

Man Machine Conflict a Posture Related Musculoskeletal Disorder a Nigeria Perspective

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Abstract

We have seen significant growth in the office-bound service industries in recent years with many office workers spending longer periods at their desks. We have also seen a subsequent increase in the reported incidence of posture-related musculoskeletal problems. The issue of chair design has therefore come under the spotlight. With sponsorship from a large (office) furniture manufacturer, interviews and direct observations were carried out to determine how people actually use their chairs and to pose questions about their working posture in light of recent ISO standards and the DSE Regulations. It was found that the majority of people chose not to use the adjustments available. It was concluded that the answer to the problems of seated posture lies not in the provision of over more sophisticated seating, but in addressing other critical ergonomics issues.

Keyword: Workstation, Conflict, Musculoskeletal Disorder, Man, Posture

1. Introduction

As the service sector expands and more employees become office bound, organizations are increasingly realizing the importance of seating and office ergonomics. Seven years on from the Health and Safety (Display Screen Equipment) Regulations (1992) – the DSE Regulations-and in light of the recently published ISO 9241 Part 5, it is time to review how people actually use their chairs in the real world. This paper will outline the variability in seating controls and controls and discuss the use of seats. The paper is based on a study carried out for a large chair manufactures into how people use their chairs, their preferences and their perceived requirements.

The growth in service industries has been rapid. In addition, technology has advanced to the point at which many jobs can be done just with a PC such that we rarely have to leave our desks. Consequently, many of us have become Homo Sedens, (after Mandal, 1981) yet without any awareness of how to sit or the consequences of inappropriate sitting. Thus, whilst using the PC might be efficient for both our working and social life, it can have serious consequences for our longer term health.

The issue is wider than just poor occupational health. As a society were are becoming more litigious. In the past were might have accepted a bad back as natural wear and tear, with no-one to blame, now, people are looking for causes of their discomfort and identifying who might be to blame. This inevitably brings the focus onto the chair.

It has long been thought that a seated posture is “best”. One of the earliest pieces of legislation dealing with seating (the Factories Act) stated that if a job could be done sitting it should be. This general feeling still remains. Even as late as 1992, there is an implicit assumption within the DSE Regulations that we should sit to use the computer and that it is the features of chairs which matter.

Manufactures have recognized that seating is neither simple nor trivial. Many seat designers have provided and promoted a huge range of features. These are supposed to promote and support good posture and ensure compliance with relevant legislation.

1.1 The Legal Context

It is not only the manufactures who have obligations to provide appropriate equipment. Every ‘user’ of display screens equipment and every ‘workstation’ (whether it is used by a ‘user’ or not) should be provided with a suitable chair. The chair, per se, must meet the minimum requirements laid down in the Schedule to the DSE Regulations. The user must also be provided with the appropriate training, information and supervision. The Regulations provide a framework aimed at helping employees to ensure that they are providing the best situation for their employers to ensure that they are providing the best situation for their employees “as far as is reasonably practicable”. The schedule to the DSE Regulations places mandatory requirements on organizations. It states that the work chair should be stable, provide easy freedom of movement and a comfortable position. It specifically states that the seat should be adjustable in height, the seat back should be adjustable in height and tilt

and that a footrest should be provided to any user who wants one.

1.2 The Standards Context

EN ISO 9241:1999 is a multi-part International Standard related to the use of visual display terminals. Part 5 was produced in March 1999 and came into effect on 15th July 1999. It concerns workstation layout and postural requirements. A number of issues are addressed by this part of the standard. These include the philosophy that work organization, job content and furniture design should encourage user movement, ensuring that prolonged static posture is minimized and that voluntary adjustments in posture can be made. More specifically the standard includes the following requirements with regards to chairs and posture in particular.

The seat should be adjustable in height where the appropriate height is that of the political height plus the thickness of the footwear

Seat depth should be adjustable or suitable for the intended user population

Seat width should be wider than the width of the hips

Seat angle should allow users to vary their posture forward or rearward

Set pan and back support should be independently adjustable

Castors should allow freedom of movement over short distances.

Ability to swivel should allow users to rotate their body without rotating their spine or twisting the torso

Back rest should provide support for the back in all sitting positions and particularly for the lumbar region

Arm support should not restrict the preferred working posture or ease of access to the workplace.

ISO 9241-5 also states that users should be informed why and how the furniture and other devices should be adjusted and that it is desirable to design furniture to minimize the need for training and information.

1.3 The user of chairs

We were approached by a large chair manufacturer interested in knowing how chair are really used. They wanted to know what sort of features users like, make use of, understand the point of, etc and to understand how users actually sit whilst working. We had evidence that the quality of seating provision, particularly amongst large organizations had significantly increased in recent years. However, as recently as 1999 musculoskeletal disorders were highlighted as a major source of occupational ill health within Nigeria, with many of the sufferers employed in sedentary work.

