DOWNLOAD PDF MUSCULOSKELETAL DISORDERS AND THE WORKPLACE

Chapter 1 : Work-related Musculoskeletal Disorders (WMSDs) - Risk Factors : OSH Answers

Musculoskeletal Disorders and the Workplace examines the scientific basis for connecting musculoskeletal disorders with the workplace, considering people, job tasks, and work environments. A multidisciplinary panel draws conclusions about the likelihood of causal links and the effectiveness of various intervention strategies.

The problem with using that kind of terminology is that it implicates a singular cause for damage to the musculoskeletal system â€" repetition and stress. This is limiting because more and more research is pointing to multiple causative risk factors leading to MSDs. Get instant access to our free MSD Prevention training course. Click here to sign up today. Over time, as fatigue continues to outrun recovery and the musculoskeletal imbalance persists, a musculoskeletal disorder develops. These risk factors can be broken up into two categories: So the root cause of MSDs is exposure to MSD risk factors â€" both work-related risk factors and individual-related risk factors. The evaluation will tell us that ergonomic risk factors are present, the worker is at risk of developing a musculoskeletal imbalance and a musculoskeletal disorder is an imminent reality. There are three primary ergonomic risk factors. Many work tasks and cycles are repetitive in nature, and are frequently controlled by hourly or daily production targets and work processes. A job is considered highly repetitive if the cycle time is 30 seconds or less. Many work tasks require high force loads on the human body. Muscle effort increases in response to high force requirements, increasing associated fatigue which can lead to MSD. Repetitive or sustained awkward postures. Awkward postures place excessive force on joints and overload the muscles and tendons around the effected joint. Joints of the body are most efficient when they operate closest to the mid-range motion of the joint. Risk of MSD is increased when joints are worked outside of this mid-range repetitively or for sustained periods of time without adequate recovery time. Exposure to these workplace risk factors puts workers at a higher level of MSD risk. The strength of the associations reported in the various studies for specific risk factors after adjustments for other factors varies from modest to strong. The largest increases in risk are generally observed in studies with a wide range of exposure conditions and careful observation or measurement of exposures. Limiting ourselves to a singular cause of MSDs will limit our ability to create a prevention strategy that addresses the multi-dimensional worker. We need to address both workplace risk factors and individual risk factors. Individual risk factors include: Workers who use poor work practices, body mechanics and lifting techniques are introducing unnecessary risk factors that can contribute to MSDs. Poor overall health habits. Workers who smoke, drink excessively, are obese, or exhibit numerous other poor health habits are putting themselves at risk for not only musculoskeletal disorders, but also for other chronic diseases that will shorten their life and health span. Poor rest and recovery. MSDs develop when fatigue outruns the workers recovery system, causing a musculoskeletal imbalance. Workers who do not get adequate rest and recovery put themselves at higher risk. Poor nutrition, fitness and hydration. For a country as developed as the United States, an alarming number of people are malnourished, dehydrated and at such a poor level of physical fitness that climbing one flight of stairs puts many people out of breath. Workers who do not take care of their bodies are putting themselves at a higher risk of developing musculoskeletal and chronic health problems. Exposure to these individual risk factors puts workers at a higher level of MSD risk. Just like workplace risk factors, individual risk factors are common sense: Having a poor overall health profile puts them at greater risk of developing a musculoskeletal imbalance and eventually an MSD. Here is what the scientific literature has to say. Evidence Base of Individual-related Risk Factors: Traditionally, workplace health and safety programs have been compartmentalized. Health protection programs have focused squarely on safety, reducing worker exposures to risk factors arising in the work environment itself. And most workplace health promotion programs have focused exclusively on lifestyle factors off-the-job that place workers at risk. A growing body of science supports the effectiveness of combining these efforts through workplace interventions that integrate health protection and health promotion programs. Therefore general health promotion at the workplace might be one option to prevent MSDs. However, the involvement and participation of all employees and their representatives is crucial to success in such a holistic approach and, moreover, in creating a culture where ergonomics and the prevention of musculoskeletal disorders is embedded in every part of the process. These factors vary depending on the study but may include age, gender, smoking, physical activity, strength, anthropometry and previous WMSD, and degenerative joint diseases McCauley Bush, A risk factor is any source or situation with the potential to cause injury or lead to the development of a disease. The variety and complexity of the factors that contribute to the appearance of these disorders explains the difficulties often encountered, to determine the best suited ergonomic intervention to be accomplished in a given workplace, to control them. Moreover, despite all the available knowledge some uncertainty remains about the level of exposure to risk factors that triggers WMSD. In addition there is significant variability of individual response to the risk factors exposure. In addition to work demands, other aspects of daily life, such as sports and housework, may present physical stresses to the musculoskeletal tissues. Risk varies by age, gender, socioeconomic status, and ethnicity. Other suspected risk factors include obesity, smoking, muscle strength and other aspects of work capacity.

