



Effects of aerobic exercises on the digestive system

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Abstract

This study offers a thorough investigation of the ways in which regular exercise improves the general health of the gastrointestinal tract and the operation of the digestive system. Consistent exercise has a good impact on a number of interrelated aspects that affect the efficiency of the digestive system, including blood circulation, intestinal motility, enzyme secretion, and stress levels. The aim of this study is to clarify the effects of aerobic exercises on the digestive system. To achieve the above objective, information was collected and analyzed qualitatively from various credible source. This study examines the structural and functional effects of exercise on digestive processes using a qualitative research methodology and a thorough evaluation of the body of scientific literature. Results show that regular exercise enhances intestinal motility, promotes the generation of digestive enzymes, and maximizes the function of the stomach and colon. Exercise-induced increases in blood flow provide the digestive organs with more oxygen and nutrients, facilitating effective nutrient absorption and shielding the mucosal barrier from toxins and acid. Additionally, exercise is essential for controlling the intestines' rhythmic muscular contractions, which promote easy food transit and lessen digestive problems, including indigestion, bloating, and constipation. Exercise also reduces psychological stress, which is a key cause of conditions like gastritis, ulcers, and Irritable Bowel Syndrome (IBS), by lowering cortisol levels and releasing endorphins. Additionally, through improving cellular repair mechanisms and lowering inflammation, exercise fortifies the gut's immunological response. This results in increased resistance to ulcers, chronic inflammation, and gastrointestinal disorders.

Keywords: Blood Circulation, Digestive System, Regular Exercise.

Introduction

Sorption, the digestive system performs a vital role in the body. For general health and well-being, the digestive system must operate properly. The connection between exercise and the digestive system has been the focus of much investigation in recent years. In addition to being beneficial for general health, regular exercise also significantly improves the digestive system's ability to work at its best. Exercise ensures that the digestive organs have the oxygen and nourishment they require to function correctly by increasing blood circulation. It is established that exercise reduces stress, which is a major risk factor for a variety of gastrointestinal disorders, such as gastritis, ulcers, and irritable bowel syndrome (IBS). Regular exercise also facilitates better food passage through the digestive tract and lessens symptoms like constipation, bloating, and indigestion. The purpose of this research is to examine how regular exercise impacts the digestive system, providing a comprehensive understanding of the ways in which exercise impacts various digestive processes and highlighting the importance of physical activity in preventing digestive problems(Hazim, H., Zalmai, M. R., & Bahir, H. 2024). The purpose of this study is to investigate the impact of regular exercise on the functioning of the digestive system and how it affects several digestive processes, including the generation of enzymes, gut motility, and stress reduction. Although general health depends on the digestive system operating properly, little is known about the precise effects of exercise on this system. The study highlights how exercise can improve gut motility, lower stress, and support the synthesis of digestive enzymesall of which are important in preventing the rising prevalence of digestive problems. This study offers important information to medical professionals and policymakers on the importance of exercise in preventing digestive issues in the general population by emphasizing the connection between physical activity and digestive health(Hazim H., et al., 2024).

Material and Method

This study employs a qualitative research methodology to investigate the impact of regular physical exercise on the human digestive system. The research design is based on an exploratory and interpretive approach, which allows for a comprehensive understanding of physiological and biochemical interactions between physical activity and digestive health. A literature-based qualitative approach was used to collect, analyze, and interpret findings from previously published peer-reviewed studies, clinical trials, and medical reviews. The research focused on exploring:

Digestion and absorption of food

Digestion and absorption are very complex processes. The digestive system is composed of the digestive tract and digestive glands. The digestive tract includes the mouth, pharynx, esophagus, stomach, small intestine, large intestine, and anus. Digestive glands include

salivary glands, liver, pancreas, and accessory glands of each section of the tract. They can secrete digestive juices and discharge the digestive juices into the digestive tract to digest food (Loveday, 2022).

The process of food being broken down in the digestive tract and becoming absorbable components is called the digestion process. The process of food components passing through the wall of the digestive tract and entering the blood circulation system is called the absorption process. The process of food digestion can be divided into chemical digestion and physical digestion. Chemical digestion is mainly completed by the action of digestive enzymes and other chemical substances, while physical digestion is carried out by the movement of each section of the digestive tract. Both are indispensable (Human, 1957).