2. The Study

Some manufacturers appear to be of the opinion that increased functionality is required by users. We were concerned that rather like the development of pocket calculators and advanced telephone systems, the functionality might be there without actually meeting user requirements. How many of a chair's features are redundant from a user's perspective and how important is this? We determined to study users in a variety of work contexts, to review their actual use of the chair and to determine the real issues associated with the provision of seating.

The study was carried out using a combination of interviews and observations. 25 participants from 6 different organizations were studied. A one hour video recording was taken of each participant during their normal working day. These were analyzed by identifying the posture adopted (against a simple set of six options), the task being performed and the posture duration in the hope of providing an understanding of how frequently postures and tasks are changed and exactly how chairs are utilized. Questionnaires were also completed in order to establish how the users felt about their chair, how frequently they made adjustments and their knowledge about the adjustments.

3. Findings

Once the data had been analyzed we drew a number of conclusions based on the general findings about chair use and more specific comments about the features available.

It was found that 64% of participants spent over 70% of their working day sitting, which served to emphasize the importance of adopting an appropriate range of postures. One of the most surprising findings of the study was that over a quarter of participants had more than one desk but only one chair which meant that they had to physically move their chair. 'Hotdesking' i.e a desk and chair used by a number of people, was also common e.g an internet machine which is used by a number of people each day. It was found that desks or chairs that were shared were generally of poorer quality.

The majority of participants were engaged in a number of tasks which even within a one hour period involved them changing posture. More importantly it was noticed that there was a correlation between the task and the posture adopted whilst carrying it out. For example, whilst using the telephone the majority of participants leant

forward and leaned on the desk, taking their back away from the back support and losing lumbar lordosis. Many of the participants had chairs with a great number of features, however most features were not used. Users reported that on initial reception of a chair they would make adjustments as necessary, but usually just seat height. After that the adjustments were rarely used unless they had been noticeably changed by somebody else. Approximately half of the participants had chairs with armrests and although some reported their importance other stated they were a hindrance. It was recognized that inappropriate arm rests can prevent good posture. Several participants had seat depth and seat tilt adjustment but only one participant reported using the feature more than once. This could either be interpreted as the adjustment not being necessary or that the users were not aware of how or when to make such adjustments. Footrest use was high and it was noted that the provision of such equipment was good and if anything over prescribed. Another interesting result was that people do not question their chair set-up even when they are experiencing discomfort! Indeed, users typically ask for a “better” chair before exploring the options on the existing chair.

4. Conclusion

Sophisticated seating is not the simple answer to improved working postures. Instead, a number of related issues need to be addressed.

A multitude of features are of no benefit unless the user is aware of how to use them, which highlights the importance of education and training. Manufacturers must either provide simple instructions or preferably, more obvious functionality, however, this does not ensure that the user actually utilizes them. Most importantly, emphasis must be placed on encouragement of postural adjustment both in terms of seating adjustments and movement away from the workstation. This can be either by physical reminders, incorporated as part of a daily routine or as a result of educating the user in how and why adjustments should be made.

Within procurement, user trialing should be used to ensure that the proposed seating option genuinely meets both user and task requirements and is compatible with other workstation elements.

The impact of working postures must not be seen simply as function of furniture provision and use. The duration and nature of adopted posture will have a direct link with task design work allocation. Regulation 4 of the DSE Regulations makes it an explicit requirement to manage users' work routines. This is not simply to limit time at the keyboard, but time at the workstation generally. Ultimately, appropriate use of a chair relies on a number of factors which need to be considered and understood by the user and promoted, managed or brought to their attention by their employer (line manager). Not only is this sound ergonomics, it is the law!

To return to the functionality of the chair itself, limited adjustment may be preferable until such time as users are capable of using more sophisticated features (i.e until general awareness improves). This reflects not only on the need for education within the workplace, but also in schools, etc. In an ideal world we would have infinitely adaptable chairs utilized by fully aware workers, but in reality a compromise must be sought. Employers must ensure that costly features are not simply redundant and that users are actually able to utilize them. When making purchasing decisions it may well make sense to look at higher quality, lower specification chairs than multi-featured but lower quality chairs at the same price point.

There is a school of thought that cheap; less comfortable chairs may actually be beneficial in reducing static load by encouraging fidgeting. We would dispute this however as discomfort leads to postural and other behavioral changes, together with muscle tension which can lead to musculoskeletal problems.

It would seem that a change of approach is required on seating in general. Given that users do not utilize what they currently have, the answer is clearly not even more sophisticated furniture. It is imperative that the users of the chairs are not aware of the implications of good posture but are also involved in seating selection (via controlled user trials) and training in chair use. Posture related MSDs will continue as long as we tolerate anatomically poor postures and the prolonged static postures often associated with modern office work. Education is vital, but it must be backed up with effective job design and appropriate supervision both on a day-to-day level and within the risk assessment process.

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