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COMPUTER RELATED MUSCULOSKELETAL INJURIES

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ABSTRACT

Repetitive Stress Injury can be truly regarded as a modern day epidemic, a gift of industrialization. We have conducted a study to find the prevalence of musculoskeletal injuries in computer professionals with the aim to present data on the problem. The initial data was collected by a self administered questionnaire enquiring about years of work and per day working hours, symptomatology with their duration and severity, their own appreciation of work output. These individuals were assessed; relevant investigations and different modalities of treatment were advised. The study was conducted in one of the leading information technology company. A total of 1159 questionnaires were collected. Six hundred and twenty four (53.8%) had at least one positive symptom. 46.6% had stage 1 symptoms, 38.5% had stage 2 and 8.1% had stage 3 symptoms at the time of presentation. Two hundred and six patients were examined clinically by the senior author and a definitive clinicoanatomical diagnosis could be made only in 43 patients. Median age in our study group was 24 years. Ninety eight (22.17%) of positive patients concluded decrease work output due to their symptoms, but only 50(11.3%) patients had consulted a doctor. Two hundred four (46.15%) of patients contributed their symptoms to an ill designed workstation. We conclude that repetitive stress injuries are a definitive problem in computer professionals. The median age in our study group was lower than many international studies. Nearly half of these patients were in stage 2 and stage 3 at presentation.

KEYWORDS : Repetitive stress injury, cumulative trauma disorders, computer related injury

In the last decade, there has been a phenomenal rise in the number of otherwise healthy, young computer users, who have developed painful, debilitating and sometimes disabling condition known as Work Related musculoskeletal disorders or Repetitive stress injury. These refer to a constellation of work related symptoms common in computer workers due to incessant work in a static posture with highly repetitive actions such as typing on a keyboard. Pain in workplace is not new for has been described long back in association with different occupations (Damin, 1998; Melhorn, 1998).

Work related conditions have multifactorial causes, with work activities or conditions significantly contributing to the development, exacerbation, or acceleration of diseases but not acting as the sole cause (Melhorn, 1998 and 2004.).

Symptoms typically involve the neck and upper limb (shoulder, arm, elbow, forearm, wrist and hand), but any part of the body may be affected, including upper and lower back, head, chest, jaws and legs (Melhorn, 2004.). It is a diffuse involvement of muscle, fascia, tendon and neurovascular structures ((Melhorn, 1998; Sjogaard, 1998; Novak and Mackinon, 1998; David, 1998). Computer professionals sitting for long hours, involve prolong static loading of muscles of the neck and shoulder area that stabilize the arm so that precise repetitive motion can be performed.

There has been an exponential rise in the number of computer professionals in India. A recent study has shown that there are about 7.5 million such professionals, and the count will cross 10 million by the year 2010. Everyday many such people present with symptoms in which specific diagnosis is difficult to reach but can be contributed to their work environment and posture.

There have been plenty of research work done in the western world on this condition (Melhorn, 2004), but no specific data is available in the Indian context, especially in regards to computer professionals, who are at maximum risk of developing the disorder because of there work demands and working environment.

We undertook a prospective study with the aim to look into the epidemiological picture of computer related musculoskel et al., disorders in computer professionals, to obtain a better understanding of extent of severity of this condition and to assess the stage of injury at the time of presentation.

MATERIALS AND METHODS

This study was started as a pilot project conducted on computer professionals working in different departments in our hospital offices. Following the results, the main study

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was conducted after institutional ethics committee approval, between July 2008 and July 2012 at a leading information technology company.

The initial data were collected using a self-administered questionnaire enquiring years of work including the number of hours spent in front of computer, details of symptoms, any previous treatment, and their satisfaction from their workstation. Absenteeism due to symptoms and their appreciation of work output decrement due to these symptoms was also recorded. All those patients working daily on computers and having symptoms everyday continuously for more than four weeks were included in the study.

People working on computers and also involved in other heavy manual work during working hours were excluded from study. People who have developed symptoms before their job started were excluded from study. Also people with underlying connective tissue disorder, congenital, inflammatory or infective disorders or in whom symptomatology is attributed to some trauma or accident in past were excluded from study.

Patients were grouped into different stages as per Damany and Bellis staging system

(Table 1). These individuals were called up according to symptoms severity, assessed according to their symptomatology by the senior author, relevant investigations and different modalities of treatment were advised.

RESULTS

A total of 1159 completed questionnaires were analyzed between July 2008 and July 2012. Out of these, there were 799 males and 360 females in the study group. At least one positive symptom was reported by 624 subjects (53.8%).182 patients were excluded based on exclusion criteria. Hence the total numbers of positive cases were 442(38.1%).Out of this there were 300 men (37.5% of male study population) and 142 women (39.4% of female study population). Total of 206 (46.6%) positive cases included in the study were examined by the senior author.

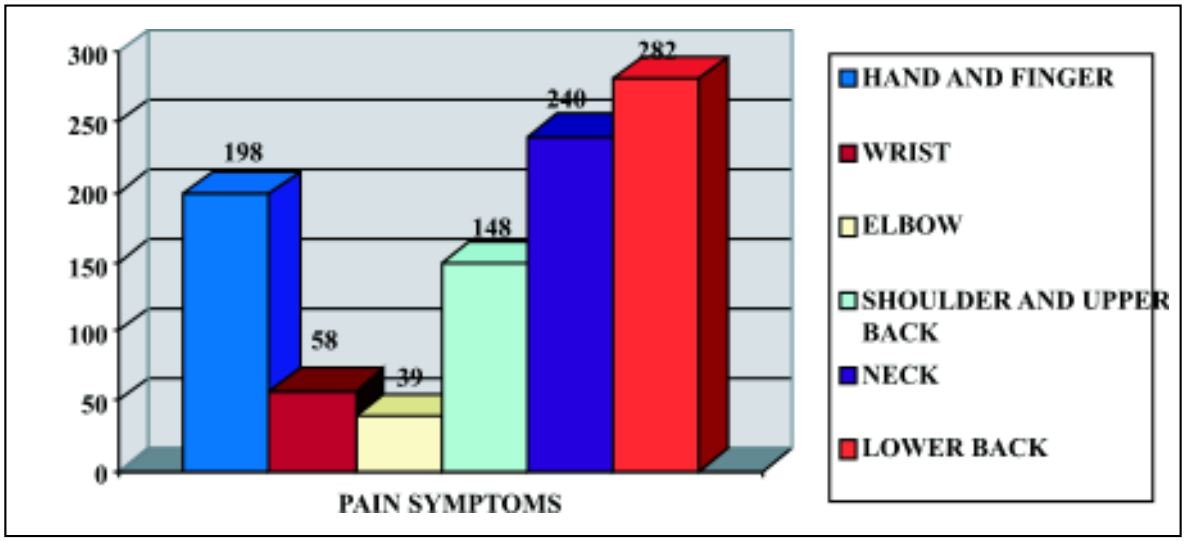
Median age in our study was found to be 24 years. 22.17 %(98) of the patients felt that because of the symptoms their work output had decreased. The median numbers of hours of continuous work on computer after which break taken was found to be 2 hours. 47.5%(211) of the professionals confessed that they did not take these microbreaks.7.5 %(33) of the patients had taken leave from there work because of there pain symptoms .Only 50 (11.3%) had shown themselves to a doctor for their pain symptoms previous to our study. 204(46.15%) of patients contributed their symptoms to an ill designed workstation and poor posture due to the same.

Symptoms at the time of presentation were staged according to Damany and Bellis staging and stage 1 symptoms were seen in 236(53.4%), stage 2 in 170 (38.5%) and stage 3 symptoms in 36(8.1%) of the patients. Low back pain was the most common presenting symptom seen in 282 (63.8%) of the patients followed by neck pain in 240(54.3%).Elbow pain was least commonly expressed symptom seen in only 39(8.8%) of the patients(Graph 1).

A definitive clinical diagnosis could be made in 43(9.7%) patients including Carpal tunnel syndrome in 12 patients, de Quervain's tenosynovitis in 6, extensor tendonitis in 2, ulnar collateral ligament of wrist affection in 1, lateral epicondylitis in 6, medial epicondylitis in 1, cubital tunnel syndrome in 5, thoracic outlet syndrome in 8,and bicipital tendonitis in 2 patients. In most of the cases, diagnosis was made on clinical grounds, but wherever required, specific investigations to those particular cases

Table 1 : Damany and Bellis, 2001 staging system used in this study

Stage	Symptoms	Duration of recovery with adequate treatment
Stage 1	Pain during work that eases off as soon as you leave the job	Recovery in days or weeks
Stage 2	Pain that goes home with you and interferes with daily activities, but disappears by the morning	Recovery in months
Stage 3	Pain, tingling or numbness that wakes you up and stays with you all day and night	Recovery in several months



Graph 1 : Distribution of the pain symptoms as expressed by the computer professionals is tabulated in the graph

were asked for, and appropriate treatment was given for the same.

DISCUSSION

India is standing at the verge of developing a modern epidemic- a gift of industrialization; in the form of repetitive stress injuries in computer professionals. With the boom in the software industry and more number of people joining the sector, the number of people at risk is increasing. These people are healthy, young, educated individuals who suffer from repetitive stress injury inadvertently.

In our study, 38% of the people had at least one symptom, which was persisting daily for a minimum period of continuous four weeks. There was no gender preponderance in our study group with 37.5% men and 39.4% of the women being affected. Median age of the affected study group was found to be 24 year, which was very less as compared to most of the data from the western world which shows age at which symptoms appear to be between 40 to 50 years1. The aftermaths of such illness in these individuals not only cause affection to the patient but also to the industry in the form of decreased productivity and quality, lost wages, absenteeism, doctor visits, cost of medical procedures and ergonomic modifications, compensation expenditures and money spent in recruiting and training new staff (King and Szabo, 1998). 22.17% of the patients in our study concluded that their work output has decreased because of their pain symptoms and 7.5% of the patients had actually taken leave from their work because of the pain, which accounts for the direct losses to the industry.

Significance and effectiveness of taking microbreaks from continuous monotonous repetitive work, in reducing the symptoms is well known (Damien, 1998; Melhorn, 1998). The median number of hours of continuous work on computer after which break was required, as expressed in questionnaire was found to be 2 hours, but only 52.5% of the people concluded that they actually took breaks at that time and rest contributed their inability to take such breaks, to heavy workload. Inspite of the fact that such a large proportion of the workers are affected, only 11.3% had shown themselves to a doctor for their pain symptoms previous to our study. 46.6% of the patients were already in stage 2 and 3 at the time this study was conducted. The victims are not compensable in India and this can be one of the causes of low reporting of the condition as no financial gain is the offering. Most of the professionals underestimate the seriousness of the condition and seek medical help only when the symptoms are severe. This clearly shows the ignorance of the worker as well as the industry, in recognizing the early symptoms, its implications and future complications. Patients who sought treatment from the doctor, had stage 2 and 3 illness. Early identification of the

condition and competent medical intervention is critical to arrest and reverse the injury in its early stages (Halder 1987, Melhorn, 2004). Unfortunately, large numbers of Indian medical professionals are not equipped to diagnose or treat this condition, since it is a relatively recent phenomenon here. Ergonomics, repetitive stress injuries and myofascial disorders do not even find a passing mention in the Indian medical curriculum. 46.15% of the patients attributed their symptoms to a poor workstation design, which includes proper height of the monitor with the level of the eye, the distance between the chair and computer, the height of the table and chair, footrest, unyielding back support etc. to mention a few. They concluded that if workstation modifications are brought about, their symptoms can be relieved of. One of the possible explanations for these basic inadequacies of the workstation is the fact that, while introducing ergonomic modifications, usually the guidelines followed by the industry, are those given by the western world. The built, structure and resilience of Indian population is different from the western world and this fact is usually ignored. Each individual has different needs. Two similar people working on similar workstation can, and do point towards different inadequacies, thus the role of individualization of the workstation and ergonomic modifications can be the key to resolve such problems. Myofascial pain symptoms were the most common findings in the present study. Low back pain was the most common finding present in 63.8% of the symptomatic people. Neck pain was observed in 54.3%, shoulder and upper back pain in 33.5%, elbow region pain was seen in 8.8%, wrist in 13.1% and hand and finger pain was seen in 44.8% of the symptomatic patients.

From our study, we conclude that computer related injuries are a significant cause of morbidity to the worker as well as the industry and 46.6% of the affected populations were already in advanced stage (stage 2 & 3).Also this condition seems to affect younger age computer professionals in India, comparing to western population

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REFERENCES

Christine B.Novak, Susan E.Mackinon: Nerve injury in repetitive motion disorders: Clin Orthop Rel Res : **351**: 10-20.

Damien C.R., 1998. Ireland: Australian Repetitive Strain injury phenomena: Clin Orthop Rel Res. **351**: 63-73.

David A., 1998. Allan: Structure and physiology of joints and their relationship to repetitive strain injuries: Clin Orthop Rel Res **351**: 32-8.

David A. Hart, Joanne M. Archambault et al., 1998. : Gender and neurogenic variables in tendon biology and repetitive motion disorders: Clin Orthop Rel Res **351**: 44-56.

Gisela Sjogaard, Karen Sjogaard: Muscle injury in repetitive motion disorders: Clin Orthop Rel Res : **351**: 21-31.

J.Mark, 1998. Melhorn: Cumulative trauma disorders and repetitive strain injuries: Clin Orthop Rel Res **351**:107-126.

J.Mark, 2004. Melhorn: Repetitive Stress Injuries: Fact or fiction: Current Opinion in Orthopaedics. **3(5)**: 251-8.

J.Mark Melhorn: Occupational orthopaedics this millennium Clin Orthop Rel Res: **385**:23-35

J.Mark Melhorn, Peggy Gardner, 2004. How we prevent prevention of musculoskeletal disorders in the workplace: Clin Orthop **419**: 285-296.

Kenneth J.King, Robert M. Szabo, 1999. Repetitive stress injury: Diagnosis or self fulfilling prophecy: J Bone Joint Surg: **81A**:587-91.

Nortin M. Hadler, 1987.: Regional Musculoskeletal diseases of the low back, Cumulative trauma versus single incident: Clin Orthop Rel Res **221**:33-41.

Robert M. Szabo, 1998. Carpal tunnel syndrome as a repetitive motion disorder: Clin Orthop Rel Res **351**: 78-89.