

DOWNLOAD PDF REDUCING STRESS FRACTURE IN PHYSICALLY ACTIVE MILITARY WOMEN

Chapter 1 : Bone Health and Military Medical Readiness (BHMMR)

Reducing Stress Fracture in Physically Active Military Women Subcommittee on Body Composition, Nutrition, and Health of Military Women Committee on Military Nutrition Research.

The subcommittee provides the following conclusions and recommendations in response to the five questions posed by the military. Why is the incidence of stress fractures in military basic training greater for women than for men? Stress fracture rates among female Army military trainees during basic combat training are more than twice those reported for males Deuster et al. This greater incidence appears to be due in part to the initial entry level of fitness of the recruits and specifically the ability of bone to withstand the rapid, large increases in physical loading. The rate of increase in the intensity, frequency, or volume of impact of loading activities in basic training is a risk factor for stress fractures. In addition, increased stride length and variations in specific exercise activities may contribute to the different site distribution of stress fractures in military women compared with military men. When training regimens are equally imposed on men and women, the resultant stress on the less physically fit increases the likelihood of injury. Conclusions Low initial fitness of recruits appears to be the principal factor in the development of stress fractures during basic training. A key component of training programs should be to match closely the rate of musculoskeletal adaptation with the participant, in order to avoid interruption of training for cardiovascular and muscular endurance or fitness. In the training program for female soldiers, rapid and excessive increases in exercise habits and abrupt changes in training load may increase the risk of stress fractures of the lower extremities. The subcommittee concludes that muscle mass, strength, and resistance to fatigue with cyclic loading bone stress created by excessive or rapid incremental skeletal muscle contraction and loading forces play a critical role in development of stress fracture. To attain an adequate level of fitness, a training program must include a history of sufficient loading and remodeling within bone if stress injuries and fractures are to be prevented during periods of intense training. Proper footwear and appropriate choice of running surfaces also contribute to the prevention of injuries. Currently there may not be sufficient time during basic training to achieve the aerobic fitness level required to avoid musculoskeletal injury. Recommendations A more appropriate fitness standard should be achieved by women entering military service either through a structured program prior to their beginning basic training or through an integrated program within basic training. It is recommended that such a program be designed to start women at a lower level of activity and gradually increase their activity as a transition into full-scale basic training. If a prebasic training program is selected, it should utilize training techniques similar to those employed in basic training. The BCNH subcommittee recommends a program of basic training that encourages and focuses on 1 avoiding training errors by alternating easy and hard days i. What is the relationship of genetics and body composition to bone density and the incidence of stress fractures in women? Genetics is a determinant of peak bone mass, but it is not known what genes are important nor is it known how important they are in the risk assessment profile for stress fractures. Body mass and composition per se influence bone density. Greater body mass is associated with higher levels of bone mineral mass and density. Stress fractures are associated not only with reduced skeletal muscle mass and its concomitant increased fatigability and lower fitness levels but also with an excessive skeletal muscle mass and its enhanced strength. Bone stress created by excessive or rapid incremental skeletal muscle contraction and loading forces can cause fractures at specific anatomic sites. However, the major problem for military recruits is likely to be insufficient muscle mass. Conclusions It is well recognized that the etiology of stress fracture is multifactorial and that lower bone mineral density is only one contributing factor. Genetics and body mass, specifically muscle mass, are also important determinants in the development of stress fractures. Although current technologies e. Recommendations Bone measurements should not be used routinely for screening recruits. Problems with the accuracy of bone mineral content measurements both specificity and sensitivity make it difficult to predict stress fractures in military women. Moreover, mean bone mineral density measurements among athletes with

