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ORIGINAL ARTICLE

Evaluation of the perception of cervical disability students of undergraduate of careers in dentistry, medicine and nursing from the University of the Andes: Cross-sectional study

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Abstract

Objective: The aim was to evaluate prevalence in perception cervical disorders in students of undergraduate dentistry, medicine and nursing from the University of the Andes. Through the use of a survey of the index of disability cervical, widely used for this purpose.

Methods: A study whose design was a cross-sectional descriptive. The number of study subjects was n = 232 students, between students of 1st, 3rd, and 5th of dentistry, medicine and nursing, who agreed to participate voluntarily in this study. Subsequently applied the rate of the cervical disability (neck disability index) survey to all the students that make up the study group. This survey consists of 10 questions and each one of them has 5 possible answers, then to each response is assigned a score of 0-5 points, being the maximum of 50 score.

Results: It was determined in the first instance the prevalence of cervical dysfunction for each career altogether, getting that 91% of surveyed students of dentistry, 63% of the students of medicine and 70% of nursing students showed some degree of disability.

Conclusions: Students of dentistry, medicine and nursing have a high prevalence of perception of some degree of cervical disability, being higher in upper courses the career of all the groups studied the greater prevalence and severity observed in students of dentistry. The women surveyed reported higher prevalence and severity in their perception of cervical dysfunction.

Introduction

There are large number of definitions of ergonomics, one defines it as the study of the interaction between humans, the objects that used and the environment in which they operate, being the purpose of ergonomics the generation of appropriate working conditions through the correct use of the equipment and correct anatomical position, decreasing fatigue and achieving greater effectiveness in the work.[1]

Since the 1980s, ergonomic studies have shown that bad working positions, can create cumulative traumatic type, which are manifested with pain or dysfunction disorders. Referred to as injury musculoskeletal to conditions involving both nerves, tendons, muscles, bones and support structures. These commitments may differ in degree of severity from periodic symptoms to severe chronic conditions.[2]

According to the WHO in its bulletin of occupational health in 1995, classifies the dental care professionals within a high-risk group that can develop occupational health problems. Musculoskeletal injuries represent a problem of the occupational health of dimensions not quantified within the dental profession. Dajpratham *et al.*[3] specify the most affected areas, being these 72.2% back pain, 70.3% cervical pain, 50.6% low-back pain.

The impact of dental professionals about musculoskeletal injuries is reflected in the increase in the use of medications, medical evaluations, difficulty sleeping and work absenteeism. Is our concern to generate applicable knowledge in the promotion of health in the framework of a healthy University, which is

one that "incorporates the health promotion project education and employment, in order to promote human development and improve the quality of life of those who there to study or work and, at the same time, train them to develop as promoters models of healthy behaviors at the level of their families, in their future work environments and in society in general."

The purpose of this study is to evaluate prevalence in perception cervical disorders in students of undergraduate dentistry, medicine and nursing from the University of the Andes. Through the use of a survey of the index of disability cervical, widely used for this purpose.

Ergonomics is the science that relates the work to the worker, this is done creating a comfortable, efficient working environment and to work to prevent work-related injuries. Can also be defined as the discipline that studies human work, ensuring the comfort, safety and health of persons. It is also known as the human factors engineering, which refers to the association between the worker and the work.[4]

The goal of ergonomics is the generation of adequate conditions of work through the proper use of equipment and the adoption of a proper anatomical position.[1]

Occupational injuries are frequent in the dental practice mainly for not working under ergonomic guidelines.[2]

Overload and poor posture of the back are associated with low back pain, the repetitiveness of movements is associated with disorders of the neck and shoulders and psychological stressors have been associated to lumbar, neck and shoulders discomfort. In addition influences the dimensional aspect of the job this corresponds to all those dinamico-espaciales job features that allow the intervention of various body segments of the individual, as well as elements of the dimensional aspect of the job.[4]

The position responsible for the neuromuscular system requires the coordination of various reflex activities involving agonist, antagonist and locking muscles governed by the central nervous system.

Recipients of muscles and joints, report changes in position and movements so that they can be processed, generating a response expressed as a muscular activity that modifies some posture.[5]

When we are standing, the column has four physiological curvature, these are cervical lordosis, thoracic xifosis, lumbar lordosis and sacral xifosis. These physiological curvature are interrelated between whether the change of stance of one affects the other.

When it is swinging against the center of gravity, an imbalance in the spinal operation and the strength to counteract the force exerted must be supported mainly by muscles, ligaments, and soft tissues of the column.

