

causal relationship with the activities evaluated. Of the 26 participants evaluated in the group, 53% had no limitations in the range of spinal movements at the time of examination, 73% reported improvement in quality of life, and only 15% said they had the same pain and limitation as when they started to do the accompaniment in the column program. When questioned, 80% of the participants reported that improvement in both physical examination and in quality of life was due to the treatment and follow-up done in the spinal group.

**Conclusion** The study found an improvement in the quality of life, a significant reduction in functional limitation and absenteeism in the participants of the group. These results are compatible with those obtained by the group in previous years and are also in agreement with those cited in the literature.

### 1571 DEVELOPMENT OF A PROGRAM FOR PATIENTS WITH FUNCTIONAL RESTRICTIONS IN A BRAZILIAN COSMETIC INDUSTRY

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**Introduction** The group of people with functional restrictions in industries needs special care and is a management challenge for any manager in occupational medicine. Being them just restricted for a limited period of time or restricted for a long period like rehabilitated for other functions by the social security institute, Readmitted (returned from medical leave longer than 15 days for diseases related to work) or Judicially reintegrated; A Brazilian cosmetic industry decided to improve the way they handle with this group of people. Trying to find the compatible areas for each of the necessary restrictions and evaluating the medical follow-up that was being performed

**Methods** Ergonomic evaluation with job mapping by visiting workplaces with the ergonomist and the occupational physician. Definition of the list of most common restrictions and the development of a follow-up model for these patients. First the physician evaluated the patient and understood the current restrictions. Second determined the compatible area after visiting and understanding the function. And then created a Job mapping based on the Medical recommendations/restrictions. The Patients needed to be evaluated in 15, 30 or 45 days based on the occupational physician evaluation.

**Result** The program provided 467 medical attendance; 61 employees were accompanied by the occupational physicians; 35 employees were diagnosed with Osteomuscular disease; 17 (27,8%) recovered from illness during a year;

**Discussion** This pilot program proved to be effective in monitoring and helping workers with restriction.

### 725 WALKING, SITTING AND STANDING TIME MEASUREMENT SYSTEM WITH FOOT PLANER PRESSURE TO EVALUATE A RISK FACTOR OF LOW BACK PAIN

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**Introduction** Prolonged walking, sitting and standing were thought a risk factor of low back pain. We wanted to measure the prolonged walking, sitting and standing time among workers at the workplace to evaluate their low back pain. But it was difficult to measure these times. Foot planter pressure shifts according to the walking, sitting and standing modes. We handmade an insole typed foot planter pressure data logger and algorithm to presume the walking, sitting and standing time from the foot planter pressure data.

**Methods** The foot planter pressure data logger was composed by two resistive pressure sensors, a microcontroller, a micro SD card memory and a lithium ion battery. The foot planter pressure data downloaded to a personal computer and analysed to presume walking, sitting and standing time using visual basic software. We validated the presumption time of walking, sitting and standing from 10 min real activity time of running, walking, static sitting, dynamic sitting, static standing, dynamic standing, and taking off the shoe, respectively. This protocol did three times by one parson.

**Results** Concordance rate between the presumption time and the real activity time was running 83%±12%, walking 100%±0%, static sitting 96%±6%, dynamic sitting 100%±0%, static standing 93%±6%, dynamic standing 73%±38%, and taking off the shoe 97%±6%, respectively. To join the running and walking time to the walking time, the static and dynamic sitting time to the sitting time, the static and dynamic standing time to the standing time, the concordance rate was up to 98.5%±3%, 100.2%±3%, and 100.2%±7%, respectively.

**Conclusion** The insole typed foot planter pressure data logger had almost 98% concordance rate between the presumption time and the real activity time of walking, sitting and standing. We could measure the walking, sitting and standing time of workers during their working time.

### 112 INJURIES AND MUSCULOSKELETAL DISORDERS AMONG YOUNG WORKERS IN THE BRICK KILNS OF NEPAL

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**Introduction** Brick manufacturing is a labour intensive informal industry using young workers as the major work force in Nepal. Young workers are required to use physical strength, carry heavy loads and remain in a squatted posture for longer periods doing repetitive tasks posing threats to musculoskeletal system. The objective of this study was to study prevalence of musculoskeletal disorders and injuries among young workers in the selected brick kilns in Nepal.

**Methods** This was a cross sectional study design involving young workers 17 years and below of age working in brick kilns in Bhaktapur and Sarlahi districts of Nepal. Study group included 101 young workers from Bhaktapur district and 97 from Sarlahi district, whereas, 64 nonworking children from Bhaktapur and 43 from Sarlahi districts were selected as the comparison group. Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms and questions on injuries were administered.

**Result** Lack of adequate physical infrastructures, poor working conditions with nonexistent safety procedures have posed risk to physical, metal and overall well-being of children. The risks

of fall in the sampled kilns were high. The musculoskeletal disorder related pain and discomfort was experienced by 73 per cent of working children in Bhaktapur and 58 per cent in Sarlahi. It was identified that work related injuries in young workers majorly affected upper and lower limbs. The odds ratio suggests that young workers were 8 times more likely to experience trouble or body pain compared to non-working children.

**Discussion** This study finds that presence of inferior physical environment, working conditions and practices has contributed to musculoskeletal injuries and problems exposing young workers to risks and hazards. This study was based on a small sample; nevertheless it portrays an overview of musculoskeletal disorders in the brick kilns focusing on young workers.

### 283 REAL-TIME BIOFEEDBACK AND ITS ABILITY TO AFFECT CHANGES IN SPINAL POSTURE DURING REPETITIVE LIFTING

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**Introduction** Low back pain (LBP) is the leading cause of disability globally. Occupational risk factors associated with LBP include heavy, repetitive lifting, and awkward and flexed postures. Studies suggest younger people may be at an increased risk of LBP compared to older individuals. Postural feedback as an early intervention may provide a viable preventative approach for reducing the risk of LBP in the workplace.

**Methods** Thirty-four healthy, young participants were randomly allocated biofeedback (BF) or no biofeedback (NBF). Participants lifted a box weighing 13 kg at a frequency of 10 lifts per minute for up to 20 min. Real-time biofeedback on lumbar posture was provided using two wireless inertial sensors attached to the lumbar spine and sacrum. The BF group received an audible cue when lumbar flexion exceeded 80% maximum flexion. Three-dimensional motion analysis and ground reaction forces were used to estimate moments at the base of the spine and on the passive structures of the lumbar spine. Participants rated perceived exertion throughout the task using Borg's scale.

**Results** Both the BF and NBF groups increased lumbar flexion over the duration of the lifting task, although the rate of change (slope) of peak lumbar flexion with BF was significantly less compared to NBF ( $p=0.009$ ). Normalised bending moments resisted by passive structures of the spine were higher in the NBF group (0.7 Nm/kg) compared to the BF group (0.12 Nm/kg) at 20 min. The BF group demonstrated lower levels of perceived exertion.

**Discussion** Real-time biofeedback provides a viable approach to increase spinal postural awareness during repetitive lifting tasks, helping to reduce loads on the passive structures of the lumbar spine. A simple wireless inertial system for monitoring posture has potential for use in the work environment, and further evaluations should be undertaken to determine the long-term effectiveness of this approach.

### 293 INVESTIGATION ON THE PREVALENCE OF MUSCULO-SKELETAL DISORDERS AMONG JUTE MILL WORKERS IN INDIA

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**Introduction** Musculoskeletal disorders (MSDs) are reported maximum among jute mill workers of India. The present study is designed to find out the actual magnitude of the problems among jute mill workers and to identify the possible associations between discomforts and working postures of these workers.

**Methodology** This study was conducted among eight selected jute mills of India. 717 male jute mill workers actively engaged in work at least for one year were randomly selected in this study. Subjects with self-reported MSD complaints for at least last 12 weeks were included. A detailed posture analysis was performed among them by Ovako Working Posture Assessment System (OWAS) method.

**Results** Among all participants 55% had complained Chronic Low Back Pain (CLBP). Age had an important association with CLBP. Subjects in the age group of 40–59 years were more likely to have pain ( $p=0.02$ ). Regarding ergonomic risk factors, lifting of load of more than 20 kg ( $p=0.04$ ) and repetitive movements of limbs ( $p=0.03$ ) had significant associations with CLBP.

**Discussion** Present study identifies a significant prevalence of CLBP among jute mill workers. Regarding ergonomic risk factors, the study has identified that MSD is significantly associated with work related awkward postures, lifting of load above 20 kg, repetitive movements of limbs and prolonged standing during work. Jute mill workers are exposed to heavy workload with repetitive and forceful motions, which generally adopt awkward and uncomfortable postures and carrying of excessive loads that ultimately has got a great impact on their health. Therefore, this study suggests the urgent need for work place interventions for improvement of work related health of 3,50,000 Jute workers of India.

### 333 RATING FORCE REQUIRED TO PERFORM SELECTED WORK ACTIVITIES

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**Introduction** The rules for the use of force when performing work activities are specified for women and men in the Ordinance of the Minister of Labour and Social Policy of 14 March 2000 on health and safety at work in manual transport and later changes – Ordinance of the Minister of Family, Labour and Social Policy of 25 April 2017. In particular, these rules apply to manual transport,