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stress fracture lie within the normal range. What are the effects of diet, physical activity, contraceptive use, and other lifestyle factors smoking and alcohol on the accrual of peak bone mineral content, incidence of stress fractures, and development of osteoporosis in military women? A diet adequate in calcium, phosphorus, magnesium, and vitamin D IOM, and moderate in sodium and protein NRC, should optimize bone health in the short term and theoretically should reduce the long-term risk of developing osteoporosis. Weight-bearing activity determines the shape and mass of bone. Graded increases in physical activity and resultant increases in the level of musculoskeletal fitness are necessary to ensure sufficient time for loading and remodeling within bone to prevent stress injuries and fractures. The use of oral contraceptives that contain estrogen with or without progestogens is not considered to have long-term detrimental effects and may benefit bone health. Use of long-acting depot preparations of progestational agents, such as Depro-Provera, has been associated with relative estrogen deficiency. Long-term use of gonadotropin-releasing hormone agonists induces a state of estrogen deficiency and has been associated with bone loss. Cigarette smoking may be a long-term risk factor for the development of osteoporosis, whereas excessive alcohol consumption may be a risk factor in the short term for overall injuries. Whether these lifestyle factors are directly related to the development of stress fractures in the short term or are indirectly related through their long term influence on bone density is not known. Conclusions Energy intake by military women should be adequate to maintain weight during intense physical fitness training. Nutritional modification of diets of incoming recruits cannot effectively prevent stress fractures during the short term of basic training. The use of oral contraceptive agents is not contraindicated. Exogenous estrogen-progestogen hormones may positively affect peak bone mass reached in adulthood, which may be important for future fracture risks in contrast to the use of long-acting progestogens and gonadotropin-releasing hormone agonists. Recommendations Implement measures to ensure that energy intakes by military women are consistent and adequate to maintain weight during intense physical fitness training. Shift emphasis of the program to one of continual physical fitness, which in turn will assist in the maintenance of weight, fat-free mass, and bone mass in all active servicemembers. The BCNH subcommittee strongly suggests that the Department of Defense DoD consider joining with other federal agencies and programs to educate young adults about the importance of physical activity for health and well-being and to identify those individuals who might be at high risk for stress fracture. How do caloric restriction and disordered eating patterns affect hormonal balance and the accrual and maintenance of peak bone mineral content? Caloric restriction or disordered eating may lead to a hormonal disruption that is associated with amenorrhea and an associated estrogen deficiency and loss of bone mineral content IOM, Conclusions Conditions that induce estrogen deficiency from any cause e. It is likely that the maintenance of body weight is important in preventing the onset of secondary amenorrhea. Recommendations In active-duty servicemembers it is recommended that fitness and body composition assessments be performed frequently. At a minimum, body weight and composition should be evaluated more frequently than the current 6 month intervals. This would foster adherence to practices of healthy weight and physical fitness and decrease high risk, or disordered eating behaviors. The prevalence and underlying causes of oligomenorrhea and amenorrhea should be assessed in women undergoing basic training and advanced training and on active duty. Young women in the military should be provided with information about the associations among the menstrual cycle, estrogen sufficiency including use of contraceptives , bone health, and energy restriction. How can the military best ensure that the dietary intakes of active-duty military women in training and throughout their military careers do not contribute to an increased incidence of stress fractures and osteoporosis? Nutrition education programs are key to providing information and direction on the choice and nutrient content of appropriate foods. It is important that education programs for military women be aimed at their meeting requirements for total energy needs as well as for nutrients supportive of optimal bone health. With consumption of appropriately higher energy intakes matched to meet the demands of physical training and fitness, higher intakes of calcium should be promoted. Women should strive to maintain a stable body weight within weight-range standards appropriate for their service and should refrain from episodes of repetitive dieting and

