions to use or not to use pharmacological interventions may ignore available scientific data. The U.S. Army has led research in this area, with an abundance of published data extending back to World War II. Behavioral effects have been a consistent concern. A key conclusion to be drawn from this research is that although there may be specialized applications for some of these interventions, the majority of soldiers will gain the greatest performance benefits from effective physical and mental training programs combined with good principles of rest and nutrition. Furthermore, the perceived need to improve human biology with drugs may be solving the wrong problem, trying to fit the human to the demands of poorly conceived tactics, tasks, and equipments instead of capitalizing on human capabilities.

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**Physical Training, Fitness, and Injuries: Lessons Learned From Military Studies.**

**Jones BH, Hauschild VD.**

**Abstract:**

Jones, BH and Hauschild, VD. Physical training, fitness, and injuries: lessons learned from military studies. J Strength Cond Res 29(11S): S57-S64, 2015-Injuries are the leading cause of medical encounters across the U.S. military services resulting in more than 2.0 million clinic visits per year. Almost 50% of military service members experience an injury each year and half of those injuries are caused by physical training (PT), exercise, or sports. To prevent a problem as large and complex as injuries in the military requires a systematic approach. Several key questions must be answered to effectively address a problem such as injuries: (1) how big is the problem? (2) what are the causes and risk factors for the problem? (3) do modifiable risk factors for the problem exist? and (4) what works to prevent the problem? The article discusses leading causes of injuries for U.S. Army populations. It then explores key risk factors for exercise and training-related injuries: (1) the amounts of training, (2) types of training activities, (3) participants level of fitness, and (4) personal health risk behaviors. The article concludes with a review of prevention strategies illustrating interventions that have been shown to be effective, and others that are not effective. The data presented suggest that PT and exercise cause injuries and that modifications of training are most likely to prevent the problem.
Abstract:

Gibala, MJ, Gagnon, PJ, and Nindl, BC. Military applicability of interval training for health and performance. J Strength Cond Res 29(11S): S40-S45, 2015—Militaries from around the globe have predominantly used endurance training as their primary mode of aerobic physical conditioning, with historical emphasis placed on the long distance run. In contrast to this traditional exercise approach to training, interval training is characterized by brief, intermittent bouts of intense exercise, separated by periods of lower intensity exercise or rest for recovery. Although hardly a novel concept, research over the past decade has shed new light on the potency of interval training to elicit physiological adaptations in a time-efficient manner. This work has largely focused on the benefits of low-volume interval training, which involves a relatively small total amount of exercise, as compared with the traditional high-volume approach to training historically favored by militaries. Studies that have directly compared interval and moderate-intensity continuous training have shown similar improvements in cardiorespiratory fitness and the capacity for aerobic energy metabolism, despite large differences in total exercise and training time commitment. Interval training can also be applied in a calisthenics manner to improve cardiorespiratory fitness and strength, and this approach could easily be incorporated into a military conditioning environment. Although interval training can elicit physiological changes in men and women, the potential for sex-specific adaptations in the adaptive response to interval training warrants further investigation. Additional work is needed to clarify adaptations occurring over the longer term; however, interval training deserves consideration from a military applicability standpoint as a time-efficient training strategy to enhance soldier health and performance. There is value for military leaders in identifying strategies that reduce the time required for exercise, but nonetheless provide an effective training stimulus.
**Physiological Readiness and Resilience: Pillars of Military Preparedness.**

**Szivak TK, Kraemer WJ.**

**Abstract:**

Szivak, TK and Kraemer, WJ. Physiological readiness and resilience: Pillars of military preparedness. J Strength Cond Res 29(11S): S34-S39, 2015-Warfighters require a range of physical capabilities to meet the demands of the military profession, and physical training must address performance along an entire continuum, depending on individual needs and mission requirements. Strength and power capabilities are needed for optimal performance of anaerobic tasks such as heavy load carriage, sprinting under load, and maneuvering over uneven terrain. For optimal performance, soldiers must also be able to recover from mission demands and strenuous training. The demands placed on a soldier can result in a chronic stress, leading to decreased mission performance, increased injury risk, and increased susceptibility to illness. These factors are exacerbated by inappropriate training strategies such as overemphasis on endurance exercise combined with other stressors such as lack of sleep or inadequate nutrition. Chronic stress has been linked to overreaching/overtraining and to the development of comorbidities such as metabolic syndrome, insulin resistance, and hypertension and has adverse effects on memory and cognitive function. Resistance exercise is an effective method to improve warfighter physical performance and resilience to stress, thereby impacting mission readiness. Resistance exercise in particular confers many benefits to include increased strength and power, improved body composition, and protective effects on tendons, ligaments, and bone. Physically fit individuals not only benefit from improved mission performance but also are more resilient to operational stressors faced during combat. Ultimately, resilient soldiers are better able to cope with the physical and mental demands of the military profession and over the long term will perform better while maintaining health and well-being.

**Development and Implementation of Evidence-Based Physical Employment Standards: Key Challenges in the Military Context.**

**Reilly TJ, Gebhardt DL, Billing DC, Greeves JP, Sharp MA.**

**Abstract:**

Reilly, TJ, Gebhardt, DL, Billing, DC, Greeves, JP, and Sharp, MA. Development and implementation of evidence-based physical employment standards: key challenges in the military context. J Strength Cond Res 29(11S): S28-S33, 2015-The use of evidence-based physical employment standards is critical in selecting individuals who can meet the requirements of arduous military occupations. The methods used to generate the physical assessments and standards are critical to the process and must withstand legal scrutiny. This article addresses the challenges encountered when developing, validating, and implementing physical standards and assessments. The challenges covered by the study include: (a) identification of critical job tasks and minimum requirements for performance of the tasks, (b) involvement of military personnel as subject-matter experts, (c) development of tests and criterion measures linked to critical job tasks, (d) determination of test performance standards, (e) evaluation of bias for protected groups, and (f) implementation, development of test policies, and revision of tests and standards.
Hydren JR, Zambraski EJ. International research consensus: Identifying military research priorities and gaps. J Strength Cond Res 29(11S): S24-S27, 2015-A multidisciplinary survey was administered to military performance researchers attending the Third International Conference on Soldier Physical Performance to obtain their opinions of the priority levels and importance of research topics related to soldier health and determinants of soldier physical performance. Respondents included 140 individuals from 22 different countries, of which 96% had at least a graduate degree and 79% were associated with a military organization. The top 5 highest importance/priority research topics were (a) physical demands in operational environments, (b) measuring physical performance/fitness, (c) musculoskeletal injury mitigation programs, (d) physical employment standards, and (e) physical strength-training programs. Of what individuals thought were their most important topics, 50% reported these were not currently being researched because of higher priorities, insufficient funding, or the lack of scientific expertise. A theme analysis of research-topic areas that were important and not being researched indicated that physical employment standards and physical training studies related to soldiers' health and performance are knowledge gaps. Although these experienced researchers had diverse backgrounds and were working on a wide array of research topics, there was a surprisingly clear consensus on what they thought were important topics that needed to be addressed in common between countries or militaries.

Santtila M, Pihlainen K, Viskari J, Kyröläinen H. Optimal physical training during military basic training period. J Strength Cond Res 29(11S): S154-S157, 2015-The goal for military basic training (BT) is to create a foundation for physical fitness and military skills of soldiers. Thereafter, more advanced military training can safely take place. Large differences in the initial physical performance of conscripts or recruits have led military units to develop more safe and effective training programs. The purpose of this review article was to describe the limiting factors of optimal physical training during the BT period. This review revealed that the high volume of low-intensity physical activity combined with endurance-type military training (like combat training, prolonged physical activity, and field shooting) during BT interferes with optimal development of maximal oxygen uptake and muscle strength of the soldiers. Therefore, more progressive, periodized, and individualized training programs are needed. In conclusion, optimal training programs lead to higher training responses and lower risks for injuries and overloading.
Abstract:

Rohde, U, Sievert, A, Rüther, T, Witzki, A, and Leyk, D. Concept for a predeployment assessment of Basic Military Fitness in the German Armed Forces. J Strength Cond Res 29(11S): S211-S215, 2015-Military fitness is defined as a hierarchical 4-level construct in the German armed forces: (a) "Fundamental/Baseline Fitness," (b) "Basic Military Fitness," (c) "Task Fitness," and (d) "Mission Fitness." "Fundamental/Baseline Fitness" is assessed with the "Basic Fitness Test." However, this test alone is not sufficient to assess readiness for the physical demands of deployments. The first part of the article describes the development of a tool mirroring the specific physiological requirements of military operations on a joint forces level. The "Basic Military Fitness Tool" (BMFT) combines 4 crucial military demands into one single timed test run performed with field uniform (5 kg), body armor (13.4 kg), and helmet (1.6 kg): (a) maneuver under fire: 130 m run with changes in direction, velocity, and body position, (b) casualty rescue: 40 m of dragging a 50 kg load, (c) load carrying: 100 m carrying of two 18 kg loads, and (d) load lifting: lifting a 24 kg load on to a 1.25 m high rack 5 times. The second part covers the first assessment of BMFT selectivity between high- and low-performing groups. Muscle mass and strength are important factors for working with loads. Thus, female soldiers are expected to need more time to complete BMFT because of their on average lower muscle mass. Eighteen female (age = 28.5 ± 6.6 years, lean body mass [LBM] = 45.0 ± 4.5 kg; mean ± SD) and 104 male soldiers (age = 30.0 ± 8.4, LBM = 64.3 ± 7.1) completed isometric strength testing (hand grip = 344.3 ± 51.4 N and 547.3 ± 79.1 N, elbow flexors = 118.9 ± 16.9 and 235.1 ± 42.0, knee extensors = 433.2 ± 87.4 and 631.4 ± 111.4) and BMFT (259.2 ± 44.0 and 150.0 ± 21.1 s). Except age, all variables differed significantly (p < 0.01) between groups.
Abstract:
Roos, L, Hofstetter MC, Mäder U, and Wyss, T. Training methods and training instructors' qualification are related to recruits' fitness development during basic military training. J Strength Cond Res 29(11S): S178-S186, 2015. Adequate physical fitness is essential for successful military service. Military organizations worldwide therefore make continuous efforts to improve their army's physical training (PT) programs. To investigate the effect of the training methods and the qualification of PT instructors on the development of recruits' physical fitness, the present study compared the outcomes of 2 training groups. Both study groups participated in approximately 145 minutes per week of PT. The control group executed the standard army PT prepared and supervised by army PT instructors. Content of the PT in the intervention group was similar to that of the control group, but their training sessions' methods were different. Their training sessions were organized, prepared, and delivered by more and better-qualified supervisors (tertiary-educated physical education teachers). After 10 weeks of training, the participants of the intervention group experienced a significantly greater physical fitness improvement than those of the control group (positive change in endurance 32 and 17%, balance 30 and 21%, and core strength 74 and 45%, respectively). In both groups, the recruits with the lowest initial fitness levels significantly increased their performance. In the intervention group, but not the control, one-third of the recruits with the highest initial fitness levels were able to further improve their general fitness performance. This study demonstrates that the training methods and quality of instruction during PT sessions are relevant for recruits' fitness development in basic military training.
The Effectiveness of Basic Military Training To Improve Functional Lifting Strength in New Recruits.

Drain JR, Sampson JA, Billing DC, Burley SD, Linnane DM, Groeller H.

Abstract:

Drain, JR, Sampson, JA, Billing, DC, Burley, SD, Linnane, DM, and Groeller, H. The effectiveness of basic military training to improve functional lifting strength in new recruits. J Strength Cond Res 29(11S): S173-S177, 2015-Australian Army recruits are required to meet the incumbent baseline physical employment standards (PES) during basic military training. A box lift and place (BLP) assessment is included in the PES, and it assesses the ability to perform essential muscular strength tasks. Therefore, basic military training must provide sufficient training stimulus to enable recruits to achieve the baseline BLP standard. A study was undertaken to investigate changes in the performance of 1-repetition maximum BLP in male (n = 154; age, 21.4 years) and female (n = 20; age, 23.1 years) recruits over the first 8 weeks of a 12-week basic military training course. Both male and female recruits showed modest improvements (2.2 ± 5.9 kg and 3.0 ± 3.1 kg, respectively; p ≤ 0.05) in maximal BLP performance, and there were no differences between genders. The female recruits showed greater relative improvements compared with the male recruits (14.7 ± 7.8% vs. 6.5 ± 2.3%). Despite the modest improvements in BLP performance, 70% of female and 100% of male recruits achieved the baseline BLP standard (25 kg) during week 8. The 30% failure rate for female recruits, however, suggests that the basic training program should be improved. A training program that yields greater gains in muscular strength would likely increase female recruit BLP pass rates. Augmented muscular strength would also likely increase the number of recruits capable of achieving higher BLP standards for more physically demanding employment categories. A training program that yields greater improvements in muscular strength may also enable lower entry standards, thereby increasing the recruit pool.
Effects of Added Resistance Training on Physical Fitness, Body Composition, and Serum Hormone Concentrations During Eight Weeks of Special Military Training Period.
Vaara JP, Kokko J, Isoranta M, Kyröläinen H.

Abstract:
Vaara, JP, Kokko, J, Isoranta, M, and Kyröläinen, H. Effects of added resistance training on physical fitness, body composition, and serum hormone concentrations during eight weeks of special military training period. J Strength Cond Res 29(11S): S168-S172, 2015-A high volume of military training has been shown to compromise muscle strength development. We examined effects of added low-volume resistance training during special military training (ST) period, which took place after basic training period. Male conscripts (n = 25) were assigned to standardized ST with added resistance training group (TG, n = 13) and group with standardized ST only (control) (CG, n = 12). Standardized ST with added resistance training group performed 2 resistance training sessions per week for 8 weeks: hypertrophic strength (weeks 1-3), maximal strength (weeks 4-6) and power training (weeks 7-8). Maximal strength tests, load carriage performance (3.2 km, 27 kg), and hormone concentrations were measured before and after ST (mean ± SD). Both groups improved similarly in their load carriage performance time (TG: 1,162 ± 116 seconds vs. 1,047 ± 81 seconds; CG: 1,142 ± 95 seconds vs. 1,035 ± 81 seconds) (p < 0.001) but decreased maximal strength of the lower extremities (TG: 5,250 ± 1,110 N vs. 4,290 ± 720 N; CG: 5,170 ± 1,050 N vs. 4,330 ± 1,230 N) and back muscles (TG: 4,290 ± 990 N vs. 3,570 ± 48 N; CG: 3,920 ± 72 N vs. 3,410 ± 53 N) (p ≤ 0.05). Maximal strength of the upper extremities improved in CG (1,040 ± 200 N vs. 1,140 ± 200 N) (p ≤ 0.05) but not in TG. Maximal strength of the abdominal muscles improved in TG (3,260 ± 510 N vs. 3,740 ± 75 N) (p ≤ 0.05) but not in CG. Testosterone concentration increased in CG (15.2 ± 3.6 nmol·L vs. 21.6 ± 5.0 nmol·L) (p < 0.01) but not in TG (18.6 ± 4.3 nmol·L vs. 19.5 ± 9.4 nmol·L). In conclusion, interference with strength gains might be related to the high volume of aerobic activities and too low volume of resistance training during ST. To develop strength characteristics, careful periodization and individualization should be adopted in ST.
How Effective Is Initial Military-Specific Training in the Development of Physical Performance of Soldiers?

Groeller H, Burley S, Orchard P, Sampson JA, Billing DC, Linnane D.

Abstract:

Groeller, H, Burley, S, Orchard, P, Sampson, JA, Billing, DC, and Linnane, D. How effective is initial military-specific training in the development of physical performance of soldiers? J Strength Cond Res 29(11S): S158-S162, 2015-The impact of basic military training (BMT) on recruit physical performance is well described. However, initial employment training (IET), the period immediately after BMT, is the final preparatory step before posting to an operational unit. There is limited evidence on the influence of this training in developing the physical attributes necessary for military duty. Therefore, this investigation determined the relative contribution of BMT and IET to develop physical capability in soldiers. Fifty-one soldiers (45 men and 6 women) were assessed at 4 time points: commencement of training (week 1), midway (week 8), at the conclusion (week 12) of BMT, and upon completion of the IET (week 18/27). Weeks 1, 12, and 18/27 are reported herein. At each time point, tasks relevant to military duties, such as 1 repetition maximum (1RM) box lift, 2 × 22 kg-jerry carry, 3.2 km of 22-kg load carriage, and preexisting assessments of military fitness, such as 20-m shuttle run, 2-minute push-ups, and sit-ups, were assessed. A subsample of recruits (n = 14) was assessed for 1RM bench press, vertical jump, 30-second high-intensity cycle ergometry, and peak treadmill oxygen consumption. A significant (p ≤ 0.05) decrease in 3.2 km of 22-kg load carriage (week 12, 1,109 ± 37 seconds; week 18/27, 1,161 ± 51 seconds), 2 × 22 kg-jerry carry (week 12, 753 ± 72 m; week 18/27, 683 ± 78 m), and 1RM bench press (week 12, 83.3 ± 16.0 kg; week 18/27, 73.2 ± 16.6 kg) was observed during IET. No change (p > 0.05) between week 12 and week 18/27 was detected in 1RM box lift, vertical jump, 30-second high-intensity cycle ergometry, sit-ups, and 20-minute shuttle run. In contrast, 2-minute push-up (week 12, 46.7 ± 2.7; week 18/27, 57.5 ± 3.1) performance increased significantly (p ≤ 0.05). Soldiers who participated in up to 15 weeks of additional IET did not make further physical performance gains in strength, power, and endurance or function before posting to their units. Thus, greater focus on the development of these physical attributes seems warranted within the IET training regimen.
**Abstract:**

Vaara, JP, Kalliomaa, R, Hynnin P, and Kyröläinen, H. Physical fitness and hormonal profile during an 11-week paratroop training period. J Strength Cond Res 29(11S): S163-S167, 2015—Physical fitness and serum hormone concentrations have been shown to change during military training. The purpose was to examine these chronic changes in paratroopers (n = 52 male conscripts) during an 11-week training period, including acute changes induced by strenuous 5-day military field training. Hormonal profiles, body mass, maximal strength, muscle endurance, and 12-minute running test were assessed at several time points during paratrooper training. In the latter part of the training period, conscripts were involved in strenuous military field training (5 days). At week 7, during specialized military training period, aerobic performance decreased (3,146 ± 163 m) but recovered back to a baseline level (3,226 ± 190 m) at the end of the study period (p < 0.001). Standing long jump decreased at week 7 (242 ± 13 cm) (p < 0.001) from the baseline value (248 ± 13 cm), whereas push-up (52 ± 11, 60 ± 13 repetitions per minute) and sit-up (54 ± 6, 56 ± 7 repetitions per minute) performances increased (p < 0.001). No changes were observed in maximal strength and body composition, neither mostly in hormone concentrations, although cortisol decreased but increased back to baseline value at the end of the study period (p ≤ 0.05). Acute responses after the 5-day military field training included decreased maximal strength of the lower extremities and body mass, as well as changes in androgen hormone concentrations (increment testosterone: -46%, increment insulin-like growth factor-1: -28%, increment sex hormone-binding globulin: +25%) compared with all other measurements (p ≤ 0.05). The first 4 weeks of parachute military training decreased maximal aerobic capacity and neuromuscular performance of the lower body, whereas muscular endurance increased. Moreover, 5-day military field training resulted in dramatic changes in hormone concentrations. These findings highlight the importance of periodizing paratrooper training and underline the need for sufficient recovery immediately after military field training.
Abstract:
Billing, DC, Silk, AJ, Tofari, PJ, and Hunt, AP. Effects of military load carriage on susceptibility to enemy fire during tactical combat movements. J Strength Cond Res 29(11S): S134-S138, 2015-Current military operations require soldiers to carry heavy external loads that are widely acknowledged to impair the ability to move tactically on the battlefield. However, to date, the effect of load on susceptibility to enemy fire (the probability of being hit) has not been examined. Nineteen soldiers completed a break contact simulation (five 30-m sprints commencing every 44 seconds) and a fire and movement simulation (sixteen 6-m bounds commencing every 20 seconds) in each of the 5 load conditions (ranging from 9.8 to 30.1 kg). For each simulation, the impact of load on exposure time and peak movement velocity was examined. In addition, the 6 fastest and 6 slowest soldiers (determined by exposure time in the heaviest condition) were parsed into subgroups to examine inter individual differences in response to load. Susceptibility for the 2 subgroups was modeled using exposure time for the 2 simulations and the assumed reaction time, shooting cadence, and shooting accuracy of the enemy. Susceptibility increased as a function of load for both the break contact and fire and movement simulations and became more pronounced when the participant population was parsed into fast and slow groups. When the impact of personal protection systems was isolated and analyzed, it was found that not only were the slower participants more vulnerable (as a result of not wearing the personal protection system) but also more susceptible than the faster participants who carried 11.2 kg more load. Large inter individual differences in response to external load have meaningful consequences for battlefield susceptibility, and it is therefore critical that personnel are afforded tailored training such that they maximize their proficiency in the execution of tactical combat movements.
**Abstract:**


Physical fitness training of military recruits is an enduring focus of armies. This is important for safe and effective performance of general tasks that anyone may have to perform in a military setting as well as preparation for more specialized training in specific job specialties. Decades of studies on occupationally specific physical requirements have characterized the dual aerobic and strength demands of typical military tasks; however, scientifically founded strategies to prepare recruits with a good mix of these 2 physically opposing capabilities have not been well established. High levels of aerobic training can compromise resistance training gains and increase injury rates. Resistance training requires a greater commitment of time and resources as well as a greater understanding of the science to produce true strength gains that may be beneficial to military performance. These are critical issues for modern armies with increased demands for well-prepared soldiers and fewer injury losses. The actual physical requirements tied to metrics of success in military jobs are also under renewed examination as women are increasingly integrated into military jobs previously performed only by men. At the third International Congress on Soldiers’ Physical Performance, a roundtable of 10 physiologists with military expertise presented comparative perspectives on aerobic and strength training. These topics included the physiological basis of training benefits, how to train effectively, how to measure training effectiveness, considerations for the integration of women, and the big perspective. Key discussion points centered on (a) the significance of findings from research on integrated training, (b) strategies for effective strength development, and (c) injury reduction in training as well as the benefits of improved fitness to injury reduction across the force.
Abstract:  
Musculoskeletal injuries are reported as burdening the military. An identified risk factor for injury is carrying heavy loads; however, soldiers are also required to wear their load as body armour. To investigate the effects of body armour on trunk and hip kinematics during military-specific manual handling tasks, 16 males completed 3 tasks while wearing each of 4 body armour conditions plus a control. Three-dimensional motion analysis captured and quantified all kinematic data. Average trunk flexion for the weightiest armour type was higher compared with control during the carry component of the ammunition box lift \((p < 0.001)\) and sandbag lift tasks \((p < 0.001)\). Trunk rotation ROM was lower for all armour types compared with control during the ammunition box place component \((p < 0.001)\). The altered kinematics with body armour occurred independent of armour design. In order to optimise armour design, manufacturers need to work with end-users to explore how armour configurations interact with range of personal and situational factors in operationally relevant environments. Practitioner Summary: Musculoskeletal injuries are reported as burdening the military and may relate to body armour wear. Body armour increased trunk flexion and reduced trunk rotation during military-specific lifting and carrying tasks. The altered kinematics may contribute to injury risk, but more research is required.

**KEYWORDS:**

Body armour; biomechanics; injury; posture
Abstract:

OBJECTIVES:
To evaluate the functional and mental health status of severely injured traumatic amputees from the United Kingdom military at the completion of their rehabilitation pathway and to compare these data with the published normative data.

DESIGN:
Retrospective independent group comparison of descriptive rehabilitation data recorded postrehabilitation.

SETTING:
A military complex trauma rehabilitation center.

