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Review Article

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Sustained Return to Work after Long-term Sick Leave Improves Work Ability and Quality of Life

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Abstract

Introduction: This prospective study describes the work ability and quality of life in workers returning from long-term sick leave (>6 months) who remained at work full time for at least 36 months.

Method: Thirty-one individuals who returned to work after long-term sick leave (RTWG) due to musculoskeletal disorders and a transversal matched Control Group (CG) of 31 workers were evaluated regarding work ability and quality of life. RTWG was followed-up from first week (baseline) to 1, 3, 6, 12 and 36 months after returning. Data were analyzed descriptively and by inferential tests. The Jacobson and Truax method for clinically significant analysis was applied.

Results: Although the RTWG showed lower values than the CG, significant improvement in work ability ($p<0.001$) and physical domain of quality of life ($p<0.001$) were associated with sustained work. Clinical significant changes were also identified for total quality of life and for quality of life domains. A high score of social domain was identified for RTWG at the baseline and remained high in subsequent evaluations.

Conclusion: Returning to work and staying occupationally active for at least three years lead to significant improvements in work capacity and quality of life in workers who have been on long sick leave.

Keywords: Physical evaluation; Cumulative trauma disorders; Ergonomics; Occupational health; Clinical significant changes

Introduction

Musculoskeletal injuries at work have led to high financial costs in a number of countries for decades due to work absence and incapacity benefits [1-4]. Apart from the financial costs, the personal negative consequences of long-term sickness absence for workers are also relevant. Loss of independence, life instability, frequent inquiries from society and social insurance, inactivity, stigmatization and a feeling of powerlessness are some of the problems faced by workers who have been absent from work for long periods [5].

The rehabilitation process enhancing the return to work has long been studied. Despite this, the "returning to work" concept is still poorly defined, and consequently, there is no consensus about the best operational variables for its evaluation [6]. Ensuring a successful return to work is a complex challenge, as subsequent sick leave is frequent among workers who have previously been absent from work. For this reason, the first return to work should not be the only outcome evaluated in these individuals, who should be followed up by longer periods [7].

Taking this into account, longitudinal studies might contribute to comprehending events associated with returning to work in an effort to increase sustainability. However, in the few longitudinal studies available, results have not provided clear evidence on the benefits from returning to work on workers' health so far [8]. Methodological biases might explain at least part of these results. This type of study is challenging and susceptible to sample loss, since part of the sick workers do not return either, during the research follow up or ever. Thereafter, only healthier workers return to work, and among them, only individuals who maintain good health over time are able to remain at work. As a matter of consequence, longitudinal studies on returning to work present an implicit "healthy worker effect" [9].

Bültmann et al. [3] carried out an interesting longitudinal study that involved evaluating various functional and demographic aspects. Workers were evaluated in the first and the sixth month after returning from sick leave. The results showed that, even after a first sustained return to work, workers had still not completely recovered from the injury that led to the sick leave. The complexity of the process suggests that the success of returning to work depends on a comprehensive approach involving the worker and his occupational environment making the worker´s reintegration a challenge for occupational health service [10]. Considering this, following up a worker who returned to work for longer periods of time might contribute to the understanding of the effects of work on the workers' health and, consequently, the improvement of interventions aiming to encourage sustained return to work.

Considering that being active also has a social value, the positive effects of work on worker functions, physical activity and satisfaction, have already been associated with the recovery of workers [11,12]. Along these lines, part-time job or occupational activity had already been suggested as a method for helping workers on sick leave to recover their capability at work [13]. Thus, we are hypothesizing here that maintaining full-time occupational activities over time might be even more effective. Such sustainability, however, only seems possible if the worker could be in an environment where there are ergonomically satisfactory work conditions.

Thus, the objective of this prospective study was to describe the work ability and quality of life in workers returning from long-term sick leave (>6 months) who remained working full time for at least 36 months. The study was conducted in a wood factory that already had a structured occupational health service to promote sustained return to work.