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weight loss so as not to disrupt normal hormonal rhythms IOM, Weight within standard may be achieved through proper diet, selection of nutrient-dense foods, and participation in weight-bearing exercise activities. These measures will be beneficial for the reduction of stress fracture risk in the short term, as well as for osteoporosis prevention in the long term. Conclusions Many predisposing factors can alter the menstrual cycle. It is likely that maintenance of appropriate body weight is important in preventing the onset of secondary amenorrhea. To ensure adequate nutrient intakes, female military personnel must be educated on how to meet both energy and nutrient needs. This education is required to enable women to choose foods of higher nutrient density and to maintain a fitness program that will allow greater energy intake. The subcommittee reinforces the recent efforts of the Army to begin providing complete nutritional labeling of all ration components and to include information to enable identification of nutrient-dense components that would help women meet the MRDAs Military Recommended Dietary Allowances at their usual energy intake. The subcommittee recommends nutritional labeling of all dining hall menu items and provision of food selection guidelines to women in garrison" p. The military should develop aggressive education programs for military women aimed at helping them identify and select appropriate foods and fortified food products to increase the number of women meeting their requirements for these nutrients. If nutrition education and counseling sessions fail to promote increased intakes, the use of calcium-fortified products becomes essential. Recommendations for Future Research by the Military Research is needed to define the appropriate fitness level that is required to enable a woman to enter and participate in basic training without incurring an increased risk of stress fractures. Further study is needed to determine the types of activities that may predispose women to stress fractures, especially in the pelvic region and upper leg, and steps should be taken to modify their activities in basic training to lower risk. Military research efforts should contribute to identifying those factors, such as diet, lifestyle, and ethnicity, that may contribute to achieving peak bone mass, as well as components of military programs that may interfere with this process. Efforts should be made, particularly in women, to investigate more fully the now-preliminary linkages between low skeletal muscle mass and stress fracture risk. Investigators should attempt to determine if this relationship is due to a low skeletal muscle mass effect per se or an associated factor such as inadequate initial fitness status. Research is needed on the effects of implanted or injectable contraceptives, such as Depro-Provera, on bone mineral density and bone strength. Chemical formulation, dosage, and route of administration require further investigation. Research is needed that assesses the effect of dietary energy status of military women on the secretion of hormones that affect bone health, particularly in situations of high metabolic stress. Based on preliminary data from athletes, the potential loss of calcium in sweat due to physical exertion during training and the impact of high levels of activity on calcium requirements needs to be investigated as possible pathophysiological factors in the development of stress fracture. More research is needed to evaluate existing technologies for cost-effective assessment of bone mass. These technologies currently include ultrasound, central and peripheral dual-energy x-ray absorptiometry, and central and peripheral quantitative computer tomography. Ultimately, the cost-benefit analysis of all techniques will have to be addressed for specific uses and populations within the military. Patterns and risk factors for exercise-related injuries in women: Assessing Readiness in Military Women: Spontaneous fractures of the femur, active-duty soldiers. Implications for Reducing Chronic Disease Risk. Copyright by the National Academy of Sciences.

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Chapter 2 : Disadvantages of Weight Training for Women - Woman

As part of the Defense Women's Health Research Program, the U.S. Army Medical Research and Materiel Command requested that the Subcommittee on Body Composition, Nutrition, and Health of Military Women (BCNH subcommittee) in addition to their evaluation of the effect of current military fitness and body composition standards on the nutrition and health of military women, also identify and provide recommendations regarding special nutritional considerations of active-duty military women.

Exercise-Related Injuries Among Women: Strategies for Prevention from Civilian and Military Studies The material in this report was prepared for publication by: The numerous health benefits of physical activity have been well documented, resulting in public health support of regular physical activity and exercise. Although beneficial, exercise also has corresponding risks, including musculoskeletal injuries. The incidence and risk factors for exercise-related injury have been poorly assessed in women. Many civilian exercise activities e. Injury risks increase as the amount of training increases increased exposure. The same exercise parameters that can be modified to enhance physical fitness i. Higher levels of current physical fitness aerobic fitness protect the participant against future injury. A history of previous injury is a risk factor for future injury. Smoking cigarettes has been associated with increased risk for exercise-related injury. Studies conducted in military populations suggest that the most important risk factor for injuries among persons engaged in vigorous weight-bearing aerobic physical activity might be low aerobic fitness rather than female sex. Because of the limited scientific research regarding women engaging in exercise, general recommendations are provided. Women starting exercise programs should be realistic about their goals and start slowly at frequency, duration, and intensity levels commensurate with their current physical fitness condition. Women should be informed about the early indicators of potential injury. Women who have sustained an injury should take precautions to prevent reinjury e. In general, a combination of factors affects the risk for exercise-related injury in women. How these factors act singly and in combination to influence injury risk is not well understood. Additional research regarding exercise-related injury in women is needed to answer many of the remaining epidemiologic questions and to help develop exercise programs that improve health while reducing the risk for injury. Exercise is an important component in improving and maintaining health; however, injury is also an accompanying risk. A review of key military and civilian research studies regarding exercise-related injuries provides some clues to reducing these injuries in women. Greater adherence to exercise guidelines can help decrease these risks. The report concluded that persons who are inactive can improve their current and future health by becoming moderately active on a regular basis. In addition, the report indicated that activity does not need to be strenuous to achieve some health benefits, but that greater health benefits can be achieved by increasing the amount frequency, duration, or intensity of physical activity. Although many studies have documented the hazards of inactivity, few have assessed the adverse effects of increased physical activity e. Increased physical activity increases the risk for injury. Although opportunities for women to participate in sports and organized fitness activities have increased substantially during the preceding century, little is known about the risks for injuries associated with increased physical activity and exercise for women. This report reviews key military and civilian research studies regarding musculoskeletal injury associated with common weight-bearing exercise e. Recent public health reports have reviewed the scientific evidence supporting the association between physical activity and several health benefits 1,2. Documented health benefits of regular physical activity include reducing the risk for coronary heart disease, noninsulin-dependent diabetes, hypertension, colon cancer, osteoporosis, and other disorders 1. Physical activity decreases the symptoms and might reduce episodes of anxiety and depression 1. In addition, regular physical activity improves physical fitness e. Physical activity enhances strength, balance, and coordination 1. These benefits might be particularly important in preventing falls and maintaining independence in older adults. As a consequence of these health benefits, regular physical activity is highly recommended for women and men of