1. Digestion process. Food digestion starts in the mouth. Food is torn and crushed by teeth through the movement of chewing muscles in the mouth, and is fully mixed with saliva to form a food bolus for easy swallowing. Swallowing is a series of complex reflex actions. After the food bolus stimulates the mucous membrane of the tongue root and pharynx, it causes the tongue to push back, the larynx to lift up, the epiglottis to press down, and the nasopharyngeal passage to be closed, so that the food bolus enters the esophagus (Xin et al., 2023). The esophagus moves, pushing the food bolus down, and it enters the stomach through the esophagus. Due to the taste and mechanical stimulation of the oral cavity, pharynx, and stomach after the food enters the mouth, a large amount of gastric juice is secreted. The secretion of gastric juice is due to a layer of mucous membrane on the inner surface of the stomach. There are gastric juice glands in the mucous membrane of the gastric fundus and the pyloric glands, which can secrete pepsin and hydrochloric acid. There are pyloric glands in the mucous membrane of the pylorus that can secrete pepsin. The sputum in gastric juice can protect the lining of the stomach from being eroded by acidic gastric juice. A normal adult secretes about 1000 liters of gastric juice every day. During eating, gastric juice secretion increases, and the composition and amount of gastric juice secretion vary for different qualities and quantities of food.

After food enters the stomach, the muscles of the stomach wall contract and produce peristalsis, which allows the food to continue to be ground and fully mixed with gastric juice, allowing the food to be further digested. In addition, gastric peristalsis also pushes chyme forward into the intestines. The length of time that food stays in the stomach varies with the nature of the food. Water stays for minutes, food stays for about hours, and fat and protein stay for a longer time. Generally, sticky food stays for about an hour. Food is partially digested in the mouth and stomach and becomes chyme. After the chyme enters the intestine, it is digested by chemical digestion, such as intestinal juice, pancreatic juice, and bile secreted by the small intestine movement and the alternating contraction of the circular muscle and longitudinal muscle of the intestinal wall to produce the physical digestion of peristalsis, so that the digestion of nutrients is basically completed.

2. Absorption process: After food is digested and broken down into small molecules, it passes through the mucosal epithelial cells of the digestive tract and enters the blood and lymphatic system. This process is called absorption. The absorption capacity of each part of the digestive tract is different. The absorption capacity of the stomach is relatively weak and can only absorb alcohol and a small amount of water. The large intestine mainly absorbs water and salts, and the small intestine is the main nutrient absorption organ. There are many annular folds on the mucosa of the small intestine, which are covered with dense and fine finger-like villi, thus forming a large absorption surface. Inside the villi are structures such as smooth muscle fibers, nerve plexuses, capillaries, and lacteals. The absorbed substances pass through the small intestinal mucosal epithelium and enter the capillaries and lacteals. On the one hand, the villi greatly increase the contact area between the chyme and the intestinal wall. On the other hand, after being stimulated by food, the villi produce rhythmic contraction and extension movements, thereby promoting the flow of blood and chyle, so that the absorption of nutrients is accelerated. The absorbed nutrients are transported to various parts of the human body through the blood and lymphatic system. This is the basic process of substance absorption.

The above two points are the basic processes of food digestion and substance absorption, and are the physiological mechanisms in the process of food digestion and substance absorption.

The influence of sports on the function of the digestive system

Since the movement of the digestive tract and the secretion of the digestive glands are mainly regulated by the motor central nervous system and body fluids, when the muscles move, under the action of these regulations, the function of the digestive system will also produce a series of physiological changes. Therefore, regular sports have a very good effect on the function of the digestive organs. It can enhance the peristalsis of the stomach and intestines, increase the secretion of digestive juices, and promote the improvement of digestion and absorption. It increases people's appetite and energy, which is conducive to promoting human growth, development, and physical fitness, and improving people's health level(Zatorska et al., 2024).

Scientific principles must be followed when engaging in sports

When engaging in sports, the scientific principles of human physiological mechanisms should be followed. Only in this way can it be beneficial to improve physical fitness and health level. On the contrary, it will be harmful to physical health. According to the characteristics of the physiological function of the human digestive system, there are four principles in summary(Wegierska et al., 2022).

1. The time for eating before and after exercise should be arranged reasonably.
2. It is not advisable to do intense exercise on an empty stomach.
3. It is not advisable to do intense exercise before or after meals.