Maintain the proper cervical lordosis is extremely important. During the prepending of head and neck vertebrae are not able to support the correct position of the column so it is the muscles of the cervical spine as chest which must contract constantly to support the weight of the head in this vicious position.

The relationship between pain and postural defects depends on the consistency of the defect. It is important to understand the relationship between pain and the posture the fact that the cumulative effect of a series of tensions is little intense, which act either constant or repeated over a long period, give rise to a problem of gravity similar to the originated by sudden tension of great intensity.

Incorrect postures of the dentist:

- Head prepending
- Shoulders prepending
- Flexion or rotation of the neck
- Abduction or flexion of shoulder
- Shoulder elevation
- Elbow flexion
- Extension or flexion of the wrist
- Ulnar or radial deviation of wrist
- Extension or flexion of the fingers
- Highly repetitive
- Movements with an isometric force and contraction component.

Prepending the head

It consists of a misalignment between the head and the trunk, which is characterized by an excessive previous position of the head in relation to the trunk. Various causal factors including been described have excessive cervical extensor muscles tension, cervical lordosis exaggerated or excessive elongation of the neck flexor muscles.

Studies have come to the conclusion that while the prepending head can lead to muscle imbalance is a common posture over time which leads it to be possibly corrected exercise.

Despite being a normal working position, is associated with multiple alterations, such as:

- Weakness of deep flexor muscles of the neck
- Shortening of the extenders of the neck and pectoral muscles
- Muscle imbalance that is manifested with pain, fatigue, limitation of movement.

The symptoms associated with the forward position of the head are predominantly due to that in this position the center of gravity of the head is anterior to the vertical axis which increases the load on the posterior neck muscles.

Injury musculo esqueletas is called those conditions involving both nerves, tendons, muscles, bones and support structures. These commitments may differ in degree of severity from periodic symptoms to severe chronic conditions.

Disorders musculoskeletal caused or aggravated by the conditions and/or working environment are referred occupational skeletal muscle injuries, controversy exists regarding the occupational origin of these pathologies, but is well known and accepted that certain occupations, tasks, and positions can cause, condition and perpetuate this kind of injury.

Musculoskeletal injuries represent a problem of the occupational health of dimensions not quantified within the dental profession. Both students and dental professionals are exposed to musculoskeletal disorders. These lesions can lead to a constant pain, cumulative damage, which can determine an early retirement of professionals.

Varied professional injured musculoskeletal of occupational origin, they dentists which are highly exposed because of their clinical work requiring numerous physiological demands, within are among them is the need to acquire static positions for long periods of time and perform procedures in one highly restricted area among others.

These physiological demands to which the dentist are exposed during their practice clinic lead it to present a high risk of developing musculoskeletal injuries. The areas most affected are the lower back, neck, and shoulders.

Static postures to this subject the dentist at first produce fatigue and muscle imbalance, then muscle ischemia and the appearance of points triggers, which produces pain. As a measure of restraint and restriction of pain occurs a protective muscle contraction which in turn leads to a hypomobility joint, nerve compression and degenerations of the intervertebral discs causing musculoskeletal disorders.

The literature describes different prevalence for musculoskeletal pain, these ranged from 64% to 93% where the regions most affected are lumbar and neck.[6]

Thornton *et al.* found that 61% of students of dentistry reported musculoskeletal symptoms related to the clinical and preclinical work at their universities. Within these students, the neck represented 48%, 31%, 44% back shoulders and hands by 20%.[2]

1. Musculoskeletal injuries more frequent at the dentist
   - Tendon injuries: Tendonitis, tenosynovitis.
   - Causes: Repetitive isometric contractions, or manipulation of objects heavy from incorrect positions.
   - Pathophysiology: Dentario causes inflammation, hypoxia, generating pain and necrosis.
2. Nerve injuries and Neurovascular: carpal tunnel syndrome
   - Causes: Work repetitive, flexo-extension of the doll, inadequate positions, and constant vibration movement.
   - Pathophysiology: Injury of the nerve in the intramuscular route either in aponeurotic muscle or osteofibroso.
   - In general: Compression, stretching, ischemia, pain and paresthesia.
3. Muscle injuries
   - Causes: Muscle overload by isometric or repetitive efforts, dislocations or sprains of small joints and tendons of the spinal column. Influence of psychological factors.
   - Pathophysiology: Sustained, muscle contraction causes ischemia, which leads to pain.
   - Defective joint: Cervical osteoarthritis of knee, shoulder pericapsulitis.
   - Among the most common in the dentist vertebral pathologies, we have mainly the cervicalgia, mainly due to cervical hyperextension or hyperflexion.
   - Other common pathology in dental care is twist cervical stretch syndrome which manifests itself with pain to the movements of the neck to upper limbs.