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all ages 1. Physical inactivity is more common in women than men 1,3. Because regular physical activity is considered essential to health, it has been included as one of the leading health indicators for health promotion and disease prevention in the United States 4. Although physical activity has many health benefits, exercise has corresponding injury risks. Participants are at risk for exercise-related traumatic or overuse injuries. Some of the consequences of these injuries can be long-term e. Injury causes many persons to stop participating in exercise 2,5. Efforts to increase physical activity and exercise in women must also be balanced with efforts to prevent injury. Because lifestyles have become more sedentary and work has become less physically demanding, planned physical activity intended to improve physical fitness has become more important. Consequently, many adults choose to participate in exercise programs or sports. Health-related exercise programs and sports are excellent ways for women to increase their physical activity. Opportunities for young women to participate in sports have substantially increased in recent decades. Since passage of the Title IX legislation that prevented sex discrimination in educational settings, the number of young women who participate in high school athletics has increased from approximately , during the early s to nearly 2. This increased participation in high school athletics has fostered increased participation in college and elite athletics as well. Many adult women participate in recreational aerobic activities. The National Sporting Goods Association reported that an estimated Walking is the most prevalent physical activity among adults in the United States 1,9. Injuries occur in association with physical activity, exercise, and sports , but the incidence and underlying causes of such injuries are not well understood. At the peak of the fitness boom in the s, researchers knew little about exercise-related injuries and injury rates, even for common activities e. During that period, researchers were only beginning to study the epidemiology of and risk factors for exercise-related injuries 12, Today, injury risk factors for physically active men remain poorly defined, and the specific risks for women who exercise are even less understood. Studies of runners have provided the most thorough examination of injury incidence and some related risk factors in civilian populations 5,12, Studies of military populations provide sex-specific information on injury risks associated with physical training and exercise; activities are controlled, and complete and detailed health records, physical examinations, and physical fitness assessments are available 18, Studies of basic combat training, which occurs in all branches of the military and involves running, marching, and other weight-bearing aerobic activities, can often provide information relevant to civilian populations. Uniformity of training within military units provides unique control for the variability observed in exercise routines in the civilian population. Examination of military studies provides some data on exposure risks 18,20 and intrinsic risk factors e. This report describes civilian and military research related to weight-bearing aerobic exercise and injuries. Military studies of training-related injuries are presented to identify shared and sex-specific intrinsic risk factors. Risks for men will be discussed briefly for comparative purposes. This report focuses on modifiable risk factors, which underlie the recommendations for prevention and future research. Definitions In this report, distinctions between the terms "physical activity," "exercise," and "physical training" are important. Physical activity has been defined as movement created by skeletal muscle contractions, resulting in energy expenditure. Exercise is a type of physical activity that is planned, repetitive, and designed to improve or maintain at least one of the health-related components of physical fitness Physical training as used in the military is organized exercise intended to enhance fitness. The terms exercise and physical training are used interchangeably. Physical fitness can be categorized into five health-related components: The focus of this report is on exercise for women aimed at enhancing cardiorespiratory endurance aerobic fitness. Musculoskeletal injuries related to exercise can be classified as either traumatic acute injuries e. A distinction is also made between extrinsic and intrinsic risk factors for musculoskeletal injury. Extrinsic risk factors refer to the parameters of training e. Intrinsic risk factors refer to the personal and internal characteristics of the participant Table 1.

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Chapter 3 : Stress fractures: Lessons from military research | Lower Extremity Review Magazine

The incidence of stress fractures of the lower extremities during U.S. military basic training is significantly higher among female military recruits than among male recruits. As part of the Defense Women's Health Research Program, this report evaluates the impact of diet, genetic predisposition, and physical activity on bone mineral and calcium status in young servicewomen.

