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Sağlıklı yaşlanma ve egzersiz

Healthy aging and exercise

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Özet

"Yaşlılık", "yaşlanmak ve artan yaşın etkilerini yaşamaktır." Biyolojik işlevler açısından ise yetişkinlik döneminin, yani üreme döneminin bitişi ile ölüm arasında meydana gelen değişim ve dönüşüm süreci olarak tanımlanmaktadır. Yaşam beklentisindeki artışı anlatan 'yaş alma' kavramı ile yaşamın farklı bir aşamasını tanımlayan 'yaşlılık' kavramı arasında bir ayrım vardır.

Yaşam biçimi tıbbı, sağlıklı yaşlanmayı teşvik etmek için etkili bir araçtır. "Fiziksel aktivite", yaşam biçimi tıbbının bileşenlerinden biridir. Bu derlemede sağlıklı yaşlanma ve egzersize bakış açısı tartışılmıştır.

Anahtar kelimeler: yaşlanma, egzersiz, yaşam biçimi tıbbı

Summary

"Old age" is "ageing and experiencing the effects of increased age". In terms of biological functions, it is defined as the process of change and transformation that occurs between the end of the adult period, that is, the end of the reproductive period, and death. There is a distinction between the concept of 'ageing', which refers to an increase in life expectancy, and the concept of 'old age', which refers to a distinct stage of life.

Lifestyle medicine is an effective tool for promoting healthy ageing, and "Physical activity" is one of its components. Perspectives on healthy ageing and exercise is discussed in this review.

Keywords: Ageing, exercise, lifestyle medicine

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Giriş:

The meaning of "elderly" in the dictionary is defined as growing older and experiencing its effects. It is described as the process of change and transformation in biological functions occurring from the end of the adult period, or from the end of the reproductive period, until death. There is a distinction between the notions of "ageing", which refers to an increase in life expectancy, and "elderly" which describes a particular stage of life.[1] The World Health Organization (WHO) has defined the psychogeriatric period as being 65 years of age or older, and 85 years of age or older as being very old. Ages 65 to 74 are considered to be younger old age, 75 to 84 are considered middle old age, and 85 and older are considered to be in advanced old age.[2] The world population is ageing more quickly than in the previous years as a result of the increased life expectancy. It is predicted that there will be 1.97 billion people over the age of 65 in the world in 2050.[3]

The extent of changes to anatomical structure and physiological function occur with ageing depend on the duration of time without disease.[4] However, many diseases could become more prevalent in the future. Individual differences in organ ageing are caused by genetic makeup, lifestyle choices, and environmental factors. Study of twins found that there was a genetic difference of about 25%, and that environmental factors had a 50% impact on life expectancy.[2]

Age-Related Physiopathological Changes:

It has been observed that with greater age, circadian rhythm of body temperature and plasma cortisol have an effect on sleep. The efficacy of gonadotropins, growth hormone, thyrotropin, melatonin and adrenocorticotropic hormone (ACTH) decreases with age.[5] It has been noted that the loss of neurons in the hypothalamic suprachiasmatic nucleus coincides with this change in function.[6] Among the changes observed in the elderly are decreased heart rate, variations in blood pressure, electroencephalographic changes, differences in auditory frequency, and variations in responses to stress.[7] However, senior athletes' heart rates increased more than their sedentary counterparts, demonstrating some flexibility.[8]

In terms of homeostasis, the risk of becoming ill increases with age.[9] Hemopoietic changes occur with aging.[10] The life of red blood cells, iron cycle and blood volume do not change with age. However, bone marrow mass and fat content decrease with increasing age.[9, 10] Erythroid precursor cells (CFU-E) in the bone marrow of healthy elderly people decreased by 35% when compared to healthy young people.[11] Lower rates in the aged bone marrow were discovered when stem cells were examined for Granulocyte macrophage colony stimulating factor (GM-CSF) and Interleukin-3 (IL-3).[12] In healthy people, the total number of white blood cells in circulation does not change with age, but some cells' abilities to perform certain tasks decline. With age comes an increase in cancer risk.[13]

