World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-23, June 2023
ISSN: 2749-3644

EFFICIENCY OF APPLICATION OF INNOVATIVE BIOMECHANICAL ORTHOPEDIC INSTRUMENTS IN THE PATHOLOGY OF THE BONE-JOINT SYSTEM

Madaminov S.M.,
Madaminov A.S.
Ferghana Medical Institute of Public Health

Article history:

Received: April 11th 2023
Accepted: May 11th 2023
Published: June 20th 2023

Abstract:

This article shows the results of treatment of diseases of the musculoskeletal system caused by violations of the rules of biomechanics, along with the use of medicines, using an innovative biomechanical orthopedic device that helps restore the biomechanical properties of the body.

Keywords: principles of biomechanics, joint structure, compressing and suppressing surfaces, imbalance, dystrophy, destruction, deformation, rehabilitation, anatomical and mechanical terms.

INTRODUCTION

The analysis of the mechanics of human movement is called biomechanics. This is a science that studies how and why the human body moves this way and not otherwise. According to the law of biomechanics, the joints are bearings in the mechanics of the motor apparatus. Synovial fluid in the joint is considered as a substance that lubricates the surface. The smooth cartilage surface is mechanically the working surface that covers the surface of the joint, while the cartilage lining is considered to be the lining.

The terminology from the field of mechanics is also applied to the process of friction in the joints. For example, if there is no joint fluid in the joints, it is called dry friction, if there is fluid between the articular surfaces of the joints, then it is called wet friction, and if the fluid is thick, then it is called slip. In mechanics, there is a coefficient of slip or friction, which in the middle is equal to 0.02 [1,2,7].

In biomechanics, in relation to joints and their movement, there is the concept of "mass geometry". This indicator depends on the average density of the body part and has a great influence on the process of mechanical movement. In biomechanics, the following terms are used to describe individual body movements:Dorsiflexion - decrease in the angle of the ankle joint

Plantar flexion - increasing the angle of the ankle joint

Elevation - moving a part of the body up (toward the head)

Lowering - moving a part of the body down (away from the head)

Eversion - rotation of the ankle joint in such a way that the plantar surface of the foot turns in the opposite direction from the other leg

Inversion - rotation of the ankle joint so that the plantar surface of the foot turns towards the other leg

Lateral rotation - rotation away from the center/medial line of the body

Medial rotation - rotation of the limb towards the center / midline of the body

Pronation - turning the forearm in such a way that, with the forearm bent, the palm is facing down

Supination - turning the forearm in such a way that when the forearm is bent, the palm is facing up

Retraction - moving the arm back (toward the back of the body) at the shoulder joint

Protraction - moving the arm forward (toward the front of the body) at the shoulder joint

Lateral tilt - tilt of the spine to the side, in the direction from the center / midline of the body.

THE MAIN FINDINGS AND RESULTS

Balance means the achievement of stability. An important principle of balance is to place the center of gravity of the body above the base of the supporting structure. [8,9,10,11,12]

So, we have given a brief overview of the biomechanics of the joints. Now consider the joint from the point of view of anatomy. As you know, the joints are formed from the following elements: the articular capsule surrounding the joint, inside which there are two articular surfaces. And inside the joint there is synovial fluid. Each joint is surrounded by tendons, muscles and strong ligaments.

From a biomechanical point of view, articular surfaces are of great importance, since they bear the main load, both during movement and while maintaining body balance. During movement, one articular surface moves relative to the other, and a huge pressure force is created on these surfaces. joints, i.e.

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-23, June 2023
ISSN: 2749-3644

their state of health mainly depends on the uniform distribution of this pressure over the entire area of the articular surface.

If the pressure between the articular surface is not evenly distributed, then an "imbalance" of loads occurs, and this leads to "dystrophy" of the articular structure. In biomechanics, such a state of uneven surface wear leads to deformation of the working part of the mechanism and is the main cause of premature failure of the part. In mechanics, worn parts are replaced with new ones.

And in medicine, doctors try to restore a worn-out deformed organ and its function. That is why doctors need to carefully study the disease and identify the root cause of the pathology. To confirm my words [4,5], as an example, I will give several case histories and the treatment method used, in relation to them, as well as the results obtained.

The patient is 63 years old, the man has been suffering for about ten years. The main pain is in the area of the right knee joint. More on the inside. And on the left knee joint, pain is less common. The pains increased progressively, and as a result he was forced to use a crutch. When examining the knee joint, changes in the deformation of the knee joint are observed. The pain is aggravated by walking, decreases in the evening. Sleeps with bent legs because of pain. Tomography revealed signs of osteochondrosis of the knee joint.

Based on this, "osteoporosis of the right knee joint" was diagnosed and for a long time he was treated at the place of residence. But without benefit, or the pain for a very short period decreased. Doctors recommended chondroprotectors, anti-inflammatory drugs, painkillers, and hormonal drugs to the patient. Meanwhile, five or six drugs were injected into the joint cavity. But according to the patient, these drugs gave temporary relief. After listening to the patient's complaints, an in-depth examination of the patient was carried out to clarify the diagnosis. Palpation determined the presence of tension and pain in some muscle groups of the thigh.

