

EVALUATION OF PAIN AND FUNCTIONAL DISABILITY BODY PARTS SEEN BETWEEN MUSICIANS PLAYING STRING INSTRUMENTS

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Abstract

Purpose: The most common discomforts in musicians are musculoskeletal injuries. Musicians who play advanced instruments use their musculoskeletal systems for long periods of time outside their normal position. Conventional treatment, including cold therapy, passive motion, parafine, contrast and circular bath with additional ESWT (Extracorporeal Shock Wave Therapy) and High Density Laser therapy are the treatment methods of wrist and elbow Problems in patients with musician. The aim of study is evaluated of pain and functional disability body parts seen between musicians playing string instruments.

Method: Our randomized, blinded, controlled included 22 in musicians aged 16 to 50 years. Disabilities of the Arm, Shoulder and Hand Score (DASH) which has minimal 0 and maximal 100 points, Oxford Elbow Scale which has minimal 0 and maximal 48 points, Shoulder Pain and Disability Index (SPADI) which has minimal 0 and maximal 130 points. Our the last evaluation form is Functional Situation Scale (FSS) which has minimal 0 points and maximal 40 points. We compared conclusion of these forms total points because our main goal was to determine the locations of inflammation and pain seen substantially in musicians playing string instruments. We compared our conclusion of questionnaire with literature.

Result: Many studies have demonstrated in vivo and in vitro evidence of frequency musicians health problems. The main objective of the our study was to determine localization of the pain, functional disability and evaluate whether consisting of different reasons can lead to an improvement in activation of finger, wrist, elbow ability in patients with musician and whether the effects of treatment on pain and inflammation may persist or not. Also, mean and standart deviation of FSS was 36,18±1,43. According to these scores and literature, problems seen frequently in musicians playing string instrument are inactivation of finger, wrist, elbow ability because of pain, functional impairment and epicondilit.

Conclusion: In shortly, playing musical instruments requires that the stimuli enter a position contrary to the natural posture of the body according to the variety and cause of physical tension. It is essential that the tension in the instrument technique is destroyed. According to OES, FSS, Musicians playing string instrument have suffered from disability of finger, wrist, elbow because of pain and restriction of functions.

Key Words: Musicians, Elbow, Wrist, Pain, Function, Rehabilitation

YAYLI ÇALGI ÇALAN MÜZİSYENLERDE AĞRILI VE FONKSİYONEL OLARAK YETERSİZ OLAN VÜCUT BÖLGELERİNİN TESPİTİ VE DEĞERLENDİRİLMESİ

ÖZET

Amaç: Müzisyenlerde en sık görülen rahatsızlıklar kas-iskelet sistemi yaralanmalarıdır. İleri düzeyde uzun süre enstrüman çalan müzisyenler kas iskelet sistemlerini normal pozisyonlarının dışında uzun süre kullanırlar. Ekstansör Şok Dalga Terapisi ve Ek Yoğunluk Lazer Terapisi, müzisyen hastaların bilek ve dirsek sorunlarının

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önlenmesi ile ağrı ve fonksiyonel zorlanmalarda kullanılır. Bu çalışmanın amacı, yaylı çalgı çalan müzisyenlerin ağrılı ve fonksiyonel olarak yetersiz olan vücut bölgelerinin tespit edilerek değerlendirilmesidir.

Yöntem: Araştırmaya, randomize, körleştirilmiş, kontrollü 16-50 yaş arası 22 müzisyen dahil edilmiştir. Minimum 0 ve maksimal skoru 100 olan Kol, Omuz ve El Skoru (DASH), en az 0 ve en fazla 48 puan olan Oxford Dirsek Ölçeği, Omuz Ağrısı ve Özürülük İndeksi (SPADI) en az 0 ve en fazla 130 puan olan. Son değerlendirme formumuz, en az 0 puan ve en fazla 40 puan içeren Fonksiyonel Durum Ölçeği (FSS) 'dir. Araştırmada, bu formların toplam puanlarının sonuçlarını karşılaştırdık, çünkü asıl amacımız yaylı enstrümanlarını çalan müzisyenlerde görülen enflamasyon ve ağrılarının yerlerini belirlemektir. Bu sebeple, anket sonuçlarını literatür ile karşılaştırdık.