Methods

This is an observational prospective study which describes data from individuals who returned to work between January 2006 and December 2012 in a large multinational wood transformation industry (approximately 2,000 workers) in Brazil. All employees who returned from long sick leave and continued working for at least three years were included in the study. In order to obtain the sample selected for the present study, workers who had returned to work were followed up for seven years. During these seven years of the study, there were no administrative changes regarding the practice and policy of return to work in the company.

Subjects

Return to work group (RTWG)

The return to work group (RTWG) included all employees who had been on sick leave for more than six months and then remained at work for at least three years after returning. This group included 31 workers (age 41.8 SD 6.2 years; 29 women). All participants were experienced workers (median=14.5 years of experience; minimum=9 years, maximum=26 years) and had been on long sick leave (median=51.5 months; minimum=7 months, maximum=144 months). During the course of this study, there were workers who were on sick leave for a short period of time (less than six months) and others who remained on leave and did not return to work; neither of these conditions were included in the study. Only workers who met the following criteria were included in the study: Workers who had been on sick leave for at least 6 months due to musculoskeletal disorders and then remained at work without interruption for a minimum of 3 years after returning.

Non-leave Control Group (CG)

A matched group of 31 workers (mean age 40.4 SD 6.6 years) who had not been on sick leave for more than 15 days due to musculoskeletal disorders were selected for comparison with the RTWG. The control group was selected during the final year of follow-up (2012) and was paired with the RTWG regarding the work sector, gender and age. The CG consisted of 29 women and 2 men, all experienced workers (median=15 years of experience; minimum=4 years, maximum=31 years).

The purpose of this control sample was to provide clinical evaluation parameters for the variables of interest evaluated in the RTWG, as no national normative data for the quality of life and work ability were available for workers in this type of work. The matching parameters allowed for a comparison of workers from the RTWG with employees who had similar personal and professional characteristics and who had never been absent from work for more than 15 working days due to musculoskeletal disorders.

All subjects agreed to participate in the study and signed a free and informed consent form. The project was approved by the University Ethics Committee under protocol CAAE-2888.0.000.135-10.

Clinical evaluation of the return to work group

After workers were considered fit to return to work by a physician from the National Institute of Social Security (INSS), they underwent a clinical and functional re-evaluation by a physician and physiotherapist from the company's Occupational Health Sector (OHS), which included professionals who were trained in ergonomics. Based on the examination results, the workers were subsequently assigned to a work sector in which physical and occupational demands were compatible with their physical condition and experience.

Workers were then evaluated by a physiotherapist and they answered a questionnaire regarding their ability to work and quality of life, as described in the procedures in the first week after returning to work (baseline), as well as after the 1st, 3rd, 6th, 12th, and 36th months. The evaluations were carried out in the company's OHS during employees´ work shifts, with no associated benefits or burdens for the worker.

The company's OHS was responsible for analyzing the type of task to be performed by the worker according to the restrictions reported by the workers, by the physician and the INSS recommendations. The OHS was also responsible for providing information on the physical limitations of each worker to the manager of each production sector related to the employee's re-adaptation process. Support was also provided during the initial period of return to work, regarding social aspects and instructions for preventing musculoskeletal pain.

Ergonomics and preventive adaptations at workstations

All workers returning from sick leave were assigned to workstations and periodically evaluated by an ergonomist from the OHS. A multi professional team including managers from each sector, OHS staff and workers, was responsible for preventive interventions in the different working sectors. Measures adopted included reducing the physical load by ergonomic redesign of the workstations, job rotation and breaks. The workers did an 8 h shift with 3 breaks: One lasting 60 min for lunch after 4 h worked, and two short breaks, lasting 3 to 5 min in between working periods for performing physical exercise at the worksite under OHS supervision. Campaigns and health education programs were conducted to encourage healthy habits.

National background on social policies

Workers from the company were covered by the national welfare benefit system from the National Institute of Social Security (NISS), an institute of the Ministry of Social Welfare. According to the policies of this agency, in case of work-related accident or illness attested by a physician from the NISS, the insured members are benefited by aids that include leaving from work. These workers are periodically reevaluated when physicians can either attest work disability, which allows the worker to maintain the benefit, or to suspend it. While on leave, the workers were paid by the company during the first 15 days and by the national welfare system after the 16th day [14].