Chapter 2 : Ergonomics and Musculoskeletal Disorders | NIOSH | CDC

Musculoskeletal Disorders (MSDs) are a common and costly problem for people and companies across the United States. MSDs are the single largest category of workplace injuries and are responsible for almost 30% of all worker's compensation costs.

The panel members worked hard and in a collegial fashion throughout the study. We talked, listened, and argued, and the process resulted in an almost unanimous outcome. One panel member found, at the end, that he was unable to agree with all the conclusions and recommendations endorsed by the rest of the panel and wrote a dissent see Appendix B. We believe that dissent misstates part of this report, and we have responded to it see Appendix C. In addition to its own study and deliberations, the panel sought and received information from many sources. We commissioned 19 outside scholars to examine the scientific literature in a variety of areas germane to its work. We had the benefit of briefings by a number of individuals from industry, the Bureau of Labor Statistics, the Livermore National Laboratories, the United Auto Workers, and researchers active in the field. Finally, the panel had the advantage of a visit to two auto assembly plants to which the Ford Motor Company kindly provided access. A list of those who provided commissioned papers, those who briefed the panel, and others who presented their views in various formats is presented in Appendix D. This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the Report Review Committee of the National Research Council NRC. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making the published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We thank the following individuals for their participation in the review of this report: Musculoskeletal Disorders and the Workplace: Low Back and Upper Extremities. The National Academies Press. Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations nor did they see the final draft of the report before its release. The review of this report was overseen by Enriqueta C. Appointed by the National Research Council, they were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring panel and the institution. I would like to thank our sponsor representatives, Lawrence J. Panagis, National Institute of Arthritis, Musculoskeletal, and Skin Diseases for their interest in this important project. My personal gratitude goes to our talented staff, Anne Mavor, James McGee, Susan McCutchen, and Alexandra Wigdor for the efficiency and good cheer with which they shepherded the group through its task. My appreciation to the members of the panel, for the intelligence and sense of public purpose with which they approached our task, is unbounded. I regret that as a panel we were unable to reach complete consensus; however, I appreciate the diligent efforts made throughout the process in this regard.

Chapter 3 : VIDEO: Work-related Musculoskeletal Disorders Summit - 21st March

Publication No. , (March) Describes the basic elements of a workplace ergonomics program aimed at preventing work-related musculoskeletal disorders. Includes a "toolbox," which is a collection of techniques, methods, reference materials and sources for other information that can help in program development.

Lack of or poor communication. Perception of low support e. Certain workplace conditions, for example, the layout of the workstation, the speed of work especially in conveyor-driven jobs , and the weight of the objects being handled influence these factors. In other situations, the psychosocial factors at the workplace may contribute to WMSDs. It is recommended that both physical and psychosocial factors be addressed. How are work postures and movements a risk for WMSDs? Any body position can cause discomfort and fatigue if it is maintained for long periods of time. Standing, for example, is a natural body posture, and by itself poses no particular health hazards. However, working for long periods in a standing position can cause sore feet, general muscular fatigue, and low back pain. In addition, improper layout of work areas, and certain tasks can make workers use unnatural standing positions. Two aspects of body position can contribute to injuries. The first relates to body position. When parts of the body are near the extremes of their range of movements, stretching and compression of tendons and nerves occur. The longer a fixed or awkward body position is used, the more likely we are to develop WMSDs. For example, working with the torso bent forward Figure 1 , backward or twisted can place too much stress on the low back. Other examples of stressful body positions include reaching above shoulder level Figure 2 , reaching behind the body Figure 3 , rotating the arms Figure 4 , bending the wrist forward, backward, or side to side Figure 5 , and reaching forward too far out in front of the body Figure 6. The second aspect that contributes to WMSDs is holding the neck and the shoulders in a fixed position. To perform any controlled movement with the arm, muscles in the shoulder and the neck contract and stay contracted for as long as the task requires. The contracted muscles squeeze the blood vessels, which restricts the flow of blood all the way down to the working muscles of the hand. However, this is where the blood is needed the most because of the intense muscular effort. Two things happen as a result. At the same time, the reduced blood supply to the rest of the arm accelerates fatigue in the muscles that are moving, making them more prone to injury. Repetitive movements are especially hazardous when they involve the same joints and muscle groups over and over and when we do the same motion too often, too quickly and for too long. Tasks requiring repetitive movements always involve other risk factors for WMSD such as fixed body position and force; the worker, in order to perform the task, has to maintain the shoulder and neck in a fixed position to exert some force. To analyze how repetitive a task is, we need to describe it in terms of steps or cycles. For example, the bottle packing operation Figure 7 requires workers to pack boxes with twenty-four bottles. Figure 7 - Packing bottles One cycle can be described as follows: Move bottles to box. Place bottles in box. If a worker grasps four bottles each time, the same cycle would have to be repeated six times to fill a box. Assuming that one cycle lasts two seconds, it would take twelve seconds to pack a box with twenty-four bottles. There are no rules to judge movements as either high or low in repetition. Some researchers classify a job as "high repetitive" if the time to complete such a job was less than 30 seconds or "low repetitive" if the time to complete the job was more than 30 seconds. Although no one really knows at what point WMSDs may develop, workers performing repetitive tasks are at risk for WMSDs Work involving movement repeated over and over is very tiring because the worker cannot fully recover in the short periods of time between movements. Eventually, it takes more effort to perform the same repetitive movements. When the work activity continues in spite of the fatigue, injuries can occur. Pace of work determines the amount of time available for rest and recovery of the body between cycles of a particular task. The faster the pace, the less time is available and the higher the risk for WMSD. When the worker has no control over timing and speed of work because of external factors like assembly line speed or quota systems then stress level increases. With higher stress level comes muscle tension causing fatigue and again increased risk for WMSD. Controlling the pace of work externally denies the worker the flexibility to determine their own work speed. It is a human characteristic to work at varying rates at different times of the day. What should I know about force of movements? Force is the amount of effort our bodies must do to lift objects, to use tools, or to move. More force equals more muscular effort, and consequently, a longer time is needed to recover between tasks. Since in repetitive work, as a rule, there is not sufficient time for recovery, the more forceful movements develop fatigue much faster. Exerting force in certain hand positions is particularly hazardous Figures 8A-8F.