Sonuç: Birçok çalışmada (canlıda ve canlı dışında) ileri düzey müzisyenlerdeki sağlık sorunları kanıtlanmıştır. Çalışmamızın amacı, yaylı çalgı çalan müzisyenlerde oluşan ağrıların nedenlerini, lokalizasyonunu saptamak ve fonksiyonel olarak yetersiz olan vücut bölümünü tespit etmektir. Ayrıca, DİE'nin ortalama ve standart sapması $36,18 \pm 1,43$ idi. Bu puanlara ve literatüre göre, yaylı çalgı çalan müzisyenlerde sık görülen problemler, ağrı, fonksiyonel yetersizlik ve epikondilit nedeniyle parmak, bilek, dirsek hareketlerinin kısıtlanmasıdır.

Anahtar kelimeler: Müzisyen, Dirsek, El bileği, Ağrı, Fonksiyon, Rehabilitasyon

1. INTRODUCTION

The most common discomforts in musicians are musculoskeletal injuries. Musicians who play advanced instruments use their musculoskeletal systems for long periods of time outside their normal position.¹⁻² Running specific muscle groups in this way leads to musculoskeletal disorders due to overloading. There are many reasons for pain and disability such as long-term use, posture disorders, muscle weakness and loss of fitness, and inappropriate instrument selection. Especially trigger finger, FCR (Flexor Carpi Radialis) and FCU (Flexor Carpi Ulnaris), tendinopathies of the incision, psitriquetral syndrome, cubital tunnel syndrome, lateral epicondylitis, olecranon impingement and trapeziometacarpal joint problems are mentioned as major musical problems.¹ Lateral epicondylitis which is a disease with elbow pain accompanied by doing pronation and supination, is frequency on musicians because of overusing extension muscle of wrist. The forearm, is spread distally and increasing with grip pain, showing insidious onset and elbow pain. reduced hand functions, decreasing grip strength and pinching strength are symptoms of epicondylitis. Pain associates with resistant middle finger instability, in excessive resistant wrist extension.² Conventional treatment, including cold therapy, passive motion, contrast and circular bath with additional ESWT (Extracorporeal Shock Wave Therapy) and High Density Laser therapy, elastic wrist, elbow brace splint, finger splint are the treatment methods of medial and lateral epicondylitis musicians. Laser therapy was administered on 5 sessions, 3-week treatment schedule, whereas ESWT was performed 3-weekly on 3 sessions once a week. There was a decrease in the visual pain scale in all patients with musician after the treatment.³⁻⁶

1.1. EXAMINATION METHODS

Normally, Different examination methods are used by scientists. For example, Neurological examination; The thumb fingers, abduction, and oppressive power are assessed. Features m. evaluation of abductor pollicis longus is more valuable. The sensory examination is performed by looking at hypostasis, light touch, sharp test, needle penetration and hot-cold distinction.⁴⁻⁸ Tinel test; is one of the most basic tests. In order for the investigator to perform the tinnitus test, either the patient's wrist should be placed on the hand table in the supine position or the wrist should be stabilized with his / her own hand. The investigator should then apply median nerve soft punches between the flexor carpi radialis and palmaris longus. If this maneuver causes the patient to feel an electric shock or an uncomfortable pain, this is called tinnitus. Tinel symptom is found in many carpal tunnel cases. The same findings can be obtained by applying compression for 1 minute instead of stroke in the same anatomical region, which is called compression test. This is the most sensitive test for carpal tunnel syndrome.⁴⁻⁵⁻⁶ The Falen test and the reverse phalange test are additional tests that indirectly compress the median sinus wrist. In the Falen test, it is requested that the opposite sides of the patient's hand be pressed together, so that the wrists are brought to the 90 degree flexion. In the reverse phalanx test, it is desired that the palmar faces of the patient's hand are pressed together so that the wrists are brought to 90 degrees of extension. In both tests, this position is applied for 1 minute. Many clinicians now think that the

