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RESEARCH ARTICLE

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ACTIVITY ANALYSIS OF DRUMMER MUSICIANS RELATED TO OSTEOMIOARTICULAR INJURES

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ABSTRACT

Repetitive strain injury (RSI) is a condition that affects the musculoskeletal system, being characterized as injuries that mainly affect the tendons of the human body, causing discomfort to those who present this type of injury. The emergence of RSI occurs through cumulative trauma of rapid movement and high intensity. The drummer musician in essence needs to use the upper and lower limbs to use his instrument, leading to a great need to move around generating sounds and silence that make up the music. The research aims to analyze the activity and movements imposed in the act of playing drums in amateur and professional musicians. Verifying the prevalence of pain and injuries of the osteomioarticular system through video recordings (where they will be evaluated by the research team) and a questionnaire made by the research team to know signs and symptoms of injuries that may affect the research volunteers. Presenting an average age of 26 years, the volunteers presented a higher rate of injuries in the upper limbs (hand and forearm), where these pathologies affected the non-dominant limb of the volunteer where they did not extend. Thus, presenting the positive effect regarding muscle stretching before the presentations.

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INTRODUCTION

For Houaiss (2010), music is the art of combining sound and silence in an organized way, that is, music is the combination of harmony, melody and rhythm. Where melody is what we do with our voice, that is, what can be singing. Harmony is the overlapping of notes serving as the basis for the melody. For example, a person who plays a piano is doing the harmony for a voice that is making the melody with their voice. And we have the rhythm that is responsible for marking the tempo of the song which is what marks the succession of strong and weak times in a musical phrase. In this study we are going to talk about the main responsible for this rhythm. The drummer musician (the one who plays the drums, particularly the American kit consisting of kick, box, deaf, hi-hat and cymbals) is primarily responsible for dictating the rhythm and tempo of the music. Its function is extremely important with regard to the performance of the band, it also has the function of marking the time of the song that is measured in beats per minute (bpm) to prevent the other musicians from leaving the beat pre-established by the music. The technique to play the drums is obtained over the years, demanding a lot of time, where one of the greatest difficulties encountered by beginning

drummer musicians is the lack of coordination and motor precision of the members of the body, because for each musical rhythm it is necessary to use each part of the body in a different way, making each style have totally different movements. Guendersen (2016 p. 236) "muscle memory is the ability to reconstruct the muscle mass and strength performed in a previous exercise" where these movements are still reduced, due to the fact that it has not been performed several times. More experienced drummers have a more precise ear for each rhythm and form of music, moreover for a good drummer it is necessary to have precision in their movements, being technical enough to reduce unnecessary energy expenses, knowing the time to make sure to use strong notes and weak notes. To be a good drummer it is necessary to listen to other more experienced drummers, observe every detail and study hard. Leading to better learning and achieving an improvement in muscle memory when playing your instrument. Vicente (2008) reports that the increase of the music industry, there was an abundant expansion in the musician profession, where the dedication to the routine of studies and practice became daily. With hours of rehearsal, shows and studio recordings; it also led to an increase in muscle overload, making these drummers more susceptible to injuries, the simplest ones like calluses generated by the friction of the stick with the hand like ligament injuries. Where this

injury may have come to harm your way of playing, as well as harm you in the intensity of your movements. With intense loads, several repetitions using the strength of shoulder, arms, hands, fingers, legs, ankles and feet for a long time this musician can be subject to injuries in all aspects, such as compressive loads on the spine for a long time sitting, repetitive strain injuries, neck pain, tendonitis and more serious injuries such as tendon rupture. Where these injuries are associated with the investment of time, being recreational or professional in the practice of physical activity, which is the act of playing the drums. Byl et al. (1996 p. 236) "Repetitive strain injuries are cumulative traumas where rapid and high-volume movements" can be prevented in several ways, such as through movements, through videos that can be used to recognize inappropriate postures, adapting your battery appropriate postures at the time of the performance so that these injuries do not interfere with your performance and the progress of the music; Through rest stops or stretching the most fatigued regions of the body, we can alleviate this type of injury and keeping all attention to the movements from the moment of mounting the battery until the time of the presentation. Therefore, this study aims to analyze the activity and movements imposed on the drumming act by amateur and professional musicians. Seeking with this study to answer the following research question: Does the activity of a drummer musician cause osteomioarticular injuries?.

