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Abstract from the Literature

by
James Ross

Tveito T, Hysing M and Eriksen H. Low back pain interventions at the workplace: a systematic literature review. *Occup Med* 2004; 54(1): 3-13.

OBJECTIVE

To assess the effect of controlled workplace interventions on low back pain (LBP) through a review of controlled studies. The rising costs of employees with LBP have resulted in an abundance of offers to society and organisations of interventions to prevent and/or treat the problem. Little is known the effect of the different interventions.

METHODS

A systematic literature search based on the inclusion criteria: controlled trial, work setting and assessment of at least one of the four main outcome measures: sick leave; costs; new episodes of LBP; and pain. Effect of the interventions was reported for the four main outcome measures.

RESULTS

Thirty-one publications from 28 interventions were found to comply with the inclusion criteria. Exercise interventions to prevent LBP among employees and interventions to treat employees with LBP have documented an effect on sick leave, costs and new episodes of LBP. Multidisciplinary interventions have documented an effect on the level of pain.

CONCLUSIONS

The results show that there is good reason to be careful when considering interventions aiming to prevent LBP among employees. Of all the workplace interventions only exercise and the comprehensive multidisciplinary and treatment interventions have a documented effect on LBP. There is a need for studies employing good methodology.

COMMENT

So, the scepticism shown by many towards a raft of low back pain interventions seems to be justified. Caution has meant that, for most of the treatment regimes, the studies have been inadequately robust, and more research is needed. However, exercise and coordinated comprehensive programs to deal with medical; social, psychological, workplace and economic issues are needed.

Miller KE, Muth ER. Efficacy of acupressure and acustimulation bands for the prevention of motion sickness. *Aviat Space Environ Med* 2004 Mar;75(3):227-34.

INTRODUCTION

The purpose of this study was to examine whether acupressure and acustimulation prevent motion sickness, taking into consideration whether or not the acupressure and acustimulation are administered properly. These techniques claim to reduce nausea through stimulation of the P6/Neiguan acupuncture point by applying acupressure or electrical acustimulation.

METHODS

The Acuband and Relief Band were used to administer acupressure and acustimulation, respectively. There were 77 subjects who were assigned to 1 of 5 conditions: Acuband trained or untrained; Relief Band trained or untrained, or placebo. Subjects were exposed to a 20-min baseline and a maximum of 20 min of optokinetic drum rotation. Untrained subjects read the device directions, used it as they deemed appropriate, and completed a usability analysis following drum exposure. Trained subjects read the device directions and were trained to use the device appropriately prior to drum exposure. Symptoms and gastric myoelectric activity were monitored during baseline and rotation.

RESULTS

In all conditions, symptoms of motion sickness and gastric tachyarrhythmia increased, and 3 CPM gastric myoelectric activity decreased, during drum exposure. The only difference found between conditions was a potential delay in symptom onset for the ReliefBand compared with the Acuband. While the Acuband was found difficult to use (0 untrained subjects used it correctly) and only a few minor usability issues were identified for the ReliefBand, usability had no impact on efficacy.

DISCUSSION

Neither band nor placebo prevented the development of motion sickness, regardless of whether the bands were used correctly or incorrectly.

COMMENT

If the bands had no benefit in the prevention of motion sickness, how is it known what is meant by using them correctly? Using them 'correctly' was not helpful. Maybe the answer is to use them in some other way...

Tu RH, Mitchell CS, Kay GG, Risby TH. Human exposure to the jet fuel, JP-8. Aviat Space Environ Med 2004 Jan;75(1):49-59.

INTRODUCTION

This study investigates anecdotal reports that have suggested adverse health effects associated with acute or chronic exposure to jet fuel.

METHODS

JP-8 exposure during the course of the study day was estimated using breath analysis. Health effects associated with exposure were measured using a neurocognitive testing battery and liver and kidney function tests.

