Application of Work Ergonomic Analysis in the return to work process of employees absent due to Work Related Musculoskeletal Disorders (WMSDs)

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1. Introduction:

According to the WHO (World Health Organization), the health disorders related to work are divided into two categories: occupational diseases and work-related diseases. Based on this classification, occupational diseases are those inherent to the work process due to exposure to agents arising from work activities (when there is a specific causal agent, for example, crystalline silica, which can cause silicosis). On the other hand, the work-related disease category includes diseases with multiple causal agents, such as those related to working conditions, for example, the WRMSDs (Work Related Musculoskeletal Disorders).

The increase in the rate of employee absence due to Work-Related Musculoskeletal Disorders (WRMSDs) has urged the global society to deal with this problem since this illness is considered a major public health problem.

Epidemiological data of work-related diseases shows high incidence of WRMSDs, in addition to psychological disorders and accidents, the major causes of sick leave and which have been associated to job stress and demands. Job tasks have increasingly demanded initiative, communication and exchange of knowledge and ideas between employees, i.e., different ways to approach the action and skill recognition process (MAGGI, 2006).

According to the Brazilian Labor and Employment Ministry, Brasil (2008), WRMSDs are work-related diseases that result from overuse of the musculoskeletal system and lack of recovery time. It is also known that the development of these diseases has multiple causes and different risk factors. Social Security statistics show that the WRMSDs remain the most common causes of absenteeism due to occupational injuries and can occur in different types of activities (BRASIL, 2013).

The number of accidents at work linked to MSDs in Brazil in 2011, as reported by the CAT (Work Accident Report), is 15,083 cases, and the most common codes provided by the ICD-10 (International Classification of Diseases Related Health Problems) referred to shoulder injuries, synovitis and tenosynovitis, back pain, upper limb mononeuropathies, and other intervertebral disc disorders (BRASIL, 2011).

The difficulty to identify the source of pain in the initial phase of a musculoskeletal disease, makes it hard to establish a relationship between this type of disease and work activities. This fact, along with the concern about the psychological and biomechanical aspects, disregards the psychosocial aspects, which helps arouse the prejudice against those absent due to WRMSDs.

The diagnosis of employees with WRMSD is followed by the absence and return to work. This process occurs through vocational rehabilitation, which, in Brazil, is included in the constitution to allow workers with WRMSDs to participate in the labor market and in the context in which they live. Therefore, the Vocational Rehabilitation Program of the National Institute of Social Security (INSS) (BRASIL, 1988) should provide workers with occupational and social rehabilitation.

However, this program does not include important factors to ensure an effective vocational rehabilitation and a successful inclusion or return of workers to their work environment (MAENO, TAKAHASHI and LIMA, 2009).

Workers affected by WRMSDs have found it difficult to return to work because, besides their functional limitations, they also face relationship problems with their peers and the management team.

With regard to the reinstatement of people at work, the World Health Organization (WHO) presented the International Classification of Functioning, Disability and Health (ICF) (WHO, 2001), which suggests to locate an understanding of disability at the intersection between the biological body and social and institutional structures.
According to Takahashi (2006), vocational rehabilitation alone does not guarantee the required improvements to ensure an effective return to work. Therefore, and given the understanding that the Work Ergonomic Analysis seeks to acknowledge and understand the real work situation in order to effectively change it, the objective of this study was to investigate and understand the applications of the Work Ergonomic Analysis (WEA) in the return to work process of employees absent due to WRMSDs through a case study.

2. The return to work process in the Brazilian context

According to the Article 136 of Decree No. 3048/99 of the Social Security, vocational rehabilitation is a Social Security service provided by the INSS (National Social Security Institute) to provide the rehabilitation or occupational readaptation for the return to work of employees under disability insurance absent from work due to a disease or accident.

Employees covered by Social Security, after evaluation by a medical expert, will start receiving the Vocational Rehabilitation Program services, and regardless of age, they must, at-risk of benefit suspension, take part in this program, which is recommended and funded by National Institute of Social Security (INSS), and therefore does not establish a minimum required contribution for the employee to be entitled to its benefits.

According to Rossi (2008), the Vocational Rehabilitation Program offered by Social Security has been facing difficulties due to high demand and a small team of specialized professionals, in addition to the financial difficulties of rehabilitation programs. The author adds that, if the companies had an integration approach with the INSS, it would facilitate workers’ return. Arnetz et al. (2003) argue that the longer the work absence, the smaller the probability of returning and remaining at work.

According to Toldrá et al. (2010), upon returning to work, workers are often placed in functions incompatible with their medical and functional restrictions and/or their level of education and professional qualification, or are not allowed to participate in the production process. Therefore, they feel left out, which reinforces the feeling of failure.

According to Maeno, Takahashi and Lima (2009), the Ministry of Social Security has not presented proposals including important factors to ensure an effective vocational rehabilitation and a successful inclusion or return of workers to their work environment.