MATERIALS AND METHODS

This research is characterized by being an observational analytical study with a quantitative approach. The sample was of the non-probabilistic type, being recruited for convenience. The evaluation protocols were carried out in the music studio of Associação Evangélica Primeira Igreja Batista do Bessamar from October to November 2019. The tests were applied individually and according to the availability of the volunteers. The sample consisted of 21 male individuals from the city of João Pessoa - PB. Where all volunteers were submitted the answer to the questionnaire and the recording of their image on video (on alternate days and at random). To participate in the research, the volunteers obeyed the following inclusion criteria: being aged between 18 and 59 years, where they have at least one year of practice and having the battery as the main instrument and having experienced a presentation. being excluded from the research those who have some cardiopathic condition or systemic changes. All volunteers were informed about the methodological procedures, agreed and signed the Informed Consent Form (ICF), informing the possible risks and the use of the information obtained. In addition, the study respected the intervention procedures and ethical precepts for research in human beings recommended by Resolution 466/2012 of the National Health Council, being approved by the Ethics and Research Committee of the João Pessoa University Center (CAAE 17173419.7.0000.5176). After the selection of the participants, they appeared on two different days with an interval of at least 24 hours between them. On the first day, the volunteers were directed to the studio where they took the questionnaire (using google forms, with structured questions, some of which may select more than one answer) to capture important information, namely: upper and dominant lower limbs, type of grip on the stick they use and the presence of injuries. Soon afterwards, they were directed to the next room to capture video, through two cameras previously positioned next to the battery; The volunteer is allowed 5 minutes to adjust the equipment according to the specifics of the same, such as: height of the bench, height and angle of the box, positioning of plates and distance from the drums. Once this was done, commands were given to start the musician's performance so that all cameras were turned on and capturing all the musician's settings on his instrument. Each musician accurately performed a track chosen by him. Being placed first without the heating of the evaluated muscles, later with the heating and stretching taught by the researchers. The volunteers performed the activity individually with the help of the original track previously recorded and without the help of the rest of the band. On the second day of recording, already on the presentation stage, all recording equipment was positioned in the same way that it was

positioned in the recording studio, playing the same musical track that was chosen by the volunteer previously, now doing all the stretches taught by the researchers and pre-heating. With the help of the band, he performed in the same way that it was recorded on the first day, the same movement with greater intensity due to the circumstances imposed by the moment.

RESULTS AND DISCUSSION

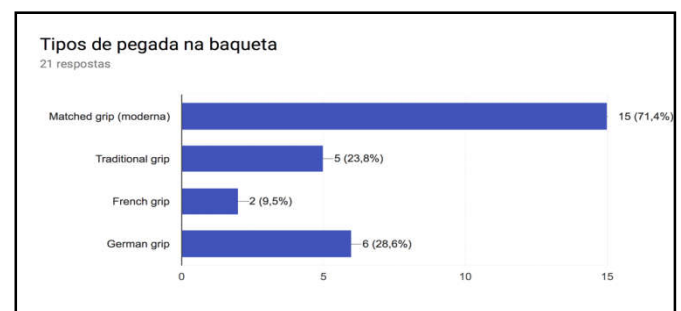
This study was carried out in musicians, who were between the second and third decade of life aged 19 years to 37 years, with an average age of 26 years, they have at least one year of activities, whether they are amateurs or professionals in the his instrument, where everyone trained or rehearsed on his instrument at least once during the week with a minimum time of 30 minutes.

Table 1. Physical examination of the research volunteers

	Dominant upper limb	Dominant lower limb
RIGHT	18 (85,7%)	19 (90,4%)
LEFT	3 (14,3%)	2 (9,6%)
TOTAL	21	21

Source: Research data (2019)

Table 1 shows the data of the dominant members of each participant who was submitted to the questionnaire, where we can, through the questionnaire together with the recorded videos, understand which member generates more strength, thus increasing the incidence of injuries on each side.

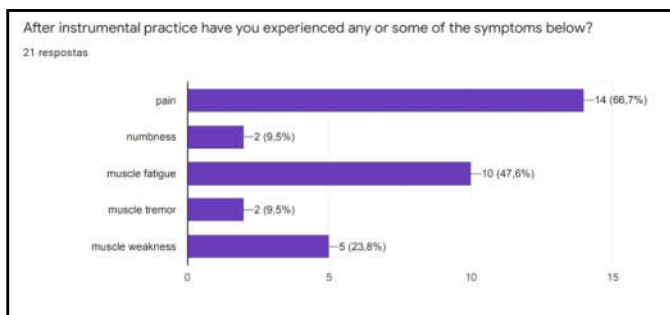


Source: Research data (2019)

Figure 1. Types of grip on the stick

Figure 1 shows the different types of footprints that were evaluated in the survey, the graph shows a higher percentage in the footprint called "matched grip (modern)" as the most used way of holding the drumsticks characterized in a way that a drummer holds the drumsticks in a way symmetrical in both hands, where it will be held with the thumb and index fingers being the axis of the movement lever and the rest of the fingers controlling the descent and ascent of the movement, thus using the muscles of the hand to touch. Being composed of movements of open kinetic chain that can lead to stress injuries and syndromes such as: carpal tunnel syndrome, D'quervain syndrome (Nascimento, et al., 2007). The second most used grip was the so-called "german grip", characterized by leaving the index finger parallel to the stick and having contact with the entire palm, thus using less of the hand muscles and having to generate strength in the arm muscles. Leading to tendonitis of the extensor and flexor muscles of the hands until the rupture of muscle fibers. In the "traditional grip" the Drumstick is positioned between the medial postero surface of the thumb and the middle phalanx of the middle finger, the palm facing up and / or perpendicular to the ground (Fidyk, 2008). For many, the type of grip on the stick is more difficult to use because it is necessary to use enough muscle strength and movements of pronation and supination. Leading to injuries like medial epicondylitis and lateral epicondylitis (Lech et al, 2003). Still with all the techniques presented, one of the main injury factors in drummer musicians stems from the fact that he did not choose the right type of drumstick. There are several types of drumsticks. The use of drumsticks is multiple, where it is ideal for the musician to choose the

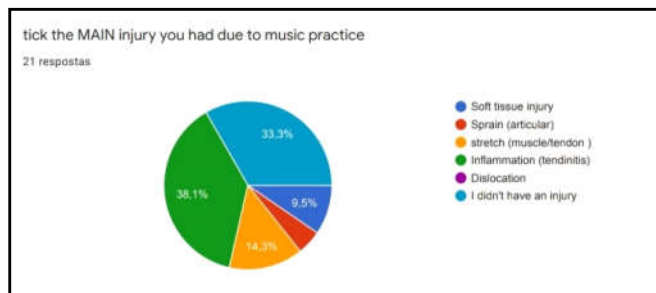
corresponding weight for his way of playing (Carince, 2012). In the German grip, it is better to use heavier drumsticks as it will take less force on the arms to generate sound on the instrument. In the traditional grip, it is ideal to use lighter drumsticks, as this grip is used in lighter styles such as jazz and forró. Another important factor is the size of the hands. If the musician has relatively large hands it is necessary to use larger drumsticks. According to Moura et al (2000) “the daily and routine repetitive activities, necessary for a good technical performance of the musician, can be harmful to the organism, producing an effect of cumulative tension in the tissues, exceeding the threshold of physiological tolerance and can produce disabilities” With the results in Figure 2, which shows that 66.7% of the volunteers had pain after using their instrument, with a total of fourteen volunteers having any type of pain, be it: from the mildest to the most intense.



Source: Research data (2019)

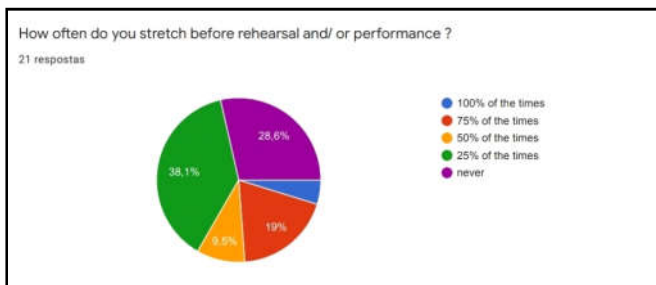
Figure 2. Symptoms after instrumental practice

Still according to Figure 2, ten volunteers presented muscle fatigue due to the high number of presentations. And five volunteers also highlighted muscle weakness due to some failure due to the intensity with which they play their instrument. Also, the fact that the instrument is bigger and is not well adapted to the physiognomy of the musician can lead to the use of other parts of the body in order to compensate for the movement (MacIver et al., 2007). Thus, complaints of muscle pain and fatigue associated with the practice of instruments are very common (Dommerholt, 2009).



Source: Research data (2019)

Figure 3. Types of injuries in musical practice



Source: Research data (2019)

Figure 4. Stretching before testing

Because these are lesions in which the symptoms slowly set in, tendon inflammation is hardly perceived in the early stages, as they are often confused with muscle fatigue. In addition, it is difficult to distinguish when an injury is no longer considered persistent and becomes chronic. It is also known that, depending on the etiological factors, there are different ways for the evolution and the installation

of the same lesion (Neto et al, 2008). Thus, the results of Figure 3 where 38.1% of the musicians presented some type of inflammation complaining of pain in the hands, arms and shoulders as the main injury in the professional walk where many of them before feeling the symptoms of the injury. And 38.1% of the volunteers answered that they perform stretches before rehearsals and / or presentation as shown in figure 4, only 25% due to the minimum amount of a presentation for, in some cases having less than an hour difference for the next presentation having to disassemble the entire instrument and mount it in another location, making it impossible to stretch necessary to reduce injuries. Still in 9.5% of the volunteers reported ligament injuries, needing to stop instrumental practice for a long period of time. According to Figure 4: 28.6% of the volunteers do not do any type of stretching or warm-up, and only 4.8% always do stretching regardless of the time they have before the presentation, be it simple stretches until the warm-up with the drumsticks. Thus generating a lower incidence of injuries in these previously elongated muscle groups suitable for musical practice.

FINAL CONSIDERATIONS

At the end of this research, it was found that the stretching of the upper and lower limbs has a positive effect in relation to the prevention of stress injuries in drummer musicians. Thus showing a positive analysis of the volunteers who marked more than four years of experience and performed the stretches, they did not present severe damage lesions in their musculoskeletal system. However, volunteers who had the same musical experience and did not perform stretches had injuries that prevented them from practicing music. This research proved to be extremely relevant for the scientific community, since it can deepen the knowledge in the area, demonstrating the performance of physiotherapy professionals in the care of drummer musicians and other instrumentalists. In addition to contributing to the performance of the physiotherapist giving greater guidance to body care during the day to day of this profession. More in-depth research on the theme is becoming increasingly important due to the increase in the phonographic market and the professionalization of musicians, making it a sub-area for the physiotherapist to take care of workers' health.

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