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Development and administration of a postural and ergonomic assessment tool: a pilot study

Desenvolvimento e aplicação de um instrumento de avaliação postural e ergonômica: um estudo piloto

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Abstract

Introduction: Prevention of occupational diseases depends on the identification of risk factors, which can be complemented by the functional assessment of workers. **Objective**: The aim of this study was to develop a postural and ergonomic assessment tool for the analysis of subjects' sitting posture at the computer work-station. **Materials and methods**: This is a quantitative, descriptive, observational, cross-sectional study. Eighty-two employees in the administrative sector of FIERGS were invited to participate in the study. The mean age was 32.8 ± 7.7 years. The IAPE (Instrumento de Avaliação Postural Ergonômica [Postural and Ergonomic Assessment Tool]) development and administration process was performed in four stages: 1) observation of the most commonly adopted postures by employees in the workplace; 2) development of the first version of the IAPE; 3) content validation by two ergonomics experts and content validity index (CVI) calculation; 4) inter-evaluator reproducibility assessment. Reproducibility was assessed by Wilcoxon test and intraclass correlation coefficient (ICC) ($p < 0.05$). **Results**: The results obtained from the calculation

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of the CVI showed that the IAPE possesses a high degree of content validity (CVI = 1). Inter-evaluator reproducibility assessment showed no differences between evaluators ($p < 0.05$) and ICC values above 0.80 ($p < 0.05$). This shows an adequate inter-evaluator reproducibility of the tool. **Conclusion**: Based on the results of the IAPE development process, it can be concluded that the tool has content validity and adequate inter-evaluator reproducibility. This tool can aid in the development of occupational disease prevention and health promotion strategies.

Keywords: Validation. Posture. Ergonomics. Computerized workstation.

Resumo

***Introdução**: A prevenção das doenças ocupacionais depende da identificação dos fatores de risco, que podem ser complementadas por avaliações funcionais dos trabalhadores.* ***Objetivo**: O objetivo do estudo foi desenvolver um instrumento de avaliação postural e ergonômica para análise da postura sentada em frente ao computador no meio laboral.* ***Materiais e métodos**: O estudo teve uma abordagem quantitativa, de cunho descritivo-observacional, do tipo transversal. Foram convidados a participar 82 funcionários do setor administrativo da FIERGS, com idade média de 32,8 ± 7,7 anos. O processo de desenvolvimento e aplicação do Instrumento de Avaliação Postural Ergonômica (IAPE) foi realizado em quatro etapas: 1) observação das posturas mais adotadas pelos funcionários em seu ambiente de trabalho; 2) desenvolvimento da primeira versão do IAPE; 3) validação de conteúdo por meio da avaliação por dois profissionais especialistas na área de ergonomia e cálculo do índice de validade de conteúdo (IVC); 4) avaliação da reprodutibilidade interavaliador do IAPE. Para avaliar a reprodutibilidade foram utilizados o teste de Wilcoxon e o coeficiente de correlação intra-classe ($p<0,05$).* ***Resultados**: Os resultados obtidos a partir do cálculo do IVC demonstraram um alto índice de validade de conteúdo para o IAPE (IVC = 1). Já os resultados de reprodutibilidade interavaliador demonstraram a não ocorrência de diferenças entre os avaliadores ($p > 0,05$) e valores de ICC acima de 0,80 ($p < 0,05$), o que demonstra uma adequada reprodutibilidade interavaliador do instrumento.* ***Conclusão**: Os resultados do processo de desenvolvimento do IAPE permitem concluir que o instrumento, apresenta validade de conteúdo e reprodutibilidade interavaliador adequada. Permitindo desenvolvimento de estratégias de prevenção e promoção da saúde do trabalhador.*

***Palavras-chave**: Validação. Postura. Ergonomia. Posto informatizado.*

Introduction

The benefits offered by information technology and its diffusion has led to the creation of computerized workstations in almost all professional areas. Computerized activities make jobs more fragmented and repetitive (1, 2).

When combined with poor physical design of workstations and lack of ergonomic and postural knowledge by the worker, fragmentation and high repeatability of working tasks may overload the musculoskeletal system (2).

In this context, the redesign of jobs is of paramount importance. A suitable design of computerized workstations may contribute to the reduction of occupational diseases and ergonomic hazards, and increase workers' comfort at work (1, 3, 4).

