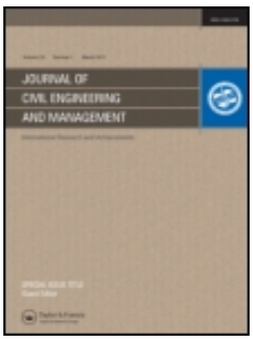

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FREQUENCY AND CONTINUITY OF WORK-RELATED MUSCULOSKELETAL SYMPTOMS FOR CONSTRUCTION WORKERS

Ivan Wing Hong Fung[1], Vivian Wing-Yan Tam[2], Chi Ming Tam[3], Kang Wang[4]

[1,3,4]*Dept of Building and Construction, City University of Hong Kong, Tat Chee Avenue, Kowloon, Hong Kong.*

[2]*Griffith School of Engineering, Griffith University, PMB 50 Gold Coast Mail Centre, QLD 9726, Australia.*
E-mail: v.tam@griffith.edu.au

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Abstract. Regarding occupational health and safety, musculoskeletal problems are serious injuries which, however, are always neglected by most construction workers (Washington State Department of Labor and Industries 2007). Limited research has been recorded in work-related musculoskeletal symptoms, especially in the construction industry. The aim of this paper is to study frequency and continuity of musculoskeletal symptoms for local construction workers. A questionnaire survey and structured interviews are conducted. It is found that the musculoskeletal symptom is common among most construction workers, practically in their upper extremities and lower back. All respondents reported that they had experienced of at least one musculoskeletal symptom in the 11 body locations including neck, shoulder, upper back, upper arm, elbow, forearm, wrist, lower back, hip, knee, and ankle. Recommendations to reduce problems occurred for work-related musculoskeletal symptoms are also discussed.

Keywords: work-related musculoskeletal symptoms, construction, Hong Kong.

1. Introduction

Musculoskeletal symptoms mean that a part of musculoskeletal systems such as muscle, nerves, tendons, ligaments, joints, cartilage and blood vessels are chronic overuse and misuse. Work-related musculoskeletal symptoms occur when mechanical workload is higher than physical capacity of human body. This is a chronic occupational illness as a result of repeated trauma rather than happening through a single accident or injury (Washington State Department of Labor and Industries 2007).

Construction workers are at high risk of developing work-related musculoskeletal symptoms in comparison with workers in other occupations (Guo *et al.* 2004). Table 1 shows the damage of the top 5 trades to various parts of a body resulted from work-related musculoskeletal symptoms in the construction industry. Scaffolders have the highest prevalence of work-related musculoskeletal symptoms in all body locations. Work-related musculoskeletal symptoms on of neck and shoulder are found in crane operators, insulators, and painters, and of lower back and lower extremity symptoms for roofers and floorers.

Millions of European workers across all employment sectors were affected by work-related musculoskeletal symptoms (European Agency for Safety and Health at Work 2002). In America, about 1,8 million workers have experienced these symptoms every year (Occupational Safety and Health Administration 2000). Work-related musculoskeletal symptoms are not just one of the major occupational health problems worldwide; it is also recognized as an economic burden on the society (Amell and Kumar 2001). A variety of costs including direct and indirect costs are arising from this occupational illness. The direct costs are associated with workers' compensation, medical care and rehabilitation while the indirect costs include work disability, sick leave, reduce productivity, decrease work quality, retraining costs, and diminished morale (Deborah 2003). The direct and indirect costs resulted from musculoskeletal conditions have been evaluated at about US $254 billion in USA (Silverstein and Adams 2005; Kassi 2004), about US $16 billion in Canada (Canadian Institutes of Health Research 2005) about US $40 billion in United Kingdom (Health and Safety Commission 2006) and about US $100 million in Taiwan (Wei 2000). Further, about 40% of the world's total workmen compensation are from work-related musculoskeletal symptoms (Takala 2002).

