

Ita. J. Sports Reh. Po.

Italian Journal of
Sports Rehabilitation and Posturology

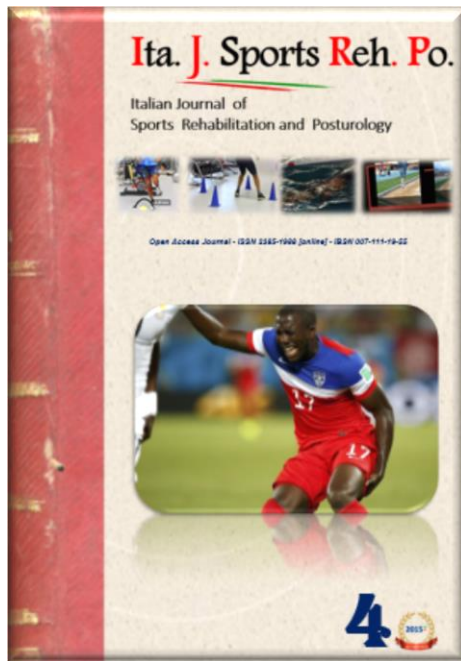


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Cari Colleghi, Cari Lettori

Accolgo con molto piacere, l'invito dell'Editor di scrivere questa prefazione al numero 4 dell'Italian Journal of Sports Rehabilitation and Posturology.

Devo affermare come con la conclusione dei campionati di calcio arriva, come sempre, per noi Medici del calcio, il momento di fare un bilancio, Clinico, con particolare attenzione al quadro epidemiologico degli infortuni riscontrati in questa stagione sportiva 2014-2015, nel campionato Italiano. Osservando i dati statistici, non si può certo affermare che sia stata una stagione "vincente", in quanto caratterizzata da troppi infortuni. Questi confermano, però, il trend degli ultimi anni. Tuttavia rimandando ad un altro

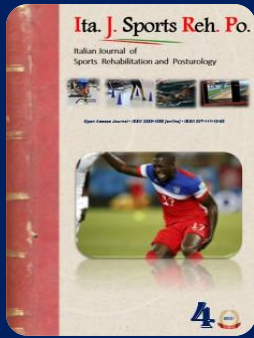
momento e ad altra sede, l'analisi clinico/epidemiologica magari al prossimo Congresso L.A.M.I.C.A. quello che ha suscitato, in me una riflessione è la diatriba tra l'allenatore del Bayer Monaco, Pep Guardiola e il medico della squadra, quel Prof. Muller-Wohlfahrt, oggi, considerato una Evidenza Scientifica in Germania. All'indomani della sconfitta contro il Porto, il Prof. Prof. Muller-Wohlfahrt è stato tacciato di essere il principale responsabile dei risultati negativi della Squadra Tedesca. La risposta a questa accusa, sono state, da grande professionista e uomo di scienza, le immediate dimissioni del Prof. Muller-Wohlfahrt e del suo Staff. Con stupore ho constatato come questa notizia sia scivolata via, silenziosamente, senza provocare quei simpatici dibattiti e tavole rotonde che pure non mancano nel mondo del calcio. Così che la mente mi ha riportato agli anni 80/90 ad un articolo pubblicato su "Stampa Sera" dal giornalista Pier Carlo Alfonsetti che in sostanza definiva i medici: le ultime "ruote del calcio". Sono trascorsi molti anni, il calcio è cambiato molto, evolvendosi sia dal punto di vista tecnico che di business, ma ahime' per quanto riguarda la figura del medico sociale le problematiche sono rimaste identiche, assumendo forse solo una dimensione più ... Europea. !? Chiudo questa mia riflessione riportando la notizia della promozione del Teramo Calcio nella serie B. Al di là dell'impresa sportiva della squadra, che pure merita di essere sottolineata essendo la prima volta che si affacciano al campionato cadetto, la mia soddisfazione sta nel fatto che lo stadio di calcio del Teramo è l'unico stadio, nel calcio professionistico, intitolato alla memoria del suo Medico Sociale "Dott. Gaetano Bonolis" che per tanti anni è stato Segretario e figura di riferimento per tutti noi della L.A.M.I.C.A. Quindi complimenti ed un augurio al Teramo Calcio.

