

Avicenna's Perspective of Exercise: Content Analysis of the “Canon of Medicine”*

İbn-i Sina'nın Egzersize Bakışı: El- Kânûn Fi't-Tıbb Eserinin İçerik Analizi

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ABSTRACT

Objective: This study aims to examine Avicenna's view of exercise in light of the information in his book Canon of Medicine and discuss his approaches to 'exercise' with today's literature.

Methods: The study is qualitative. Five volumes work consisting of 6 books in total called El-Kânûn Fit-Tıbb (The Canon of Medicine) which are Turkish translation by Professor Esin Kâhya, were used for content analysis. In the Turkish translation of the book, the sections containing the subject of 'exercise' were sent to content analysis. Avicenna's comments in the relevant sections were analyzed and interpreted in-depth.

Results: It was observed that the themes of 'exercise' were handled in the first and fourth books of the five-volume book. According to the theme of 'exercise' in Avicenna's book called Canon of Medicine; six main topics that can be categorized under the main headings of 'prevention of health and exercise, physiological effects of exercise on heart rate, factors related to exercise timing, exercise-related problems, excess/insufficiency of exercise in the etiology of the disease, and exercise in the treatment' have been determined.

Conclusion: Although many of the comments and suggestions on 'exercise' in the Canon of Medicine book were made without modern technological opportunities, their equivalents in the current literature containing evidence-based contemporary medical data can be considered as proof that Avicenna was a physician who transcended the ages.

KeyWords: Avicenna, Exercise, Qualitative Study

Öz

Amaç: Bu araştırmanın amacı, El-Kânûn Fi't-Tıbb adlı eserinde yazdığı bilgiler ışığında İbn-i Sina'nın egzersize bakışını incelemek, 'egzersiz' konusundaki yaklaşımlarını günümüz literatürü ile tartışmaktır.

Yöntem: Çalışma, nitel bir araştırmadır. Türkçe çevirisini Prof. Dr. Esin Kâhya'nın yaptığı toplam 6 kitaptan oluşan 5 ciltlik El-Kânûn Fi't-Tıbb adlı eserden içerik analizi için yararlanılmıştır. Eserin Türkçe tercümesinde 'egzersiz' konusunu içeren bölümler içerik analizine tabi tutulmuştur. İbn-i Sina'nın ilgili bölümlerdeki yorumları derinlemesine analiz edilerek yorumlanmıştır.

Bulgular: Beş ciltlik eserin 1. ve 4. kitaplarında 'egzersiz' temalarının işlendiği görülmüştür. İbn-i Sina'nın El-Kânûn Fi't-Tıbb adlı eserinde 'egzersiz' temasına göre; 'sağlığın korunması ve egzersiz, egzersizin nabız üzerine fizyolojik etkileri, egzersiz zamanlaması ile ilişkili faktörler, egzersiz ile ilişkili sorunlar, hastalık etiolojisinde egzersiz fazlalığı/azlığı ve tedavide egzersiz' ana başlıkları altında kategorize edilebilecek altı ana başlık belirlenmiştir.

Sonuç: El-Kânûn Fi't-Tıbb adlı eserde 'egzersiz' konusunda yapılan yorumların ve önerilerin birçoğunun modern teknolojik imkanlardan yoksun olarak yapılmış olmasına rağmen kanıta dayalı çağdaş tıp verilerini içeren güncel literatürde karşılıklarının bulunması İbn-i Sina'nın çağları aşan bir hekim olduğunun kanıtı olarak değerlendirilebilir.