Candidates for the mechnosensory system in bone. Exercise-associated amenorrhea, low bone density, and estrogen replacement therapy. Bone density in women receiving depot medroxy progesterone acetate for contraception. A controlled trial of the effect of calcium supplementation on bone density in postmenopausal women. Bone-sparing properties of oral contraceptives. Bone health is not affected by luteal phase abnormalities and decreased ovarian progesterone production in female runners. Ground reaction forces in elite high jumping. International Congress of Biomechanics. The measurement of shock waves following heel strike while running. Relation between bone mass and muscle weight. Characteristics of female midshipmen: Presentation at the workshop on Assessing Readiness in Military Women: The Relationship to Nutrition. September , Irvine, Calif. Bone mineral content of amenorrheic and eumenorrheic athletes. Treatment of athletic amenorrhea with a diet and training intervention program. Biomechanical factors associated with injury during landing in jump sports. Correlation between skeletal calcium mass and muscle mass in man. Stress fractures in children. Influence of oral contraceptive use on bone density in climacteric women. The effect of weight-bearing exercise on bone mineral density: A study of female ex-elite athletes and the general population. FM Field Manual Department of the Army, Factors affecting peak vertical ground reaction forces in running. Consequences of scaling on impact loading in running. Medicine and Science in Sport and Exercise 3 Common injuries in runners. Diagnosis, rehabilitation and prevention. The Eating Disorders Inventory 2. Psychological Assessment Resources, Inc. Decreased bone turnover in oral contraceptive users. Effects of recombinant insulin-like growth factor-I and growth hormone on bone turnover in elderly women. Page 62 Share Cite Suggested Citation: The National Academies Press. Association of recent fractures with quantitative U. Bone mineral effects of oral contraceptives, pregnancy, and lactation. Physiological action of progesterone in target tissues. The range of bone density in normal British women. Variations in ground reaction force parameters at different running speeds. Effects of grade running on kinematics and impact force. Bone mass, nutrition, and other lifestyle factors. Residual bone mineral density and muscle strength after fractures of the tibia or femur in children. Bone mineralization, hypothalamic amenorrhea, and sex steroid therapy in female adolescents and young adults. Bone mineral changes in young women with hypothalamic amenorrhea treated with oral contraceptives, medroxyprogesterone, or placebo over 12 months. Osteoporosis risk factors in perimenopausal women. Health and nutrition profile of women in the Navy. Associations of parity, breast-feeding, and birth control pills with lumbar spine and femoral neck bone densities. IOM Institute of Medicine. IOM Institute of Medicine Assessing Readiness in Military Women: USAF recruit fitness study. Bone loss accompanying voluntary weight loss in obese humans. Morphological bone changes in shin splints. Histogenesis of stress fractures. Page 63 Share Cite Suggested Citation: Stress fracture of the femoral shaft in athletes--more common than expected. A new clinical test. Overuse injuries of the lower extremities associated with marching, jogging, and running: Exercise-induced stress fractures and stress reactions of bone: Epidemiology, etiology, and classification. Osteoporosis in men with a history of tibial fracture. Genetic effects on bone turnover and bone density. Risk factors for fractures of the distal forearm and proximal humerus. Nutrition Issues in Military Women. Oral contraceptive use may protect against low bone mass: Changes in bone mineral content in male athletes: Mechanisms of action and intervention effects. The effects of estrogen administration on trabecular bone loss in young women with anorexia nervosa. Nutritional assessment of U. Military Academy cadets at West Point: Assessment of nutritional intake. Army Research Institute of Environmental Medicine. Nature and causes of injuries in women resulting from an endurance