carpal tunnel compression test is more sensitive than the phalang test and is more reliant on this test.⁶⁻⁷ Carpal instability is a recent interest and research topic. This is a constantly growing field of information. Several tests have been described for carpal instability and are currently in use. The scaphoid shift test (Watson test) used for scapholunate instability is probably the most common test. Scapholunate has been developed to detect abnormal movement between scapoid bone and lunatum bone due to ligament injury. For example, in order to test the patient's right wrist, the researcher's right hand puts the right hand of the patient into the scapular tubercle in the volar wrist of the patient's thumb, the researcher's thumb.⁸⁻⁹ The patient's wrist is given dorsiflexion and ulnar deviation position. The scaphoid pushes the tubercle up, the investigator gently wraps the patient's wrist into volar flexion and radial deviations. In a normal person, this maneuver should produce a smooth movement and a sense of discomfort. In the presence of scapholunate instability, the researcher feels that the scaphoid proximal pole is subluxated from the dorsal corner of the distal radius of dorsalin. The researcher then removes the pressure applied to the scaphoid tubercle, allowing the scaphoid bone to enter the joint. If there is pain in this series and the pain on the scaphoid is lifted from the center, this is another evidence of scapholunate instability.¹⁰⁻¹¹⁻¹² The scafoid shuck test was developed to demonstrate scapholunate instability. This test is performed when the patient's elbow joint is flexed and the forearm is pronounced. The aim of this test is to independently control the scaphoid and lunatum bones, and to test for abnormal movements of these bones between each other. For example, in order to test the right wrist, the patient's right scapoid bone is held between the left thumb and left index finger of the lunate bone researcher while being held between the researcher's right thumb and index finger. The researcher moves the scaphoid and lunatum bones up and down in opposite directions. In normal conditions there is minimal movement and pain. Severe pain and movement are present in the complete scapholunate ligament rupture.¹²⁻¹⁵ For examination of hand grip and pinching grip strength, the patient sits and grasp dynamometer in position at 90 degrees flexion, forearm at neutral position, wrist at 0-10 degree extension and 15 degree flushing.¹⁶⁻¹⁷ Lunotriquetral ballotman test was developed to find instability due to lunotriquetral joint Injury.¹⁸ This test is performed when the patient's elbow joint is flexed and the forearm is pronounced. The purpose of this test is to independently control the lunatum and trichuetrum bones, and to test the movement of these bones between each other. For example, to test the right wrist, the right thumb of the lunatum bone researcher and the right index finger are placed in the volar of the carpal tunnel while the right trichotomy bone of the patient is held between the left thumb of the researcher and the left index finger of the right volunteer of the right pisiform bone. The researcher moves the trichuetrum and lunatum bones opposite each other. To do this test, lift your right hand up and your left hand down. This sequence is then reversed, pulling the left hand up while pushing the right hand down. If more translational attention is noted in severe amounts than in the contralateral wrist, lunotriquetral instability should be suspected. If this maneuver causes pain in the patient or results in a rubbing sensation, evidence demonstrates that the patient's symptoms may be due to lunotriquetral instability.¹⁹⁻²²

2. MATERIAL AND METHODS

Twentytwo advanced musicians playing string instruments were recruited from Inonu University State Conservatory. This study includes female (n:13) and male (n:9). None of the musicians performed any type of clinical evaluation test before the start of the study.

Including critera were:

- Being advanced musician or student at Inonu University State Conservatory.
- Ability to perform at least one string instrument

Excluding criteria were:

- Presence of orthopedic disease and operation
- Not being musician and having the ability to play at least one string instrument

We scanned and skipped 51 essays and working about what is the frequently pain location of musician. Therefore, we used Oxford elbow score, DASH, SPADI, functional situation scale and compared of these data with previous conclusions about these topics. Patients gave their informed consent for participation in the

study. The study was carried out according to the Declarations of Helsinki and was approved by the Ethics Committee of, Inonu University.

2.2. ASSESSMENT PROCEDURE

Oxford Elbow Score (OES)

The OES has 12 questions with 5 response options each. Underlying the 12 items are 3 domains (subscales): elbow pain, function and elbow restriction. Functions of elbow which has minimal 0 and maximal 48 points, is used to determine location of pain. This is a validated test used for quantitative analysis of elbow movement. This scale evaluated that the musician is asking for difficulties in the activities of daily living by using elbow in the last 4 weeks. Answers of this scale which includes five selections are never, occasional, sometimes, mostly, all time. Interpreting the Oxford Elbow of Score 0 to 19 is severe elbow arthritis. Surgical intervention is need for musicians. The meanings of score 20 to 29 is that might indicate moderate to severe elbow arthritis. Musician need to be evaluated with X-ray. Score 30 to 39 means that musicians may have mild to moderate elbow arthritis. They are benefit from non- surgical treatment such as physical exercises. Score 40 to 48 means that musicians have satisfactory joint function.