Anahtar kelimeler: İbn-i Sina, Egzersiz, Nitel Araştırma

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Introduction

The importance of physical activity for a healthy life is emphasized by many health authorities, especially the World Health Organization (WHO). WHO reviews the scientific evidence over time and publishes up-to-date physical activity and exercise recommendations guidelines. In the last guide, updated and published in 2020, exercise recommendations have been expanded and categorized from childhood to geriatric age groups. In addition, detailed recommendations are given for conditions such as chronic diseases, pregnancy, postpartum period, and disability.¹

The professional experience of all physicians especially sports medicine specialists who examine the effects of exercise and sedentary life (sedentary) and encourage participation in exercise to protect public health, needs to know the recommendations and opinions on exercise from past to present.² Although modern sports medicine began to sprout at the beginning of the 20th century, the fact that exercise and sports are among the recommendations given by physicians for a healthy life was leading to B.C.^{2,3}

The development of sports medicine was aided by ancient Greek physicians such as Herodicus (5th century B.C.), Hippocrates (5th century B.C.), Galenos (2nd-3rd century), and Islamic physician Avicenna³. Avicenna (10th-11th century), Gerolamo Mercuriale (16th-17th century), Bernardino Ramazzini (17th-18th century), August Bier (19th-20th century), and Arlie V.Bock (19th-20th century) were among the figures who laid the foundation for sports medicine by designing methods to improve health and fitness while also ensuring the safety and well-being of all athletes³. In addition to being Turkish and Muslim, Avicenna stands out with the fact that the book he wrote was used as a textbook in medical faculties for centuries.

When the ancient works about exercise being among the health recommendations and prescriptions of physicians are examined; the systematic encyclopedic medical work *El-Kânûn Fi't-Tıbb* (Canon of Medicine), written by the Turkish ancestry Muslim scientist Avicenna [born 980, in Bukhara (presently Uzbekistan) and died 1037, in Hamedan (presently Iran)], who was one of the shining stars of the Golden Age of Islam (Islamic Renaissance), was used for the education of medical students by both eastern and western civilizations until the 17th century.^{4,5} Although Avicenna, whose mastery in the field of medicine has been accepted by all scientific areas, is famous for the 'medicine' that he practiced started from a very early age of 17 to passed away at the age of 57, he was interested and educated in many fields of science such as logic, philosophy, natural knowledge, theology, metaphysics, astronomy, physics, and chemistry. He produced works in these fields as well.⁵⁻¹¹ Since the common scientific language of the 11th century he lived was accepted as Arabic, and it must be because of his desire to increase scientific influence,⁵ almost all of his medical works written in Arabic can be found in the manuscript libraries in Turkey.⁶⁻¹¹ As far as we know, retranslation into contemporary Turkish by Professor Esin Kâhya of the Canon of Medicine⁶⁻¹¹ (which was started to be written in 1012 and completed in more than ten years, and has been translated into various languages, especially Latin) has been a unique achievement in the history of Turkish science.¹²

The aim of this qualitative study is to examine Avicenna's view of exercise in the light of the information in his book *Canon of Medicine* and to discuss the approaches to 'exercise' in this valuable book, which was written 1000 years ago, with today's literature.

Methods

Five volumes work consisting of 6 books in total called *El-Kânûn Fit-Tıbb* (The Canon of Medicine) which are Turkish translation by Professor Esin Kâhya⁶⁻¹¹ were used for content analysis. It was seen that the theme of 'exercise' took place in 44 different parts of the books.

In the Turkish translation of the book, the sections containing the subject of 'exercise' were sent to content analysis. It has been seen that the themes of 'exercise' are handled in the first and fourth books of the five volumes. Avicenna's comments in the relevant sections were analyzed and interpreted by academics who are experts in sports medicine between November 2021 and April 2022. After the main themes were determined by the academician who was trained in qualitative research (SE), the related sections were interpreted by both academicians (SE, AÖ) from the perspective of sports medicine.

The research is a qualitative study in the type of narrative inquiry.¹³ The study does not require ethics committee approval due to its scope.

Results

Six main topics that can be categorized according to the 'exercise' theme in the 'Canon of Medicine' were determined in this study. These are; 1-Prevention of health and exercise (1a. Exercise-specific general principal recommendations, 1b. Breast milk and exercise, 1c. Exercise for baby and child's health, 1d. Exercise in elderly), 2-Physiological effects of exercise on heart rate, 3-Factors associated with exercise timing (3a. Nutrition and exercise, 3b. Liquid intake and exercise, 3c. Massage, 3d. Hammam and cold bath, 3e. Trip), 4-Exercise-related problems (4a. Suffering, 4b. Stiffness, 4c. Swelling, 4d. Dryness), 5-Excess or insufficiency of exercise in the etiology of the disease, 6-Exercise in treatment.