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training program. Heritable and life-style determinants of bone mineral density. Bone mineral density in postmenopausal women as determined by prior oral contraceptive use. Effects of energy deprivation on sex hormone patterns in healthy menstruating women. The female athlete triad: Prevalence in military women. Madigan Army Medical Center. A meta-analysis of cigarette smoking, bone mineral density, and risk of hip fracture: Recognition of a major effect. Page 64 Share Cite Suggested Citation: Radiographic and histologic analyses of stress fracture in rabbit tibias. Skeletal transients on heel strike in normal walking with different footwear. The effect of oral contraceptive use on vertebral bone mass in pre- and postmenopausal women. Athletics and menstrual dysfunction in young women. Youth, Exercise, and Sport, G. Induction and prevention of low T3-syndrome in exercising women. Induction of low T3-syndrome in exercising women occurs at a threshold of energy availability. Hypothalamic-pituitary-thyroidal function in eumenorrheic and amenorrheic athletes. Bone mineral density of total body, spine, and femoral neck in children and young adults: A cross-sectional and longitudinal study. Clinical and basic aspects of glucocorticoid action in bone. Menstrual function and bone mass in elite women distance runners. Invited review of a workshop. Anabolic hormones in bone: Basic research and therapeutic potential. The regulation of development, structure, and function in the skeleton.

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Chapter 4 : Reducing Stress Fracture in Physically Active Military Women : Health and Medicine Division

The incidence of stress fractures of the lower extremities during U.S. military basic training is significantly higher among female military recruits than among male recruits.

Army Medical Research and Materiel Command requested that the Subcommittee on Body Composition, Nutrition, and Health of Military Women BCNH subcommittee in addition to their evaluation of the effect of current military fitness and body composition standards on the nutrition and health of military women, also identify and provide recommendations regarding special nutritional considerations of active-duty military women. An area identified for further study in military women concerned the effect of calcium, as well as total energy intake, on the incidence of stress fractures in the short term, and osteoporosis in the long term and the nutrient implications of these conditions. The incidence of stress fractures during U. This injury has a marked impact on the health of service personnel and imposes a significant financial burden on the military by delaying the training of new recruits. Stress fractures increase the length of training time, program costs, and time to military readiness. In addition, stress fractures, a short-term risk, may share their etiology with the long-term risk of osteoporosis. The workshop included experts in the areas of endocrinology, calcium metabolism, bone mineral assessment, sports medicine, and military nutrition to evaluate the effects of diet, genetics, and physical activity on bone mineral and calcium status in young servicewomen. Specifically, the subcommittee and thus, the speakers were asked to consider the effects of dietary restriction at the levels observed in military women, combined with the physical demands of basic training, both on short-term bone mineral status and the immediate risk of stress fracture and on the long-term risk of osteoporosis. In so doing, the subcommittee was asked to respond to the following five questions: Why is the incidence of stress fractures in military basic training greater for women than for men? What is the relationship of genetics and body composition to bone density and the incidence of stress fractures in women? What are the effects of diet, physical activity, contraceptive use, and other lifestyle factors smoking and alcohol on the accrual of peak bone mineral content, incidence of stress fractures, and development of osteoporosis in military women? How do caloric restriction and disordered eating patterns affect hormonal balance and the accrual and maintenance of peak bone mineral content? How can the military best ensure that the dietary intakes of active-duty military women in training and throughout their military careers do not contribute to an increased incidence of stress fractures and osteoporosis? The BCNH subcommittee met in executive session following the workshop to begin drafting their brief report. The subcommittee met in executive session for an additional writing session and to discuss their conclusions and recommendations on January 27, Based on information gathered from discussion with the workshop speakers, the military liaison panel and a brief review of the literature on bone metabolism and risk factors for bone health, the subcommittee prepared this brief report, Reducing Stress Fractures in Physically Active Military Women. The report was submitted to the sponsor in June, Conclusions Low initial fitness of recruits appears to be the principal factor in the development of stress fractures during basic training. The basic training period may be insufficient time to achieve the aerobic fitness level required and the musculoskeletal adaptations necessary to avoid injury. Muscle mass, strength, and resistance to fatigue with cyclic loading bone stress created by rapid or excessive incremental skeletal muscle contraction and loading forces play a critical role in the development of stress fracture. The etiology of stress fracture is multifactorial, and bone mineral density is only one contributing factor. Genetics and body mass, specifically muscle mass, are also important determinants of stress fracture. Energy intake by military women should be adequate to maintain weight during training. Nutritional modification of diets of incoming recruits cannot effectively prevent stress fractures during the short term of basic training. The use of oral contraceptives is not contraindicated. Exogenous estrogen-progestagen hormones may positively affect peak bone mass reached in adulthood whereas any conditions that induce estrogen deficiency e. It is likely that maintenance of appropriate body weight is important in preventing the onset of secondary amenorrhea. Training and Physical

