36 - ERGONOMICS ANALYSIS OF TATTOO ARTISTS

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1 INTRODUCTION

Ergonomics cherishes for better working conditions and quality of life, always seeking the human being, and may be classified as technology or science, it performs as socioeconomic response and also broadens the knowledge (KARNAS; VAN LEENPUT, 1990). The increase competitiveness through globalization of the economy brings new opportunities to ergonomics through new demands for productivity and performance, sedentary work, intensification and globalization of psychological stress (DO RIO; PIRES, 2001).

With an increase demand of tattoos these days, tattoo artists have long working hours, not worrying about their physical integrity. Moreover, in most cases, they do not adapt their spaces in order to have a better quality of work.

The ergonomic analysis serves to improve working conditions and can also improve the productivity and quality of products or services that are or will be produced or performed (SANTOS; FIALHO, 1997).

Thus, the general objective of this study was to develop an Ergonomic Analysis of the tattoo artists work in southern Brazil, reporting the qualitative differences of these professionals through RULA software, questionnaires, social networks, informal conversations and field research, showing the main problems encountered in the ergonomic field.

2 LITERATURE REVIEW

2.1 Ergonomics and Health

Ergonomics according to Laville (1977) is the discipline that seeks to improve working conditions in the global sense. Thus, Wisner (1994) notes that there is increasing quality and productivity.

The ethical conduct and fundamental technique of ergonomics, that would adapt the work to the human being, in most cases, may not be feasible in practice because of difficulties such as technical failure, cultural and social financial issues, causing the man has to adapt the work (DO RIO; PIRES, 2001).

According to Iida (2005), ergonomics has as its primary objective the reduction of harmful consequences for workers and who may be involved in the production process. In seeking to reduce fatigue, stress, errors and accidents, results in satisfaction, safety and health for workers during their productive activity.

Do Rio and Pires (2001) point out that health is determinant of well-being physical and psychic, allowing interaction with the world, and most obvious expression for the quality of life. The authors also state that the motivation, training and commitment with health make up a competitive advantage, as they are demonstrative performance factors and optimal productivity, making the optimization work.

With regard to the characteristics and needs of the human body ergonomics is based on the physiological activity of the musculoskeletal system and the optical system. The difficulty in proposing an approach to human needs, ergonomics has been more dedicated to preventing fatigue, accidents and musculoskeletal diseases (DO RIO; PIRES, 2001).

2.2 Disorders, Injuries and Diseases

The biomechanics is the wide variety of human disorders and performance limitations, interpreting and resolving these difficulties. The musculoskeletal system is the fundamental functions support and protection of the body and organs, initiating and maintaining movement (ANDERSSON; CHAFFIN; MARTIN, 2001).

In the musculoskeletal system may occur disorders that compromise their effectiveness, with pain being the most frequent symptom (DO RIO; PIRES, 2001).

The column is one of the most vulnerable structures of the body and thus, is subject to various deformations that can be congenital or acquired in other ways such as physical effort, sustaining muscle disability, poor posture at work, infections, etc. (IIDA, 2005).

2.3 Work Sitting Posture

Do Rio and Pires (2001) show that the working man's interaction with objects is continuous so the process on the environment. The job is the set of components that make up the physical environment in which the person works and interacts.

With the advances of modern life, most of the work is carried out in relatively small spaces, standing or sitting in a straight line with one member while the rest of the body remains almost static, in the case of sedentary workers (IIDA, 2005).

The advantages of the sitting position, according to Andersson, Chaffin and Martin (2001), and Iida (2005) are to provide stability in activities that require more visual and motor control, consuming less energy than standing position, causing less stress on joints .

There is no single ideal posture and the posture being maintained at rest for a short time it is important that the chair allow postural changes. The stay in the same position for long periods is becoming increasingly a problem, especially in jobs where movements are limited or stereotyped (ANDERSSON; CHAFFIN; MARTIN, 2001).

2.4 RULA Method

Method developed by McAtamney and Corlett in 1993, serving for the evaluation of persons subject to postures that contribute to upper limb disorders. The RULA (Rapid Upper Limb Assessment) uses observations adopted by the upper limbs, such as the neck, back and arms, forearms and wrists. This method evaluates the posture, strength and movements linked to sedentary tasks (STANTON, 2005).