Chapter 4 : The Causes of Musculoskeletal Disorders (MSDs) | ErgoPlus

Musculoskeletal Disorders or MSD, are injuries and disorders that affect the human body's movement or musculoskeletal system, muscles, tendons, ligaments, nerves, discs, or blood vessels. An injury occurs when the applied load on the body exceeds the failure tolerance or strength of the supporting tissue.

MSDs are the most commonly reported cause of occupational ill health in GB, affecting many workplaces, arising from different work activities and resulting in a variety of ill-health outcomes. Everyone has the right to go home healthy from work and we want to enable employers to do the right thing to protect the health of their workers today and for the future. In turn, this will mean a healthier more productive business. Sarah was previously a councillor on Merton Council. During her time in Wimbledon, she served as the head of Friends of Cannizaro Park. Sarah won a rotary international postgraduate scholarship in the USA. Professor Karen Walker-Bone Karen trained as an academic rheumatologist with a special interest in occupation and musculoskeletal pain in Southampton. She leads the multidisciplinary Centre and coordinates a programme of work to find cost effective ways to reduce the burden of disability for work caused by musculoskeletal disorders. He has held leading roles for HSE in the manufacturing, quarrying, construction and public service sectors. Stuart Bassford Stuart is the Ergonomics lead for Toyota Motor Europe, with the responsibility of identifying gaps and setting the pathways for all Toyota European plants. With 25 years experience in Toyota thinking ways from shop floor upwards, he has a true understanding of the working difficulties and challenges of a high paced, lean manufacturing company. GMB is a general trade union with more than , members working across the UK economy. In this role he covers industries from the Nuclear Sector to Construction sites, and workplaces from chemical plants to casinos. He has been a trade union activist for almost two decades and a Safety Representative since His particular interests are human factors; gas safety; worker involvement in health and safety management; and the development of drug and alcohol policies. Working for Freyssinet who are a specialist civil engineering contractor in both post tensioning and structural repair disciplines, Darren has gained experience of managing Health and Safety in large scale civils and building new build and civils and building repair and refurbishment environments including highways, marine and underground structures. Darren has a specific interest in working with the Freyssinet engineering teams on innovative projects to ensure that they are delivered with Health and Safety at the forefront and full consideration is given to all aspects of employee safety and wellbeing. Maurizio has been working in the socio-economic research domain for more than 15 years, focussing in particular on topics related to labour market, working conditions and quality of work, international development and evaluation of public policies. She has worked at HSE since , and spent the first half of this time working in the Pedestrian Safety and Engineering Safety sectors. During her time with HSE, Louisa has worked on incident investigations, literature reviews, onsite assessments and laboratory-based tests. Matt Birtles Matt is a Principle Ergonomist working in HSL and has been involved in numerous research projects, including the evaluation of welding equipment design for manual handling; development of a manual handling best practice guides in foundries, the rubber and dairy industries; development of improved ergonomics in Rolls-Royce aerospace; design review of train driver operations and layout of rail ticketing offices and improving efficiency and wellbeing in supermarket distribution. He has over 20 years of experience in the field of ergonomics and design, during which time has worked internationally in Hong Kong, Australia and Israel. Matthew has particular interest in the prevention of musculoskeletal injury. His role is to monitor developments in science, technology, economics and politics to help identify issues that could significantly affect workplace health and safety in the UK over the next ten years. His role has included forming links with a range of colleagues within HSE, wider Government and other organisations to raise awareness of a range of future topics and their likely impact on work. He has written a range of reports on future trends that will affect the future workplace which have been published online. Zoe Whyatt Zoe heads up the European business for dorsaVi, working with clients in elite sports, clinical, research and workplace settings. Zoe is currently leading on cross industry projects supported by the HSE and will bring stories of these and other case studies to the Summit to help share how companies across a wide variety of sectors are using wearable technology. Zoe has a background in biotechnology and is passionate about using technology to advance our understanding of human behaviours and movements, and enthusiastic about using objective data to improve decision making. He has long been involved in initiatives to raise awareness of the impact of musculoskeletal conditions and priority for education, prevention, treatment and research at a national, European and global level. He leads the Bone and Joint Monitor Project, a global health needs assessment that provides the evidence base for action working in partnership with experts and organisations globally. This has included identifying the burden of musculoskeletal conditions through the Global Burden of Disease project and developing strategies for their prevention and control through EU funded projects. Research interests during this time have included factors predicting return to work time for back pain, workplace physical activity interventions and management of recurrent MSDs in the workplace. Anna has led on a variety of projects, including several high-profile impact assessments for European Directives. Some of her most recent projects include leading on the cost-benefit analysis for HSE post implementation reviews. Prior to joining HSE, Anna worked as a chartered accountant in the private sector. Kerry Trow Kerry Trow was born in the Rhondda and initially worked in the NHS as a Registered Nurse in acute settings before changing direction to train as a public health nurse specialising in occupational health. Delivering occupational healthcare in a range of settings, he subsequently developed broad experience of health and safety management of musculo-skeletal disorders. Occupational Health Inspectors are qualified occupational health nurses whose work includes delivering and supporting inspection, investigation and enforcement activity. As an inspector, Kerry has extensive experience of investigating reported upper limb disorders and inspecting health and safety management arrangements focussing on health risks in a wide range of sectors. Most recently he has conducted and managed inspection activity focussed on musculo-skeletal risks in the NHS and motor vehicle manufacturing. Terry Woolmer Terry joined EEF in September to head policy work on occupational safety and health, health and well-being. Peter Kinselley Peter has over 20 years experience of successfully implementing health and safety management systems within large corporate organisations. He has worked internationally, on multi-site operations, within food manufacturing, professional services, banking, government and charity industries. Peter has extensive experience in developing Health and Wellbeing Programs and has detailed knowledge and experience of leading, working and influencing teams within a multi-disciplined environment. He has developed and implemented behavioral safety, competency based training and wellbeing programs in a range of international organisations. He has extensive knowledge of fleet safety, emergency and business continuity planning. Programme Please find below the programme for the MSD summit. MSD Summit - 21 March