Several studies have detected major failures to be overcome by public policies on workers' health care. There is high demand for vocational rehabilitation, and the program is funded only by intersectoral policies with technical cooperation and agreed goals between the actors involved in the return to work process (SALDANHA et al., 2013).

Lancman et al. (2013) highlight that workers returning from a leave should be reinstated to their former position and job function or be placed in a function compatible with their health conditions and working skills. The success or failure of this process depends on several aspects such as: work organization, interpersonal relationships, work capacity, professional training. The successful return to work and remain at work is related to the involvement of various bodies, areas, and social and professional actors who should focus their actions towards common and collectively predefined goals. Otherwise, the workers will be placed in functions incompatible with their work skills, training, and qualifications or will not be allowed to participate in the production process.

When people are absent from work temporarily due to a disability caused by their work activity, especially WRMSDs, they are often deprived of their rights of workplace integration.

As required by Social Security regulations, after returning from a sick leave, there is an evaluation visit of the INSS rehabilitation program team. However, these evaluations are specific and restricted to cases of serious resistance to returning to work. Furthermore, this team fails to negotiate over the creation of new job positions with the companies since there is an overall lack of knowledge about the risks that may exist in the workplace, in the process, and in workplace relationships; therefore, very few workers remain in the new functions. This difficulty in negotiating with companies often leads to dismissing the worker or he/she has to be reevaluated by a medical expert, making the vocational rehabilitation process ineffective (SIMONELLI et al., 2010).

The lack of a joint effort between businesses and public agencies penalizes workers, a fact that indicates the very little importance given by public authorities to work-related health issues since they have been addressed separately but are actually inseparable (SIMONELLI et al., 2010).

Return to work is as a challenge in terms of the conditions that provide guidance to workers absent due to WRMSDs since there are facilitators and barriers involved in this process.
3. Methods and Techniques

A case study was carried out in duty stations that grant sick leave and those that reinstate workers after absence due to WRMSDs. The case study approach allows for the broad and detailed knowledge of one or few objects, depicting the reality and the complex socio-cultural conditions of the situation studied (YIN, 2014).

According to Yin (2014), case study is an empirical research method that investigates a contemporary phenomenon within its real-life context. It is a type of exploratory research that allows for an investigation preserving the significant characteristics of real life events.

Case study is a research strategy that can be used when the initial research question is "how" or "why" in order to explore situations in which the intervention being evaluated has no clear, single set of outcomes. (YIN, 2014).

Phenomenology and logics analysis were used in this study for interpretation and understanding of events, seeking to reduce the distance between context and action and between theory and data collected (BERTO, NAKANO, 1998). The work activity analysis, one of the premises of the EWA (Ergonomic Work Analysis), was used as the methodological approach in the study case.

The EAW (Ergonomic Analysis of Work) involves representations of the work performed and the work of those who plan activities in order to understand and possibly turn it (WISNER, 1994 and GUÉRIN et al. 2001). It is based on systematic observation of participatory work situations to understand how it is actually done.

This method observes human behavior, analyzing in detail every gesture, communication, verbalization, posture, gaze direction, attitudes, operation methods, and cognitive procedures, i.e., anything that relates the worker to an activity. According to Wisner (1994), "All work activities must be observed, whether assigned, unforeseen, or even unconscious" (WISNER, 1994, p. 94).

Guerin et al. (2001) argue that the EAW takes workers into consideration, individually and collectively, when assessing health, skill development, and at the same time, in the establishment of the relationship between conditions, activities, and the results of work by functional integration of work activities. In addition, according to these authors, EAW is based on the work activity point of view, which presupposes its understanding due to the analysis of its physical, cognitive, and organizational dimensions.

Therefore, performing an activity is what the worker actually does to be able to handle the work assigned or the tasks that should be performed, according to the company plans. It involves all the worker's actions to perform a portion of the production work and the interaction of the worker with the artifacts to accomplish the tasks assigned by the company. "A work activity occurs in real conditions and produces effective results" (CAMAROTTO, et al., 2013).

Based on these concepts, an analysis was performed using a camera, a notepad, and pen to take notes of the situations that arose during the course of the work. Using these data, a task description file was created, including the photos (step by step photos of the activity), details of what is done and how the worker performs the activity, and the worker and researcher's observations (Figure 1).

![Figure 1: Task Description File](image-url)
In order to identify the work constraints, after creating the task description file, a Finnish manual, EAW (Ergonomic Analysis of Work), was applied for a detailed analysis and to improve the workplace, after identifying the ergonomic problems.

In addition to the case study, a semi-structured interview was conducted with the workers returning after sickness absence due to WRMSDs.

Minayo (1992) defines interview as a conversation between two people, conducted by an interviewer, in order to collect relevant information for a survey or research. It reveals personal, group, or an organization’s experiences evaluating daily activities, opinions, and motivations of history participants, protagonists of social facts.