Prevention of health and exercise

1a. Exercise-specific general principal recommendations

Avicenna identified the subject of medicine as the prevention of health and rooting out diseases. For this, it is necessary to plan the diet well, choose the suitable weather conditions, rest (sleep) and exercise to a certain extent, treat with medicine or prepare the operating condition.⁶ In this context, it is commonly emphasized that regular exercise for adults is preventative for temperament and humoral diseases. On the other hand, exercise is preventative and has some effects that increase the influence of the treatment administered or being a main component of the treatment.⁶ It is explained that these effects can be occurred by the physiological responses such as accelerating the circulation created by exercise, increasing the body secretions, and raising the body temperature.⁶

It is seen that Avicenna divides exercise into two main types: 'incidental exercise due to physical activity' and 'special exercise done for benefit'. Avicenna divided the types of exercise into two 'vigorous exercise' (wrestling, strength testing, boxing, running, jogging, archery, javelin throwing, jumping on one leg, swordplay, fencing on horseback, etc.) and 'moderate exercise' (swaying in one's seat, standing still or lying down, walking around, riding a horse, riding a camel, or riding an elephant, etc.). There are also examples of challenging and fast exercises. On the other hand, he reports that challenging and fast exercises should not be done without taking a break in between, but it is important to continue light exercises without stopping the exercise entirely during breaks.⁶

Avicenna thinks that in addition to the exercises for general body health, there may be special exercises for each organ (e.g., for the chest and respiratory organs shouting, starting with a high and low voice and gradually increasing to a high pitch) and organ-specific exercises will be beneficial. Avicenna suggested that for eye health, looking at something tiny purposefully, but not for too long; for hearing health, listening to low-pitched sounds and occasionally listening to high-pitched sounds. Avicenna stated that exercises specific to the nervous system contribute to body exercise in general.⁶

On the other hand, it was stated that it is necessary to exercise for an individual who is debilitated due to illness, but light exercises such as rocking should be recommended. Also, there would be issues to consider

when prescribing exercise advice for these patients. It is necessary to protect weak organs from intense exercise, but there will be no harm if the weak organ exercises with other organs. For example, Avicenna recommends that the individual with varicose veins be directed to exercises that will work the upper extremity instead of the lower extremity.⁶

Suggestions for the time of the exercise; when there are no galls (primary fluids: blood, sputum, yellow bile, black bile; secondary fluids: essential fluids or excesses), when the bowel and bladder are emptied, in other words, when the body is clean when the previous day's food has been digested, and it is almost time for the next meal. If vigorous exercise is not to be avoided, the stomach is empty or contains very little food. Avicenna recommended that exercise with an empty stomach be preferred to exercise with a full stomach.⁶

According to Avicenna, massaging before exercise will prepare the body for exercise by stimulating the natural temperature and widening the holes in the body. There is a preference that it is better to be hot and humid than cold and dry for the conditions of the environment to be exercised. Exercising in a room is appropriate at moderate temperature in the afternoon in spring and the evening in summer. Exercise should be done at moderate limits in the spring but faster steps. In summer, exercise, food, and drink should be reduced; exercise should be freely encouraged in winter. Food and exercise should be reduced on days with southerly winds in winter. It is necessary to protect the hands and feet from the cold during the exercise, wrap the limbs with protective clothing and move them abundantly to generate heat. If there are wounds caused by frostbite, the limbs should be treated first by exercising (movement) and then by massaging.⁶