Chapter 5 : Work-related Musculoskeletal Disorders (WMSDs) : OSH Answers

Work-related musculoskeletal disorders (WMSDs) are a group of painful disorders of muscles, tendons, and nerves. Carpal tunnel syndrome, tendonitis, thoracic outlet syndrome, and tension neck syndrome are examples.

The literature provides strong evidence for the role, in low back disorders, of job satisfaction, monotonous work, social support at work, high work demands, job stress, and emotional effort at work. While the literature on upper extremity disorders is not so extensive as with back disorders, higher levels of perceived job demands and job stress were the psychosocial factors most consistently linked to upper extremity disorders. The reviews of the epidemiologic literature also indicated that certain psychosocial factors that are not work-specific e. Nonwork-related variables tend to be more commonly related to back than to upper extremity disorders. Given that the emphasis of this report is on work-related factors, this chapter reviews various models of occupational stress and discusses how exposure to stresses at work can impact the physiology of musculoskeletal pain in the spine and upper extremities. Nonworkplace psychosocial stressors can exert similar effects, but are not discussed here. The study of occupational stress is a difficult endeavor because of the many factors that can influence the development, exacerbation, and maintenance of job stress and the highly subjective nature of measures of exposure and outcomes used in this area. In addition, the various biological correlates of stress exposure and, more specifically, the proposed models of how job stress may affect occupational musculoskeletal disorders, are speculative. Also, if biological pathways linking job stress to work-related musculoskeletal disorders exist, it is currently unknown whether they are specific to these disorders or, more likely, represent the final common pathway by which exposure to both work-related and nonwork-related stressors exert an effect on a number of health disorders e. That is, the specificity of these pathways is unknown. It is generally accepted that musculoskeletal pain can be experienced in the absence of evident physiological change or tissue damage Melzack, and that such pain is modulated primarily by cognitive processes. This chapter reviews general models of occupational stress, biological correlates of stress exposure, selected theories related to how occupational stress might impact musculoskeletal disorders, and hypothesized pathways that may account for the relationship. An early model proposed by Levi includes the components of most models of occupational stress. A simplified version of the major features of this and most models of stress is depicted in Figure 7. From Sauter and Swanson The Levi model describes a process by which a worker is in constant interchange with his or her work environment; these interactions require continuous adaptation by the worker. When these transactions are perceived as uncontrollable, the event or situation generates a condition of psychological distress that, if persistent or repeated, can lead to negative health outcomes. The first component of this stress model includes social structures such as workplace, family and social processes events that take place within the social structure. These structures and events are continuously perceived, appraised, and evaluated by the individual. This response can result in transitory disturbances in mental and physical function stress response that, if prolonged, can eventually lead to persistent feelings of distress frustration, anger, anxiety, dysphoria and subsequently to physical disorders. Presumably, this response to stress is affected by early environmental influences and genetic factors. These models typically propose the existence of a set of stressors, which are generally defined as environmental demands, and responses to these stressors, often referred to as strains. These strains are the acute effects of the exposure to stressors. A set of intervening factors plays a role in modulating the effect of the demands on strain. As indicated earlier, these intervening factors can include coping skills, problem solving abilities, past learning and exposure, and biological predisposition to react to stress. It is important to note that there are other models of occupational stress e. The purpose of this section is not to provide an exhaustive review of models but rather to provide a general overview of the components of most models. The stress response is typically associated with systemic and localized physiological changes that are intended to reestablish a biological state of homeostasis Selye, It is postulated that recurrent or chronic exposure to a wide range of intrinsic or extrinsic stressors or demands repeatedly evokes a stress response, which, in turn, contributes to the etiology, exacerbation, and maintenance of a number of prevalent health problems Chrousos and Gold, ; Baum and Posluszny, ; Kiecolt-Glaser et al. These two systems are regulated both centrally brain and peripherally; they can exert their effects on target tissues and bodily systems through substances released in response to exposure to stressful conditions. These substances include adrenocorticotropic hormone, glucocorticoids, and catecholamines epinephrine and norepinephrine. Recent research on neuro-immunomodulation the bidirectional signaling between both the central and the peripheral nervous systems and the cells and organs of the immune system has demonstrated that the brain can send neuroendocrine signals to cells within the immune system; the immune system, in turn, through the release of cytokines, can signal neurons in the brain and the peripheral nervous system Felten and Maida, ; Watkins, Maier, and Goehler, ; Chrousos and Gold, The significance of these findings