On the other hand, we have the syndrome of the trapezium, which is a myofascial pain and ligamentous, persistent contracture of the trapezius muscle. Anterior cervical flexion long and fixed positions, as well as pre-existing cervical lesions can influence the appearance of a persistent muscle contraction and the relaxation or ligamentous tensile of the insertions of the trapezium, with the onset of pain. Finally have pain syndrome low back, which is characterized by a persistent pain in the lumbar area, mainly associated with the position of foot.

Neck pain or neck pain is a disease with a high prevalence, described that at least 70% of the population over 20 years has suffered or suffer from some degree of cervicalgia.

Causes of neck pain

Myofascial pain: Muscle factors or desmoid postural by poor ergonomics and stress or chronic muscle fatigue, these may be secondary to a postural adaptation that has as a primary cause a pathology of the shoulder, vertebro-cranial junction or temporo-mandibular joint.

The pain of discogenic origin: Disks are innervated at its periphery nerves sinuvertebrales, formed by branches of the ventral nerve roots and sympathetic plexus. Stimulation of nerve endings that exist in the annulus fibrosus by disc degeneration can be the source of the pain.

There are multiple methods of evaluation of pain and cervical dysfunction, among them there are multiple surveys, joint mobility test among others. There are five scales, three of them are similar in structure and psychometric properties, these are index disability cervical, cervical dysfunction of Copenhagen scale and the scale of Northwick Park. The unique scale validated for different populations is the cervical disability index.[7]

There is a scale specific for each patient, which measures more specifically the painful symptoms, not used this scale since it is virtually impossible to make comparisons between individuals.

Five scales to assess the cervical painful symptoms have similar features, however, cervical disability index to been revalidated at different times.

Cervical disability index

The rate of cervical disability (neck disability index [NDI]) was developed in 1989 by Howard Vernon. The index was developed as a modification of the Oswestry low back pain index of disability with the permission of the original author (J. Fairbank, 1980). In 1991, Vernon and Mior published the results of a study of reliability and validity in the journal of manipulation and physiological therapeutics. Since then, around ten articles have appeared in the literature indexed in NDI. All these studies have confirmed the original reports of a high level of reliability and validity.[7]

The NDI has become a standard instrument for measuring disability self-perception due to neck pain and is used by clinicians and researchers. This scale consists of 10 questions, each question has 5 possible answers, each answer is given a score from 0 to 5. The maximum score is 50. From time to time, the respondent does not complete a question or another. The average of all other elements added to the completed elements.[8]

The original report includes intervals of scores for the interpretation, in the following manner, of:

- 0-4 points = no disability
- 5-14 points = mild disability
- 15-24 points = moderate disability
- 25-34 points = severe disability
- More than 34 points = complete disability.

Methods

A study whose design was a cross-sectional descriptive.

Complied the study group through the application of a questionnaire during the month of August, where information was collected on the health condition of the students of dentistry, medicine and nursing, to subsequently excluded from the study, students who reported medical diagnosis of any pathology of spine ligament hypermobility, hearing loss, depression, mouth breathing use of orthopedic insoles or they have diagnosis of flat feet, in addition to students who have not answered the initial questionnaire in a complete way.

The final number of study subjects was n = 232 students, between students of 1st, 3rd and 5th of dentistry, medicine and nursing, who agreed to participate voluntarily in this study.

Subsequently applied the rate of cervical disability (NDI) survey to all the students that make up the study group. This survey consists of 10 questions and each one of them has 5 possible answers, then to each response is assigned a score of 0-5 points, being the maximum of 50 score.

NDI provides score intervals for performance, in the following manner:

- 0-4 points = no disability
- 5-14 points = mild disability
- 15-24 points = moderate disability
- 25-34 points = severe disability
- More than 34 points = complete disability.

It was determined the prevalence and degree of perception of cervical dysfunction according to career, academic year, and gender.

Analysis

Nominal variables were tabulated and described with absolute and percentage frequencies. We explored the Association through the odds ratio (OR) obtained by the ordinal logistic regression for ordinal variables and logistic regression for dichotomous variables.

The variables were adjusted according to career, academic year and gender through the computer program STATA 11.0.

Results

The sample corresponds to 232 students of the Universidad de los Andes, dentistry (n = 88), medicine (n = 73) and nursing (n = 71).