During the sick leave period, workers have no contact with the employer and after returning to work, workers have no contact with the INSS. Despite that there has been an increase in the evaluation of the workers on leave, there is no a time limit for sickness benefit duration in Brazil so far. There is also no standardized protocol for the follow-up of workers on leave.

Procedures

Evaluated variables and their respective analysis criteria

The data was collected using the following self-administered questionnaires: the Work Ability Index Questionnaire (WAI) [15] and the short-version of the World Health Organization Quality of Life Assessment (WHOQOL-bref) [16]. Both instruments had been previously adapted to Brazilian Portuguese and presented satisfactory psychometric characteristics for use among Brazilian workers [15,16]. All RTWG workers were evaluated immediately after their return to work and again after the 1st, 3rd, 6th, 12th and 36th months.

The WAI evaluates work ability using 10 questions. Scores vary from a minimum of 7 points and a maximum of 49 [15]. Final scores of work ability can be classified as: poor (scores between 7 and 27), moderate (28-36), good (37-43) or excellent (44-49). The Brazilian Portuguese version of WAI presented acceptable internal consistency (Cronbach's alpha of 0.72), discriminating validity and criterion validity [15].

The WHOQOL-bref evaluates the quality of life by means of 26 questions covering four domains: physical, psychological, social and environmental. The total score obtained from all domains and from each individual domain can range from 0 to 100. The Brazilian Portuguese version of WHOQOL-bref presented acceptable test-retest reliability, internal consistency (Cronbach's alpha>0.69), discriminating criterion and concurrent validity [16].

Data Analysis

Descriptive and inferential analysis

Data were analyzed descriptively and by inferential tests. Since the results were not normally distributed according to the Shapiro-Wilk test, the Friedman test was used to verify significant differences between the results from the baseline evaluation and the other ones (1st, 3rd, 6th, 12th and 36th months). A significant level of 0.05 was adopted. For multiple comparisons between the baseline and other RTWG evaluations (resulting in 5 comparisons), the Wilcoxon test with Bonferroni's adjustment was used ($p<0.01$). For multiple comparisons between the CG results and all RTWG evaluations (6 evaluations), the Mann-Whitney test with a Bonferroni's adjustment ($p<0.0083$) was used.

The statistical analyses were conducted in SPSS version 11.5 (SPSS Inc., Chicago, IL, USA).

Clinical significance analysis

In order to identify clinically significant changes in the RTWG over time, the Jacobson and Truax method [17] was applied. The Jacobson and Truax method classifies the changes over time as: 1) fluctuations due to the imprecision of the instrument´s measurement, when the change does not exceed a reliable change index (i.e., when the difference between two measurements divided by the standard error of the difference does not exceed 1.96); or 2) reliable changes, when the changes are beyond the fluctuation range (i.e., changes which present a reliable change index over 1.96). When reliable changes occur, they can also be considered as clinically significant. A clinically significant change occurs between two consecutive measures when, in addition to the occurrence of a reliable change, the second measure reaches a value which is considered within the health population distribution, indicating a change of category in the individual's functional status. Thus, according to these criteria, workers followed in successive evaluations can be classified in five levels of change: reliable and clinically significant changes; reliable change; lack of change; reliable worsening; and reliable and clinically significant worsening.

In order to make it easier to understand how results are presented using the Jacobson and Truax method [17]; Figure 1 shows some scatter plots. For this exemplification, the values obtained in the baseline were placed along the x axis and those obtained in the follow-up evaluations along the y axis. The intersection of them was represented by a unique symbol. Thus, in the clinical significance graphs described in the Results section, the symbols correspond to the intersection between the results of the baseline and those of the follow-up evaluations (from the 1st, 3rd, 6th, 12th and 36th months) for each individual.

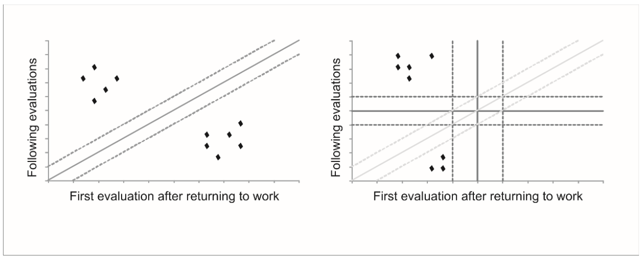

Figure 1: Illustration of how results are presented in the Jacobson and Truax method. Figure 1a: Graph with diagonals set for identifying cases of reliable change positive change (improvement) which are depicted to the left of the diagonals, and reliable negative change (worsening) which are depicted to the right of the diagonals (Figure 1b). Graph with diagonals and intervals of clinical significance (vertical and horizontal lines) for identifying reliable and clinically significant changes: Case of reliable and clinically significant improvement are depicted to the left of diagonals and above clinical significant interval, case of reliable and clinically significant worsening are depicted to the right of the diagonals and to the left of the clinical significant interval.

In order to identify the reliable change interval, three diagonals were drawn in Figure 1a: a bisectrix (continuous diagonal line whose values are represented by the letter B in the following formula) and two parallel diagonals (D) that are based on the bisectrix (B), i.e., an upper diagonal determined by the addition, and the lower diagonal determined by the subtraction, of the standard error of the difference, according to Equation 1 below:

$$D=B \pm 1.96\ SD\ ^{2}\sqrt{2}^{2}\sqrt{(1-r)} \qquad (1)$$

Where SD is the standard deviation of the first evaluation and r is the reliability of the measurement [17].

Thus, the points located on the left of the upper diagonal in the graph represent cases of positive change (Figure 1a), points in the interval between the diagonals represent a lack of change and points to the right of the lower diagonal represent cases of negative change.

The baseline data were considered as parameters for determining the interval of clinical significance (horizontal and vertical lines in Figure 1b) in order to identify reliable changes which were also clinically significant. Based on the baseline data, the mean values of the functional population was estimated, i.e., the mean of the clinical significance interval (M in the Equation 2), which corresponds to the mean obtained at baseline plus two standard deviations (value represented by the continuous horizontal and vertical lines in Figure 1b). The vertical and horizontal dotted lines correspond to the confidence interval of the Clinical Significance (CICS), determined from the measurement error, which is calculated by Equation 2:

$$CICS = M \pm (1.96 \times SD/\sqrt{n}) \quad (2)$$

Where M is the mean of the clinical significance interval, SD is the standard deviation of the baseline, and n is the number of individuals [17]. Therefore, to be considered as a clinically significant change, the data from the evaluation of the 1st, 3rd, 6th, 12th and 36th months should be located above the upper limit of the clinical significant interval for clinically significant improvement, or below the lower limit of clinical significant interval for clinically significant worsening [17].

Taking into account the interval of clinical significance and the diagonals for data interpretation depicted in Figure 1b, the points on the left of the upper diagonal and above the interval determined by the clinical significance represent the cases in which there was clinically significant positive change (clinically significant improvement); whilst points on the right of the lower diagonal and to the left of the clinical significance interval represent cases of clinically significant negative change (clinically significant worsening).

Analysis of measurement reliability

The reliability of the measurement found in the literature for the two instruments were used to calculate the standard error of the difference. The indices reported by Fleck et al. were used to calculate the quality of life standard error of the difference for the general score (Cronbach's Coefficient=0.91) and for the physical, psychological, social and environmental domains (Cronbach's Coefficient=0.84; 0.79; 0.69 and 0.71; respectively). Cronbach's Coefficient=0.72, reported by Martinez et al. [15], was used to calculate the standard error of difference for work ability.

An analysis of clinically significant changes was carried out using the criteria mentioned previously, and was plotted in Microsoft® Excel 2007.

Results

The work ability reported by the RTWG was poor at the baseline (27.4) and became moderate (33.8) after the third year of returning. The RTWG also improved in all quality of life variables except in the social domain, which was already high upon returning (Table 1). The total score of work ability (after the first year) and the physical domain of the quality of life measurement (after the sixth month) presented a significant improvement.

The clinical significance analysis (Figure 2) revealed that returning workers had reliable improvement in work ability, particularly in the third year after returning as 28.6% of the total number of workers presented reliable improvement and two workers showed a clinically significant change.