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Fitness Assessment Develop a more appropriate fitness standard for women through a structured program prior to basic training or through an integrated program with basic training. This program should be designed to increase the level of activity gradually. Focus the basic training program on alternating low impact loading and higher impact routines that lead to cardiopulmonary fitness to avoid training errors. Emphasize a program of continual physical fitness; this will assist in the maintenance of weight, fat-free mass, and bone mass in all servicemembers. Perform fitness and body composition assessments more frequently, and in a manner that will foster adherence to healthy weight and physical fitness practices. Use of bone mineral measurements for routine screening of recruits to determine stress fracture susceptibility is not recommended at this time. As recommended previously AFEB, , develop research to determine the types of activities that may predispose women to stress fractures, especially in the pelvic region and upper leg. Develop modifications of these activities in basic training to lower risk.

Nutrition and Related Factors Ensure that energy intakes by military women are consistent and adequate to maintain weight during intense physical fitness training. Aim aggressive education programs at helping military women identify and select appropriate foods and fortified food products to meet their nutrient requirements. Develop research efforts to assist in identifying those factors, such as diet, lifestyle, and ethnicity, that may contribute to achieving peak bone mass, as well as components of military programs that may interfere with this process. Little is known about the prevalence and underlying causes of menstrual cycle disturbances oligomenorrhea, amenorrhea. Evidence indicates that oral contraceptives have no detrimental effects on bone mineral density, and may in fact have a positive effect. Develop a research program to determine the effects of implant and injectable contraceptives on bone mineral density and bone health. Copyright by the National Academy of Sciences.

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Chapter 5 : The Disadvantages of Building Muscle Mass | blog.quintoapp.com

Get this from a library! Reducing Stress Fracture in Physically Active Military Women.. [Institute of Medicine Staff] -- The incidence of stress fractures of the lower extremities during U.S. military basic training is significantly higher among female military recruits than among male recruits.

Under the guidance of the Committee on Military Nutrition Research CMNR , the BCNH subcommittee was asked to evaluate whether existing body composition and physical appearance standards for women in the military conflicted with body composition requirements for task performance and if these same standards might interfere with readiness by encouraging chronic dieting, inadequate intake, and sporadic fitness. The BCNH subcommittee conducted an extensive review of this topic, including a workshop held in September to gather information on current knowledge and activities relating to achieving fitness and readiness for military women. Additionally, the subcommittee sought to identify factors that would interfere with the readiness and long-term health of military women. A report of this activity has been completed recently IOM, Page viii Share Cite Suggested Citation: The National Academies Press. An area identified for further study in military women concerns the effect of calcium status, as well as total energy intake, on the incidence of stress fractures in the short term, and osteoporosis in the long term, and the nutrient implications of these conditions. The incidence of stress fractures during basic training is substantially higher in female than in male recruits IOM, , This injury has a marked impact on the health of service personnel and imposes a significant financial burden by delaying the training of new recruits. Stress fractures increase the length of training time, program costs, and time to military readiness. In addition, stress fractures and short-term risks to bone health may share their etiology with the long-term risk of osteoporosis. The incidence of stress fracture in male military recruits has been reported to range from 0. Navy recruits to 4. Marine Corps recruits Shaffer, The incidence among females in these same training programs is higher, ranging from 0. Thus, it could be projected that the costs to the U. Army, a service that trains a greater number of recruits annually, would be substantially higher. Because of this higher incidence of stress fractures in female recruits and the resulting increase in length of training time, operating costs, time to military readiness, and the possibility of a shared etiology or pathogenesis between short-term stress fractures and long-term osteoporosis risks to bone health, the DoD, specifically the Headquarters, U. Why is the incidence of stress fractures in military basic training greater for women than for men? What is the relationship of genetics and body composition to bone density and the incidence of stress fractures in women? What are the effects of diet, physical activity, contraceptive use, and other lifestyle factors smoking and alcohol on the accrual of peak bone mineral content, incidence of stress fractures, and development of osteoporosis in military women? How do caloric restriction and disordered eating patterns affect hormonal balance and the accrual and maintenance of peak bone mineral content? How can the military best ensure that the dietary intakes of active-duty military women in training and throughout their military careers do not contribute to an increased incidence of stress fractures and osteoporosis? Page ix Share Cite Suggested Citation: In addition, the report would consider the effects of dietary restriction at the levels observed in military women combined with the physical demands of basic training on short-term bone mineral balance and the immediate risk of stress fracture and on the long-term risk of osteoporosis. The BCNH subcommittee believed it was very important to gather as much information as was available from all military services to determine the incidence of stress fractures in women during basic training and the training conditions imposed to assess whether if, among the services, differences in stress fracture incidence would be observed that might be attributed to differences among the training regimens. In addition to the military research personnel who presented data to the subcommittee, a liaison group composed of members of the various uniformed services was asked to attend and provide additional information relevant to the topics discussed. Thus, the discussion at the workshop involved experts in various scientific and clinical disciplines, as well as service personnel who dealt with issues of health and physical performance. Thus, the subcommittee