During cancer chemotherapy, there is a significant increase in myelotoxicity risk.[14] Although platelet count was found not to change with age, it was discovered that platelets' response to thrombotic stimuli increased. Bleeding time also decreases with age.[14] Aging is known to be a procoagulant condition. Age causes an increase in fibrinogen, Factor V, Factor VII, Factor VIII, high molecular weight kininogen, and prekallikrein. This appears to be related to low-grade inflammation

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in normal ageing as well.[15] Elevation of fibrin degradation products (D-dimer) is two-peak in healthy elderly without thrombosis; it may be higher in inpatients.[16] Furthermore, plasminogen activator inhibitor-1, a fibrinolysis inhibitor, increases with age.[17, 18] All of these factors increase the risk of deep venous thrombosis.[18]

Acid production decreases with age; parietal cells decrease while intestinal leukocytes increase.[19] Without basal stimulation, 90% of people aged 65 and over produce gastric acid.[20-22] It is emphasised that 50% of H.pylori infection is detected in older people, and its prevalence is gradually increasing.[22,23] Gastric acid production was found to be reduced. Pepsin secretion is reduced when H. pylori is present.[24,25] Prostaglandin, bicarbonate, and nonparietal fluid secretion in the stomach may also be reduced.

This may cause mucosal damage in patients taking nonsteroidal anti-inflammatory drugs. As a result, numerous studies have revealed that gastric emptying of liquid foods is prolonged while gastric emptying of solids is constant.[20] Reduced gastric blood flow and sensory neuron function have been shown in ageing rat models to result in increased mucosal injury.[26]

Aging causes anatomical changes in the small intestine, such as villi atrophy and mucous membrane deepening. With age, absorption of substances such as xylose, folic acid, vitamin B12, and copper decreases. Reduced gastric blood flow and sensory neuron function have been shown in ageing rat models to result in increased mucosal injury.[20, 23] Calcium absorption from the lumen decreases as vitamin D receptors decrease, as does the level of 25(OH) vitamin D in the circulation.

In women over 75, less than 25% of calcium intake is absorbed, especially when acid secretion is reduced.[27] Iron absorption decreases with age, but macronutrient absorption is less affected.[20] The number of sensory and myenteric neurons in the intestines has been found to decrease with age.[28] Calorie restriction has been shown in animal experiments to reduce myenteric neuronal cell loss.[29]

Aging causes hypertrophy of the muscularis mucosa, atrophy of the muscularis externa, and structural changes in the mucosal glands in the large intestine. Also observed are functional changes such as increased contraction and opiate sensitivity. Constipation was reported by 14% of those over the age of 65.[30] Anal sphincter tone decreases as resting pressure decreases with age.[31] A study comparing women and men under the age of 30 to men and women over the age of 70 discovered that the elderly had 30-40% lower anal sphincter tone.[31]

It has been observed that liver mass decreases by 20-40% with aging.[32] Lipofuscin pigment accumulation has been observed in the aged liver, similar to the livers of severely malnourished young people. Brown atrophy is the medical term for this condition.[33]

It has been discovered that the kidney mass decreases by 25-30% with age.[34] Some of the functional parenchyma areas have fat and fibrosis, which affects the nephrons. Nyengaard et al. observed that at the age of 75, 30 percent of the glomeruli were destroyed[35], and the capacity for filtration of the remaining glomeruli is insufficient. Aging also causes intrarenal vascular changes (such as spiralling of afferent arterioles, flattening of larger arteries, and intimal fibrosis).[36, 37]

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Glomerulosclerosis, interstitial fibrosis, and arteriosclerosis were discovered in the Rule et al. study in 3% of donors between the ages of 18 and 29, but in 73% of those between the ages of 70 and 77.[38] Creatinine clearance has been found to decrease with age (7.5-10 mL/min over 10 years).[39] GFR (glomerular filtration rate) can also change with age. One-third of the elderly experience no change, one-third, mild changes and one-third, more severe changes.[40] While creatinine synthesis declines with age, creatinine tubular secretion rises. As a result, despite the drop in GFR, the creatinine level remains constant.[40] It is recommended to include the age in the calculation, especially over the age of 90.[41, 42] In order to understand kidney functions, it is recommended that Cystatin C (Cystatin C) levels be measured in the elderly.[43] Cystatin C levels in healthy elderly people between the ages of 40 and 80 rise by 50% with age.[44]

Aging has been shown in animal studies to affect the hormonal functions of the kidney. For example, vitamin D hydroxylation [42] and renin-angiotensin system down-regulation [45] are reduced.