Nel salutarvi vi auguro Buone Vacanze

Dr. Pasquale Tamburrino

Segretario L.A.M.I.C.A.





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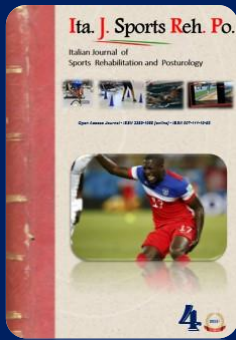
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Joseph A. Giandonato, Victor M. Tringali, Christopher D. Policastro

Evaluative Analysis of Interventive and Preventative Physical Activity Initiatives within Occupational Environments.

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Abstract

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Abstract



R. D'Onofrio, S. Bruno - **Indagine epidemiologica delle lesioni muscolari nel calcio. Analisi retroattiva delle letterature** . ; Ita J Sports Reh Po 2015; 2; 4 ; 345- 367 ; doi : 10.17385/ItaJSRP.015.3007 ; ISSN 2385-1988 [online] ; IBSN 007-111-19-55



Il calcio è considerato lo sport più popolare del mondo essendo praticato da almeno 200 milioni di atleti e da 21 milioni di calciatrici, registrate alla Fédération Internationale de Football Association (FIFA). Gli eventi lesivi sono un evento avverso, importante, spesso estremamente invalidante, per la carriera di un giocatore di calcio. Le lesioni muscolari sono molto comuni nel calcio, che rappresentano fino al 37% di tutte le lesioni per assenza dall'attività agonistica. I risultati delle ricerche sulle evidenze scientifiche evidenziate nella letteratura dipendono dal concetto di definizione della lesione, dalle caratteristiche dei giocatori e dall'obbiettivo della ricerca¹⁶. I problemi metodologici associati alla ricerca delle lesioni sportive sono stati descritti ed evidenziati da Finch,⁵⁸ Dvorak^{59,60} e da Noyes.⁶¹ Studi epidemiologici, internazionali, sui giocatori di calcio, hanno identificato un livello di incidenza delle lesioni pari al 10-35 per 1000 ore di gioco.⁶⁴ La maggior parte delle lesioni si verificano all'arto inferiore, in particolare il 61.2% a carico del ginocchio e della caviglia². Oltre 1/4 degli infortuni nel calcio sono rappresentati da lesioni muscolo scheletriche, principalmente localizzate nel quadricipite (14%), nei muscoli ischio-crurali (28%) e negli adduttori (8%).^{3,4} Asymmetries/dysbalances" nel rapporto funzionale quadricipite/ischio crurali dimostrano un significativo impatto sull'incidenza delle lesioni. La prevenzione e riabilitazione delle lesioni degli ischio crurali dovrebbe essere parte di un approccio, interdisciplinare, sistematico basato sulle evidenze proposte e validate dalla letteratura scientifica.

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N. Apostolopoulos, G. S. Metsios, J. Taunton, Y. Koutedakis, and M. Wyon - **Acute Inflammation Response to Stretching : a Randomised Trial.** ; Ita J Sports Reh Po 2015; 2; 4 ; 368 - 381 ;doi 10.17385/ItaJSRP.015.3008 ISSN 2385-1988 [online] ; IBSN 007-111-19-55

Background: The aim of the study was to examine the effects of an intense stretch on selected serum-based muscle inflammation biomarkers. **Methods:** A randomised within-subject crossover trial was conducted with 12 healthy recreationally active males (age: 29±4.33yrs, mass: 79.3±8.78kg, height: 1.76±0.06m) participating in both an intense stretching and control intervention. During the stretch intervention the hamstrings, gluteals and quadriceps were exposed to an intense stretch by the same therapist, in order to standardise the stretch intensity for all participants. The stretch was maintained at a level rated as discomfort and/or mild pain with use of a numerical rating scale (NRS). Each muscle group was stretched for 3 x 60 seconds for both sides of the body equating to a total of 18 minutes. During the control intervention, participants rested for an equivalent amount of time. A 5ml blood sample was collected pre-, immediately post, and at 24h post for both conditions to assess the levels of interleukin (IL)-6, interleukin (IL)-18, tumour necrosis factor (TNF)-α, and high sensitivity C-reactive protein (hsCRP). Participants provided information about their level of muscle soreness 24, 48, and 72h post treatment, using a numeric rating scale. **Results:** hsCRP increased significantly at 24h compared to control and immediate post stretch intervention, for time (p=0.005), and time x condition (p=0.006). No significance was observed for IL-6, IL-18 or TNF-α (p>0.05). **Conclusion:** It is observed that intense stretching may lead to an acute inflammatory response supported by the significant increase in hsCRP.