In a computerized working environment, there are many important factors that may predispose the development of musculoskeletal disorders (5, 6, 7). Factors that are likely to be generators of musculoskeletal pain and disorders involve inadequate postures and repetitive movements. They are considered to be major predictors of the emergence of occupational diseases and, therefore, prevention strategies need to be developed (8, 9, 10, 11).

A very important part of a prevention program is training and education on basic ergonomics and on the use of one's body in everyday work situations and everyday life in general. Therefore, it is important that professionals with knowledge in the areas of ergonomics and posture constantly work with companies to increase awareness (12, 13, 14). Sampaio and Oliveira (15) state that health promotion and quality of life improvement programs in the workplace are becoming indispensable and should make part of companies' culture. In this sense, an occupational physical therapist should encourage employees and help companies develop a new healthy culture of body and postural awareness.

In a company, an occupational disease prevention program starts with the identification of risk factors in the work environment (16, 17). However, prevention of occupational diseases does not depend on individual measures, but rather on the identification of risk factors, and can be complemented by the functional assessment of workers (18, 19).

Functional assessment for risk prevention is a dynamic process which aims at identifying a person's individual needs. In this sense, the availability of standardized assessment tools has contributed to this process (20). According Baú (21), the assessment tools which can be used in the work environment are based on checklists and are systematic and objective assessments that can be used in different sectors of a company.

Couto (22), Baú (21) and Figueiredo et al. (20) believe that it is possible to obtain detailed information on employees through the use of checklists related to worker's posture and workplace ergonomics, and that this information would allow the planning and implementation of measures to improve people's working conditions.

In order to implement effective prevention measures in the workplace, it is necessary that the assessment is based on data from different sources, such as interviews, observation, resources such as photos and films, as well as the worker's own contributions. Thus, the creation and implementation of preventive guidelines should be based on the individual needs of each person, making it possible to plan and provide guidelines that make sense and actually help change a person's behavior (23).

In this context, there is a gap in the literature regarding a single tool for the evaluation of risk factors related to body posture, workplace ergonomics and the relationship between the posture adopted by a worker and the workplace furniture. Thus, the aim of this study was to develop a postural and ergonomic assessment tool for the analysis of subjects' sitting posture at the computer workstation. The assessment tool was named IAPE (Instrumento de Avaliação Postural Ergonômica [Postural and Ergonomic Assessment Tool]) (Annex 1).

Materials and methods

This is a quantitative, descriptive, observational, cross-sectional study. Eighty-two employees in the administrative sector of the Rio Grande do Sul Industries Federation (FIERGS), Porto Alegre, RS, Brazil, were invited to participate in the study, regardless of sex. The mean age was 32.8 ± 7.7 years. The employees were divided into groups according to the sectors to which they belonged and to the stages of the study: group A (30 subjects), group B (20 subjects) and group C (32 subjects). In this study were included only those employees who had been working in the administrative sector of FIERGS for at least six months. All participants signed an Informed Consent Form (ICF). The study was approved by the Research Ethics Committee of the Vale do Rio dos Sinos University, protocol number 107/2010. In this study, we used an intentional, non-probability sampling method (24).

IAPE development and assessment stages

The IAPE development and administration process was performed in four stages. First we contacted the FIERGS and requested their authorization to conduct the study. In the first stage, we observed the most commonly adopted postures by FIERGS employees in the workplace. We observed the position of the body segments, which were divided into: 1) head and cervical spine; 2) thoracic spine; 3) lumbar spine; 4) shoulder; 5) elbow; 6) wrist; 7) hip; 8) knee; and 9) ankles.

The 30 employees assessed in the first stage of the study (Group A) did not participate in the other development stages of the study. During the observation period, we observed and recorded the positions adopted by each of the nine body segments. The data collected in the first stage served as initial guidance for the development of the tool.