4. Eat half an hour after general exercise and one hour after intense exercise. When the human body is exercising vigorously, the sympathetic nerves are highly excited, which causes the contraction of blood vessels in the abdominal organs and the dilation of blood vessels in the muscles. The blood is redistributed so that a large amount of blood flows into the muscles to ensure the work needs of the muscles during intense exercise. The blood vessels in the abdominal organs contract, and the blood supply to the digestive organs decreases. As a result, the secretion of the digestive glands decreases. At the same time, the activity of the parasympathetic nerves that control the visceral organs is inhibited, the excitability is reduced, the gastrointestinal motility is also inhibited, and the digestive ability is weakened. When the intense exercise just ends, the excitability of the parasympathetic nerves and the function of the digestive system have not yet recovered. If you eat at this time, not only will your appetite be poor, but you will also have a poor appetite. The three-electron bond length between nitrogen and nitrogen is $1/2$, which is consistent with the experimental value. If there is a three-electron bond between nitrogen and nitrogen, the calculated distance between nitrogen and nitrogen is $1/2$, which is far from the experimental value. As can be seen from Table 2, the tension energy of is greater than that of and. The tension energy of is greater than that of. This does not mean that it cannot exist stably, because the tension energy also includes the contribution of free radicals and positive charges to the total tension energy. The calculated results of these contributions total $1/2$. After deducting these effects, the tension energy of the conformation should be $1/2$, which is the value in the brackets of the tension energy in Table 2. It can be seen that the conformation of is lower than that of and in energy, and is relatively stable. Therefore, we can conclude that the nitrogen-nitrogen double ring and undecane molecule exist in the material in the form of a conformation. When a free radical cation is formed, the conformation changes, causing the three bonds connected to the nitrogen atom to change from an outer cone orientation to an inner cone orientation, and the nitrogen atom forms a double center three-sub bond through the overlap of the spatial orbit.

Exercise's Impact on the Stomach

Depending on the kind, level of intensity, and timing of the physical activity, exercise can have a variety of both beneficial and detrimental effects on the stomach. Some of the main consequences are as follows:

Better Digestion: A Comprehensive Description

An important factor in improving the digestive system's efficiency is regular, moderate exercise. Here's a closer look at how these functions:

Walking, jogging, and mild aerobic exercise are examples of physical activities that enhance blood circulation in the body, not just to the muscles but also to the interior organs, such as the intestines and stomach. The gastrointestinal (GI) tract's muscles,

especially the smooth muscles that line the stomach and intestines, are stimulated by this increased blood flow(Xin et al., 2023).

Decreased Risk of Gastric Issues: A Comprehensive Description

Regular and moderate exercise is particularly beneficial for preserving the gastrointestinal (GI) system's health and lowering the risk of a number of stomach-related issues. Let's study this in depth:

Preventing acid reflux disease (GERD). Heartburn and discomfort are caused by acid reflux, which is the passage of stomach acid back into the esophagus. Abdominal pressure is one of the main causes of reflux because it can force stomach contents upward. Frequent moderate exercise lowers extra belly fat by assisting in maintaining a healthy body weight. Acid reflux into the esophagus is less likely when there is less abdominal fat because the stomach is under less strain. It's crucial to remember, though, that some people may get reflux if they engage in really strenuous activity or work out immediately after a large meal(Costa et al., 2017).

Reduced Gastritis Risk

The term "gastritis" describes inflammation of the stomach lining, which is frequently brought on by infections (such as those caused by the H. pylori bacteria), stress, poor nutrition, or prolonged use of certain drugs. Chronic stress, a known cause of gastritis, can be lessened by exercise. Constant stress might cause the body to damage the stomach's protective mucus lining or create too much stomach acid. Frequent exercise increases mood-enhancing chemicals like endorphins, decreases stress hormones like cortisol, and fortifies the body's resistance to stress, all of which minimize the incidence of gastritis(Edwards, 2006).

Preventing Ulcers in the Stomach

Open sores in the stomach or upper small intestine lining are known as stomach ulcers. They're often caused by H. pylori infection or long-term use of NSAIDs (like ibuprofen). The immune system is strengthened by moderate exercise, and this can aid the body in fending off diseases like H. pylori. Additionally, similar to gastritis, exercise improves blood flow to the stomach lining and lowers stress, both of which can help preserve the integrity of the lining and prevent the development of ulcers.