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felt it was appropriate to compare the incidence of training injuries stress fractures observed in female, civilian competitive athletes with that in military women, given similar training environments. This comparison was deemed relevant because the incidence of athletic amenorrhea, a condition associated with estrogen deficiency and an increased risk of lower bone mineral content, is increased in competitive female athletes. The subcommittee discussed a related but longer-term issue: Because the new trainees are largely 18 to 25 years old, no incidence of osteoporosis would be expected in this population. Page x Share Cite Suggested Citation: Because of time constraints, the responses are largely based on data gathered at the workshop, a review of related relevant publications, and the expertise of the subcommittee. Yates, and the staff of the BCNH: Study Director Rebecca B. Costello, Staff Officer Sydne J. Edington and Associate Claudia M. Additionally, the subcommittee would like to thank editor Judith Grumstrup-Scott, members of the military liaison panel, and the individuals and organizations who provided information and materials. The purpose of this independent review is to provide candid and critical comments that will assist the author and the Institute of Medicine in making the published report as sound as possible and to ensure that the report meets institutional standards of objectivity, evidence, and responsiveness to the study charge. The content of the review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. The BCNH subcommittee wishes to thank the following individuals for their participation in the review of this report: Schnakenberg, and Richard Wood. Although the individuals listed above have provided many constructive comments and suggestions, responsibility for the final content of this report rests solely with the authoring subcommittee and the IOM. Page xi Share Cite Suggested Citation:

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Chapter 6 : reducing_stress_fracture_in_physically_active_military_women

SUBCOMMITTEE ON BODY COMPOSITION, NUTRITION, AND HEALTH OF MILITARY WOMEN BARBARA O. SCHNEEMAN (Chair), College of Agricultural and Environmental Sciences, University of.

She is a certified yoga instructor, group fitness instructor and massage therapist. Weinblatt received her B. A muscular man is weight lifting in the gym. Increasing the amount of muscle on your body may be achieved by engaging in strength training. These exercises, which enhance muscle size and definition encompass a wide range of activities including weight machines, resistance bands and exercises using body weight. Building muscle mass has advantages and disadvantages including weight gain and stress fractures. Video of the Day Initial Weight Gain An individual who is trying to lose weight and build muscle mass simultaneously may initially gain weight. This condition is temporary. When first starting your diet and strength-training program, your increase in muscle mass may outpace your loss of fat. Using lighter weights and doing more repetitions can minimize the bulking effect causing your weight gain or plateau. Consulting with a fitness trainer gives you personalized and professional help to negate this disadvantage of building muscle mass. Stress Fractures in Women Quickly accumulating muscle mass is associated with stress fractures in women, warns the Nutrition and Health of Military Women Subcommittee on Body Composition. A stress fracture presents as a tiny crack in your bone. Embarking on a workout program too intensely and too quickly, along with lifting more weight than you can handle, can cause this skeletal injury and represents one of the disadvantages of building muscle mass. Additionally, the heavy loads and repetitions associated with weight lifting and strength training can cause stress fractures. To avoid stress fractures while building muscle mass, a woman who is out-of-shape must increase the intensity of her workouts incrementally. Muscle Pain Muscle aches and pains may result from the activities required to build muscle mass. Lifting too much weight or moving in an unusual manner in an effort to build muscles could result in a muscle tear as well as damage to ligaments and tendons as well as the surrounding soft tissue. Reverse Anorexia Bodybuilding and the drive to build muscle mass may lead to reverse anorexia. This health condition is characterized by the obsession to constantly increase the size of your muscles. While this drive provides motivation in the beginning, a bodybuilder begins to give up friends, shirk responsibilities and embark on unusual diets to attain his muscle mass goals. An individual with reverse anorexia suffers from an inaccurate perception of his body image, constantly feeling his physique is inadequate despite bulging muscles.