In particular, the "lateral" and "medial", wide muscles and also tailors. Muscle pain during exercise was noted. The tomography data and the clinical picture of the disease did not quite match. Therefore, the causes of the disease were carefully clarified. As a result, it turned out that the patient worked for a long time as a postal clerk in the village, all the time he rode a bicycle several kilometers a day, distributing letters, newspapers, magazines and pension benefits to the population. According to the patient, the bicycle had a malfunction in the form of the absence of a rubber footrest on the right pedal.

For this reason, the right leg moved in an uncomfortable position. As a result, it became known that the cause of the disease in the patient's knee was the result of a long-term imbalance of loads on the knee joint. It was concluded that as a result of an imbalance of loads in the connective tissue and cartilage of the joint, dystrophic changes gradually occurred, which ultimately led to the destruction and deformity of the joint. Based on this conclusion, we decided first of all to stop taking the drugs.

In place of this, a restorative biomechanical therapy was performed using home-made orthopedic devices. For this, a device was specially made for the patient's knee joint, which simultaneously reduced and distributed the pressure evenly over the articular surface. As a result: treatment with a specially modulated biomechanical corrective device significantly reduced pain, and movements in the knee joint became much more active. And six months later, he left the crutches and began to move independently.

Along with this, he noted that due to the discontinuation of the drug, the activity of the gastrointestinal tract, kidneys and liver improved. The patient also noted with joy that he saved a huge amount of money intended for the purchase of medicines.

Below are a couple more such examples.

Patient "A" is 38 years old. He has been treated for several years with a diagnosis of cervico-brachial plexitis. But the result is not satisfactory. Before treating the patient, we, as always, decided to find out the root cause of the disease. To do this, I had to thoroughly study all the habits, as well as working and rest conditions. As a result, it was found that the patient's bed, especially the size of his pillow, not only does not comply, even contradict the laws of biomechanics.

Therefore, we came to the conclusion that the initial imbalance of the loads of the cervical vertebrae was a further dysfunction and then to dystrophy, which is the cause of osteochondrosis and pain in the neck and shoulder segment. We explained to the patient about the cause of his suffering and, with the help of specially prepared means, eliminated the dysfunction of the cervical vertebrae, as always, canceled the medication. As a result of which, within a month, the patient was completely relieved of pain.

And finally, the third patient "T" is 42 years old. She complained of increasing pain and deformities in the ankle joint. Taking medications for painkillers, anti-inflammatory and chondroprotectors does not give the desired effect, the pain intensifies. The collection of analyzes and a thorough examination showed that the

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-23, June 2023
ISSN: 2749-3644

cause of the pathology in the ankle joint is wearing high-heeled shoes! As a result, the changes in the joints disappeared, the pain disappeared completely.

Over the next three years, more than fifteen such patients were treated on the basis of the laws of biomechanics, and positive results were achieved in all patients.

CONCLUSION

1) Each person must live in full compliance not only with hygiene rules, but also with the laws of biomechanics in order to strengthen their health.

2) Taking into account the fact that many today do not know the laws of biomechanics, it is necessary that there be widespread propaganda among the younger generation in the first place.

3) To apply to the clinic in case of pathology of the musculoskeletal system, it is necessary to introduce the concept of imbalance syndrome and develop special therapeutic measures against this pathology.

4) In the treatment of pathologies of the musculoskeletal system, one should focus on restoring the disturbed biomechanical properties of the body, as well as on drugs as the main method of treatment.

REFERENCES

1. Ахмедов А. Г. "Анатомия человека". 2007.
2. Ахмедов Н.Г. "Атлас анатомии человека". 2005.
3. Гурфинкель до н. э. Сафронов В. А. "Способ исследования тонуса Мышц в динамике" 1969.
4. Isaqova, N.R. (2023). Influence of constipation on anthropometric indicators of children. *Science and Innovation*, Volume 1, Issue 8, pp. 888-892.
5. Isakova,N.R. (2021). The effect of constipation due to diseases of the colon on the anthropometric parameters of children. *Asian journal of multidimensional research,* Volume:10, Issue 5, pp. 666-669.
6. Интернет материалы: "Биомеханика: понимание терминов, определяющих движение нашего тела" www.technogym.ru
7. Синельников Р.Д "Атлас анатомии человека том I". 1996г.
8. Hammerman C., et al "Avery's Neonatology: Pathophysiology & Management of the Newbor". 1962г.
9. Sasada T, Maezawa H "Data Book on Mechanical Properties of Living Cells, Tissues, and Organs" 1973г.
10. В.М. Зацировский А.С.Аурин В.Н Селуянов "Биомеханика двигательного аппарата человека"
11. Самсонова А.В., Комиссарова Е.Н. "Биомеханика мышц" 2008г.
12. Евгений Блюм Биомеханика. "Методы восстановления органов и систем" 2019г.
13. Няшин Ю.И., Лохов В.А. "Основы биомеханики" 2007г.
14. Дубровский В.Н., Федоров В.Н. "Биомеханик" 2008г.