Despite non-significant results for total quality of life scores on inferential analysis, returning workers showed reliable improvement over time. Three years after returning to work, 40% of the workers showed reliable improvement and one showed clinically significant improvement.

Reliable improvements also occurred in the physical and psychological domains of quality of life, for 44% and 24%, respectively, of the returning workers by the 36th month, as well as in smaller proportions for the environmental domain (8% of the workers). Some workers (12%) have also shown significant clinical change in the physical domain. Regarding the social domain, similar proportions of workers presented reliable improvement and worsening over time, 4 and 8% respectively, but they were not clinically significant.

The control group presented a good work ability index and good mean scores of the quality of life domain (over 70 points), except for the environmental domain (Table 2). The comparison between RTWG and CG revealed that in spite of significant improvement in work ability and the physical quality of life domain in the RTWG over time, the CG's values showed to be significantly higher than the ones presented by the RTWG.

Discussion

Evaluation of returning workers after work-related sickness leaving over time, by inferential statistics and analysis of the clinical significance, indicated significant increases in work ability indexes. These findings contradict the natural tendency of work ability, which decreases among healthy workers over time due to ageing [18].

The work ability index has been reported to be low to moderate, remaining relatively low in individuals who take long sick leave [19]. In a longitudinal study, Ahlstrom et al. [19] reported a mean value of work ability of 24 SD 9 (N=290) for workers who had been on sick leave from 60 days to 14 years (mean of 458 days of leave at the beginning of a year follow-up study). The same subjects were reevaluated 6 months and 1 year after returning to work, and showed a mean work ability value of 27 SD 10 (N=184) and 28 SD 10 (N=169), respectively. These indexes are similar to those presented here for results around the 3rd month (mean of 27.2 SD 6.9). However, in our study these values continued to increase over time, reaching 33.8 SD 6.6 after three years of follow-up. However, no results for a follow-up period longer than 1 year were found in the literature to have our results comparatively analyzed. Possibly, the scarcity of data available on the effects of work on individuals who have taken long sick leave can be explained by the fact that only a small fraction of such individuals remain on the job after the return.

		Baseline	1st Month	3rd Month	6th Month	1st Year	3rd Year
	M	27.4	28	27.2	29.3	31.2	33.8
	SD	7	6.1	6.9	6.7	6.8	6.6
	Min	13	16	13	19	19	24
	Max	41	38.5	39	40	42	47
Total work ability index	*Friedman (p<0.001)						
	**Wilcoxon		p=0.753	p=0.563	p=0.020	p<0.001	p<0.001
	M	56.2	60.4	59.2	62.4	62.3	64.3
	SD	12	12.4	14.5	12.6	11.3	12.4
	Min	31.5	39.3	31.3	36	36	39.3
	Max	79.5	89.3	89	89.3	84.3	89
Total Score WHOQOL	*Friedman (p=0.203)						
	M	42.5	50.3	47.5	52.5	56.7	58
	SD	15.7	15.7	16.1	13.1	14	12.4
	Min	13	19	13	25	31	38
	Max	75	75	81	81	88	88
Physical Domain WHOQOL	*Friedman (p<0.001)						
	**Wilcoxon		p=0.020	p=0.178	p=0.002	p=0.001	p=0.001
Psychological Domain WHOQOL	M	56	62.3	64.4	65	63.3	66.5
	SD	17.6	16.4	18.2	16.9	17.4	17.6
	Min	19	31	31	31	31	19
	Max	88	94	94	94	94	94
	*Friedman (p=0.275)						
	M	69.5	70.1	69.8	71.3	69.2	69.6
	SD	16.4	19	17.6	19	13.7	18.3
	Min	31	19	31	44	44	19
	Max	100	100	100	100	100	100
Social Domain WHOQOL	*Friedman (p=0.961)						
	M	56.2	56.9	57.1	58.8	58.6	61.6
	SD	13.6	13.3	13.4	11.9	11.7	9.8
	Min	19	38	31	31	25	44
	Max	81	88	88	81	81	81
Environmental Domain WHOQOL	*Friedman (p=0.702)						

*Comparison between baseline and consecutive measures (1st, 3rd and 6th months and 1st and 3rd years) were performed by the Friedman test.