It was determined in the first instance the prevalence of cervical dysfunction for each career altogether, getting that 91% of surveyed students of dentistry, 63% of the students of medicine and 70% of nursing students showed some degree of disability.

An OR the career of dentistry of 5.8 was determined through analysis of Association in related medicine.

In relation to the prevalence, according to the academic year they were respondents was obtained 68, 24% of 1st year students, had some degree of cervical dysfunction. Specifically the 83.33% of the students in 1st year of dentistry, 57.14% of the medicine, and 62, 96% of 1st year nursing students had some degree of cervical disability. For 3rd year students, in total 79, 01% of students had some degree of cervical disability. In the case of the career of dentistry a 93.33%, medicine a 61.9% and nursing by 74, 04% of 3rd year students showed some degree of cervical dysfunction. Students in 5th year in turn presented a total of 81, 82% presence of dysfunction, dentistry presents the prevalence but high with 96%, nursing students with a 76, 02% and finally the medicine 70, 83% prevalence continue it.

Realized a study of association according to academic year and the presence of cervical dysfunction, which determines a 4.8 OR (0, 2 and 5-44) for the 5th year and a 3.1 OR (0, 5-17, 4) for 3rd year of dentistry when compared with the 1st year of dentistry, in relation to the same academic years of medicine.

In relation to the prevalence of perception and severity of cervical dysfunction in women in relation to men, it was determined that 80, 86% of women and 64, 29% of the men surveyed had some degree of disability, resulting in all cases greater severity of perceived dysfunction in women surveyed above men. It was determined a 2.3 OR (1, 25-4, 39) for women making it an indicator of risk for the presence of disability cervical.

In the first instance study the degrees of disability present in students by career, dentistry presented by 9.09% of students without disabilities, 76, 14% with a slight disability and 14.77% with moderate intensity.

The students of medicine presented a 36.99% without disabilities, 56, 16% with slight, and 6.85% with a moderate degree of severity. Meanwhile, students of nursing presented 24.14% without disabilities, 63.79% with a slight degree, and a 12.07 with moderate disabilities.

The severity of cervical dysfunction was also evaluated in the students of the different courses obtaining result that 31.76% of 1st year students were not any degree of cervical disability, the 62.35% 5.88% a moderate degree and a mild disability.

In the case of students in 3rd year 20.99% not a present disability, the 64, 20 presented a slight degree, and a moderate degree 14.81. 5th year students by 18.18% does not present any degree of disability, the 65, 15 presented a slight disability, and 16.67% presents it in its moderate degree.

The students of dentistry within the 1st year 16.67% does not present any degree of dysfunction and 83.33% presents a slight degree. For students of the 3rd year of the same career a 75, 76% presents a slight degree-18.18% a moderate degree. Meanwhile, 5th year students had a 68% 28% a moderate and mild degree.

Neck pain intensity is evaluated by one of the applied survey question, this response has six possible responses which you correlations with degrees of intensity of cervical pain presenting respondents.

One of the items that evaluate the survey used is the intensity of cervical pain perceived by respondents. In the case of dentistry 43, 18% did not have any pain, 22.73% presented mild pain, 22.73% had moderate pain, and 11% have severe pain. The students of medicine 60, 27% I not present pain and by 28.77% story a slight neck pain, 8.22% 1.37%, moderate pain intense and very intense pain. Meanwhile students of nursing 40, 85% not present pain, 39, 44% mild pain, 14.08% moderate pain and a 5.63% intense pain.

Analysed the responses of all of the questions in the survey, included the analysis of question one and the five question since these two tried pain which was the most relevant for us. It was decided not to include the analysis of the other response since none of them gave us meaningful information.

Discussion

Musculoskeletal alterations are a severe problem within the area of health, specifically the dental care professionals. These injuries can even disable a professional develop their clinical practice. Inside the most common musculoskeletal injuries are neck pain, which limits the individual in different aspects affecting their quality of life. The cervicalgia are produced by the operator and its environment risk factors.[9]

Dental students and dentists are exposed to ergonomic hazards product of enforced prolonged static postures, activities that use small muscles, forces of high intensity and frequent repetitive. Medical students and doctors specifically surgeons are mainly exposed to wrong positions taken by long periods in which remain standing. Another risk factor for doctors is prepending head adopt to have a greater view of the operative field. Nursing and nurses, students are exposed to positions forced by prolonged repetitive motions as well as great forces for mobilization and accommodation of patients.

This study revealed that 90.91% of the dental students have some degree of perception of cervical disability. The students of medicine a 63, 01% perceived cervical disabilities, and students of nursing by 70, 42%. This affects in different aspects of daily living, activities such as: Reading, sleeping, dressing and handling among others.

It was determined an OR of 5.7 for the career of dentistry, medicine and nursing that can be explained by the number of clinical hours required during the career and risk factors are which exposed students.

On the other hand, the prevalence of perception of cervical disability in dental students is on the rise according to academic year, still in 1st year 83.33% ($n = 25$), junior 93, 94% ($n = 31$) and in 5th year 96% ($n = 24$).

The severity of perception of the students of dentistry is mild to 83.33% ($n = 25$), not presenting moderate, on the other hand, the 3rd and 5th year students refer a 75,76% ($n = 25$) and 68% ($n = 17$) disability mild respectively and 18.18% ($n = 6$) and 28% ($n = 7$) moderate disability. i.e., the severity worse with the passage of the years of study.

Determined a 4.8 for 5th year OR and an OR of 3.1 for 3rd year of dentistry, in relation to the students of the same years of medicine. In other careers studied Association could not be established. This may be due to the number of clinical hours that students of dentistry perform in relation to the students of other careers studied. While neck pain increases as increases the academic year of the respondents there are a high percentage of students who do not have neck pain at the time of answering the survey, what would demonstrate that there is the possibility of some degree of cervical dysfunction without pain. This represents a risk, as to not feel neck pain it is not work or repetitive movements, reaching suffer a cervical disability of great severity.

According to the literature, women tend to have higher perception and expression of painful stimuli. Also tend to have higher prevalence of muscular alteration of the upper trunk. In our research was evaluated only the perception of neck pain and disability caused by this. The results of this study reveal that 80, 86% of women reported some degree of disability cervical, being a moderate 19% and 81% of mild character. About neck pain 62, 35% suffers from some degree of pain, instead only 28.57% of men present neck pain. perception of the intensity of the pain also differs between genders, according to Paulson *et al*. women perceive the painful stimuli as more intense in 63% of the cases. Of our surveyed 35.8% story feel slight neck pain and an 8.02% present pain, instead only a 2.86% of the men present severe cervical pain. This variation in the perception of the intensity can be explained by psychosocial factors since women tend to be mostly affected by the situations of stress.

It is necessary to mention, keep in mind that the etiology of the problems in the musculoskeletal system is multifactorial and that for prevention will be necessary to pay attention to three factors: Worker, work and place of work.

It is important to be aware of the magnitude of the problem and create strict ergonomic guidelines to minimize the incidence of future professionals of health musculoskeletal injuries. It is recommended to take preventive measures such as implementing the healthy break, in which it would be advisable to perform stretching exercises.[10]

Female individuals perceive the painful stimuli more intensely than the male sex. This can be explained both by the female hormones, which influence the perception of pain, both the perception and the tolerance depend on the woman's menstrual cycle.

Numerous studies have shown a higher prevalence of painful chronic conditions in women than in men. However, it has been shown that the perception of pain is influenced by factors social, biological, psychological and.[10]

Another mechanism by which may explain the differences in the perception of the pain of women related to mechanisms

associated with the opioid activity, having women less sensitive to this.

Painful stimuli caused by pressure or electrical stimuli are the biggest differences of perception between men and women, on the other hand, in painful thermal stimuli do not have significant differences.

It is concluded that although there are mechanisms by which explain a more painful women's perception, perception and expression of pain is mainly influenced by personality, emotional state and factors psychosocial.

During dental work is affected greatly the four physiological curvatures of the spine, as it affected the cervical lordosis. He has been described that 78% of dentists exerts its clinical practice with a prepending of the head and neck to achieve greater insight with a consequential disharmony of the cervical lordosis.

The postural misalignment of the head and trunk, as, for example, the forward position of the head, are associated with pain in the neck and shoulder region, but has also been observed in asymptomatic individuals.

Conclusions

Students of dentistry, medicine and nursing have a high prevalence of perception of some degree of cervical disability, being higher in upper courses the career.

Of all the groups studied the greater prevalence and severity observed in students of dentistry.

The women surveyed reported higher prevalence and severity in their perception of cervical dysfunction.

Male surveyed students reported 71, 43% not present neck pain, a 15.71% story present a mild 10% pain moderate pain and a 2.86% intense pain. On the other hand, women surveyed reported not present neck pain 37, 65%, very intense 0.62% and mildly by 35.8%, moderately intense 8.02% 17.9%.

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