is that this bidirectional communication system can serve as one pathway by which exposure to stressful events in the environment can translate to profound changes in immune function, thereby affecting a range of health outcomes. While the complex biological processes involved in the stress response are just beginning to be revealed, current knowledge regarding the biological response to stress provides a foundation for understanding how psychological stressors may modulate activity within the nervous, endocrine, and immune systems, thereby exerting an effect on health. At present, these efforts have not identified specific pathways linking stress to back or upper extremity pain, but they do provide general information that offers a preliminary framework for identifying such pathways in the future. The peripheral pain receptors nociceptors thought to be responsible for the initiation of back pain have been identified. Nociceptors responsive to mechanical deformations have been identified in facet joint capsules, spinal ligaments, bone, and the outermost fibers of the disc annulus fibrosus, but not in the disc nucleus. The response of spinal nerve roots and dorsal root ganglia to compression, vibration, and chemical stimuli has been analyzed in part. A possible role for the nerve root vascular supply in mediating the nerve root pain associated with spinal stenosis has also been identified. Afferent pathways in the spinal cord have been mapped. In contrast, the role of central mechanisms i. Similarly, the role of afferent feedback loops signals back to the brain from the periphery is largely unknown. One biobehavioral hypothesis for how exposure to work-related stressors may be associated with physiological processes involved in low back pain is that certain individuals possess a predisposition to respond to a stressor with increased paraspinal muscle activity, which may lead to ischemia, reflex muscle spasm, oxygen depletion, and the release of pain-producing substances e. It has been proposed that this increased reactivity to stress results in a feedback loop that involves subsequent increased pain, triggering further increases in muscle activity, psychological distress, and pain Flor and Turk, Attempts to confirm this model in individuals with chronic low back pain have resulted in inconsistent findings Flor and Turk, Investigations have typically measured surface paraspinal EMG in a laboratory setting in response to various nonwork-related stressors. These studies have demonstrated that individuals with chronic low back pain have baseline EMG activity similar to normal controls and show no consistent pattern of accentuated activity different from that of controls. This research does indicate that individuals with low back pain demonstrate a delayed muscle recovery to prestress levels, suggesting that the recovery following exposure to stress may be deficient in those with back pain. However, it is difficult to determine whether this delayed recovery predated the onset of the disorder. It is possible that increased muscle reactivity may be observed in addition to the delayed recovery in individuals with less chronic back pain, or that increased reactivity may be observed only during actual work exposure rather than in response to exposure to a simulated laboratory stress i. Identification of EMG reactivity to stress may require the use of more sophisticated measurement approaches and laboratory protocols. A recent investigation observed that exposure to psychosocial stress while performing a lifting task resulted in greater cocontraction of a number of spinal muscles and significant increases in spine compression and lateral shear Marras et al. This study also found that how an individual interacts with his or her environment i. Those who were more internally focused or introverted generated higher spinal loads greater trunk musculature coactivation and alterations in movement patterns in response to stress during an identical lifting task than did those with a more extroverted style. This study highlights the utility of testing models of occupational stress and low back pain within the context of the performance of work tasks. There is a need to develop more sophisticated models of how occupational stress can affect occupational back pain and to identify the physiological processes involved. In the past, most models of low back pain were based on clinical observations with chronic patients. Models and related research on chronic low back pain do not provide information on the more immediate or shorter-term processes by which stress at work can affect the onset of back pain. Upper Extremity Disorders Models Linking Occupational Stress to Work-Related Musculoskeletal Disorders In contrast to the back literature, over the past decade a number of work-specific models have been proposed to help explain how stress at work could affect upper extremity disorders. Four representative models that attempt to link job stress to work-related upper extremity disorders are the balance theory of job design and stress, the biopsychosocial model of job stress, the ecological model of musculoskeletal disorders, and the workstyle model. The balance theory of job design and stress provides a framework for examining the relationships and interactions among work organization, ergonomic exposure, job stress, and work-related upper extremity disorders. Smith and Carayon identify three general domains of the human stress response: As with the generic models of stress, this model proposes that job stressors produce short-term emotional e. For individuals who are chronically exposed to job stress, these reactions can lead to increased risk for adverse health outcomes, which may includeâ€”but are not limited toâ€”work-related upper extremity disorders. This model also incorporates individual characteristics, such as age and personality, which