Influence of pedal use in developing of chronic low back pain and work disability

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ABSTRACT: Low back pain is a common dysfunction in workers, contributing to decreased quality of life and productivity. The aim of this study is to evaluate the influence of the pedal in industrial machines for developing chronic back pain, as well as the impact of back pain on quality of life and ability to work. The sample consists of 34 sewers of an automotive industry, divided into two groups: with and without using the pedal. Was applied to the scale of pain and disability of Quebec, the quality of life questionnaire (SF-36) and the Beliefs, Fear and Avoidance questionnaire (QCM). After descriptive statistics and inferential analysis, it was found that back pain does not suffer an influence statistically significant, use pedal. It is concluded that the workers back pain is not influenced by using the pedal, while causing a decrease in quality of life and increased fears concerning the failure.

1 INTRODUCTION
Is estimated that nearly two million Portuguese suffering from chronic pain. Only with the back pain, the costs with health care, absenteeism and loss in productivity, stand at around two billion euros per year (Figueiredo, 2008). Back pain has been defined as the activity intolerance due to lumbar symptoms or symptomatology of the lower limbs (Kendall, 1997). In addition to the time factor, the classification of low back pain should consider the function (Airaksinen et al., 2004) and the psychological and social aspects of pain (Van Tulder et al., 2000).

Currently, we can say that the pain is associated with chronic low back pain and functional disability, not directly resulting from the pain, but the existence of cognitive-behavioral change and environmental translated, into each individual as beliefs and attitudes, sometimes more disabling than pain itself (Waddell, 2004). According to Benard et al (1997), psychosocial factors related to employment and the workplace, can develop musculoskeletal disorders of the upper limbs and spine, particularly with regard to the perception of the performance of an intensive, monotonous with limited control, unclear and low social support work. With all technological advances, the incidence of occupational low back pain caused by overload on the lumbar spine has increased, leading to a number of physical disorders and financial losses caused by absenteeism, decreased productivity and therefore corporate earnings (Goumeens et al., 2006). The use of the pedal of the sewing machine may be a factor aggravating injury, or by the same driving force exercised repeatedly, or by the asymmetry of movement that might cause its use (Dellman, 2002). The design of the proper pedal, should also take into account not only the force needed to operate the foot, but also by the output biomechanics and kinematics of the foot pedal (Bullinger, 1991).

2 OBJECTIVES
The main objective of this study is to evaluate the contribution of the frequent use of the pedal in industrial machinery, to the development of chronic low back pain as well as determining the impact of low back pain in limiting the activities of daily living and work disability. Specifically we intend to know the relationship between low back pain and inability to perform activities of daily living and functionality; verify the influence of the use of pedal, bilateral or unilateral, for the development of limiting the activities of daily living and occupational health; assess the physical and mental component operators and finally check the beliefs of fear and avoidance, work-related.
3 METHODS

The study took place in a branch company of auto-mobile in the district of Avireo, specifically in the field of sewing, work stations operated in the standing position. This place was chosen for the job requirement and multi-task performed, as well as the representativeness of the population. The field study was conducted between April and May 2010.

For this study, it was considered a target population of workers of the company, who met the inclusion criteria: present some form of back pain symptoms, aged over 18 years who can read and write without cognitive and no pregnancy.

The sample was randomly chosen stratified each. The study population was divided into two groups: one group A, which does not use the pedal and to serve as control group) and sample B using the pedal. The last group was further divided into two subgroups: sample B1, which uses an alternating pedal and the sample B2 using the pedal in a unilateral fashion.

The study is descriptive-correlational and cross, in order to find relationships between variables at the same time you want to collect information regarding the frequency of health problems at the time of the study (Fortin, 1999).

After the process of contact and authorization of the company, the employees were informed about the purpose of the study, to collect informed consent daily signed. Participants were instructed as to the filling of the instruments chosen.

In total 100 questionnaires were delivered, only 80 have been collected and used in the study, 84 fully completed questionnaires. The confidentiality and anonymity were assured by assigning a number to each worker to protect your identity and your computer where they found the database was protected by a password.

The variable limitation of daily activities and functional, will be assessed using the scale of Low Back Pain and Disability Quebec, consisting of a measuring instrument composed 20 items, developed based on the conceptual model of disability ICIDH (Jette, 1994). The answers may be given on a numerical scale of 6 points, where 0 corresponds to no difficulties and 5 to the total inability to perform the activity. The score is calculated by simply proceed to the sum of each item. Values can range from 0 to 100, 0 being no failure and 100 total failure to perform these activities (Kopec, et al, 1996; Schopinetti et al, 1996).

We also used the reduced health questionnaire (SF-36) to assess the perception of health status. The SF-36 contains 36 items, grouped into eight dimensions and too physical. The SF-36 is split into eight dimensions such as physical functioning, physical performance, bodily pain, general health perception, vitality, social functioning, role emotional, mental health (Pain 2009).

Finally we applied the Questionnaire Fear Avoidance Beliefs (QCFME), self-administered, with 15 items on a single page, which are divided into two sub-scales: fear-avoidance and physical activity and fear-avoidance and work. This instrument is used for screening and quantification of fear-avoidance beliefs, and work-related physical activity in individuals with low back pain (Gonzalves, 2004).

Statistical analysis of the collected data was performed in Statistical Package for Social Sciences (SPSS) version 17.

4 RESULTS

The sample was composed of 84 workers females with a mean age of 36 years to a maximum of 57 and a minimum of 19 years presenting a normal distribution. Regarding working hours, all working were fixed shifts with 8 hours, with an average of 10.4 years of work.