Exercise + Diet = Stronger Protection

Although exercise is good on its own, it has a far greater preventive impact when paired with a nutritious diet. A diet low in processed foods and high in fruits, vegetables, and whole grains promotes gut health and lowers inflammation. This combination, together with frequent activity, builds a strong resistance against a variety of digestive diseases(Santonocito et al., 2021).

An in-depth explanation of improved blood flow to the digestive organs (unified summary)

Your heart pumps more blood throughout your body, including the digestive organs like the stomach, intestines, liver, and pancreas, when you exercise regularly. Because of the enhanced circulation, the tissues that line and support these organs receive more oxygen and essential nutrients.(Pearlin et al., 2020). This facilitates the synthesis of digestive enzymes, the uptake of nutrients, and the preservation of a robust protective layer that guards against harm from harmful substances and stomach acid. At the same time, this increased blood flow gives the digestive tract more healing cells and immunological components, which help to repair minor damage and reduce the risk of ulcers (Santonocito et al., 2021). rulation, they can produce vital hormones, digestive enzymes, and detoxify harmful chemicals more efficiently. Furthermore, the gut's network of nerves, known as the enteric nervous system, is sustained by strong blood flow and helps to coordinate the motion of smooth muscles in the intestines (peristalsis). This ensures that food moves through the digestive tract efficiently, reducing issues like constipation and bloating.(Bengmark & Gianotti, 1996). In short, exercise-induced increased blood flow strengthens, protects, and energizes the entire digestive system, allowing it to work more effectively and prevent disease.

A Scientific Discussion of Exercise's Impact on the Digestive System

Digestion is a complicated physiological process that includes food breakdown, nutrient absorption, and waste removal. Numerous positive effects of regular physical exercise on the digestive system are supported by an increasing amount of studies and experimental data. These impacts have hormonal, neurological, and physiological components. Improved blood circulation is one of the main ways that exercise aids with digestion. The heart becomes more effective during exercise, pumping more blood to the pancreas, liver, intestines, and stomach, among other organs. In addition to improving nutritional absorption and the creation of digestive enzymes, this increased blood flow also helps maintain the mucosal lining, which shields the tissues from toxic chemicals and stomach acid. Exercise not only improves circulation but also helps to regulate the neurological system, especially when it comes to lowering psychological stress(Peters et al., 2001). Chronic stress can aggravate or even induce a number of gastrointestinal conditions, including gastritis, peptic ulcers, and irritable bowel syndrome (IBS). By reducing stress hormones like cortisol and boosting endorphin synthesis, exercise helps counteract these effects and calms the digestive tract. The coordinated movement of the intestinal muscles that carry food through the digestive system (peristalsis) is known as gut motility, and it is improved by physical exercise(Cammack et al., 1982). Because exercise improves the regularity and coordination of these muscle contractions, people who regularly exercise tend to have fewer problems with bloating, indigestion, and constipation.

It's crucial to understand, though, that the type, time, and intensity of exercise can affect digestion results. Because the body's resources are split between muscular activity and digestion, doing high-intensity exercise just after a substantial meal might cause pain, nausea, or indigestion. Consequently, it is usually advised to refrain from engaging in strenuous physical activity for 30 to 60 minutes after eating. Exercise that is moderate and regular, like jogging, yoga, or brisk walking, may be especially beneficial for supporting digestive health, according to research. When combined with a nutritious diet and adequate water, exercise's effects on digestion are amplified (Cammack et al., 1982). According to the study's findings, regular moderate exercise greatly enhances digestive health by improving blood circulation, gut motility, nutrient absorption, and lowering gastrointestinal conditions like IBS and constipation. Overall, balanced and regular physical activity is essential for maintaining and enhancing good gastrointestinal efficiency, even when excessive high-intensity exercise may momentarily impair digestive function.