may influence the stress response. In addition, the model emphasizes feedback loops among disease or illness, stress reactions, and stressors, and uniquely considers the experience of symptoms as stressors, in and of themselves, which can increase stress reactivity and lead to further adverse mental and physical health outcomes Smith and Carayon, The biopsychosocial model of job stress and musculoskeletal disorders Melin and Lundberg, was developed for application to individuals performing light physical work, such as data entry or other types of computer-related work. In this model, job stress biomechanical or psychological is defined as any task or situational demand that creates a condition of over- or under stimulation Frankenhaeuser and Gardell, Both of these conditions can evoke physiological responses, including increased muscle tension and secretion of cortisol and catecholamine. This model also addresses the potential effects of nonwork-related demands e. It is argued that individuals with high levels of total workload work and home are at increased risk because they remain at higher levels of physiological arousal or experience a delayed recovery due to prolonged work demands. The ecological model of musculoskeletal disorders Figure 7. According to this model, work-related musculoskeletal disorders can be ultimately traced to work technology, which includes tools and work systems. In addition, this model proposes a direct path among work organization, psychosocial stressors, and musculoskeletal outcomes via two routes. First, psychological strain is hypothesized to produce muscle tension and autonomic effects that, in turn, compound biomechanical strain induced by task-related physical demands. Second, psychological strain is hypothesized to moderate the relationship between biomechanical strain and the appearance of symptoms, by means of perception, attribution, and appraisal of symptoms, without directly affecting physical pathology i. For example, in the execution of dull, routine, or repetitive tasks, the need to attend to the details of the work may be reduced, increasing the probability that symptoms, which might have gone unnoticed under more stimulating circumstances, will be detected. As with the appraisal of any internal stimulus, once the symptom is perceived, explanations are then sought Schacter and Singer, In this manner, job stress and the psychosocial work environment may increase the probability of help seeking and injury reporting without exerting a direct influence on the underlying pathology. Finally, the model suggests that the experience of musculoskeletal symptoms themselves can influence stress at work. The workstyle model of job stress and musculoskeletal disorders Feuerstein, was proposed to explain the relationship among job stress, ergonomic exposure, and work-related upper extremity disorders illustrated in Figure 7. This model posits the importance of workstyle, that is, how an individual performs work in response to work demands. Workstyle consists of cognitive, behavioral, and physiological components that are consistent with the frequently reported multicomponent stress response. The behavioral component represents the overt manifestations of movement, posture, and activity. These behaviors can interact with workplace exposure to ergonomic risk factors, potentially increasing the risk of musculoskeletal pain Macfarlane, Hunt, and Silman, The physiological component represents the biological changes that accompany the behavioral and cognitive reactions; these changes include increased muscle tension, tendon force, catecholamine or cortisol release, and stress-induced changes in immune function Feuerstein, Huang, and Pransky, This continuous arousal or reactivity can then set the stage for the development of symptoms, disorders, and, if this process persists, disability. High-risk workstyle has been shown to be associated with symptom severity, functional limitations, and work disability in individuals exposed to hand-intensive work Feuerstein et al. Adapted from Feuerstein While these models have some components in common, each has a unique contribution, such as a focus on work systems, the integration of work demands and unpaid domestic workload, the labeling of or attributions for symptoms experienced in the process of work, and the potential impact of workstyle. Also, each of these models hypothesizes a psycho-physiological substrate linking occupational stress to various health outcomes, in an effort to explain how job stress may affect work-related upper extremity disorders. The biological plausibility of a link between job stress and work-related upper extremity disorders is a critical element in determining the validity and credibility of such an association. As with generic stress and health models, the majority of models attempting to describe how exposure to job stress may exert its effects on the physiology of upper extremity disorders focus their attention on musculoskeletal and neuroendocine pathways. These pathways are common to each of the models discussed above. Increases in muscular activity have been associated with tasks involving greater psychological demands Melin and Lundberg, It has also been observed that muscle activation can be triggered by mental stress independent of physical effort Melin and Lundberg, Spectral changes in forearm EMG, increased forearm tremor, and increased musculoskeletal discomfort have been observed in response to stress Gomer et al. In the absence of a quantifiable increase in work demands, the perception of an increase in work demands is sufficient to increase forearm muscular tension during task performance Arndt, When exposure to psychological stressors co-occurs with physical stressors, levels of EMG, blood pressure, and self-reported stress tend to be greater than in response to either exposure alone Lundberg et al.