The general recommendation of Avicenna is to exercise in a warm room when the nutrients are fully digested, and the intestines are moving.⁶ The amount for the exercise duration is as evaporation in the body is replaced by sweating, stopping the exercise, and switching to the massage application recommended after the exercise. Avicenna states that when a personalized exercise program is given, it should be followed strictly, and changes should be avoided as much as possible.⁶

1b. Breast milk and exercise

Avicenna recommends that the mother exercise regularly to improve the quality of breast milk. If the milk is too thin (small), he recommends that the mother rest, relax, and avoid exercise. On the other hand, mastitis-like disorders may occur in the mother when the milk amount is high, and it may be beneficial to exercise a lot and massage the breasts for the prevention/treatment of this.⁶

1c. Exercise for baby and child's health

Avicenna recommends moderate exercise for a long time to prevent babies' health. Exercise in babies occurs spontaneously already. Instinctive mobility in babies should not be hindered, and this is normal in the transition period to childhood. It has been reported that making opposite movements that are not suitable for the natural developmental stages of the baby's growth, such as forcing the baby who wants to stand up and starts to crawl, sit or walk, will cause deformity in the legs and back of the baby. Avicenna emphasized the importance of leaving moderate exercise in babies following the natural flow.⁶ In childhood (4-7 years), the amount of exercise and playtime should gradually increase.⁶ Avicenna recommends a gradual reduction of exercise since the moisture in the body will decrease around the age of 14, which is expressed as the developmental age. The exercise should not be moderate, too vigorous, or vigorous. At the age of maturity (adulthood), Avicenna recommends following the general principles of exercise, diet, and sleep, which are the three principles of protecting health.⁶

1d. Exercise in elderly

The exercise suggested by Avicenna for the elderly was a mild walk or (by car) tour, which started after massaging with a moderate amount of suitable oil. There is no need for exercise limitations for healthy elderly people, but exercises that will force the organ affected by the disease should be avoided if they have diseases. For example, the elderly who have epilepsy or dizziness due to brain disease have been warned not to do exercises that require tilting and lowering the head.⁶

Avicenna directs the elderly to exercises that activate the upper side in a urogenital disease affecting the lower body and exercises that activate the lower side in cases like chest diseases affecting the upper body. Also, increasing the speed of exercise in the elderly does not contribute to physical strength, and moderate exercise approaches would be appropriate for this age group. Avoid exercise for the elderly if he/she has a hot and dry disease.⁶

Physiological Effects of Exercise on Heart Rate

The fact that the subject of 'pulse' is mentioned in detail in his book Canon of Medicine is proof that Avicenna made depth observations and researches on this issue.

Avicenna stated that the ideal heart rate measurement should be done when the person is calm and not under exercise or stress. At the beginning of moderate exercise, the heart rate will increase and strengthen depending on the increase in body temperature. At the same time, it has been commented that the need for breathing will increase, which will cause an increase in the pulse rate and amount.⁶

It is said that 'if the exercise continues for a long time or is done more vigorously, the power that increases the heart rate disappears and decreases, and after the natural heat distributes, the heart rate weakens'. "However, the pulse continues by beating frequently and trying to keep the pulse rate high because the need for ventilation becomes greater" is commented. On the other hand, as the strength decreases further, the rate and amount of the pulse decrease; if the exercise is prolonged, the pulse weakens more and becomes like an ant in terms of rate of beat. If the exercise is tried to be continued above the tolerance limits, the pulse decreases; even a worm-like pulse occurs at first, then it weakens further and tends to decrease in speed and pulse, and eventually, death occurs.⁶

Factors Associated with Exercise Timing

3a. Nutrition and exercise

Avicenna recommends not to do the exercise with a full stomach. However, he expresses his opinion that mild exercise right after a meal will help digestion.⁶ People with excess bile secretion in their stomach are to exercise before a meal, never after a meal. However, for this or other reasons, the amount of food eaten before exercise should be so small that it should begin to be digested as soon as eaten. Avicenna suggests that exercise is moderate after a meal, while exercise before a meal should not be moderate or gentle.⁶