In the second stage, we developed the first version of the IPEA, based on other assessment tools found in the literature, such as RULA (25), REBA (26), postural assessment (27, 28) and the checklist for analysis of working conditions at the computer, which was proposed by Couto (29). We also compared them to the results obtained in the first stage of this study. In the third stage, the developed tool was assessed by two ergonomics experts. These experts assessed the tool with respect to its suitability, its content and its purpose. To evaluate the instrument, each ergonomics expert was provided a scripts in which it was possible to identify each item of the proposed tool and confirm or deny the suitability of the item. Moreover, an extra blank space for possible suggestions and comments was inserted for each item. The results obtained from the experts' assessment were analyzed using the Content Validity Index (CVI) adapted from Waltz, Strickland and Lenz (30), and calculated according to Equation 1.

$$CVI = \frac{\text{Number of items assessed as equivalent by the 2 evaluators}}{\text{Total number of tool items}}$$

A CVI close to one indicates similarity in responses from the two evaluators regarding the analysis of the adequacy and internal coherence of the IAPE. In the fourth stage, after the ergonomics experts had given their approval, the tool was simultaneously administered to 20 FIERGS employees by 2 evaluators, in order to assess its reproducibility. This procedure was conducted by the researcher (EVA1) and by an ergonomics expert who worked for FIERGS (EVA2). During the administration of the IAPE, there was no communication between the evaluators. To assess the reproducibility of the IAPE, each item result for group B from each of the two evaluators (EVA1 and EVA2) were compared using the Wilcoxon test. Correlation between results was analyzed by the intraclass correlation coefficient ($p < 0.05$).

To conclude the tool development procedure, the IAPE was administered to 32 FIERGS employees (Group C), once all four stages had been completed.

Postural and ergonomic assessment tool (IAPE)

The IAPE was developed with the objective of evaluating employees working at the computer and implementing prevention strategies in the work environment. The tool consists of five items, which should be completed with information derived from the use of interview methods, image analysis and observation of the employee and his/her workstation: A) worker identification data; B) postural analysis (position of body segments); C) ergonomic analysis of the workstation; furniture features and the relationship between user and furniture; D) assessment of the posture varying from the sitting posture (a) and of the variant posture of the trunk (b); E) descriptive evaluation of the postural and ergonomic assessment.

The first item of the assessment tool aims to gather subjects' identification data by means of an interview. These data are important for the assessment because they help the evaluator to learn more about the company and the employee. In the second item of the IAPE, three photos of the employee sitting at the computer at his/her workstation (two in the sagittal plane with bilateral view and one in the frontal plane with posterior view) were taken. Postural analysis was then performed based on the three photos. We evaluated the position of the various body segments, according to the assessment script proposed by the IAPE. The assessment script describes adequate and inadequate postures for each body segment evaluated from a biomechanical point of view. The evaluator selects the alternative that best corresponds to the posture seen in the photo. This postural analysis based on photographs is performed after the analysis of item four of the IAPE.

The third item corresponds to the ergonomic analysis of the workstation. In this section, based on the sequence of the proposed instrument, the evaluator analyzes whether the furniture is suitable for the work performed by the employee, whether the furniture has adequate features and whether it can be easily adjusted. Moreover, in this item, the evaluator also observes and evaluates the relationship between the subject and the furniture. This provides evidence on how the employee uses the furniture in the workplace.

Item four of the assessment tool provides information about postures varying from the sitting posture and about variant postures of the trunk. Throughout the entire process of administration of the IAPE, the evaluator observes the postural changes adopted by the employees, especially in relation to the position of the trunk and the sitting position. All postures adopted are registered at the end of the assessment. On completion of the IAPE assessment, the results are shown to the employee for educational purpose, in order to provide him with postural and ergonomic guidance.

Results

The results will be presented according to the four IAPE development stages and its administration to groups B and C. In the first stage, we observed the postures most commonly adopted by FIERGS employees, who belonged to group A. The most commonly observed inadequate postures from a biomechanical point of view were: cervical spine bent forwards, elevated shoulders, increased dorsal kyphosis and ulnar deviation. With regard to the sitting posture, in the first stage we found that most employees did not use the backrest of the chair and tilted their trunk forwards or ended up sitting on their sacrum. In the second stage, these results were compared with items of other ergonomic and postural assessment tools found in the literature. This helped in the construction and development of the initial version of the IAPE.

In the third stage, the designed tool was evaluated by two ergonomics experts. Both experts made suggestions and issued a favorable opinion on the adequacy and internal coherence of the proposed tool. The results of the responses from both experts were analyzed by means of Equation 1 and resulted in a CVI value of one, which means agreement between both expert evaluations of all IAPE items. The CVI values obtained show the adequacy and internal coherence of the IAPE.