Hypertension and coronary artery disease are risks associated with advanced age. Coronary artery disease has been found in 75 percent of autopsies.[46] According to the findings of the Baltimore study, ageing has little effect on left ventricular ejection fraction at rest.[47]

Both the aortic and mitral valves thicken and develop calcific deposits as they age.[48] This can lead to conduction issues in the elderly heart. Increased afterload has been shown to cause ventricular cardiomyocyte hypertrophy.[49, 50] Larger myocytes are more sensitive to stress.[50] With age, there is a decrease in myocytes with apoptosis and necrosis.[6, 49-52] As a result of the decrease in cells in the sinoatrial node (SA) and atrioventricular node (AVN), the SA node may become more sensitive to calcium channel blockers.[53]

Parasympathetic tone and sympathetic response may decrease with aging.[54] Cardiac risk increases as the prevalence of premature atrial beats increases with age.[55] In addition, the risk of isolated ventricular ectopic beats increases.[56] Resting left ventricular ejection fraction (LVEF) does not change in healthy old age, but there may be a slight increase in response to exercise.[57]

Depending on the anatomical and functional changes that occur with age, the risk of hypoxia increases and the maximum oxygen uptake decreases; this increases the risk of pneumonia. Many anatomical changes occur in the lungs with age.[58] As the elasticity of the alveoli decreases with aging, limiting the extent of gas exchange. Anatomical dead space increases over the years.[59] Surfactant also degrades with age[59] and the content of proinflammatory proteins in alveolar fluid increases, thus, the anti-inflammatory profile decreases.[60] Carbon monoxide diffusion studies show that the diffusion capacity decreases by about 5% every decade.[61]

With aging, muscle weight decreases by 30-50% in men and women compared to body weight.[62] In the elderly, the penetration of fat and connective tissue into the muscle also decreases muscle quality. [63] Slow-twitch muscle fibers are less affected than fast-twitch muscle fibers. [62] In the muscle bundle, the number and volume of myofibrils decrease; muscle innervation is also reduced in men over 50 years of age.[62]

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Although it is compensatory and the k motor unit volume increases with age, the number of motor units going to the muscles decreases.[62] Growth hormone and androgen are also associated with muscle mass and function, possibly due to age. Increased proinflammatory cytokines also affect muscle protein structures.[64] In particular, IGF-1 is held responsible for the neuromuscular effect.[65]

Ageing increases the risk of fractures in the bones, and slows the healing of fractures.[66] Tomography and magnetic resonance images show that the lumen of the femur is enlarged, the cortex is thinned, and the rate of fat in the bone marrow increases[66] With age, mineral loss occurs in both cortical and trabecular bone. While the number of osteoblasts decreases, the number of osteoclasts remains the same, therefore the bone mass of healthy elderly individuals decreases by about 5% each year.[65] Vitamin D deficiency, which accelerates bone loss, is more common in the elderly than in the young.[67]

In the elderly, resistance exercises can reduce the balance of negative calcium balance and bone mineral loss.[67] Thus, age-related bone loss can be prevented by increasing bone mineral.[68] In aging animals, regional blood vessel formation appears to be reduced after fracture (lower osteogenic differentiation of progenitor cells has been demonstrated).[69] The matrix is less structured in the elderly than in the young.[70]

Exercise: Physical inactivity is regarded as one of the most serious health issues, particularly in developed countries. Many diseases, including cardiovascular diseases, have been shown to improve both the process and mortality.[71, 72]

The terms physical activity and exercise should not be used interchangeably.[72] Physical activity is defined as bodily movements that result in an increase in energy expenditure due to skeletal muscle contraction above the basal level. It is classified based on the type, severity, and purpose. Regular, planned, repetitive physical activity aimed at maintaining or improving one or more components of physical fitness is referred to as exercise.[73] Sport is a rule-governed physical activity. Physical fitness, also referred to as bodily fitness, is the ability to perform successful muscular work. Factors to consider are Cardiorespiratory endurance, skeletal muscle endurance, skeletal muscle strength, flexibility, balance, movement speed, reaction time, and body composition.[74]