It is stated that individuals who exercise regularly can easily consume wealthy foods because these individuals are easy to digest. The fruit is not suitable for every temperament, and only hardworking people with a melancholic temperament should eat it. It is among the suggestions that it would be appropriate to exercise immediately after eating the fruit and help the liquid part of the fruit to disperse so that a short walk should be taken a right after eating the fruit before the second meal.⁶

3b. Liquid intake and exercise

It has been commented that taking water on an empty stomach after exercise may disturb the stomach. It has been reported that it is appropriate to sip wine diluted with hot water before ordinary water after exercise.⁶

3c. Massage

Two of the nine types of massage mentioned in the Canon of Medicine show a temporal relationship with exercise. There is a suggestion that 'Preparatory massage should be applied before the exercise, gently at first, then gradually, vigorously'. It was stated that the healing massage should be done towards the end of the exercise and should be such that it facilitates the elimination of useless substances that cause fatigue and accumulate in the body. Healing massage, according to Avicenna, should first be done with a firm oil, then gradually moderated.⁶

3d. Hammam and cold bath

As Avicenna's general rule, one should enter the bath (hammam) not immediately after exercise but after rest. If the body is to be strengthened, a warm bath should be followed by a relatively moderate cold bath. The main conditions for taking a cold bath after exercise; the initial massage should be more complex than usual, the massage after exercise should be done for a long time moderately, cold water should be poured into the body suddenly, massage should be done after the bath, the amount of food should be increased, and the amount of drink should be reduced. If the color and temperature of the body quickly return to normal after the bath is over, the cold bath is considered to have been applied at a normal time and intensity. If these signs are delayed, the duration of the cold bath should be reconsidered the next day.⁶

3e. Trip

It is among the suggestions of Avicenna that travelers increase their daily exercise to prepare for travel.⁶

Problems Associated with Exercise

According to Avicenna, exhaustion from exercise is caused by; a. suffering (suffering when touched and moved), b. stiffness, c. swelling, and d. dryness.

4a. Suffering: This condition consists of excessive accumulation of harmful substances resulting from muscle and adipose tissue destruction and damage through vigorous exercise. Treatment is to reduce exercise.⁶

4b. Stiffness: This felt like the pain of a bad crush, with a feeling of warmth and tension. The stiffness resulting from vigorous exercise is caused by the immobility of unnecessary gaseous harmful substances in the muscle tissue. In its treatment, spasms and stiffness should be relaxed.⁶

4c. Swelling: The body is warmer than usual, red, and swollen. Movement is affected in this situation, and pain and tension sensations are detected when touching the affected part. The treatment is the application of hot oil, a light massage, an extended stay in a hot bath, and rest.⁶

4d. Dryness: In this type of exhaustion caused by strenuous exercise, there is dryness in the body. In its treatment, approaches should be taken to tighten the pores and reduce fluid excretion, and a small amount of moist food should be consumed.⁶

According to Avicenna, in the case of spontaneous exhaustion, which is different from the exhaustion arising from exercise, there is a harmful substance inside or outside the blood vessel, creating fatigue. In such a case, exercise should be strictly avoided.⁶

Excess or Insufficiency of Exercise in Disease Etiology

According to Avicenna, diseases have internal and external causes. Exercise and excessive movement are among the external causes that play a role in the etiology of the disease.⁶

It has been interpreted that doing heavy exercise while sunbathing will increase body secretions, accelerate breathing, increase excretion, and help relieve swelling and edema. Heavy exercise in an environment that is heavily exposed to the sun can increase sweating and cause dehydration.⁶

While it is stated that exercise is one of the activities that create/increase body temperature, it has been observed that Avicenna also refers to the classification made by Galen and suits scientific, ethical approaches.⁶

According to Avicenna, who associates that exercise is necessary for health with many conditions, lack of exercise causes the accumulation of swellings, leading to inflammation of the swellings. On the other hand, when Avicenna examined the fluids excreted from the body, he considered the appearance of urine as a thin or thick haze as an indication that the body, which was under the lack of exercise, was cleansed with exercise. The urinary sediment is less common in those who exercise. Also, a similar situation can be observed in the stool, and that pus-like stool excretion is observed in people who have stopped exercising with the habit of sitting a lot.⁶

Exercise in the Treatment of Diseases

Avicenna also includes exercise in the treatment of diseases. For example, he aimed to strengthen the weak ones from the lung and chest organs with exercises such as breath-holding. He recommended gradually increasing exercise to improve weak organs.