Its great advantage is to provide a classification of the job as the policy priority, and the use of specialized equipment is

not necessary, not interfering in the work situation (MOTTA, 2009).

The method consists of three steps, the first related to the selection of the pose or posture for evaluation; the second postures are scored using a spreadsheet points, parts of the body diagrams and tables.

Finally, these scores are converted into one of the four proposed measures. Approach thus results from a risk score of 1 to 7, where in the highest mean apparent high levels of risk. However, a low score on RULA method does not guarantee that the workplace is free of ergonomic risks, as well as a high score does not guarantee that there is a critical problem (MOTTA, 2009).

3 METHODOLOGY

The methodology performed in this study was divided into four phases: first there was the implementation of eleven questionnaires to tattoo artists for lifting a database and prior analysis of the resulting musculoskeletal problems of their activities.

In the second phase there was data collection through social networks and personally for the technical survey of the processes used during the activity as equipment. The third phase took place in two visits to the standard tattoo parlors to check the space, furniture, equipment used, adopted motions during a session, adopted postures, detection and positioning of objects required for activity.

In the last phase was performed 1 visit in a studio standard for monitoring a session and confirmation of data through images.

After performing all the steps, they obtained data that led to the results achieved through programs and comparisons. The professionals had different ages, different profession time and differences in lifestyle, a fact that highlighted some of the results obtained.

The collection of images to use the RULA method was carried out with only a professional, where the job is very similar to the others, reaching the consensus that the stance adopted by the professional of this studio is also adopted by other, proven in the questionnaires through reports of the existence and location of pain.

3.1 Description of Work Office and Activities Undertaken

The work office related to the tattoo artist is a relatively small environment and may vary in size depending on the number of tattoo artists working on site. The working period varies greatly between professionals, which can be 2 hours coming up to 12 hours daily, and professionals with longer experience perform more hours of work, according to data marked in the questionnaires.

In the professional tattoo process generally remains seated, the predominant foot resting on a pedal that activates the tattoo machine, the upper body leaning forward, neck also flexed, and this position allows more concentration to make the details of the design (Figure 1).

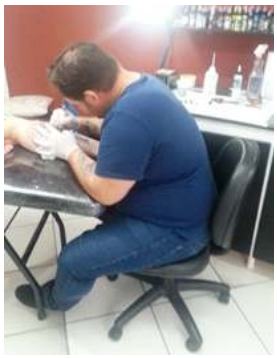

Figure 1 - Sitting position, tattooing action. Source: The authors (2016).

In the second position (Figure 2) it remains seated without supporting the prevailing foot pedal to prevent the machine drive. The stem position to a more upright position, but there is rotation thereof to achieve the bench with the necessary ink, the dominant arm and shoulder remain high, and the arm continues in abduction and forearm performs a slight movement of rotation side, the dominant hand turn performs a bending movement, this movement takes around 10 seconds, and then returns the first position described.

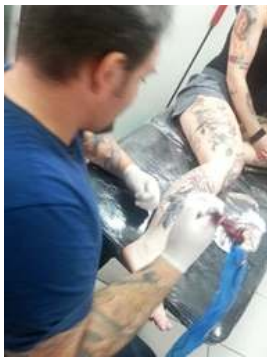

Figure 2 - Sitting position, action for ink supply. Source: The authors (2016).

These two movements are repeated several times, depending on the tattoo to be made. In analyzing the tattoo session it took about 3 hours and 30 minutes, and repeated 180 times on average the two movements and misplacement.

Were also evaluated items in comparision with the height of the furniture found, such as: Lumbar Height (backrest): 37 cm -within than is recommended for sitting position, but back in this study is not used for the activities of the professional; popliteal height (seat height): 40 cm - within the recommended and possess height adjustment, however, is below its anthropometric measure that is 45,7cm the popliteal height, making your legs and feet are not properly supported and balanced with respect to ground; elbow height (height of the stretcher and bench): 75 cm -within the recommended, to avoid shoulder elevation should raise the height of the chair, or in the case of this litter can tilt down one end to adjust the height of the area to be tattooed. The predominant elbow has no support and is high on average 15 cm litter.