Disabilities of the Arm, Shoulder and Hand Score (DASH)

Disabilities of the Arm, Shoulder and Hand Score (DASH) which has minimal 0 and maximal 100 points includes 30 questions. It evaluates the kind of activity that keeps over the last 1 week and keeps the degree of strain. The responses are coded as no difficulty 1, mild difficulty 2, moderate difficulty 3, severe difficulty 4 and no activity 5. Completion time is 5-7 minutes The DASH is scored in two components: the disability/symptom questions (30 items, scored 1-5) and the optional high performance sport/music or work section (4 items, scored 1-5). Function of the entire upper extremity is evaluated by DASH and high score show more disability.

Shoulder Pain and Disability Index (SPADI)

SPADI can be used as a self assessment questionnaire of pain and disability. The main instruction is that the patient should assess different situation on a scale from 0 to 10, for the pain component, which include 5 question, 0 being no pain and 10 being worst pain imaginable while for the disability component have 8 modalities including point scale from 0 (absence restriction) to 10 (high restriction). Its modalities are about that normal or daily functions of shoulder. Shoulder Pain and Disability Index which has minimal 0 and maximal 80 points. It evaluates different type of activities based on shoulder mobility. A mean taken of the two subscales to code a total score out of 100, higher scores show indicating severe disability.

Functional Situation Scale (FSS)

Our the last evaluation form is Functional Situation Scale (FSS) which has minimal 0 points and maximal 40 points. It is a questionnaire about the availability of activities on complaints of hand and wrist during the last two weeks.

2.2. Statistical Analysis

IBM-SPSS Statistics 22.0 program was used in the analyzes. In order to make multiple evaluation, we set the descriptive statistical significance of total point's frequencies and percent's. In the power analysis performed prior to the start of the study, it was calculated that at least 22 experiments should be taken with $\alpha = 0.05$ and $1-\beta$ (power) = 0.80.

3. RESULTS

Table 1. Demographic Characteristics and Clinical Parameters of study populations at Baseline (n = 22)

N:22 (Female:13, Male:9)	Mean± Standard Deviation	Minimum	Maximum
Age(Year)	24,3 ± 5	19	41
Height(cm)	1,69 ± 0,07	1.52	1.85
Weight(kg)	60,90±9,3	45	86
BMI (kg/m ²)	22,90±4,52	16,73	31,22

Normally, Elbow Problems which has minimal 0 and maximal 48 points, seen mostly in musicians because of high total point's percent (Table 2). The lowest grade musicians have, the greater severity they feel. DASH-SM which evaluate entire upper extremity has minimal 0 and maximal 100 points includes 30 questions. According to conclusion of DASH been in our parameter, musicians don't mostly suffer from shoulder problems. (Table 2).

Shoulder Pain and Disability Index which has minimal 0 and maximal 80 points. We analyzed of total point's frequency and percent, it supported conclusion of DASH. In other words, Musicians who attended to our study, didn't suffer from their shoulder health (Table 2).

Functional Situation Scale (FSS) which has minimal 8 points and maximal 40 points. FSS supported to restriction of finger, hand and wrist (Table 2).

Table 2. Distribution by Scores of Evaluation Scales

N:22	Mean± Standard Deviation	Minimum	Maximum
Dash	49,04±1,98	45,00	52,00
Elbow Scale	14,68± 3,32	6,00	26
SPADI	22,40±2,87	18,00	29,00
FSS	36,18±1,43	34,00	38,00

4. DISCUSSION

According to previous studies, playing musical instruments requires that the stimuli enter a position contrary to the natural posture of the body according to the variety and cause of physical tension. It is essential that the tension in the instrument technique is destroyed; but the music itself is tense and relaxed, with dissonant and consulates. "In terms of the instrument technique, there is cooperation with the opposing muscles because of the tension of" agonist and antagonist ".²⁰⁻²² Agonist and antagonist tension are a muscle contraction accompanied by a contraction of a muscle that is its opposite (Shen, 1999). While playing a musical instrument in the instrument technique, the other relaxes at the same time, allowing it to extend and move. If the muscle