It is seen that it is recommended to exercise before bathing in the treatment of weakness caused by low body mass index.⁶ He also stated that exercise should be done to treat obesity.^{6,10} However, he emphasized that the exercise to treat obesity is the opposite of the exercise for treating thinness and gave detailed information about the need to regulate the nutrition regime to treat obesity.¹⁰

Understanding that exercise has positive effects on the gastrointestinal system, Avicenna recommended exercise for bowel cleansing and stated that it is important to encourage exercise to increase the effectiveness of medicine with emetic properties.⁶

It is among the suggestions of Avicenna that intense exercise can be used for the removal of abnormally intense secretions from the body. He stated that exercise could be beneficial in reducing swelling in inflamed organs, but if inflammation concerns internal organs, exercise should be avoided. He also stated that exercise could increase circulation and support drainage in ulcer (wound) treatment.⁶

Discussion

In Canon of Medicine, written by Avicenna 1000 years ago, the association of exercise with many issues, the effect of exercise on the etiology and treatment of disease, and the recording of these observations are precious in terms of medical literature and the history of science. Even though many of the comments and suggestions about 'exercise' in the Canon of Medicine were made without modern technological facilities, their counterparts in the current literature can be considered proof that Avicenna is a physician who transcends the ages. Of course, there are issues where some of the information in the Canon of Medicine and today's literature differ.

Prevention of health and exercise

1b. Breast milk and exercise

The exercise regimens recommended by Avicenna for maternal health and the quality of breast milk are still up-to-date today. It is recommended that pregnant women and mothers in the postpartum period exercise.¹⁷ Breastfeeding or milking should be done before exercise so that breast milk does not create a feeling of fullness in the breasts. In addition, breastfeeding before exercise avoids the problem of infant refusal to suck breast milk due to increased milk acidity due to lactic acid formation. Another ideal breastfeeding timing is when the lactic acid level returns to normal 1 hour after exercise. It is recommended in the current literature that elite athlete mothers should plan the breastfeeding time before the exercise or at least 1 hour after the high-intensity exercise. In addition, for the continuity of milk quality, the fluid lost by the mother should be replaced immediately, and dehydration should not occur.¹⁷

1c. Exercise for baby and child's health

Avicenna's exercise recommendations from infancy to the development age include issues compatible with WHO's current guide. WHO formalizes the exercise prescription at the age of 5, and it is aimed to keep the movements before this age as active as possible in their natural flow. It recommends at least 60 minutes of exercise a day, seven days a week, from the age of 5 to 17. When exercise is recommended for children and adolescents, it is stated that strength exercises should be done with the child's weight rather than additional equipment. It recommends at least 150-300 minutes of exercise per week for adults (18-65 years old). When considering the time limits set by WHO for the exercise recommendation, it is striking that the exercise, which was 420 minutes/week in childhood-adolescence, gradually regressed to 150-300 minutes/week in adulthood.¹

1d. Exercise in elderly

It is noteworthy that Avicenna opened a special section for exercise in elderly individuals and presented specific group-specific exercise prescription approaches. Avicenna's age group as the elderly is individuals aged 65 and over, which is accepted today; most of his recommendations align with the current literature.¹

Physiological effects of exercise on heart rate

Comments on the pulse response to exercise written in the book called Canon of Medicine are precious in terms of sports cardiology.¹⁸ When the comments on the effects of exercise on heart rate are synthesized in the book; it suggested that the scenario described was interpreted by Avicenna as the changes in heart rate that might occur in the case of a consumer exercise with an experimental approach rather than the pulse fluctuations experienced by individuals in a programmed exercise session.