Abstract



F. Osei, R. D'Onofrio and M. Omoniyi Moses - **Kibler's Test as a Functional Pre-Physical Examination Asymmetries of the Scapula in Overhead Game Athletes . A Field Test.** ; Ita J Sports Reh Po 2015; 2; 4 ; 382 - 396 ; doi : 10.17385/ItaJSRP.015.3009 ; ISSN 2385-1988 [online] ; IBSN 007-111-19-55



Analysis and study of the posture of athlete is one of the most important aspects of evaluation during pre-season. In overhead athletes, assessing the functionality of the scapula is one of the most important and interesting observations in postural manner. Postural asymmetries frequently remains as dysfunctional abnormalities that correlate with increase in risk factors for disease in the shoulder of athletes who involv ein overhead sports. These asymmetries scapular posture are more pronounced in the upper limbs dominant for their repetitiveness gestural in game play. Test of static and dynamic evaluation have been presented in the literature to classify the presence of dyskinesia'sscapular between the Kibler's test (lateral scapular slide test, LSST) that evaluates the postural modulation of the scapula in static positions clinically. Through this test, asymmetries side to side above the measurement of 1.5 cm may be classifiable as scapular dyskinesia after fifteen minutes of assessment on the field. We therefore recommend LSST to overhead game (volleyball) athletes' technical teams as a functional assessment field test for scapula. It is simple within 15 seconds, repeatable and capable of detecting any scapular dysfunction in asymptomatic volleyball athletes.



Abstract



M. Armeni, C. Civitillo - **Osteopathic Manipulative Treatment combined with Body Composition Analysis and Caloric Balance improves Pain and Performance in an Amateur Cyclist suffering from Chronic Neck-Pain. A Case-Report.** ; Ita J Sports Reh Po 2015; 2; 4 ; 397 - 405 ; doi : 10.17385/ItaJSRP.015.3010 ISSN 2385-1988 [online] ; IBSN 007-111-19-55



Introduction: *This Case-Report analyses the potential efficacy of the Osteopathic Manipulative Treatment (OMT) combined with caloric balance in an amateur cyclist, both in relation to pain onset and perception, and performance enhancement. Following an accurate analysis of the literature through the main biomedical data banks, the authors did not find previous studies focusing on these specific parameters in the case of amateur cyclists.* **Case description:** *This case is about Mr. M. M., an amateur cyclist with chronic Neck-Pain, severe anxiety, overweight, low energy and poor performance. The authors carried out an osteopathic evaluation together with a multi-compartmental body composition analysis and caloric balance, and administered specific measuring scales. The primary composite outcome was identified by the Rate of Perceived Exertion (BORG/RPE) and the Visual Analogue Scale (VAS). The Hamilton Anxiety Rating (HAMg-A) and Post-Race Heart Rate reduction identified the secondary outcomes.* **Results:** *After 4 test-based OMT sessions and the adjustment of the daily calorie intake, at 60 day follow-up, the subject did not show any cervical pain; anxiety was significantly reduced, the body composition analysis showed a significant decrease of fat mass and performance improved significantly.* **Conclusions:** *This Case-Report shows that continuous benefits can be obtained with a multifactorial approach, both in amateur and professional athletes. The authors hope that the originality of this study might stimulate other researchers to focus on these issues with a larger cohort.*

Abstract



P. Tamburrino, R. D'Onofrio, A. Tucciarone - **Ankle Sprains in Professional Soccer Players. Isokinetic Strength of Evertors and Invertors Muscles after Ankle Sprains Treated With Two Different Dynamic Protection.** Ita J Sports Reh Po 2015 ; 2 ; 4 ; 406 - 412 ; doi : 10.17385/ItaJSRP.015.3011 ; ISSN 2385-1988 [online] ; IBSN 007-111-19-55