Chapter 6 : Occupational Stress - Musculoskeletal Disorders and the Workplace - NCBI Bookshelf

Musculoskeletal Disorders and the Workplace: Low Back and Upper Extremities Vibration and Ergonomic Exposures Associated With Musculoskeletal Disorders of the Shoulder and Neck Low Back Pain Prevalence and Related Workplace Psychosocial Risk Factors: A Study Using Data From the National Health Interview Survey.

The evaluation of WMSDs includes identifying workplace risks. Consideration is given to the frequency, intensity, duration, and regularity of each task performed at work. Diagnosis of WMSDs is confirmed by performing laboratory and electronic tests that determine nerve or muscle damage. One such test, electroneuromyography ENMG , encompasses two areas: Magnetic resonance imaging MRI , an alternative to x-rays, provides images of tendons, ligaments, and muscles and improves the quality of the diagnostic information. How are WMSDs treated? The treatment of WMSDs involves several approaches including the following: Application of heat or cold. This often requires work restrictions. In some cases, transfer to a different job should be considered. A splint can also be used to restrict movements or to immobilize the injured joint. However, the use of splints in occupational situations requires extreme caution. If used inappropriately, splints can cause more damage than good. Splints are usually used for two reasons: In the occupational context, splints should not be used as a mechanical support for the joint. To be effective, the use of splints to immobilize an affected joint also requires that the work activity that caused the injury be stopped or changed. If injurious work continues, then the worker is exposed to risk of injury to other joints that have to compensate for the one that is splinted. Application of Heat or Cold Applying heat or cold seems to relieve pain and may accelerate the repair process. Cold reduces pain and swelling and is recommended for injuries and inflammations tissues that are swollen, red, hot and inflamed. The use of ice it is not recommended in case of muscle pain spasm because cold temperature will contract the muscle even more. Application of ice on painful muscle is recommended only immediately after an injury occurred, and only for few days. Heat is recommended for muscle pain relief. Heat increases the flow of blood which facilitates the elimination of lactic acid build up. It is not recommended for injuries with significant inflammation and swelling. Exercise Stretching is beneficial because it promotes circulation and reduces muscle tension. However, people suffering from WMSDs should consult a physical therapist before exercising. Stretching or exercise programs can aggravate the existing condition if not properly designed. Medication and Surgery Anti-inflammatory drugs can reduce pain and inflammation. The doctor may try more elaborate treatments or even surgery if all other approaches fail. How can we prevent WMSDs? Hazards are best eliminated at the source; this is a fundamental principle of occupational health and safety. In the case of WMSDs, the prime source of hazard is the repetitiveness of work. Other components of work such as the applied force, fixed body positions, and the pace of work are also contributing factors. Therefore the main effort to protect workers from WMSDs should focus on avoiding repetitive patterns of work through job design which may include mechanization, job rotation, job enlargement and enrichment or teamwork. Where elimination of the repetitive patterns of work is not possible or practical, prevention strategies involving workplace layout, tool and equipment design, and work practices should be considered. Job Design Mechanization One way to eliminate repetitive tasks is to mechanize the job. Where mechanization is not feasible or appropriate, other alternatives are available. Job Rotation Job rotation is one possible approach. It requires workers to move between different tasks, at fixed or irregular periods of time. But it must be a rotation where workers do something completely different. Different tasks must engage different muscle groups in order to allow recovery for those already strained. However, job rotation alone will not be effective in reducing WMSDs if not combined with the proper design of workstations. And it will not be effective while the high pace of work persists. Job Enlargement and Enrichment Another approach is job enlargement. This increases the variety of tasks built into the job. It breaks the monotony of the job and avoids overloading one part of the body. Job enrichment involves more autonomy and control for the worker. Team Work Team work can provide greater variety and more evenly distributed muscular work. The whole team is involved in the planning and allocation of the work. Each team member carries out a set of operations to complete the whole product, allowing the worker to alternate between tasks, hence, reducing the risk of WMSDs. Workplace Design The guiding principle in workplace design is to fit the workplace to the worker. Evaluation of the workplace can identify the source or sources of WMSD. Proper design of the workstation decreases the effort required of the worker to maintain a working position. Tools and Equipment Design Proper design of tools and equipment significantly decreases the force needed to complete the task. Providing the worker with the proper jigs or fixtures for tasks that require holding elements saves a lot of muscular effort in awkward positions. Good tools, maintained carefully and where necessary frequently changed, can also save a lot of muscle strain. Work Practices A well-designed job, supported by a well-designed workplace and proper tools, allows the worker to avoid unnecessary motion of the neck, shoulders and upper limbs. However, the actual performance of the tasks depends on individuals. Training should be provided for workers who are involved in jobs that include repetitive tasks. Workers need to know how to adjust workstations to fit the tasks and their individual needs. Training should also emphasize the importance of rest periods and teach how to take advantage of short periods of time between tasks to relax the muscles, and how to consciously control muscle tension throughout the whole work shift.