Factors associated with exercise timing

3a. Nutrition and exercise

From Avicenna's description of the "nutrition-exercise time relationship" for the time of exercise, it is commented that exercise should be done during hunger.¹⁹ Current literature recommends 1-2 hours after the main meal for exercise timing and does not recommend full satiety. The current literature views that an intermittent fasting diet may not adversely affect the athlete's performance, but not performing activities that require high performance while fasting.²⁰

3b. Liquid intake and exercise

Current recommendations for fluid (water) intake are to close the fluid deficit before dehydration develops and ensure the continuity of fluid intake during and after exercise.¹⁴

3c. Massage

The massage recommended by Avicenna for before and after exercise is frequently performed and recommended as dynamic stretching and warm-up/cool-down exercises today. It remains true that massage can also provide passive warm-up.²¹ It is thought that the effects of reducing lactic acid accumulation are derived from the massage performed at the end of the exercise.¹⁴

3d. Hammam and cold bath

Hammam and cold bath applications are still applied today by showing contrast features; regeneration of the body is tried to be stimulated by staying in more extreme cold such as even cryotherapy/icelab, etc.^{14,22} In this context, although some of Avicenna's suggestions on bathrooms do not find a response today, the contrast bathroom proposal remains up-to-date.

3e. Trip

Avicenna's suggestion to increase the amount of daily exercise to prepare for the trip will be beneficial to increase the aerobic-anaerobic exercise capacities of the body before the planned long trip.¹⁶ In addition, last paragraph of 1a and this recommendation of Avicenna suggests that he noticed the physiological responses to exercise.

Exercise-related problems and Excess or insufficiency of exercise in the etiology of the disease

The current equivalents of the conditions described by Avicenna as exhaustion arising from exercise can be delayed onset muscle soreness pain caused by muscle breakdown after creatine kinase (CK) enzyme elevations, muscle spasm, drainage difficulty due to the circulatory/lymphatic system, or exercise-induced compartment syndrome, fatigue due to dehydration.²³ The clinical picture, which is expressed as a spontaneous state of exhaustion, was interpreted as the fatigue of the disease caused by the infectious factor that occurs with the elevation of sedimentation and c-reactive protein (CRP). Today, the principle of suspending exercise in the presence of active infection is also included in the recommendations of Avicenna.

Exercise in treatment

Considering the current literature, the exercise recommendation given by Avicenna for individuals with varicose veins is recommended for individuals with deep vein thrombosis. However, it is known that lower extremity exercises should be performed to treat individuals with varicose veins.²⁴

It is noteworthy that Avicenna included exercise in the etiology and treatment of disease. He opened a special topic for treating obesity, especially on exercise and nutrition plans, suggesting that he understood this issue. At the same time, it is important that exercise's effects on systems such as circulation, digestion, and excretion have not been observed and recommended exercise to increase the effectiveness of treatment or treatment.

The anthropological studies have scientifically proven that Avicenna belongs to the Turanian race, not the Iranian. The interest shown to Avicenna in our country was realized under the leadership of the great leader Atatürk. In this context, the first Avicenna Congress was held in 1937.⁵ On the other hand, the second "National Avicenna Congress" was held on 14 March 1984 at the Kayseri Gevher Nesibe Institute of Medical History.²⁵ Although various activities were organized during this process, and sufficient scientific evidence

could not be reached on this subject. We must embrace Avicenna's saying, 'Science and art leave societies in which they are discredited'. We think that our society should show great effort to protect their spiritual honor by examining the works and research of our scientists/physicians who have left their mark on the history of world medicine and the history of Turkish science like him. At the same time, these studies reveal the importance of data on the history of medicine.

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Author contributions

Sabriye Ercan: Idea/concept, design, data collection and/or processing, analysis and/or interpretation, literature review, writing the article, references and fundings.

Aydan Örsçelik: Control/supervision, literature review, critical review, references and fundings.

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