Generally, these symptoms occur in many parts of human body including neck, upper limbs (hands, wrists, elbows and shoulder), lower limbs (legs, hips, ankles, and feet) and back. Discomfort, fatigue and pain are the most common early symptoms of the work-related musculoskeletal symptoms (Hagberg *et al.* 1995). These symptoms will not kill workers, but it generates a destructive impact on workers' life, such as persistence of pain in work or leisure, and even permanently disability. Work-related musculoskeletal symptoms are the leading cause of disability in America, Canada and Ireland (Arndt *et al.* 2005; Bone and Joint Decade 2005). Most studies on work-related musculoskeletal symptoms focus on office,

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Table 1. Damage of top 5 construction trades to various parts of a body from work-related musculoskeletal symptoms (Holmstrom and Engholm 2003)

Body part	Trades	Body part	Trades
Neck	Crane operators	Hip	Roofers
	Painters		Rock workers
	Insulators		Asphalt workers
	Scaffolders		Bricklayers
	Machine operators		Ground preparators
Shoulder	Scaffolders	Knee	Floorers
	Insulators		Plumbers
	Painters		Roofers
	Crane operators		Sheet metal workers
	Machine operators		Insulators
Elbow	Scaffolders	Ankle or foot	Scaffolders
	Bricklayers		Roofers
	Roofers		Sheet metal workers
	Sheet metal workers		Rock workers
	Insulators		Repair men
Wrist or hand	Scaffolders	Lower back	Roofers
	Sheet metal workers		Floorers
	Floorers		Scaffolders
	Rock workers		Insulators
	Glaziers		Bricklayers
Upper back	Insulators		
	Scaffolders		
	Crane operators		
	Glaziers		
	Roofers		

service, or manufacturing industries. However, the construction industry is regarded as one of the most hazardous industries for work-related musculoskeletal symptoms, which is one of the 10 most frequently reported industries in the United Kingdom and America. About 30% of the workforce is affected by these symptoms (Guo *et al.* 2004; Chen *et al.* 2005; Bureau of Labor Statistics 2006). Unfortunately, a paucity of research on work-related musculoskeletal symptoms is recorded for construction.

This study is to assess frequency and continuity of work-related musculoskeletal symptoms for construction workers. Recommendations to minimize the symptoms in the construction industry are also discussed.

2. Frequency and continuity of work-related musculoskeletal symptoms

To investigate frequency and continuity of work-related musculoskeletal symptoms for construction workers, 178 face-to-face surveys with structured interviews with construction workers from 15 construction sites are conducted.

As construction is a male-dominant industry, it is not surprising to find that about 99% of respondents from construction workers. As regards their age distribution, most are from 40 to 49 of about 55% of the resondents, about 3% are below 30, about 12% are from 31 to 39, about 28% are from 50 to 59 and about 2% are above 60. The majority of the respondents have an education level of primary or secondary schools of about 60% and 36% respectively, and about 4% are uneducated. All respondents are with at least 1-year working experience and majority of them are with 6 to 10-year working experience of about 56% of the respondents. About 15% and 29% of the respondents are with 1 to 5-year and 11 to 15-year working experience, respectively. For their job positions, most of the respondents are carpenters (about 27%), bar benders and fixers (about 23%) and plasterers (about 20%). About 3% 4%, 7%, 8% and 8% of the respondents are equipment operators, labourers, concreters, welders and electricians, respectively.

Table 2 summarizes the survey results of the workers' discomfort for work-related musculoskeletal symptoms. About 90% of the respondents revealed that pain and symptoms were observed after they had engaged in construction activities. Besides, the majority of the respondents (about 70%) reported that their working efficiency and production were influenced by the pain and symptoms.

Table 2. Survey of the workers' discomfort for work-related musculoskeletal symptoms

Discomfort and symptoms for WMSDs	Percentage, %
Musculoskeletal pain and symptoms occurred after engaging in the construction industry	
Yes	90
No	10
Musculoskeletal pain and symptoms influence working efficiency and production	
Yes	70
No	30
Continue to work under the pain situation	
Yes	89
No	11
Reasons for not taking a break after injured	
Do not want to loss wages of rest days	42
Afraid of losing job	15
Other workers are not rest too	3
Because pain is a normal phenomena for workers	38
Others	2
Visit a physician when pain felt in your body	
Yes	22
No	78

Although the pain and symptoms could affect working efficiency and productivity, about 89% of the respondents continued to work. The major reasons for not taking a break after injury were that workers were afraid of loss in wages (about 42%) and considered pain as a normal phenomena for workers (about 38%). Furthermore, only about 22% of the respondents mentioned that they had consulted a physician when pain was observed, while majority of the respondents had to endure a pain without visiting a physician.