In the fourth stage, the tool was tested for intra-evaluator reproducibility. Twenty subjects (Group B) were simultaneously evaluated by an ergonomics expert (EVA 2) and by the researcher (EVA 1). Table 1 shows the results of the IAPE reproducibility assessment, which was performed in the fourth stage. The results showed no differences between the two evaluators in all items of the tool ($p > 0.05$).

The intraclass correlation coefficient (ICC) obtained from the data collected in the fourth stage — to assess reproducibility — had minimum values ($r = 0.80$, $p = 0.00$) and maximum values ($r = 1.00$, p = 0 00) corresponding to a high level of agreement between the assessments carried out in group B ($n = 20$) by the researcher (EVA 1) and the expert who worked for FIERGS (EVA2).

Table 1 - Evaluation of the reproducibility of the results of items 2 (postural assessment), 3 (ergonomic assessment) and 4 (variant posture) of the IAPE, administered to Group B by the two evaluators (EVA1 and EVA2)

(To be continued)

	Item	EVA 1 *versus* EVA 2 (p value)
Postural analysis	Cervical spine, anterior view	1.00
	Cervical spine, lateral view	0.18
	Dorsal spine, lateral view	1.00
	Lumbar spine, lateral view	1.00
	Shoulders, lateral view	1.00
	Shoulders, posterior view	1.00
	Scapula, posterior view	1.00
	Arm, lateral view	1.00
	Arm, posterior view	1.00
	Forearm	1.00
	Wrists	1.00
	Computer screen features	1.00
Ergonomic analysis of the workstation	Relationship between user and computer screen position	0.31
	Relationship between user and computer screen height	1.00

Table 1 - Evaluation of the reproducibility of the results of items 2 (postural assessment), 3 (ergonomic assessment) and 4 (variant posture) of the IAPE, administered to Group B by the two evaluators (EVA1 and EVA2)

(Conclusion)

	Item	EVA 1 *versus* EVA 2 (p value)
Ergonomic analysis of the workstation	Relationship between user and distance to the computer screen	1.00
	Keyboard features	1.00
	Relationship between user and keyboard position	1.00
	Relationship between user and keyboard height	1.00
	Relationship between user and mouse pad position	1.00
	Chair features	1.00
	Relationship between user and chair	1.00
	Table features	1.00
	Relationship between user and table	1.00
	Accessories	0.32
Variant posture	Sitting posture	1.00
	Trunk posture	1.00

Note: Significant difference at $p < 0.05$.

Discussion

The aim of this study was to develop a postural and ergonomic assessment tool for the analysis of subjects' sitting posture at the computer workstation. According to our observation, which was performed in order to develop the tool, in the first stage, the most commonly adopted postures by employees were: cervical spine bent forwards, elevated shoulders, increased dorsal kyphosis and ulnar deviation of the wrist. Kendall (28) and Guimarães (31) emphasize that inadequate postures of the cervical spine and upper limbs may be directly related to sensations of strain and pain. According Baú (6), these postures are often seen in the workplace and may contribute to the occurrence of occupational musculoskeletal disorders.

With regard to the sitting posture, we found that most employees ended up sitting on their sacrum. Baú (6) emphasizes that the sitting posture imposes a significant biomechanical load on the intervertebral discs, especially in the lower back. Brandimiller (32) affirms that sitting on the ischia relieves pressure on the intervertebral discs, and reduces the load on the hip muscles. The results obtained during the initial observation encouraged the inclusion of another item in the IAPE, in order to assess postures varying from the sitting posture. This item makes it possible to collect data for the implementation of postural guidance, especially regarding a worker's sitting posture at the workstation.

In the third stage, we conducted a content validation procedure. According to the two ergonomics experts and the CVI value obtained (CVI = 1), the IAPE shows adequacy and internal coherence. Thus, since the results obtained from the responses given by both experts were similar, this indicated that the IAPE possesses content validity.

Validity is one of the criteria that can indicate the quality of a tool. Content validity refers to the careful analysis of a tool's content. In this type of validation, the tools are assessed by experts on the subject, who may suggest the removal, addition or modification of items (33).

According to Valentini et al. (34), the use of tools with content validity is essential for the work of health professionals. Lacerda et al. (35) emphasizes that determination of content validity is an important step in the development of new tools. Mendez et al. (36) designed and performed content analysis a questionnaire which aimed to identify the psychosocial factors that influence physical activity behavior in CAD patients. Three experts assessed the content validity of the tool. The results provide evidence of content validity of the tool.