4 RESULTS AND DISCUSSION

From the questionnaires applied to tattooists, it was noted that a total of 11 professionals, the variation between the ages was 22-41 years; the workday varies of 2 to 12 hours and the time of operation as tattooist was from 8 months to 20 years.

It found that 100% of these professionals feel any pain related to their posture independently on the gender, and more than 50% feel some chronic pain - which are occurring every day, and may or may not have some relief during the time of rest of individuals.

It was noted that 18% of respondents have had to move away from their activities due to musculoskeletal problems, and 82% did not perform a prevention related to their posture or improving the quality of your postural health in their work.

To check the data on pain falls to their laterality, of the 11 respondents 100% are right-handed. As the results, the pain felt in the neck are more evident due to posture and time abiding in the same position as the questionnaire of the respondents have chronic pain on both sides of the neck, and two reported chronic pain just the right neck.

Within results were verified pain in the mid dorsum and lower back, there is only one report of chronic pain in the lower back on either side.

It was reported by only one respondent felt pain in the hip region and thighs, and two respondents reported pain in the legs and feet.

In general, the results of the questionnaires showed that the need for tattoo artist professional to adapt the area to be tattooed by the hours of permanence working are very relevant, because it requires no ergonomic postures are adopted during the activity, many times over a long time or static position with minimal movement.

The furniture used in these studios is not designed specifically for this activity, are generally adapted stretchers used in aesthetic centers and chairs with adjustable height, the kind used in offices.

When analyzing the questionnaires individually, it was realized that the tattoo artists with less time experience are those who work fewer hours per day, and have severe pain or no. Another relevant fact is the professionals who perform physical activity or lengthen during the work period (less than 50% of the total) has its minimized and / or no pain.

The data collected from the visit made to one of the interviewees were placed in RULA software within the Ergolândia program and the positions adopted during its proven activities through photos. It was verified the need for immediate action to changes in the way of carrying out the work, relevant changes in the post or in the mode of carrying out the activities in the work.

In the Ergolândia program there is a space on anthropometric measures to be adopted at work in relation to the individual's height, in which case the tattooist was 1.77 meters tall and 120kg weight does not correspond with his stature, he is an individual with overweight. Despite the widespread generated figure (analyzed a sitting position that is normally used in administrative work) these measures can serve as a basis to better tailor the securities used in tattoo parlors and so incite a preliminary study with these data.

In order to certify the results already obtained, it was also carried out the checklist of Couto which is found in Ergolândia program. This checklist is intended to achieve a simplified assessment of the risk factors for musculoskeletal disorders of the upper limbs in relation to work.

Through the three methods adopted was found that the risk of disorder, injury and/or musculoskeletal diseases is high, especially for the studio that was the case study of this work, but the studio observed, being a standard model and with the other without much variation in the position or how the activity is performed, the biggest difference would be related to hours, break time for stretching and/or rest time of the sessions and the musculoskeletal strengthening.

5 CONCLUSION

Through the data collected by case study and questionnaires carried out it was concluded that the labor activity of the tattoo artist takes an improper posture for their musculoskeletal system is indispensable correction of the job, for a total of 100% of respondents feel any pain relation to their activity.

Effective deployments ergonomically for a tattoo studio should be adopted in order to improve the quality of work and preserve workers' health.

However, it considers the difficulty of adjusting and hold a 100% ergonomic design for this activity because there are several positions that can be taken during working hours, this occurs because of the different regions of the body that can be tattooed.

The ideal is to be adopted securities which have several adjustments to the customer and professional as height adjustment, headrest, armrests and legs, among others.

With regard to the organization of tattoo artist activity it is necessary that it can carry out and breaks in more frequencies during longer sessions in order to perform another activity that works opposite to the muscles used to make the tattoo. It is also necessary awareness to the physical activities outside of office hours, to strengthen the musculoskeletal system, thus decreasing the chances of system fatigue during the work performed and to promote better implementation of labor market activity.