Purpose: The aim of this study was to investigate the effects of two forms of immobilization in ankle sprains on the strength of evertor and invertor muscles, in order to draw up a rational training plan, designed to speed up the athlete's return to competitive sport. **Methods:** A total of 18 soccer players (average height 1.76 ± 0.05 - average age 24.5 ± 3.5 - average weight 66.3 ± 8.1), with a second degree ankle sprain, were treated with two different therapeutic strategies: 1) group A, with Aircast Air-Stirrup Ankle Brace functional support (9 male soccer players - average height 1.80 ± 0.05 - average age 24.7 ± 3.3 years - weight 75.6 ± 5.7) and 2) group B, with taping (9 soccer players, 7 men and 2 women - average height 1.73 ± 0.04 - average age 24.2 ± 3.9 years - weight 66 ± 7.7). All athletes were tested 30 days after injury; Lido Active isokinetic system was used to monitor peak torque, total work, average power of ankle evertors and invertors. **Results:** The findings of our study contribute to state that the strength of ankle invertors and evertors, tested at angular speeds of 30° , 60° , 90° and 120° sec., is significantly higher in group A than in group B, in all reference parameters, with a higher index in the peak torque and in the movement of inversion, at all angular velocities tested. **Conclusions:** Adopting a "dynamic and functional project" allowed us not only to safeguard the biological tissue healing process, but also to keep very good levels of evertor/invertor muscle strength. All this will allow us to develop a rational program of training, drawn up on the basis of individual characteristics and in relation to injury time in the season.

Abstract



P.M.N. Perera **Assessment of Osgood Disease among Teenager Footballers in Negombo, Srilanka** Ita J Sports Reh Po 2015; 2; 4 ; 413 - 419; doi : 10.17385/ItaJSRP.015.3012 ISSN 2385-1988 [online] IBSN 007-111-19-55

Football is an upcoming game in Negombo, Srilanka among teenage sportsmen. A descriptive cross-sectional study was carried out and data were gathered from 224 number of randomly selected football players(male) Interviews were conducted among 224 football players and 45 (20.8%) of them have been sufferings from Osgood disease. They have been following Ayurvedic treatments, Western medicine and Conservative management (Self-care). Its percentages were respectively 28.8%, 55.5% and 13.3%. Among players who have followed Western medicine, 76% of them have consulted doctors and balances 24% have consulted physiotherapists. Among injurers, 8.8% were between 12yrs to 13yrs. 71.8% were between 14yrs to 15yrs. 17.7% were between 16yrs and 17yrs. 2.2% were between 18yrs and 19yrs. It was understood that the most injured age group was 14yrs to 15yrs. Also, it was noted that they were not aware of the importance of physiotherapy at all (Only 13.3% of the sample have consulted physiotherapists solely).

Abstract



R. Flowers

Sacral Stress Fracture in an Adolescent Dancer Ita J Sports Reh Po 2015 ; 2; 4 ; 420 - 428;
doi 10.17385/ItaJSRP.015.3013 ISSN 2385-1988 [online] - IBSN 007-111-19-55

Sacral stress fractures are a fairly uncommon injury that if gone undiagnosed can cause significant morbidity. The incidence is not well known and is thought to be underreported, due to vague symptoms that can mimic other more common injuries, such as muscle strains and sciatica. The following case outlines an adolescent female with a less common presentation of a sacral stress fracture and a slow progressive return to activity. This article will also present a brief review of the literature focusing on the pathophysiology, presenting symptoms, diagnosis, treatment, and expected length of recovery for sacral stress fractures. Although this injury is uncommon, it often presents with common symptoms, and the clinician should not overlook it as a possible diagnosis.

Abstract



J. A. Giandonato, V. M. Tringali, C. D. Policastro

Evaluative Analysis of Interventive and Preventative Physical Activity Initiatives within Occupational Environments Ita J Sports Reh Po 2015 ; 2; 4 ; 429 - 441; doi : 10.17385/ItaJSRP.015.3014
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This summative literature review examines the establishment and efficacy of multiple strategies aimed to improve an assortment of metrics associated with occupational performance, musculoskeletal and metabolic health, psychosocial domain, and longevity. The role of physical activity based interventions and prevention programs will be emphasized, as will outcomes and suggested actionable strategies emanating from a theoretical amalgamation of public health, exercise science, and human resource management.