**Statistically significant differences identified by the Friedman test were verified by the Wilcoxon test with Bonferroni's adjustment to identify differences between the baseline and subsequent evaluations. The Wilcoxon test was only applied for cases presenting differences between evaluations by the Friedman test. Multiple comparisons were carried out only for the total work ability index and the physical quality of life domain.

Table 1: Mean values (M), standard deviation (SD), minimum (Min), maximum (Max) and inferential analysis of the results of work ability and quality of life of workers returning from long-term sick leave (RTWG).

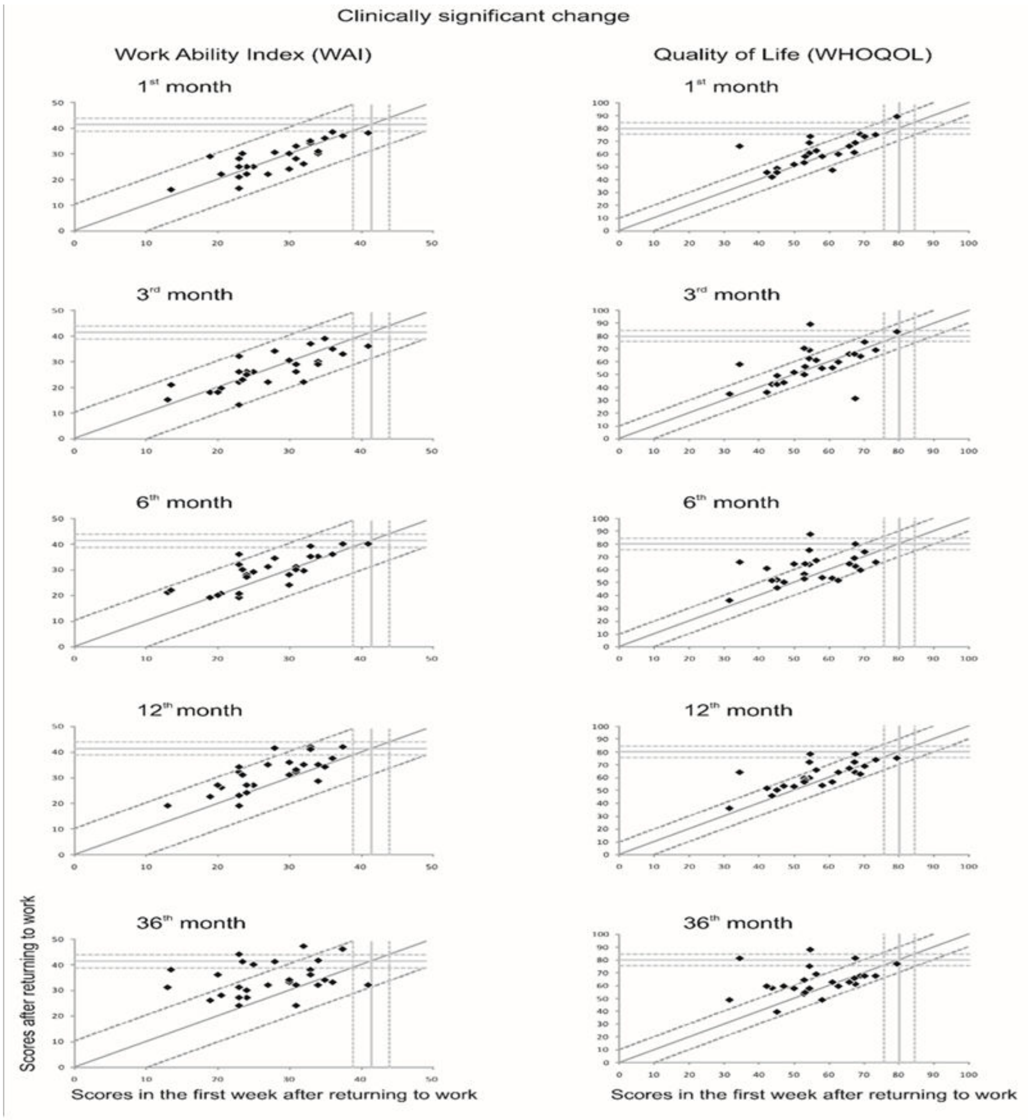

Figure 2: Analysis of the clinical significance of changes in work ability and quality of life in the 1st, 3rd, 6th, 12th and 36th months after returning to work from long sick leave due to musculoskeletal disorders.