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ERGONOMICS ANALYSIS OF TATTOO ARTISTS

ABSTRACT

This study aims to develop an ergonomics analysis of the tattoo artist's profession, identifying harmful postures inherent to the function, capable of causing injuries and disorders of the musculoskeletal system diseases. Questionnaires were

conducted and applied to professional, on-site verification, as well as information acquired in person and through social networks. After the survey, results were generated and also analyzed by RULA software. From the results, the lack of better working conditions for this professional was found as his stance has proved inadequate for long period of his work activities. In addition, some suggestions for ergonomic improvements in the workplace were also inserted in the study. The adjustments desk and work organization promote an improvement in the health of tattoo artists, aiming to continue the quality of their work and therefore the optimization of their working time.

Key words: Ergonomics, Postures Damaging, Adequacy of Workplace, Working Conditions, RULA.

ANALYSE ERGONOMIQUE POSTURALE DU TATOUEURS

RÉSUMÉ

Cette étude vise à analyser le travail de l'artiste de tatouage ergonomique, l'identification des postures nuisibles fonction inhérente, capable de blessures causant, et les troubles des maladies du système musculo-squelettique. Des questionnaires ont été menées appliquées à vérification professionnel sur le site, ainsi que des informations acquises en personne et par le biais des réseaux sociaux. Après l'enquête ont été générés résultats ont également analysé par le logiciel RULA. D'après les résultats, l'absence de meilleures conditions de travail pour ce professionnel a été trouvé parce que sa position est avérée insuffisante pour une longue période de leurs activités professionnelles. En outre, quelques suggestions d'améliorations ergonomiques sur le lieu de travail ont également été insérés dans l'étude. Le réglage bureau et l'organisation du travail favorisent une amélioration de la santé des artistes de tatouage, visant à poursuivre la qualité de leur travail et donc l'optimisation de leur temps de travail.

Mots-clés: Ergonomie, Postures Damaging, Adéquation du milieu de travail, les conditions de travail, RULA.

ANÁLISIS ERGONÓMICO POSTURALES DEL ARTISTAS DEL TATUAJE

RESUMEN

Este estudio tiene como objetivo analizar el trabajo del artista del tatuaje ergonómicamente, la identificación de posturas perjudiciales función inherente, capaz de causar lesiones y trastornos de las enfermedades del aparato locomotor. Se llevaron a cabo cuestionarios aplicados a, verificación profesional en el lugar, así como la información adquirida en persona ya través de las redes sociales. Después de la encuesta se generaron resultados también se analizaron por software RULA. A partir de los resultados, se encontró que la falta de mejores condiciones de trabajo de este profesional porque su postura ha demostrado ser inadecuados para el largo periodo de su actividad laboral. Además, algunas sugerencias de mejoras ergonómicas en el lugar de trabajo también se insertaron en el estudio. El mostrador de ajustes y la organización del trabajo promueven una mejora en la salud de los artistas del tatuaje, con el objetivo de continuar con la calidad de su trabajo y por lo tanto la optimización de su tiempo de trabajo.

Palabras clave: Ergonomía, posturas perjudicial, la adecuación del lugar de trabajo, las condiciones de trabajo, RULA.

ANÁLISE ERGONÔMICA POSTURAL DE TATUADORES

RESUMO

O presente estudo objetiva analisar ergonomicamente o posto de trabalho do tatuador, identificando as posturas prejudiciais inerentes à função, capazes de causar lesões, distúrbios e doenças do sistema musculoesquelético. Foram realizados questionários aplicados aos profissionais, verificação in loco, assim como informações adquiridas pessoalmente e através de redes sociais. Após o levantamento foram gerados os resultados também analisados através do software RULA. A partir dos resultados obtidos, constatou-se a carência de melhores condições de trabalho para este profissional, pois sua postura revelou-se inadequada durante grande período de sua atividade laboral. Além disso, algumas sugestões para aperfeiçoamento ergonômico no posto de trabalho também foram inseridas no estudo. As adequações de posto e organização do trabalho promovem uma melhoria na saúde dos tatuadores, objetivando a continuidade da qualidade de seus trabalhos e consequentemente a otimização de seu tempo de trabalho.

Palavras-chave: Ergonomia, Posturas Prejudiciais, Adequação do Posto de Trabalho, Condições de Trabalho, RULA.