In this study, the content validity of the IAPE was determined by two experts, who assessed the objectives and the content of the tool. According to Lacerda et al. (35), there are numerous empirical methods to establish content validity of a tool, but the method that seems to be most effective is asking a group of experts (judges) to compare the test objectives with its content.

In the fourth stage, the tool was tested for intra-evaluator reproducibility. 20 subjects (Group B) were simultaneously evaluated by an ergonomics expert (EVA 2) and by the researcher (EVA 1) (table 1). According to Zanolla et al. (37), in addition to validity, reproducibility is also required to certify the quality of a tool. Reproducibility analyzes whether the results obtained on two occasions/under different measurement conditions are similar. In this study, this was achieved by using two evaluators. The results obtained from the administration of the IAPE showed no differences between the two evaluators in all items of the tool ($p > 0.05$). This shows a high level of agreement between evaluators. ICC also had minimum values ($ICC = 0.88$, $p < 0.05$), which indicates high level of agreement between the responses obtained by the two evaluators and good reproducibility of the IAPE.

A study by Farias Junior et al. (38) assessed the reproducibility levels of a questionnaire for adolescents by using the ICC. The tool showed moderate to high reproducibility levels for most of the questions, and proved to be a good option for collecting information on health-related behaviors among adolescents. The lowest ICC between items was $ICC = 0.80$, which, according to classification criteria adopted by Farias Junior et al. (38), shows that the IAPE has a strong reproducibility.

Conclusion

The results obtained in this study indicate that the proposed tool, the IAPE, is adequate, has a strong reproducibility and has content validity. We found that the IAPE makes it possible to combine the evaluation of risk factors related to body posture, workplace ergonomics and the relationship between the posture adopted by a worker and the workplace furniture. In this sense, as the IAPE involves postural and ergonomic issues, and workers' attitude, it may effectively help occupational physical therapists in identifying risk factors in the work environment which are associated with the sitting posture at the computer. This tool allows the performance of an organized and proper assessment of the work environment and the creation of disease prevention and health promotion strategies, based on individualized information.

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Annex 1

Postural and ergonomic assessment tool – IAPE

1) Identification data

General data to be collected from the participant

Name:	
Female ( )	Male ( )
Age:	
Sector/job position:	
Number of years in the job position:	
Number of daily working hours:	
Physical exercise yes ( ) no ( )	Specify which one:
Workplace exercise yes ( ) no ( ) occasionally ( )	
Working breaks yes ( ) no ( )	How often:
Does the company offer health promotion and injury prevention interventions? yes ( ) no ( )	
In case the company offers these interventions, do you take part in them? yes ( ) no ( )	

2) Postural Analysis (position of the body segments)

This item aims assesses the position of the body segments. To make this assessment, the evaluator carefully watches the employee at work

Cervical spine Anterior view	
Normally aligned	( )
Sloped to the right	( )
Sloped to the left	( )
Rotated to the right	( )
Rotated to the left	( )
Sloped and rotated to the right	( )
Sloped and rotated to the left	( )
Could not be watched	( )
Other:	( )

Lateral view	
Normal	( )
Projected forwardly	( )
Projected backwardly	( )
Cervical flexion	( )
Could not be watched	( )
Other:	( )

Dorsal spine Lateral view	
Normal	( )
Increased dorsal kyphosis	( )
Rectified	( )
Could not be watched	( )
Other:	( )

Lumbar spine Lateral view	
Normal	( )
Increased lumbar lordosis	( )
Rectified	( )
Could not be watched	( )
Other:	( )

Shoulders Lateral view		
	Right	Left
Normal	( )	( )
Protruding	( )	( )
Retracted	( )	( )
Could not be watched	( )	( )
Other:		
Posterior view		
	Right	Left
Elevated	( )	( )
Depressed	( )	( )
Could not be watched	( )	( )
Other:		

Scapulas Posterior view		
	Right	Left
Normal	( )	( )
Abducted	( )	( )
Adducted	( )	( )
Could not be watched	( )	( )
Other:		

Arm Lateral view		
	Right	Left
Normal: at small flexion angle-max. 25º	( )	( )
Flexion (greater than 25º)	( )	( )
Extension	( )	( )
Medial rotation	( )	( )
Lateral rotation	( )	( )
Could not be watched	( )	( )
Other:		