The body mass index showed a percentage in the normal range, indicating a trend towards the decrease of the proportion of obese, according Data from the World Health Organization (Table 1).

This value representative of a slight excess weight, can be considered as a possible risk factor for the development of musculoskeletal injury association work and thus as limiting the generic health status of workers (Hellowa 1991).

In Table 2, the values of the sample of the percentage of the pedal to the total Quebec depending on the use or non-use foot pedal.

<table>
<thead>
<tr>
<th>Pedal</th>
<th>N</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without pedal</td>
<td>15</td>
<td>17.9</td>
</tr>
<tr>
<td>Right Pedal</td>
<td>30</td>
<td>35.7</td>
</tr>
<tr>
<td>Left Pedal</td>
<td>10</td>
<td>11.9</td>
</tr>
<tr>
<td>Bilaterally</td>
<td>29</td>
<td>34.5</td>
</tr>
</tbody>
</table>

There was greater use of the right pedal and pedal bilaterally pedal than the left.

Given the possible limitation of functional daily activities and there are no significant effect on the use of the pedal in the analysis of variance. Since the number of observations in each group is the same, we applied the test for independent samples, according to F test, with the result at 0.8 to 0.1 and there were no significant differences. Conducting Post-Hoc Tukey Test, to find the differences between the different uses of pedal, also revealed no significant differences for a result of 0.26.

The questionnaire applied fear and avoidance, comprises two sub-scales: fear-avoidance and physical activity (FA) and fear-avoidance and work (WR). A score above 15 on the subscale of physical activity QCFME was proposed as an indicator of elevated fear-avoidance beliefs for users with low back pain seek-rum primary care or osteopathic treatment (Fritz, 2002). A score of sub-scale work/employment QCFME than 34, is associated with an increased risk of these users do not return to work, while scores of less than 29 of the same sub-scale were associated with a decreased risk of their users do not return to work. Participants in the study have an average of 21.3.

There is greater use of the right pedal and pedal bilaterally pedal than the left.

In relation to SF36, the best health profiles were obtained in the Mental Health dimension, with values of 69.7, above the average used for the construction of the questionnaire with a sample of 1434 healthy individuals (Paix, 2005). The average values referred to below, are located in physical performance dimension (difference 27) followed by bodily pain scale (difference 23.9) (Table 6). The significance of lower scores for physical performance are described as problems with work other daily activities in con-sequence of physical health (Paix, 2005).

The mean of the study population are below the average reference for all health questionnaire except the item mental health in the study population has a higher average (69.7).

This survey showed an index of Cronbach's alpha of 0.91 in item 1 and 0.8 in the remaining items. This result demonstrates good internal consistency (Ribeiro, 1999).

Looking at the values of Pearson's correlation verified the existence of statistically significant associations (p <0.05) between the overall score and sub-scales of the work/employment (r = 0.34) with a moderate positive correlation.

In the analysis of the association between the overall score of esca her pain and inability to Que-bec and dimensions of the health questionnaire, there is the existence of statistically significant associations (p <0.01) between the amount of pain scale and inability to Quebec and all dimensions of the SF36.

The fact that there are negative associations indicates that the strength of the association between these variables is done in reverse and not in the same sense. Ie, the higher the score on the pain scale and inability to Quebec (greater limitation in
the activities of daily living and functional) lesion scores in the dimensions of the SF36 (lower quality of life). When comparing the influence of the use of pedal with the scale of pain and inability to Quebec we can infer that our sample presents detectable changes in limitation of daily activities and functional for a confidence interval of 90%. Despite these results, the limitations do not appear to be related to the different use of the pedal, but above the level of beliefs. Although the company has bet on preventive measures in the workplace, such as the adaptation of workstations and ergonomic measures darias secondary control stations as rotation of the labor and gymnastics program, the population holds the beliefs of fear and avoidance relates to the work, so it is therefore important to foster an approach that emphasizes the components with cognitive-behavioral directed to various aspects.

The worker education about the multidimensional pain associated with the integration of physical activity programs may result in behavioral changes that reduce significantly the self-reported disability.

5 CONCLUSIONS

The exponential increase of occupational low back pain is a problem that has been worrying different organisms, with an increased incidence and prevalence, emerging solutions and therefore more effective in terms of clinical practice.

Ergonomics conditions may be related to the occurrence of the first episode of pain, however, there is no evidence that control of these conditions will influence the risk of recurrence or progression to a chronic condition. The results from the Quebec scale, seem to demonstrate that the use of pedal represents no effect on disability and functionality of the workers, not directly linking low back pain with the attitude during work hours, but a multifactorial etiology. However, lower back pain and consequent disability and functionality limitations, influences the quality of life of workers and increases fears due to the inability to work. Results show the importance of fear and avoidance beliefs about work for the development of a chronic disability. It will therefore be noted that, beliefs, related to pain, are modified to become the target for intervention in working with back pain, to prevent the chronic situation and absenteeism caused by this clinical condition.

Considered as limitations of the study, the absence of a socio-demographic characterization of the sample depth, as the educational level, the extra labor activities, history of smoking, previous professional activities. The lack of characterization of low back pain such as previous medical history, physical state (tests or evaluation musculoskeletal) and complaints of pain time was considered a limitation of the results presented.

The fact that the sample is composed only of females did not allow for comparisons between genders and understand the influence of this variable on the difference of the limitations of physical activity, health status and beliefs of fear and avoidance related to work in the Automotive Industry.

The study also revealed the need to develop new lines of research directed to this group of people, particularly in terms of intervention and monitoring clinical perspective based bio-psycho-social and educational.

REFERENCES


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