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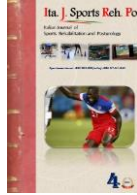


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Italian Football Medical Association
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J. A. Giandonato, V. M. Tringali,
Making the Case for Exercise and Fitness Professionals Leading Wellness Programs
Ita J Sports Reh Po 2015 ; 2; 4 ; 342 -344 ; doi : 10.17385/ItaJSRP.015.3006
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Editorial

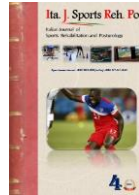
Making the Case for Exercise and Fitness Professionals Leading Wellness Programs

Authors : Joseph A. Giandonato, and Victor M. Tringali

Technological advances in conjunction with a reduction in laborious occupational demands have significantly contributed to escalating obesity rates in the United States throughout the past half century. According to Centers for Disease Control and Prevention estimates, the percentage of obese Americans has ballooned from 13% in 1962 to 35.7% in 2008 ². Sedentary behaviors and physical inactivity are correlative with increased rates of cardiovascular disease diagnose and stroke, which mark the two of the most prevalent causes of death within the US. In response to the resounding, yet largely preventable public health crises, legislators and organizations scramble to enact strategic measures to mitigate economic impact.

Spearheading the effort to engender healthy behaviors among working Americans, organizations have begun implementing wellness programs. The creation and implementation of wellness programs, which are defined as employer directed initiatives aimed at improving the health and well-being of employees ⁵, and in some instances, their dependents, and communities in which they reside, are rationalized through widely documented benefits, including: increased productivity, improved morale, reduced absenteeism, and curtailing organizational healthcare premiums, compensation and disability claims, and direct medical costs¹. Wellness programs have also been purported to augment employee retention and recruitment efforts ¹.

Professionals hailing from medical, allied health, and public health and policy realms are often



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commissioned by firms to lead wellness programs. While professionals arising from each sect encompass distinct attributes and in certain scenarios, the capacity to practice with professional licensure, individuals possessing a background in exercise science are best suited to handle the dual role of administrator and practitioner of health education and disease prevention. Academic programs in exercise science at the undergraduate and graduate levels cover an immense breadth of subject matter, often including electives in education, management, and statistics in conjunction with traditional coursework in physiology, biomechanics, and nutrition. When coupled with a background in fitness training or coaching, those in possession of sound theoretical exercise science acumen will prove adroit in their provision of actionable strategies, thus enhancing constituency engagement, a key determinant in the success of wellness programs.

Literature has suggested that wellness programs consisting of physical activity demonstrated improvements in health related quality of life, reduced absenteeism³, and attendant improvements in multiple biomarkers, including streamlined insulin control⁴, decreased body fat percentage and serum cholesterol concentrations⁷. The establishment of physical activity as a vital tenet within a wellness program may prove efficacious among employees, as many workers remain sedentary for a disproportionate amount of their work hours⁶.

Based on the aforementioned inferences in conjunction with a combined four decades of experience in the wellness and fitness industries, it is our communal assertion that degreed exercise and fitness professionals are worthy of consideration in leading wellness programs.

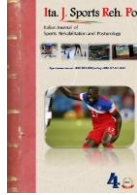
In good health and happiness,



Joseph A. Giandonato, MBA, MSc, CSCS
Drexel University - International Associate Board Member , Ita J Sports Reh Po



Victor M. Tringali, MSc, CSCS
Drexel University - International Associate Board Member , Ita J Sports Reh Po



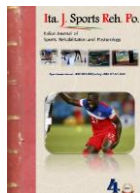
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J. A. Giandonato, V. M. Tringali, C. D. Policastro
Evaluative Analysis of Interventive and Preventative Physical Activity Initiatives within Occupational Environments
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Evaluative Analysis of Interventive and Preventative Physical Activity Initiatives within Occupational Environments

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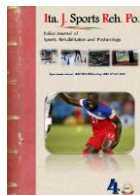
2 MSc, CSCS is the Executive Director of University Wellness at Drexel University located in Philadelphia, Pennsylvania, USA.