Posterior view		
	Right	Left
Normal (small abduction - max. 20º)	( )	( )
Abduction (greater than 25º)	( )	( )
Shoulder adduction	( )	( )
Could not be watched	( )	( )
Other:		

Forearm		
	Right	Left
Normal (approx. 90º flexion)	( )	( )
Flexion (greater than 90º)	( )	( )
Flexion (smaller than 90º)	( )	( )
Could not be watched	( )	( )
Other:		

Wrists		
	Right	Left
Neutral position	( )	( )
Wrist flexion	( )	( )
Wrist extension	( )	( )
Ulnar deviation	( )	( )
Radial deviation	( )	( )
Could not be watched	( )	( )
Other:		

3) Ergonomic analysis of the workstation

The aim of this item is to assess the ergonomics of the workstation. The evaluator watches the furniture used by the employees at their workstations.

Computer screen features		
	Yes	No
Is it possible to adjust the height of the screen?	( )	( )
Can it be easily adjusted?	( )	( )

Relationship between the user and the distance to the computer screen	
Position	Adequate: ( ) in front of the trunk Inadequate: ( ) to the left of the trunk Inadequate: ( ) to the right of the trunk
Height	Adequate: ( ) An imaginary line is drawn from the user's eyes to the upper part of the computer screen Inadequate: ( ) low Inadequate: ( ) high
Distance	Adequate: ( ) the computer screen is at a distance of 50-70 cm from the user's eyes Inadequate: ( ) too close Inadequate: ( ) high

Keyboard features		
	Yes	No
Is it a soft touch keyboard?	( )	( )
Is it setup according to the Brazilian ABNT standards?	( )	( )

Relationship between the user and the keyboard position	
Position	Adequate ( ) located in front of the computer screen and in front of the user Adequate ( ) there is enough space for the forearm Inadequate ( ) there is not enough space for the forearm Inadequate ( ) located to the right or to the left of the computer screen and the user
Height	Adequate: ( ) the user's hands are in neutral position Inadequate ( ) low Inadequate ( ) high

Relationship between the user and the mouse pad position	
Position	Adequate: ( ) close to the keyboard as if it was a continuation of the keyboard Adequate: ( ) close to the body Inadequate: ( ) far away from the body Inadequate: ( ) far away from the keyboard

Chair features		
	Yes	No
Can the height of the chair be adjusted?	( )	( )
Is it possible to adjust the height of the chair?	( )	( )
Is the back support of the chair firmly fixed and allows comfort?	( )	( )
Can the back support of the chair be adjusted?	( )	( )
Is it a swivel chair?	( )	( )
Is it possible to adjust the height of the arms of the chair? Is it easily adjusted?	( )	( )

Relationship between the user and the chair	
Height	Adequate: ( ) arms at the height of the table surface and positioned at a 90° angle to the forearm. Knees flexed at approx. 90° Inadequate ( ) higher Inadequate ( ) lower

Table features		
	Yes	No
Is the type of table used adequate for the work performed?	( )	( )
Is the anterior part of the table rounded?	( )	( )
Does it provide a high space for the accommodation of the legs?	( )	( )
Does it provide a wide space for the accommodation of the legs?	( )	( )
Does it provide a deep space for the accommodation of the legs?	( )	( )

Relationship between the user and the table	
	Inadequate ( ) not enough space Adequate ( ) enough space to accommodate work materials

Does the employee need accessories?		
	Yes	No
Feet support	( )	( )
Forearm support on the chair	( )	( )
Mouse Pad	( )	( )
Paper or book support	( )	( )
Others:		

Items 4.a and 4.b aim at assessing possible postures adopted by the employee during his/her workday. The evaluator watches the employee at his/her workstation.

4.a-Posture varying from the sitting posture	
Sits with his/her legs crossed (lateral rotation)	( )
Sits on tiptoe (ankle plantiflexion)	( )
Sits far away from the backrest of the chair	( )
Sits on his/her legs	( )
Sits at the forward edge of the chair seat	( )
Sits on his/her sacrum	( )
Other	

4.b-Variant posture of the trunk	
Trunk flexion	( )
Trunk extension	( )
Spine rotation	( )
Spine inclination	( )
Other	

Descriptive evaluation of the postural assessment:

Descriptive evaluation of the ergonomic assessment: