

**154 - IMPACT SYNDROME PREVENTION IN THE CLASSROOM**

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**1. INTRODUCTION**

Teachers' health related problems, highlighting the musculoskeletal disorders, have been showing increasing levels, considerably affecting such population's quality of life (PUNNETT and WEGMAN, 2004; GASPARINI, BARRETO, ASSUNÇÃO, 2005). The school environment is constituted by a complex organization, and the several activities carried out there enable the development of occupational pathologies. That happens due to inadequate postures, noises and emotional distresses, which are part of school routine (ARAUJO, et al., 2005).

During teachers' daily work activities, several actions are performed, which use the shoulder joints in significant frequency, and mostly with an anti-ergonomic posture. Concerning that, Criscuolo et al., (2000) state that such joint is the most flexible of the human body, offering conditions to execute movements of significant extension; but when submitted to efforts beyond their functional capacity, those might compromise their integrity, enabling the development of a pathology.

Thus, according to Couto, (2007) the shoulder joints are quite complex, especially the rotator cuff. Their movements allow huge postural changes and changes of technical action to an individual. Nevertheless, all shoulder extreme movements can only be performed a few times, and against little resistance; otherwise, those joints might suffer from an overload, which, consequently, cause an injury. It could be observed that one of the most overloaded structures is the supra-spinal muscle, which, when contracted, causes discomfort to the umeral articulation, harming that region's mobility (FARIA, 1999). In that sense, when one stays with their arms statically apart for a long period of time, a significant overload shall also be developed in tendons and ligaments (COURY, 1995; FORNAZARI, 2000).

Brox, (2003) alerts that even if actions are performed with suspended arms, they might compromise such joint's integrity. Accordingly, Ilda, (2005) points out that the shoulder is formed by a set of joints, which work harmonically with several tendons and muscles, in which the synchronized contraction of such muscles provoke a high mobilization of the humerus. That same author also alerts that many lesions might occur mainly when the arm, in their work activities, is raised above the shoulders, especially with excessive abduction movements above 90 degrees, which might cause a clinical condition of subacromial bursitis due to the continuous and repetitive compression in that place.

Vigorous and repetitive movements of the superior members, with arms above the shoulder level (and even more critical, above the head level), result in tendon clamping of the supra-spinal muscle, between the humerus head and the coracoacromial ligament, resulting in ischemia, inflammation and pain; repeatability leads to calcification, which perpetuates the inflammation, especially when the raising is above 45 degrees (MAGEE and OLIVEIRA, 2005).

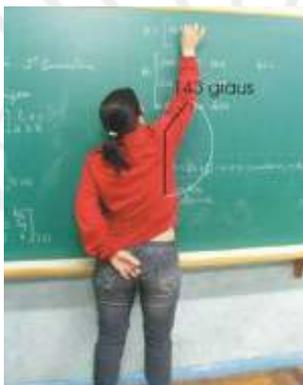


Figure 01 - Abnormal Abduction of the arm in the Interaction Professor Black Picture

Source: Author

In the classroom, during the writing activities, the teacher conducts about 50% of their classes with blackboard activities, and in most of them they maintain an exaggerated abduction, compromising all the humeral joint, even though the discomfort is mostly perceived as the age and service time grows (CARVALHO and ALEXANDRE, 2006; NORONHA et al., 2002).

Therefore, it becomes important to prevent synovial bursae inflammations, so that the tendons from the supra-spinal muscles as well as from long head of the biceps brachii are able to perform their functions without obstacles in the acromial region. Besides, bursae perform a vital function of nourishing muscles, mainly the rotator cuff's muscles (ANDREWS; HARRELSON; WILK, 2000). We can, thus, contribute with this professional by preventing two important pathologies: the supra-spinal Tendinitis, which stems from projecting the shoulder ahead in suspension, and the biceps' long portion Tendinitis, caused by the permanence of the fist flexioned with a pronation of the forearm, and, mainly, by the arm abduction, worsen when that is raised without a support (CHAFFIN et. al., 2001; ANDREWS; HARRELSON; WILK, 2000). One of the very used tools for pain

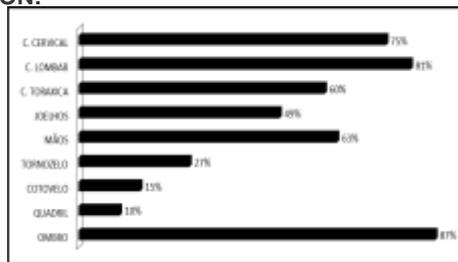
perception is the discomfort scale, proposed by Borg (2000), which ranges from 0 to 10, offering faithful results, and being a tool also for illness prevention.

Teacher's activities in the classroom demand constant movements of the arm in extension, flexion, abduction, and adduction, which, when inadequately performed, shall significantly compromise that professional's shoulder joint. That confirms what was stated by Brandimiller, (2002) who alerts about the performance of tasks that demand raising the arms above shoulders, an action that may contribute for onset of pain, which might evolve into a pathology. It becomes evident that when the shoulder joint is anatomically incorrect due to an ergonomically incorrect work environment, one professional is prone to getting ill (MAGEE, 2005; COUTO, 2009). In that sense, this article seeks to alert teachers about the inadequate use of the shoulder joints.

**2. METHODOLOGY**

This case study was carried out with the participation of teachers from the city Santa Terezinha de Itaipu, state of Paraná, Brazil. 40 teachers from day shift, with ages ranging from 37 to 45 years, weighing from 68 to 73 kilos and height from 1.62 to 1.72m, from both genders, and with working time superior to 15 years, were used as objects of study. The discomfort coming from working activities were collected through a checklist adapted from Couto, (2007) which, once the informed consent had been signed and clarified, was applied at the end of the work week, on Fridays at 10 a.m. and 4 p.m., with the sole purpose of verifying the musculoskeletal disorders in joints. The perception of pain, though, was verified through the discomfort scale, which ranges from 0 to 10 points, according to pain perception (BORG, 2000).

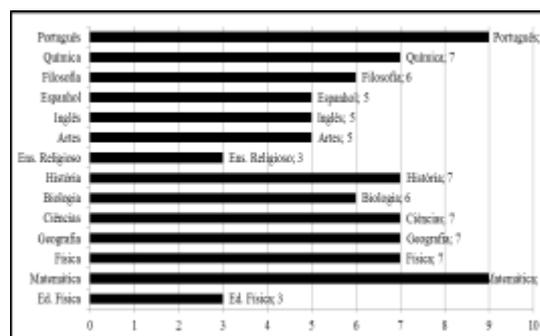
**3.RESULTS AND DISCUSSION:**



Graph 01 - Complaint of pains after the weekly day of work

The graph 01 describes the pain scores in joints as related by teachers after a work week, confirming that the region of the upper members is the one mostly reported by those professionals, highlighting the shoulder region, with 87% of complaints. Such data meets the statements of Reis, (2003), Coury (1995) and Fornazari (2000), who pointed out that the lack of ergonomically appropriate equipment adapted to those professionals, added to vicious and incorrect postures are the main reasons for pathologies in that body part.

Teachers' daily work in the classroom mainly consists of reading and writing activities, and content transmission, this last one being performed with the help of the blackboard. In such activity, raising the shoulder becomes necessary, an action that causes pressure over the bursae, fact which, according to how long and how often it is performed, may contribute for the appearance of occupational pathologies, confirming the statements of Coury, (1995); Barbosa (2002); Chafin et. al., (2001); Reis (2003) and Andrews et al., (2000), authors who report that the raising of shoulders may compromise the whole shoulder joint health, leaving the teacher prone to getting ill, mainly when arms are raised above 45 degrees (BRANDIMILLER, 2002; MAGEE e OLIVEIRA, 2005). In that same line of thought, Ilda, (2005) and Reis et al., (2003) explain that the work environment of any worker should be ergonomically correct, in order not to compromise their health. Chafin et al., (2001) alert that raising shoulders above 25° can already compromise shoulder joints' integrity. After the analysis of results, it became evident that teachers' shoulder use through an anatomically incorrect posture, shall contribute for such professional to be prone to occupational pathologies (IIDA, 2005; MAGEE, 2005; REIS, MORO and NUNES, 2003).



Graph 02 - Scale of pain told for the professors in the end of the weekly day of work.

Concerning pain perception, graph 02 describes that pain is reported by teachers of all subjects, but chiefly by teachers of Portuguese and Mathematics, whose reports reached a score 9 in the discomfort scale, ranging from 0 to 10. Such results confirm Reis, Moro and Nunes' (2003) writings, which alert that teachers should perform their activities using the blackboard with minimal abduction, flexion and extension of the arm, so that their health is not jeopardized, otherwise painful processes at shoulder and cervical region can be provoked, conditions that may evolve into a pathology (BRANDIMILLER, 2002; MAGEE e OLIVEIRA, 2005). Thus, it was noticed that teachers of subjects reporting a score above 6 for the discomfort scale should examine and control procedures performed in the classroom so that throughout their class planning and application they can use the blackboard with health, comfort and safety.

**4. FINAL CONSIDERATIONS**

This case study has showed us that activities performed by teachers cause a significant deterioration of the joints, especially those from the shoulders. Thus, even though classrooms' ergonomics need adjustments, it's necessary that the teacher, when carrying out blackboard activities, perform them with the minimum arm abduction, flexion and extension, so that

their health is not harmed. It could be concluded with this study that ergonomics in the studied school's classrooms need some corrections concerning the raised problematic. Therefore, it is important to alert politicians, Education professionals, engineers, and architects so that when a classroom is built, ergonomics between teacher-students and students-teacher is respected. It could be noticed that public schools from the state of Paraná demand a constant use of the blackboard. So, developing a blackboard that can be adequate to teachers' anthropometric measures is imperative. In that way, schools will be able to offer an enjoyable, comfortable, safe, pain free, and, consequently, injury free educational environment to both teachers and students.

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### IMPACT SYNDROME PREVENTION IN THE CLASSROOM

#### ABSTRACT

This study was conducted with 40 teachers from Santa Terezinha de Itaipu, Parana, Brazil with more than 15 years of professional work. The musculoskeletal disorders in the joints resulting from their activities were collected through the use of a checklist adapted from Couto, (2007). The perception of pain, however, was performed through the use of a scale ranging from 0 to 10 points, according to the Borg, (2000) subjective perception of pain. It could be concluded that the activities performed by the teacher on the blackboard provide significant deterioration of the joints, especially on the shoulder joints.

**KEYWORDS:** Teachers; Shoulder; Classroom

### PRÉVENTION DU SYNDROME D'IMPACT DANS LA SALLE DE CLASSE

#### SOMMAIRE

Cette étude a été menée auprès de 40 enseignants de la ville de Santa Terezinha de Itaipu, Paraná, Brasil, avec la durée de service maximale de 15 ans. Troubles musculo-squelettiques des activités conjointes ont été recueillies en utilisant une liste de contrôle adapté de Couto, (2007). La perception de la douleur a été réalisée en utilisant une échelle qui varie de 0 à 10 points, selon la perception subjective de la douleur, Borg, (2000). Il est conclu que l'activité exercée par l'enseignant sur le tableau fournit usure importante des articulations, en insistant sur l'articulation de l'épaule.

**MOTS-CLÉS:** Enseignement; épaule; classe

### PREVENCIÓN DEL SÍNDROME DE IMPACTO EN EL AULA

#### RESUMEN

Este estudio se realizó con 40 profesores de la ciudad de Santa Teresita de Itaipu, Paraná, Brasil, con el tiempo de servicio superior a 15 años. Los trastornos musculoesqueléticos de las actividades conjuntas fueron recolectados a través de una lista de control adaptado de Couto (2007). La percepción del dolor se realizó mediante una escala que va de 0 a 10 puntos, de acuerdo con la percepción subjetiva del dolor Borg, (2000). Se concluye que la actividad realizada por el profesor en la pizarra, ofrece una fatiga extrema de las articulaciones, haciendo hincapié en la articulación del hombro.

**PALABRAS CLAVE:** Enseñanza, hombro, en el aula

### PREVENÇÃO DA SÍNDROME DO IMPACTO NA SALA DE AULA

#### RESUMO

Este estudo foi realizado com 40 professores da cidade de Santa Terezinha de Itaipu, estado do Paraná, Brasil com tempo de profissão superior a 15 anos. Os distúrbios musculoesquelético nas articulações oriundos das atividades foram coletados através de um check-list adaptado de Couto, (2007). Já a percepção de dor foi realizada através de uma escala a qual oscila de 0 a 10 pontos, de acordo com a percepção subjetiva de dor Borg, (2000). Conclui-se que a atividade realizada pelo professor no quadro negro proporciona um desgaste significativo das articulações, destacando a articulação do ombro.

**PALAVRAS-CHAVE:** Professores; Ombro; Sala de aula