RESULTS

Breath analysis provided an estimate of an individual's recent JP-8 exposure that had occurred via inhalation and dermal routes. All individuals studied on-base exhaled aromatic and aliphatic hydrocarbons that are found in JP-8. The subject who showed evidence of the most exposure to JP-8 had a breath concentration of 11.5 mg/m³ for total JP-8. This breath concentration suggested that exposure to JP-8 at an Air Guard Base is much less than exposure observed at other Air Force Bases. This reduction in exposure to JP-8 is attributed to the safety practices and standard operating procedures carried out by base personnel. The base personnel who exhibited the highest exposures to JP-8 were fuel cell workers, fuel specialists and smokers, who smoked downwind from the flight line.

DISCUSSION

Although study-day exposures appear to be much less than current guidelines, chronic exposure at these low levels appeared to affect neurocognitive functioning. JP-8-exposed individuals performed significantly poorer than a sample of non-exposed age- and education- matched individuals on 20 of 47 measures of information processing and other cognitive functions.

COMMENT

The problem using neurocognitive testing is that the best comparison is against a baseline reading in an individual. Age and education matched groups are a poor substitute. Having low-level chronic exposure is now being

suggested to have long term, ongoing negative impact on brain function. If these turns out to be the case, then this has very profound consequences for many industrial processes.

Risberg, Ostberg C, Svensson T, Norfleet W, Ornhagen H, Mjaavatten O, Juvik T Atmospheric changes and physiological responses during a 6-day "disabled submarine" exercise. *Aviat Space Environ Med* 2004 Feb;75(2):138-49.

BACKGROUND

Survival time within a disabled submarine (SUBSUNK) is dependent on atmospheric composition and proper design and use of emergency atmospheric control systems. The objective of this study was to investigate atmospheric changes and physiological responses during a SUBSUNK trial.

METHODS

There were 18 volunteers who were restrained within a 250 m³ front compartment of an Ula-class submarine submerged in 8 degrees C seawater for 6 d, 18 h. Atmospheric control was maintained according to emergency procedures using non-electrically powered chemical CO₂ absorption, and O₂ was replenished using chlorate candles. Atmospheric parameters, skin and body temperatures, weight, urine, and drinking volume were measured. Subjective responses to cold were measured on a visual analogue scale (VAS), and symptoms were logged on the environmental symptoms questionnaire (ESQ).

RESULTS

Atmospheric temperature gradually decreased to a minimum of 14.1 degrees C. Toe, heel, and finger temperatures decreased significantly. Subjects reported inferior subjective thermal comfort on the VAS and increased cold stress on the ESQ. Except for CO₂, no inorganic or volatile organic compounds exceeded occupational exposure limits. The PO₂ and PCO₂ ranged from 17.4-20.3 and 1.9-2.8 kPa, respectively, during the first 5 d. During the last 2 d, PO₂ and PCO₂ were deliberately maintained at about 15.8 and 3.1 kPa, respectively. Mean oxygen consumption and CO₂ productions were 23.8 and 19.8 L standard temperature and pressure (STP) x man (-1) x h (-1), respectively. Soda-lime and lithium hydroxide CO₂ absorption capacities were 126 and 405 L STP x kg (-1) respectively.

CONCLUSIONS

Atmospheric conditions can be controlled acceptably for 6 d, 18 h within the front compartment of an Ula-class submarine operating according to emergency SUBSUNK procedures.

COMMENT

Eighteen people for a week in a space 10 metres by 10 metres by 2.5 metres. So they survived, but what of the psychology of that experiment?

Appenzeller GN. Injury patterns in peacekeeping missions: the Kosovo experience. *Mil Med* 2004 Mar; 169(3):187-91.

Proper medical deployment planning requires projecting injuries. For this reason, the injury patterns and mechanism of injury were reviewed for an 18-month period in Kosovo, and injury rates and mechanisms were extracted for review. Overall, there were 404 trauma patients treated during the study period. Isolated head and neck injuries accounted for 29.5% (119) of injuries, chest wounds 5.7% (23), abdominal wounds 4.5% (18), and extremities 33.4% (135). Multiply injured patients accounted for the remaining 27.0% (109). When subdivide by mechanism, penetrating injury made up 36.9% (149), whereas blunt trauma accounted for 63.1% (255). Motor vehicle accidents made up the majority of blunt trauma (72.2%). Of penetrating injuries, gunshot wounds accounted for 55%, blast wounds 38%, and stabbings 6.7%. The data clearly demonstrate that humanitarian and peacekeeping missions require preparation for a wide variety of mechanisms of injury beyond the typical penetrating trauma of combat situations.

COMMENT

The lesson is hardly revolutionary. In peacekeeping, there will be injuries from causes other than combat. The detail is more interesting, with motor vehicles by far the most dangerous place to be.

Cummings TF. The treatment of cyanide poisoning. *Occup Med (Lond)* 2004 Mar;54(2):82-5.

Cyanide has gained historical notoriety as a poison used with intent to cause fatality. Its occurrence in industry is confined to a small number of uses in a relatively narrow range of industries, including the manufacture of Perspex and nylon and in electroplating. With proper controls in these settings, episodes of poisoning are extremely rare. However, because of the potential for a fatal outcome, procedures for the treatment of acute poisoning are essential. Antidotes include methaemoglobin generators, direct binding agents and sulphur donors, but there is a lack of international consensus about the treatment of choice. This article reviews the mechanisms and treatment of cyanide intoxication and emphasizes the importance of having agreed local procedures for the emergency treatment of poisoning.

COMMENT

It seems that where you are in the world dictates how cyanide poisoning will be treated. UK (dicobaltesetate) is different to Germany (dimethylaminophenol) is different to the US (sodium nitrate) is different to France (hydroxycobalamin). Which just means that no one treatment is a standout.

Knapik, Reynolds KL, Harman E. Soldier load carriage: historical, physiological, biomechanical, and medical aspects. *Mil Med* 2004 Jan; 169(1):45-56.

This study reviews historical and biomedical aspects of soldier load carriage. Before the 18th century, foot soldiers seldom carried more than 15 kg while on the march, but loads have progressively risen since then. This load increase is presumably due to the weight of weapons and equipment that incorporate new technologies to increase protection, firepower, communications, and mobility. Research shows that locating the load centre of mass as close as possible to the body centre of mass results in the lowest energy cost and tends to keep the body in an upright position similar to unloaded walking. Loads carried on other parts of the body result in higher energy expenditures: each kilogram added to the foot increases energy expenditure 7% to 10%; each kilogram added to the thigh increases energy expenditure 4%. Hip belts on rucksacks should be used whenever possible as they reduce pressure on the shoulders and increase comfort. Low or mid-back load placement might be preferable on uneven terrain but high load placement may be best for even terrain. In some tactical situations, combat load carts can be used, and these can considerably reduce energy expenditure and improve performance. Physical training that includes aerobic exercise, resistance training targeted at specific muscle groups, and regular road marching can considerably improve road marching speed and efficiency. The energy cost of walking with backpack loads increases progressively with increases in weight carried, body mass, walking speed, or grade; type of terrain also influences energy cost. Predictive equations have been developed, but these may not be accurate for prolonged load carriage. Common injuries associated with prolonged load carriage include foot blisters, stress fractures, back strains, metatarsalgia, ruck-sack palsy, and knee pain. Load carriage can be facilitated by lightening loads, improving load distribution, optimising load-carriage equipment, and taking preventive action to reduce the incidence of injury.

COMMENT

Comprehensive and erudite review.

Pronk N, et al. The association between work performance and physical activity, cardiorespiratory fitness and obesity. *Occup Environ Med* 2004; 46(1): 19-25

The purpose of this study was to test the association between lifestyle-related modifiable health risks (physical activity, cardiorespiratory fitness and obesity) and work performance. Data were obtained from 683 workers. Dependent variables included number of workdays lost, quantity and quality of work performed, extra effort exerted and interpersonal relationships. Results indicated that higher levels of physical activity related to reduced

decrements in quality of work performed and overall job performance; higher cardiorespiratory fitness related to reduced decrements of quality of work performed and a reduction in extra effort exerted to perform the work; obesity-related to more difficulty in getting along with co-workers; severe obesity-related to a higher number of workdays lost. It is concluded that lifestyle-related modifiable health risk factors significantly impact employee work performance.

COMMENT

This study has demonstrated an association between obesity, lower physical activity and lower cardiorespiratory fitness on the one hand and better work outcomes: the ability to maintain work performance for longer without decrement, on the other hand. Obesity of itself was associated with increased lost time.