Table 3 summarizes the survey results on the frequency of pain occurred. All respondents reported that they experienced pain in at least one of the 11 body locations (including neck, shoulder, upper back, upper arm, elbow, forearm, wrist, lower back, hip, knee and ankle). More than half of the respondents (about 53%) reported that they usually experienced lower back pain during the last 12 months. Over a half of the respondents reported that elbow pain (about 52%), and forearm pain (about 51%) were sometimes occurred, followed by shoulder pain (about 49%) and wrist pain (about 44%) which were reported by more than one-quarter of the respondents, whereas, neck pain (about 50%), upper back pain (about 64%), upper arm pain (about 58%), hip pain (about 56%), knee pain (about 40%) and ankle pain (about 53%) were less frequently experienced by the respondents.

Table 3. Survey on the workers' frequency of pain occurrence

Body part	Discomfort frequency			
	Usually, %	Sometimes, %	Seldom, %	Never, %
Neck	6	42	50	1
Shoulder	30	49	21	0
Upper back	1	11	64	24
Upper arm	3	27	58	12
Elbow	15	52	29	4
Forearm	4	51	35	10
Wrist	26	44	25	5
Lower back	53	36	10	1
Hip	0	5	56	39
Knee	11	40	40	9
Ankle	4	37	53	6

For the continuity of pain occurred, the majority of the respondents reported that musculoskeletal pain in the 11 body locations had lasted for less than 3 hours (see Table 4); about one-quarter of the respondents claimed that they had to endure lower back pain for 3 hours a day.

Table 4. Survey of the workers' continuity of pain occurrence

Body part	Continuity of pain				
	Less than 3 hours, %	3 hours a day, %	2 to 4 days, %	One week or more, %	No pain, %
Neck	92	7	0	0	1
Shoulder	68	25	4	1	2
Upper back	77	1	1	0	21
Upper arm	82	1	3	0	15
Elbow	78	15	4	0	3
Forearm	85	0	5	0	10
Wrist	65	28	2	0	5
Lower back	44	34	18	3	1
Hip	67	0	0	0	33
Knee	82	8	5	0	5
Ankle	90	1	0	1	8

Table 5. Survey of the workers' work-related musculoskeletal symptoms

Body part	Musculoskeletal symptoms					
	Loss of strength, %	Swelling, %	Stiffness, %	Fatigue, %	Numbness, %	No symptoms, %
Neck	0	0	7	7	4	82
Shoulder	2	0	7	44	4	43
Upper back	0	0	0	7	3	90
Upper arm	1	0	0	12	2	86
Elbow	12	1	1	31	10	45
Forearm	9	1	1	19	1	69
Wrist	39	0	0	31	5	25
Lower back	1	0	2	37	2	58
Hip	2	0	0	2	1	95
Knee	12	1	0	21	17	49
Ankle	5	1	1	16	5	72

Apart from musculoskeletal pain, some of the respondents also mentioned that they had experienced other musculoskeletal symptoms, such as loss of strength, stiffness, fatigue, numbness, and swelling on the 11 body locations (see Table 5). However, majority of the respondents highlighted that they did not receive any musculoskeletal symptoms at various parts of their body.

From the interview discussions, the interviewees explained that the construction industry involves a lot of laborious work, which is not surprising to find that the major causes for work-related musculoskeletal symptoms are repeated tasks, and transport, lifting or moving heavy materials or equipment. It should also be noted that because of the lack of training and education to workerson the work-related musculoskeletal symptoms, they are not aware of the seriousness of work-related musculoskeletal symptoms, noted by an interviewee.