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Abstract

This summative literature review examines the establishment and efficacy of multiple strategies aimed to improve an assortment of metrics associated with occupational performance, musculoskeletal and metabolic health, psychosocial domain, and longevity. The role of physical activity based interventions and prevention programs will be emphasized, as will outcomes and suggested actionable strategies emanating from a theoretical amalgamation of public health, exercise science, and human resource management.

Keywords: *Wellness, Physical activity, Musculoskeletal pain, Prevention*



Introduction

Organizations are tasked with negotiating a multitude of public health issues, which chiefly include: an aging workforce, a robustly evolving technological landscape, and operating within the context of insufficient healthcare infrastructures abounded by convoluted reform legislation and surging insurance premiums. The incorporation and implementation of wellness programs and associated physical activity initiatives have garnered palpable interest and adulation among various organizational stakeholders for extensively demonstrating positive impacts on health, fitness, work performance, and attendance.¹⁵

The Rise of Technology and the Fall of Physical Activity

Many organizations are pierced by the double edged sword of technology. While countless technological advances have contributed to maximizing efficiency within industrialized cultures, they have also encouraged sedentary behavior which has infiltrated working constituencies with a host of musculoskeletal ailments and increasing the occurrence and rapidity of onset of various hypokinetic diseases.³⁸

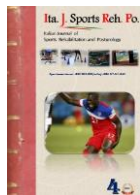
Sedentary behavior refers to any waking activity characterized by energy expenditure equal or less than 1.5 metabolic equivalents (METs), and a sitting or reclining posture. It has been estimated that working adults spend about one third to three quarters of their work time sitting.⁵⁷ Additionally, 75% of occupations are dependent upon work on the computer⁵⁸ likely resulting from a decrease in occupations which typically require physical labor and an increased proportion of workers employed in low activity occupations.^{31,39} While sedentary workers may be less exposed to many of the hazards associated with more physically demanding occupations (e.g. manual laborers), they may gain less of the benefits of physical activity and be exposed to more of the detrimental effects of inactivity.^{20,47} Extended periods of sitting have been associated with premature mortality as well as the development of morbidities, including cardiovascular disease, diabetes, cancer, metabolic syndrome, and obesity.^{19,49} Furthermore, epidemiological evidence suggests a 2% increase in all-cause mortality for every hour of daily sitting time, and a non-linear risk association of 5% for adults sitting more than 7 hours per day.^{9,29,49}

Musculoskeletal Pain

Musculoskeletal pain has also been linked to excessive sitting, particularly when prolonged and uninterrupted.³⁶ A recent study which examined the work-related risks of academicians in higher learning institutions, suggested that activities performed from the prolonged seated posture such as reading and computer use were correlated to high prevalence of neck and back pain.⁴²

Low Back Pain

These findings have been affirmed by multiple studies which reveal that protracted bouts of sitting

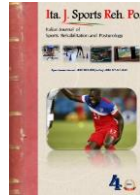


may heighten the risk for developing low back pain (LBP)^{7,8,16,17} contrasting from causative factors associated with manual labor which encompasses repeated movements, involving lifting⁶¹ and flexion and rotation of the trunk^{6,21} and crouching.⁵¹ Repetitious occupational activities involving flexion and compressive forces traumatize the lumbar region and delaminates the layers of the annulus fibrosis⁵⁶, a fibrocartilagenous structure that encapsulates the nucleus pulposus, a gelatinous bulb which serves as a shock absorber separating each vertebrae. An accrual of concomitant flexion and compression may fissure the annular fibers thus prompting the seepage of the nucleus onto proximate neural structures and causing pain. Low back pain is a major global health problem marked by annual prevalence rates ranging from 22% to 65% .⁶⁰ Lifetime prevalence rates in industrialized countries are as high as 70% and peak between the ages of 35 and 55. ⁷ Significant associations have been established between job-related sitting time (i.e. for more than 3 hours) and increased severity of LBP. ¹⁶ LBP was identified as the fourth most expensive health condition behind angina pectoris, hypertension, and diabetes mellitus, with an estimated prevalence of 52.7 per 1,000 employees and costs of \$90.24 per employee. ¹² Recurrent LBP affects 78% of individuals within one year of the initial onset of pain ³⁷ and is often flanked by considerable pecuniary costs. Median disability costs associated with recurrent back pain episodes were greater than those for non-recurrent LBP .³⁷ Prevalence rates of narcotic drug usage among patients with LBP have been reported as high as 45%. Narcotic-using patients with LBP accounted for 62% of health care costs among all patients with LBP.⁵²

Suboptimal postures throughout the workday may accelerate degenerative changes occurring along the spine .⁵⁵ Degenerative changes are characterized by the accretion of bony lesions which become evident during magnetic resonance imaging.³² Degeneration is believed to be attributable to an assortment of factors, including: anthropometry,⁵⁴ kyphosis, direct trauma, heightened cytokine and prostaglandin activity which stems from inflammation associated with injured discal tissue, ^{24,55} greater bodyweight, smoking, ³² and is seemingly ubiquitous among individuals suffering from pain within the lumbar and cervical spinal regions. ⁵⁵

Neck and Upper Back Pain

A proliferation in electronic devices, including desktop and laptop computers as well as handheld devices, including smartphones, personal digital assistants, and media players in conjunction with prolonged sitting, has contributed to the onset of neck pain.⁵⁸ One month prevalence rates of neck pain among the general population ranged from 15.4% to 45.3%. ¹¹ Within the aforementioned group, 14% of individuals categorized the pain as being frequent. One year prevalence rates reached 71.5% and reported inability to work due to neck pain was tabbed at 1.7% . ¹¹ Incidence of neck pain is directly correlated with the quantity of hours worked. Among all workers, those working 60 or more hours per week were most likely to report neck pain. ⁶² Persistent neck pain is classified as cervical pain syndrome (CPS), which is a condition that refers to a continuum of disorders of gradating severity, ordinarily stems from poor posture, sudden body movements, repetitive job demands^{2,3,5} and insufficient ergonomics⁴⁶ and may interfere with functioning of the upper extremity. ⁵⁸ Though less frequent than low back and neck pain, 1 in 10 men and 1 in 5 women suffer



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from thoracic spine pain according to a 2002 survey involving 3710 employed participants that was conducted by the French Institute for Public Health Surveillance.¹³ It can be inferred that persons exhibiting a greater modicum of thoracic kyphosis, which typically results from sustained deviant posture are at an increased risk of developing hyperkyphosis, a condition characterized by an aggravated curvature of the thoracic spine that is associated with atherosclerosis, compromised pulmonary health, and serves as a significant predictor of increased all-cause mortality in multivariable analyses.²⁶

Associated Musculoskeletal Conditions

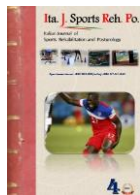
Related occupational overuse conditions include: carpal tunnel syndrome, a condition which arises from pressure emitted on the median nerve within the canalis carpi of the wrist and leads to symptoms of paresthesia and reduced sensation in the hands, forearms, and fingers, and mouse shoulder,⁵⁸ a condition characterized by impingement of tendons beneath the acromion process which restrains joint mobility and induces pain and stiffness. One year prevalence rates of musculoskeletal pain among neck, back, and upper extremity regions were as high as 69%, 54%, and 52%, respectively. Considerable prevalence of musculoskeletal pain (77%) was observed in Eastern European office workers.⁴⁵

A combined effect of high psychological demands and low decision latitude among employees exhibited a greater prevalence of pain,³³ lending credence to existing hypotheses that symptoms manifest themselves via somatization^{14,22} as psychosocial stressors emanating from the workplace are internalized. In addition to back pain, a relationship amid low social support from supervisors and cohorts and low job satisfaction and absence was demonstrated.²¹

The lost productivity time (LPT) due to musculoskeletal pain is an additional burden to employers. Over 50% of the annual cost of musculoskeletal pain-related LPT has been associated with pain exacerbation which is consistent with previous research showing the substantial work impact of pain flares among individuals with a history of persistent or recurrent musculoskeletal pain.⁵³