Exercise prevents diseases such as hypertension, diabetes, obesity, and high cholesterol while also maintaining mental balance.[75] Exercise promotes bone and muscle health while also decreasing blood pressure and removing toxins from the body.[76]

Exercise ensures the proper functioning of muscles, bones, joints, cardiovascular system, and other functions. Endurance sports, such as long-distance running and swimming, for example, have been shown in studies to reduce the risk of coronary artery disease, hypertension, and diabetes.[76]

When the human body is inactive for an extended period of time, it loses its ability to move, and new health problems may arise.[77] In patients with moderate hypertension, regular aerobic exercise lowers blood pressure.[78] Daily moderate-intensity exercise for at least 30 minutes has been shown to reduce the risk of cardiovascular disease, diabetes, and some cancers.

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Tiang and Meng's publication: "The American College of Sports Medicine and the American Heart Association" recommends that elderly people undertake 30 minutes of moderate intensity activity 5 times per week or 20 minutes of vigorous intensity activity 3 times per week to protect against aging-related diseases. Strength training should be included twice a week to improve muscle groups and prevent falls. Strength training should consist of 8-10 exercises with 10-15 repetitions. Joining exercise classes to improve balance and prevent falls is strongly advised for the elderly."[79]

When regular exercise is performed before the age of 65, biological ageing can be delayed, according to WHO. For elderly, regular exercise improves physical fitness and provides psychological support, which reduced an individual's dependence on others during the ageing period.[75, 80-84]

Balance, reaction time, harmonious movement of the body (orientation, rhythm, elasticity, etc.) and adequate proprioception sense are also important in preventing falls, which is one of the most common health problems in old age. The simple reaction time, which is measured as the time it takes to respond to a single stimulus, begins to slow in the third decade and reaches a plateau around the age of 60. Fast and accurate reaction times are critical in providing postural control to adapt gait in response to unexpected postural perturbations and avoiding the dangers of falling.

A prolonged simple reaction time is a risk factor for falls in the elderly. Every year, approximately 25% of people aged 65 to 74 experience a fall. The rate rises to 29 percent for those aged 75 to 84, and 36% for those over 85. Approximately 30% of the world's elderly fall at least once a year, and 15%, twice or more.[85-87]

According to WHO guideliness: https://www.who.int/news-room/fact-sheets/detail/physical-activity

Adults aged 18–64 years

• should do at least 150–300 minutes of moderate-intensity aerobic physical activity;

• or at least 75–150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week;

• should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week, as these provide additional health benefits;

• may increase moderate-intensity aerobic physical activity to more than 300 minutes; or do more than 150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week for additional health benefits;

• should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits, and

• to help reduce the detrimental effects of high levels of sedentary behaviour on health, all adults and older adults should aim to do more than the recommended levels of moderate- to vigorous-intensity physical activity".

Adults aged 65 years and above

• Same as for adults; and

• as part of their weekly physical activity, older adults should do varied multicomponent physical activity that emphasizes functional balance and strength training at moderate or greater intensity, on 3 or more days a week, to enhance functional capacity and to prevent falls."

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Most studies recommend exercising 30-90 minutes per week, or three times per week in sessions lasting for a minimum of 12 weeks. A meta-analysis found that exercise training for fall prevention reduced fracture-causing falls by 61%, and falls requiring medical care by 43%.[88,89]

According to the American Association of Sports Medicine, aerobic exercise should be done 3-5 times per week, with emphasis on keeping the heart rate between 60-90% of the maximal heart rate (220-age) x 20-60 minutes of exercise for at least 10 minutes. It is also possible to divide. [90] The "start slowly-slowly" strategy should be used, especially in the elderly who have just begun exercising and are not physically fit enough. The first suggestion is to walk slowly.[91] Individuals who realise that they can complete the exercise will be more likely to continue with the programme.

All of this information emphasises the importance of prioritising active ageing measures. The gradual rise in life expectancy has raised the question of how to extend and improve the quality of life. In this regard, developed countries, in particular, are taking steps and developing policies to ensure active ageing. Lifestyle affects large segments of society and contains elements that can be changed, and so plays an important role in achieving healthy ageing goals. Physical activity is one of these elements, and it has been reported that those with high levels of physical activity in the geriatric group also have higher life satisfaction. As a result, the importance of exercise in the elderly's health will remain a key issue.

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