3. Recommendations

Based on the interview, discussions with workers, several recommendations are suggested to minimize work-related musculoskeletal symptoms in the construction industry:

- to provide regular breaks during construction activities for avoiding pains and symptoms occurred due to repetition of the work;
- to provide induction training and education to each worker in ensuring the understanding the symptoms and its seriousness;
- to provide good housekeeping on site for reducing unnecessary accidents and symptoms occurrence;
- to provide leave days for any symptoms occurred in supporting workers, take necessary rest when the symptoms occur.

4. Conclusions

This paper investigated frequency and continuality of work-related musculoskeletal symptoms for construction workers. A questionnaire survey and structured interviews were conducted. It was found that the musculoskeletal symptom is common among most construction workers, practically in their upper extremities and lower back. All respondents reported that they had experienced at least one musculoskeletal symptom in the 11 body locations including neck, shoulder, upper back, upper arm, elbow, forearm, wrist, lower back, hip, knee, and ankle. Recommendations to reduce problems occurred for work-related musculoskeletal symptoms were also discussed.

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STATYBOS DARBININKŲ GRIAUČIŲ IR RAUMENŲ PATOLOGIJOS DARBE DAŽNUMAS IR TĘSTINUMAS

I. W. H. Fung, V. W.-Y. Tam, C. M. Tam, K. Wang

S a n t r a u k a

Profesinės sveikatos ir darbų saugos atžvilgiu griaučių ir raumenų patologija yra rimta problema, į kurią daugelis statybos darbininkų nekreipia dėmesio. Atlikta nedaug tyrimų, susijusių su griaučių ir raumenų patologija darbe. Tai susiję su statybos sektoriais. Šio straipsnio tikslas – atlikti vietinių statybos darbininkų griaučių ir raumenų patologijos darbe dažnumo ir tęstinumo studiją. Atlikta darbininkų apklausa taikant anketas ir struktūriškai apibrėžtus pokalbius. Nustatyta, kad griaučių ir raumenų patologija yra įprasta daugeliui statybos darbininkų. Visi respondentai minėjo, kad yra patyrę mažiausiai vieną griaučių ir raumenų simptomą vienuolikoje kūno dalių: kakle, pečiuose, viršutinėje nugaros dalyje, viršutinėje rankų dalyje, alkūnėje, dilbyje, rieše, apatinėje nugaros dalyje, klubuose, keliuose ir kulkšnyje. Aptartos rekomendacijos, kaip sumažinti griaučių ir raumenų patologiją, susijusią su darbine veikla.

Reikšminiai žodžiai: griaučių ir raumenų patologijos darbe, statyba, Honkongas.

Dr **Ivan Wing Hong FUNG** has been working at the City University of Hong Kong since 1996. After completing his undergraduate study in Building, he worked as a graduate assistant in the Department. In 2004, he became a lecturer of the Department after he had completed his PhD study in Construction Safety & Health Management. Last years, he was engaged in various researches on construction project and safety management. Now, his major research is about Multilevel Site Layout Planning in 3D Visualization. His research interests include Construction & Project Management, Engineering Surveying, Engineering Education, Automation in Construction, Industrial Safety Psychology, SHEQ (Safety, Health, Environmental & Quality) Management and Risk Management.

Dr **Vivian Wing-Yan TAM** is a Lecturer in the Griffith School of Engineering at the Griffith University, Australia. She received her PhD on recycling concrete waste at the Department of Building and Construction in the City University of Hong Kong in 2005. She is invited as Editorial Advisory Board member for Construction and Building Materials, Elsevier, United Kingdom and The Open Construction and Building Technology Journal, Bentham, United States. She has been developing her research interests in the areas of environmental management in construction and sustainable development.

Prof **Chi Ming TAM** is a Professor at the Department of Building & Construction in City University of Hong Kong. He is a Fellow Member of the Chartered Institute of Building, Fellow Member of the Hong Kong Institute of Construction Managers and Member of the Hong Kong Institution of Engineers. His research interests include productivity studies, safety and quality management, use of information technology in construction and education, and construction materials.

Kang WANG is a Research Associate at the Department of Building and Construction in the City University of Hong Kong. Before that, he had several years experience of working in the Project Design Engineer in China Aeronautical Project and Design Institute. His research interests include the performance of recycled aggregate concrete utilization, especially in heavy constructions, and the indoor environment concerned the people inside the buildings and constructions.