Chapter 7 : Musculoskeletal Disorders / Ergonomics

Disorders of the musculoskeletal system represent a main cause for absence from occupational work. Musculoskeletal disorders lead to considerable costs for the public health system. Specific disorders of the musculoskeletal system may relate to different body regions and occupational work. For.

Register for free access to the full workshop today. Get Free Access The only way to prevent something is to know what caused it, understand what caused it and then systematically eliminate those causes. This is a foundational lesson because it is so vitally important that you understand what causes MSDs. Keep this in the back of your mind as you learn about the causes of MSDs: Your goal is to identify MSD causes in your workplace and put control measures in place to lower, and hopefully eliminate, these causative risk factors. The Cause of MSDs The work environment is a complex set of systems and the human body is a complex set of systems. We break these risk factors down into two categories in order to simplify the issues at hand: Ergonomic Risk Factors risk factors related to the work environment Individual Risk Factors risk factors related to the individual themselves When workplace athletes are exposed to these risk factors over the course of time, it puts a tremendous amount of stress and strain on their soft tissues. Reactive Ergonomics A reactive ergonomics philosophy allows workplace athletes to be exposed to ergonomic risk factors. The three primary ergonomic risk factors are: Many work tasks and cycles are repetitive in nature, and are frequently controlled by hourly or daily production targets and work processes. A job is considered highly repetitive if the cycle time is 30 seconds or less. Many work tasks require high force loads on the human body. Muscle effort increases in response to high force requirements, increasing associated fatigue which can lead to MSD. Awkward postures place excessive force on joints and overload the muscles and tendons around the effected joint. Joints of the body are most efficient when they operate closest to the mid-range motion of the joint. Risk of MSD is increased when joints are worked outside of this mid-range repetitively or for sustained periods of time without adequate recovery time. Other ergonomic risk factors include: Vibration Cold temperatures Reactive Healthcare A reactive healthcare philosophy allows workplace athletes to be exposed to individual risk factors and only provides help after an injury occurs. The primary individual risk factors are: Workers who do not properly warm-up for work or get adequate rest and recovery after work put themselves at a higher risk of developing an MSD. Workers who smoke, drink excessively, are obese, or exhibit numerous other poor health habits are putting themselves at risk for not only musculoskeletal disorders, but also for other chronic diseases that will shorten their life and health span. Before founding Ergonomics Plus, Mark Middlesworth worked at an outpatient rehab facility. Unfortunately, Ed had been on quite a journey over a year period leading up to the time they met. The treatment consisted of pain medication and time off work. He returned to work without rehab or any of the causative risk factors being addressed. Over the course of the next 10 years, Ed sustained multiple recurring lower back injury incidents. Each time, he would be treated the same way with meds, rest, and case management designed to get him back to work as soon as possible. So, after each episode he returned to work without rehab and consequently developed progressively diminished strength and functional capacity. At the end of this 10 year period, he sustained another injury to his lower back while lifting at work. This time, it was the last straw â€” one of the discs in his lumbar spine had finally herniated and rendered him incapable of even walking out of the facility. He was transported by ambulance to the local hospital, stabilized, evaluated by the company physician and then referred to a neurosurgical specialist. The neurosurgeon recommended surgery. He ended up on social security disability. The company Ed worked for had a reactive ergonomics philosophy. Ergonomic risk factors were left unchecked and Ed was exposed to these risk factors over a long period of time. The company Ed worked for also had a reactive healthcare philosophy. HR was all about aggressive case management as the primary method to contain costs. They only got Ed help after he was already injured, but by then it was too late. Also, Ed would also be the first to tell you that his poor health habits and work practices were part of the problem. The bottom line is that a reactive philosophy only leaves you with one outcome: This can be prevented. After seeing too many people like Ed go through the rehab clinic, Mark decided to be in the prevention business, founding Ergonomics Plus and going on his own journey to discovering a world class process to prevent MSDs.

Chapter 8 : Musculoskeletal disorders - Safety and health at work - EU-OSHA

Symptoms of musculoskeletal disorder include a level of pain. This could be an ache, followed by stiffness and tightness in the muscles as well as a 'pins and needles' type sensation or changing in skin colour and a swelling of the damaged area.

Chapter 9 : Musculoskeletal Disorder in the Workplace | BDGM

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