In a cohort study by Bültmann et al. [3], 24% of the workers remained away from work for more than 6 months after injury. Besides, a substantial rate of employees taking leave (38%) was observed in less than six months after the first leave. These authors also reported significant improvement in pain level, functional impairment and quality of life in workers 6 months after returning to work. Moreover, these workers had fewer limitations when compared to individuals who did not return to work or who returned but then took a new leave of absence. Accordingly, we observed a significant increase in work ability and in the physical domain of quality of life (Table 1). These findings can be understood in light of Tüzun's [20] argument, who states that the presence of chronic pain impairs the individual's physical condition by reducing the level of physical activity, which consequently leads to a progressive decrease in muscle force and flexibility. Thus, the activities performed when returning to work would be a positive intervention against progressive loss of functionality, which may occur in workers who remain on sick leave due to chronic musculoskeletal pain for long periods of time.

The positive effect consequent from activity seems to have been enhanced by the ergonomic work conditions provided to the workers upon their return. In a systematic review, Krause et al. [21] analyzed the effect of work environment modifications on workers returning after sick leave. These authors reported that when work conditions were improved by ergonomic interventions, twice as many workers on leave due to temporary or permanent disability were able to return to work. Ergonomic interventions to improve work conditions usually

WHOQOL						
WAI		**Total score**	**Physical Domain**	**Psychological Domain**	**Social Domain**	**Environmental Domain**
M	39.7	72.4	73.4	72.3	76.2	67.9
SD	5.5	13.8	18.3	17.2	17.6	13.8
Min	24	39.5	14	19	25	38
Max	49	98.5	100	100	100	94
Multiple comparisons between RTWG and CG (Mann-Whitney)						
1st Week	0.001	0.001	0.001	0.001	0.099	0.005
1st Month	0.001	0.001	0.001	0.022	0.133	0.006
3rd Month	0.001	0.001	0.001	0.079	0.149	0.005
6th Month	0.001	0.004	0.001	0.083	0.168	0.018
1st Year	0.001	0.003	0.001	0.039	0.042	0.012
3rd Year	0.001	0.014	0.001	0.17	0.104	0.064

Table 2: Mean values (M), standard deviation (SD), minimum (Min) and maximum (Max) values for the total work ability index (WAI) score, total score and domains of quality of life (WHOQOL) for the control group (CG). Results from multiple comparisons between the return to work group (RTWG) and CG for WAI, total score and domains of WHOQOL. Statistically significant differences between the CG (single evaluation) and the RTWG (1st week, 1st month, 3rd month, 6th month, 1st year and 3rd year of return to work for the RTWG).

require the involvement and compromise from workers and managers to ensure the necessary alterations in the work environment, organization and positive cultural changes [22]. As mentioned in the Method section of the present study, several physical and organizational measures were available to the workers in order to make the job conditions safer.

Inferential analysis indicated that the RTWG presented no variation in total points for either the total score of quality of life over time and for the psychological or environmental domains (Table 1). However, the clinical significance analysis, which is based on the individual results of each worker, indicated reliable improvement in these aspects. The lack of significance in the inferential analysis may be explained by the fact that it was based on mean value calculations, which did not discriminate individual variations, even when higher values were identified for some workers. Taking this into account, the clinical significance analysis used here was efficient to detect individual changes and contributed to a more comprehensive understanding of the results.

Regarding the social domain, the RTWG presented high values at the baseline after returning to work, which were similar to those of the CG. This could suggest a relation between already having high values of social domain and being able to remain at work after long sick leave. According to Dekkers-Sánchez et al. [10], a sustainable process of returning to work after long sick leave can help solve social, financial or family problems for most workers. In this study, contradictory results were identified, however they do not allow us to understand if having already high social domain scores was crucial to help these workers to keep working. Methodological aspects should also be considered in relation to the present results. According to Fleck et al. [16], there may be instability in the results from social quality of life domain in the WHOQOL-bref due to the fact that there are only few questions dealing with this aspect in the instrument. In any case, future studies designed in a prospective approach, should bring attention to this issue, as results can provide helpful directions to intervention programs.