4. Case Study

The case study was carried out in a metallurgical company that produces parts for the automotive industry in Brazil. The company has two main processes: casting and milling of aluminum iron alloy.

The return to work process difficulties faced by affected workers absent due to WRMSD motivated from the company to participate in this study. The analysis was performed in the duty station that granted the sick leave to the worker and in the one selected for the worker reinstatement. In addition, a semi-structured interview with a worker who returned to work after removal for MSDs was performed.

4.1 Duty station responsible for granting the sick leave: Oil lubrication tasks

The machine lubrication maintenance or paraffin refilling task was evaluated in the lubrication sector.

The machine maintenance activity is characterized by the physical effort made to push and pull a cart (containing three to six 18-liter buckets) a distance of approximately 100 meters (figure 2). The worker may have to perform this activity several times during the 8-hour workday, depending on the refilling demand of the milling machines.

Figure 2: Worker pushing the cart.

The worker lifts the heavy buckets (18 liters each) to fill them with paraffin (Figure 3) and to lubricate the machine (Figure 4). The operator grips the handle of the bucket with one hand, while the other hand supports it and pours the paraffin into the machine. Static contraction (isometric contraction) can be observed in the arms and back of the worker while he lifts the bucket and holds it as he pours down the product.
Moreover, the worker must check the machines that need to be refilled since the lack of paraffin can hinder production.

The worker takes turn performing this and other activities that are carried out in this sector.

4.2 Reinstatement duty station: Metal Ring Packing Activity

Metal ring packing task was evaluated.

Metal ring packing activity is characterized by the orthostatic posture adopted by the worker during the entire work day while wiping, packing, and placing the metal rings a box (Figures 5 and 6).

The ring wiping task requires full attention during 40% of the cycle, otherwise the rings may rust after packing.

Repeatability is diversified since the same cycles are carried out during the 8-hour work day.

4.3 Interview with a reinstated employee and validation of activity analysis

The interviewee J. has been working in the company for over 11 years, but a few months ago he was granted a sick leave due to WRMSDs. One month ago he returned to work and was reinstated in a duty station in a sector (packing) totally different from the one he used to work (lubrication).

He said that she had to have surgery on both of his shoulders, and according to some tests, he has a herniated lumbar disc and has been experiencing back pain.

According to the Vocational Rehabilitation Program (INSS), his activity restrictions include: avoid repetitive movements; avoid performing activities above shoulder level; avoid lifting objects weighing more than 5 kg.

The interviewee stated that he is not happy with the duty station selected for his reinstatement because he has had back pain after spending the entire work day standing up. He also reported feeling pain on his shoulder when cleaning the metal rings.

He said he would like to return to work in his previous duty station (machine lubrication), since could move around the company while doing his job. Now, in this new duty station, he feels like "a bird trapped in a cage".
He added that performing the same activity all day long, and the fact that he cannot take turns monitoring the machine with another worker (a common activity in other duty stations), makes him feel bad. Based on his responses, it can be said that the employee is unhappy with his work situation.

The interviewee stated that the injury to his shoulders and cervical spine was not caused by the activities he performed in the machine lubrication duty station, but rather by the extra activities he performed to help other workers in the company.

5. Discussion

The activities evaluated show that there have been significant changes for the workers in terms of their previous duty station and the reinstatement duty station.

There have also been changes regarding lifting and carrying loads between machine lubrication activities and packing activities. The worker stands the entire work day, which worsens his back pain. Moreover, the new task seems boring compared to that he used to perform in the machine lubrication duty station, which does not satisfy the employee, who claims to feel like his freedom was suppressed and his job has lost its allure.

An employee returning from a sick leave is usually reinstated to a position selected by the company, which seeks to fulfill the restrictions imposed by the INSS Vocational Rehabilitation Program. However, there is no follow-up during the reinstatement process.

Therefore, we identified a neglected employee dissatisfied with his new duty station, who has not been heard during this this adaptation process. This situation can lead to lawsuits and attract opportunists who seek to gain personal advantage.

The interviewee responses showed that the company overlooks the reinstatement process, which should be supervised by the Vocational Rehabilitation Program team (INSS) seeking to ensure the successful return to work of injured employees.

6. Conclusions

The Vocational Rehabilitation program of INSS does not guarantee the effective return of workers from sick leave due to WRMSDs.

The successful return to work of employees absent due to WRMSDs depends on the joint work of three social actors (company, employee, and Vocational Rehabilitation Program of INSS), who can benefit from discussing and making this process work.

However, the EAW is essential for a proper granting of sick leave and selection of duty stations for the worker's reinstatement since it enables understanding the jobs performed and a successful reinstatement with the necessary changes in this process.

The present study suggests need for further research for the development of a return-to-work model.

References


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