that provides the relaxation remains constantly stretched, movement is inhibited and disturbances arise (Mark, 2003). To make music Some of the required muscle tension is used for playing, while others remain in the muscle and the current tension in the player is added. This is called "residual tension". C. Grindea's book "Tensions in Musical Performance" shows that stress and physical tension can lead to injuries (Reubart,141). The nervous system is the source of life for the body. All nerves passing through the brain, spine and spine control muscles, organs, tissues, glands and hormones. As a result of continuous exposure of the body to the stress, short circuiting occurs in the nervous system, and it becomes time for the spinal cord to be disrupted. This causes tension on the nervous system and malfunctions in some organs.²² In the literature, interesting music records for musicians. It is encountered. For example, in Robert Schumann's youth has found a way to strengthen his finger: 3.to keep the finger as 'extensible' as possible and to play with others splinted and used but the shortening of the middle finger 'extensors' 'a serious loss of function in his hands. As a result, Schuman lost virtuosity and turned to composition. In general, terms such as overuse syndrome, misuse syndrome, RSI-repetitive strain / stress injuries are used for various musculoskeletal disorders. In addition, another term used in recent years is relative upper limb disorders. According to recent studies, bursitis, lateral and medial epicondylitis, carpal tunnel syndrome, trigger finger, and focal dystonia are seen mostly in musicians playing string instruments. Few studies have been carried out to propose remediation programs for functions of patients with musician.²⁴⁻⁴⁸ According to recent studies including Oxford and DASH evaluation scales, Violinists suffer from lateral epicondylitis, pianist-carpal tunnel syndrome, vibration- related peripheral neuropathy Guitar, violin, piano, percussion instruments, trigger fingers in violin, tendinopathies, de Quervain syndrome, lateral epicondylitis, olecranon impingment.⁴²⁻⁴³ The most common discomforts in musicians are musculoskeletal injuries. Musicians and performance artists use their musculoskeletal systems for long periods of time outside the natural range. Running specific muscle groups in this way leads to musculoskeletal disorders due to overloading. This problem is unfortunately not limited only to the disturbance of theregion being operated. According to newly developed models, which describe the biomechanics of the human body, the human body consists of bones floating in a soft touch like a sponge. The part of this model that we are interested in is the distribution of stress in any region to the entire structure. For example, if there is a problem in the elbow, it affects the shoulders. The vicious circle is at this point. If the loaded joint is shoulder, elbow, wrist, neck slowly begin to add to the current situation.⁴⁴⁻⁴⁵⁻⁴⁶ Let's consider a musician whose instrument is the violin. The grip position of the violin is far out of the normal joint use positions. A professional violinist works for hours at this position. His profession is life. Small aches starting on the knee can be the first to be a columnist who may have very serious consequences. The musician has no chance to take over the affected area for weeks. As the installation continued, the problem gradually settled and now the dominoes began to accelerate. The body biomechanics reflects the problem in a particular region to other regions. If no action is taken, then this cycle continues. One of the basic philosophies of medicine is preventing the problem before it occurs.⁴⁶⁻⁴⁷ Of course these people will work for long hours and these studies will cause negative charges, but nowadays medicine offers the necessary facilities to prevent these problems from concentrating. Muscle, skeletal system disorders are affected by many factors at the same time. In addition to pain and disability there are many preparatory factors such as postural disorders, muscle weakness and lack of fitness, and inappropriate instrument selection. These reasons are possible with some modifications. A previous study that through the questionnaire applied to the students; based on students' working habits, working attention levels to the environment, physical preparations before the study, forearm structures and the level of knowledge about their diseases. It obtained knowledge about frequency and the percentages of working times. According to this study, the most of the students had a physical discomfort and most frequently the discomfort felt in the region is the wrist. However, they did not take adequate measures against the statements. Conventional treatment methods include stage of pain control. Muscle training is used to provide muscle strength, to maintain ligament and tendon strength, to prevent atrophy, and to reduce muscle spasms.⁴⁴⁻⁴⁸

5. CONCLUSION

In shortly, playing musical instruments requires that the stimuli enter a position contrary to the natural posture of the body according to the variety and cause of physical tension and pain. It is essential that the tension in the instrument technique is destroyed.⁴⁶ According to our evaluation and previous studies, musicians playing string instrument mostly have suffered from disability of finger, wrist, elbow because of pain, functional restriction and muscle strain. Few studies have been carried out to propose remobilization programs for treatment of patients with musician. After operation, physical therapy need for reactivation muscles, boosting range of motion of fingers, wrist, elbow and fine motor reeducation.⁴⁶⁻⁴⁷Physical preparation / warm-up 'for about 10 minutes seems useful to take studies. Because, before playing physical exercises, such as providing

maximum mobility of the joints preparation of effort to be used by the organism with effects and besides being protected from professional problems, psychologically concentrating on the work to be done.⁴⁹⁻⁵⁰

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