Despite the improvements identified among workers who remained at work, they presented lower levels of work ability and quality of life than CG. According to Dekkers-Sánchez et al. [10] sustained return to work requires an in-depth understanding of work disability and a multidimensional approach to optimize the return to work. Five promoting factors are identified by authors as follows: employed-based vocational guidance, effective communication between employee and employer, active participation of the sick-listed employee, a supportive work environment and a stimulating social environment. Most of these factors were considered by the OHS in the situation described here, however a more interdisciplinary evaluation of the worker, complementary to the physical assessment, could be included in OHS actions in order to achieve more substantial improvements in psychological domains.

The investigation of sustained return to work also needs to be considered in the context of the differences between compensation policies among countries. A comparison between Denmark, Germany, Israel, the Netherlands, Sweden, and the United States disability policies to identify predicting factors for sustained return to work indicate that less stringent eligibility criteria for disability benefits seems to favor more sustainable return to work [23]. However, in an attempt to obtain more active participation from all parts involved (employers, employee, occupational health service and primary care) in a rehabilitation process, the Swedish Social Insurance System has established fixed schedules for worker assessment and sickness benefits. Since 2008, only severely injured workers have benefits for periods longer than 365 days [24,25]. In Norway, a time limit of four years of disability pension was introduced between 2004 and 2010 [26].

These contradictions between less or more stringent criteria for benefits show evidence of the complexity of the return to work process and the challenges faced by agencies to regulate benefits´ concessions in order to obtain sustainable return to work and, at the same time, to reduce social burden. Since Brazilian social policies allow for long term sickness absence, the information from longitudinal evaluation of workers who have been absent from work for long periods (median of 51.5 months of sick leave) and who returned successfully might contribute to new guidance for compensation policies in Brazil and in other countries.

In general, the results of the present study indicated that work had a positive effect on individuals who returned to their job and kept working. Four aspects should be considered when interpreting these results: 1) Individuals who were able to remain at work presented better health conditions, which reinforces the survivor worker effect [9]; 2) The effect of the activity itself seems to have played an important role in the improvement of work ability and quality of life in these workers; 3) Workers returning to work already had high scores of social domains which may have played a role in the results; 4) The ergonomic adaptation performed by OHS may also have contributed to these results [12]. The better probable explanation, however, is that these aspects might have acted simultaneously to facilitate improvement, leading to a double benefit from the survival effect.

Study limitations

Limitations of this study concerns to the subject's recruitment, to the CG measurements that were obtained transversally and for healthy workers only, and to the fact that gender composition were unbalance with female predominance. No control group of workers who did not return to work was available as workers on leave had no contact with the company, as mentioned in the Method. The factors that may attenuate this limitation were that the CG parameters were paired with the ones from RTWG, and that the CG's work ability and quality of life scores were consonant with those reported in the literature for healthy workers of the same nationality. Martinez et al. [15] found mean work ability values of 41.8 ± 5.1 in male workers (mean age of 36.8 years) from an energy transmission sector. da Costa et al. reported a mean work capacity of 40.3 and a quality of life score of 66.5 in female and male industrial workers (mean age 34.8 ± 8.28 years). The latter results are particularly important as they refer to a broader group of industrial workers presenting very similar characteristics to the group evaluated in the present study. Thus, the CG database seems to be a consistent parameter to be compared with the RTWG. For future studies, gender balance composition and larger sample size are recommended in order to enhance the current findings reported here.

Conclusion

Despite presenting lower work ability and quality of life values than controls, reliable and clinically significant improvements were identified among workers who returned from long sick leave (>6 months) due to musculoskeletal injuries and continued working in an ergonomically favorable environment for a period of at least 36 months. Therefore, returning to work and remaining occupationally active for a few years seems to lead workers who have been on long sick leave to a double benefit from the survival effect. It is worth reinforcing the need for more longitudinal studies to confirm the present results among diverse working samples.

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