PARTICIPANTS:
Amputees (N=65; mean age, 29±6y) were evaluated at the completion of their rehabilitation pathway; of these, 54 were operationally (combat) injured (23 unilateral, 23 bilateral, 8 triple) and 11 nonoperationally injured (all unilateral).

INTERVENTIONS:
Continuous ~4-week inpatient, physician-led, interdisciplinary rehabilitation followed by ~4-weeks of patient-led, home-based rehabilitation.

MAIN OUTCOME MEASURES:
The New Injury Severity Score at the point of injury was used as the baseline reference. The 6-minute walk test, Amputee Mobility Predictor with Prosthesis, Special Interest Group in Amputee Medicine, Defence Medical Rehabilitation Centre mobility and activity of daily living scores as well as depression (Patient Health Questionnaire-9), anxiety (General Anxiety Disorder Scale-7), mental health support, and pain scores were recorded at discharge and compared with the published normative data.

RESULTS:
The mean New Injury Severity Score was 40±15. After 34±14 months of rehabilitation, amputees achieved a mean 6-minute walk distance of 489±117m compared with age-matched normative distances of 459 to 738m. The 2 unilateral groups walked (544m) significantly further (P>.05) than did the bilateral amputee (445±104m) and triple amputee (387±99m) groups. All groups demonstrated mean functional mobility scores consistent with scores of either active adults or community ambulators with limb loss. In total, 85% could walk/run independently and 95% could walk and perform activities of daily living independently with an aid/adaptation. No significant difference in mental health outcome was reported between the groups (P>.05). At discharge, 98% of patients were able to control their pain.

CONCLUSIONS:
Severely injured military amputees who completed intensive interdisciplinary rehabilitation achieved levels of physical function comparable with those in age-matched healthy adults. Mental health outcomes were indicative of preparedness for full integration back into society.

KEYWORDS:
Amputees; Mental health; Outcome assessment (health care); Physical and rehabilitation medicine; Rehabilitation
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**Noise Exposure on a Warship during Firing of a Heavy Machine Gun.**

Paddan GS.

**Abstract:**

Sound pressure levels were measured on a military ship during firing of a Heavy Machine Gun (HMG). Measurements were made at three locations on the ship’s bridge (the wheelhouse) and one location on the starboard bridge wing. The highest peak sound pressure levels measured on the bridge wing and on the bridge were 160.7 dB(C) (2170 Pa) and 122.7 dB(C) (27.3 Pa), respectively. The highest sound exposure levels measured on the bridge wing and on the bridge corresponding to one round being fired were 127.8 dB(A) and 88.9 dB(A), respectively. The ship’s structure provided about 40 dB attenuation in the transmitted noise. The operator of the weapon would be required to wear some form of hearing protection. Based on the measured peak noise levels, there would be no requirement for bridge crew to wear any hearing protection during firing of a HMG. However, crew exposure to noise on the bridge is likely to exceed the upper exposure action value corresponding to 85 dB(A) after about 11 750 rounds.

**KEYWORDS:**

hearing protection; peak noise; ship; sound exposure level; weapon

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**Evaluation of Cortical Thickness after Traumatic Brain Injury in Military Veterans.**

Michael AP, Stout J, Roskos PT, Bolzenius J, Gfeller J, Mogul D, Bucholz R.

**Abstract:**

Military service members frequently sustain traumatic brain injuries (TBI) while on active duty, a majority of which are related to explosive blasts and are mild in severity. Studies evaluating the cortical gray matter in persons with injuries of this nature remain scarce. The purpose of this study was to assess cortical thickness in a sample of military veterans with chronic blast-related TBI. Thirty-eight veterans with mild TBI and 17 veterans with moderate TBI were compared with 58 demographically matched healthy civilians. All veterans with TBI sustained injuries related to a blast and were between 5 and 120 months post-injury (M = 62.08). Measures of post-traumatic stress disorder (PTSD) and depression were administered, along with a battery of neuropsychological tests to assess cognition. The Freesurfer software package was used to calculate cortical thickness of the participants. Results demonstrated significant clusters of cortical thinning in the right hemispheric insula and inferior portions of the temporal and frontal lobe in both mild and moderate TBI participants. The TBI sample from this study demonstrated a high incidence of comorbid PTSD and depression symptoms, which is consistent with the previous literature. Cortical thickness values correlated with measures of PTSD, depression, and post-concussive symptoms. This study provides evidence of cortical thinning in the context of chronic blast-related mild and moderate TBI in military veterans who have comorbid psychiatric symptoms. Our findings provide important insight into the natural progression of long-term cortical change in this population and may have implications for future clinical evaluation and treatment.