Interventions and Preventative Strategies

A 2011 study aimed to reduce sedentary activity showed that a 16% reduction in sedentary time via intermittent breaks led to improvements in numerous health factors, including a 54% reduction in back and neck pain.⁴⁹ Incorporating frequent breaks in sedentary activity has also been shown to be a potentially viable intervention to improve metabolic profiles, reduce waist circumference, body mass index (BMI), triglyceride levels, plasma glucose levels, and even improve emotional status.^{12,49} Alternatives to standard seating, such as active workstations affixed to treadmills or garnished with pedals or seated atop unstable surfaces^{4,30} have been proposed to raise daily energy expenditure.⁵⁹ Treadmill desks have been shown to increase energy expenditure by more than 100 kcal per hour.³⁴ Standing while at a workstation may assuage lower back pain by allowing the line of gravity to pass posterior to the mediolateral axis of rotation through the femoral heads and can serve as a lower



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threshold activation strategy for the musculature of the anterior core and posterior extensor chain, provided the trunk remains stationary.⁴⁴

The inclusion prostheses have produced somewhat confounding results^{1,25} and should not be resorted to as a convenient standalone to address or prevent musculoskeletal pain. Instead, a multifaceted approach involving an assessment of occupational tasks which account for requisite biomechanical, bioenergetic, and neurocognitive domains. Workplace ergonomics should be addressed to mitigate back discomfort and prevent forward head posture.^{17,18} An intervention may be appropriate in triaging employees who are suspected to be injured or may be coping with pain.²⁷ It should be noted that employees who engage in regular physical activity are more apt to seek care via physician and dentist visits as well as telephone consultations with a nurse.²⁸ Structured physical activity programs have been recognized in improving a host of health, fitness, and skill related qualities. A supervised and periodized worksite exercise program elicited a 12% improvement in back muscular endurance and 21% improvement in core muscular endurance over the course of 24 weeks.⁴⁰ A 12-week aerobic exercise program held twice weekly evoked improved muscular strength and endurance.³⁵ A 10-week onsite yoga class which transpired at lunchtime three times per week resulted in global improvements in flexibility, state anxiety, and musculoskeletal fitness among participants.¹⁰ Previous research has indicated that muscular endurance of the core is correlative with incidence and severity of lower back pain.⁴¹ Recent literature suggests that mobile applications may provide an augmentative benefit to an organizational physical activity program as participants experienced formidably lower back pain prevalence rates.²³

In an effort to curtail expenditures associated with health premiums and lost productivity times, organizations should encourage employees to participate in physical activity throughout the workday. Some suggested strategies which can be shared with employees include:

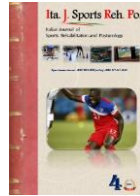
- Set a timer once an hour to be reminded to stand up and move around
- Walk a lap around the office floor
- Stand upright when taking phone calls
- Take the stairs in the building instead of the elevator
- Use the restroom on a different floor
- Correspond with colleagues in person rather than phone or e-mail
- Have an adjustable desk computer installed so that you can stand while reading/typing emails,
- Take a walk outside during lunch or start a walking club to engender camaraderie and a healthy work environment
- Bring portable fitness equipment to work such as resistance bands and light dumbbells or weight plates and perform exercises intermittently throughout the day



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Conclusion

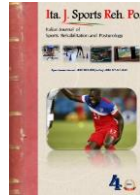
It has been projected that the deleterious health-related disabilities associated with protracted periods in the seated posture will imminently result in consequential societal and public health concerns.^{42,43,50} Potential health risks for workers who are exposed to prolonged periods of unbroken sitting are increasingly clear. Based on the preponderance of the aforementioned evidence, it is prudent for workplace health promotion initiatives to target increased participation in physical activity while also reducing and breaking up prolonged sedentary time. These factors may contribute to worker disabilities which negatively impact quality of life, and predispose workers and their employers to considerable healthcare costs.



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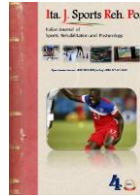
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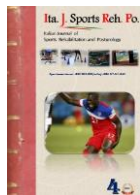
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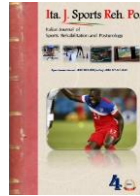
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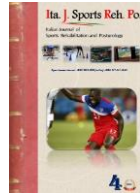
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