**KEYWORDS:**

cortical thickness; magnetic resonance imaging; military veterans; traumatic brain injury
An Evaluation of the Feasibility and Safety of a Home-Based Telemental Health Treatment for Posttraumatic Stress in the U.S. Military.
Luxton DD, Pruitt LD, O'Brien K, Kramer G.

Abstract:
BACKGROUND:
Although home-based telemental health options have the potential to greatly expand the range of services available to U.S. military service members, there remains a need to demonstrate that home-based care is technically feasible, safe, and effective and meets the military health system's standards of care before widespread implementation can be achieved. The purpose of this preliminary study was to evaluate the feasibility and safety of providing U.S. military service members with a behavioral health treatment delivered directly to the home using videoconferencing.

MATERIALS AND METHODS:
Ten previously deployed soldiers volunteered to complete eight sessions of a novel behavioral activation treatment for posttraumatic stress disorder. The primary clinical outcomes assessed included symptoms of posttraumatic stress and depression. Patient safety data and attitudes about seeking mental health services, treatment satisfaction, treatment adherence, and treatment compliance were also assessed.

RESULTS:
Clinically significant reductions in posttraumatic stress symptom severity and depression symptoms were observed. Soldiers indicated high levels of satisfaction with the treatment, and there were no adverse events requiring activation of emergency safety procedures. Technical problems associated with the network were observed but successfully mitigated.

CONCLUSIONS:
The results provide initial support for the feasibility and safety of telemental health treatments delivered by videoconferencing to the homes of soldiers. The optimal technical infrastructure needs to be determined to support expansion of synchronous videoconferencing capabilities to the home. The findings provide preliminary evidence of the feasibility, safety, and high user satisfaction with home-based telemental health in the military setting.

KEYWORDS:
behavioral activation; home-based; military; posttraumatic stress disorder; telemental health
Abstract:

OBJECTIVE:
To document food acquisition experiences during Iraqi military occupation in Kuwait.

DESIGN:
Retrospective cross-sectional study.

SETTING:
Urban areas in Kuwait during occupation.

SUBJECTS:
Those living in Kuwait during the period of occupation, and aged between 15 to 50 years at the time of occupation, recruited by snowball sampling. A total of 390 completed questionnaires (response rate 78 %, 202 female and 188 male) were returned.

RESULTS:
During the occupation, food became increasingly difficult to acquire. Two food systems emerged: (i) an underground Kuwaiti network linked to foods recovered from local food cooperatives and (ii) a black market supplied by food imported through Iraq or stolen locally. Food shortages led to reductions in meal size and frequency. Some respondents (47.7 %) reported not having sufficient income to purchase food and 22.1 % had to sell capital items to purchase food. There was a significant increase (P<0.01) in home production, with 23.1 % of people growing vegetables and 39.0 % raising animals to supplement food needs. Reduction in food wastage also emerged as a significant self-reported behaviour change. Respondents reported deterioration in the quality and availability of fish, milk, and fruit in particular. Despite a decrease in opportunities for physical activity, most respondents reported that they lost weight during the occupation.

CONCLUSIONS:
Although the Kuwaiti population fell by about 90 % and domestic food production increased during the 7-month occupation, the local population continued to rely heavily on imported food to meet population needs. The high prevalence of self-reported weight loss indicates the inadequacies of this food supply. High apparent food security in systems which significantly exceed the ecological carrying capacity of the local environment and rely on mass food importation remains vulnerable.

KEYWORDS:
Food acquisition; Home food production; National food security; Sustainability; War