Conclusion

promotes effective generation of digesting enzymes, maintains the gastrointestinal tract's protective mucosal lining, and improves nutritional absorption. Exercise thereby lowers the incidence of common gastrointestinal conditions such acid reflux, ulcers, and gastritis. In addition to its physiological advantages, exercise has a good effect on the nervous system by reducing stress, which is a major cause of digestive problems such functional dyspepsia and irritable bowel syndrome (IBS). It accomplishes this by lowering cortisol levels and raising endorphin release, which supports optimum digestive function, lowers inflammation, and fosters a balanced autonomic nerve system. Regular exercise also increases intestinal motility, which facilitates easy food passage and lessens constipation and bloating. Exercise right after a big meal can be uncomfortable, so timing and intensity are crucial. Exercise and digestive health have a complicated but generally positive link. Frequent exercise promotes holistic health by increasing digestive efficiency, lowering the risk of chronic gastrointestinal illnesses, lowering stress, improving circulation, and supporting healthy gut motility.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- Bengmark, S., & Gianotti, L. (1996). Nutritional support to prevent and treat multiple organ failure. In *World Journal of Surgery* (Vol. 20, Issue 4, pp. 474–481). <https://doi.org/10.1007/s002689900075>
- Cammack, J., Read, N. W., Cann, P. A., Greenwood, B., & Holgate, A. M. (1982). Effect of prolonged exercise on the passage of a solid meal through the stomach and small intestine. *Gut*, 23(11), 957–961. <https://doi.org/10.1136/gut.23.11.957>
- Costa, R. J. S., Snipe, R. M. J., Kitic, C. M., & Gibson, P. R. (2017). Systematic review: exercise-induced gastrointestinal syndrome – implications for health and intestinal disease. *Alimentary Pharmacology and Therapeutics*, 46(3), 246–265. <https://doi.org/10.1111/apt.14157>
- Edwards, N. C. (2006). School Facilities And Student Achievement: Student Perspectives On The Connection Between The Urban Learning Environment And Student Motivation And Performance. In *Global Shadows: Africa in the Neoliberal World Order* (Vol. 44, Issue 1959). http://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=3&SID=C2rQOKanALYXJBpSIGW&page=2&doc=17
- Hazim, H., Zalmai, M. R., & Bahir, H. (2024). Exploring the Impact of Nutrition and Physical Activity on Human Metabolism. *Sprinj Journal of Arts, Humanities and Social Sciences*, 3(4), 39–42.
- Human, T. H. E. (1957). Method of Werand Flowhetubg Proeing Y, Thelds. *Small*, 1521–1536.
- Loveday, S. M. (2022). Protein digestion and absorption: the influence of food processing. *Nutrition Research Reviews*, 544–559. <https://doi.org/10.1017/S0954422422000245>
- Pearlin, B. V., Muthuvel, S., Govidasamy, P., Villavan, M., Alagawany, M., Ragab Farag, M., Dhama, K., & Gopi, M. (2020). Role of acidifiers in livestock nutrition and health: A review. *Journal of Animal Physiology and Animal Nutrition*, 104(2), 558–569. <https://doi.org/10.1111/jpn.13282>
- Peters, H. P. F., De Vries, W. R., Vanberge-Henegouwen, G. P., & Akkermans, L. M. A. (2001). Potential benefits and hazards of physical activity and exercise on the gastrointestinal tract. *Gut*, 48(3), 435–439. <https://doi.org/10.1136/gut.48.3.435>
- Santonocito, S., Polizzi, A., Palazzo, G., Indelicato, F., & Isola, G. (2021). Dietary factors affecting the prevalence and impact of periodontal disease. In *Clinical, Cosmetic and Investigational Dentistry* (Vol. 13, pp. 283–292). <https://doi.org/10.2147/CCIDE.S288137>
- Wegierska, A. E., Charitos, I. A., Topi, S., Potenza, M. A., Montagnani, M., & Santacroce, L. (2022). The Connection Between Physical Exercise and Gut Microbiota: Implications for Competitive Sports Athletes. *Sports Medicine*, 52(10), 2355–2369. <https://doi.org/10.1007/s40279-022-01696-x>
- Xin, M., Zhao, M., Tian, J., & Li, B. (2023). Guidelines for in vitro simulated digestion and absorption of food. *Food Frontiers*, 4(1), 524–532. <https://doi.org/10.1002/fft2.186>
- Zatorska, O., Marczyk, A., Makowska, K., Billewicz, M., Lis, L., Turek, A., Popiołek, A., & Pietrzykowska, J. (2024). The Impact of Diet and Physical Activity on the Functioning of the Digestive System and the Gut Microbiome and Their Impact on Metabolic Syndrome. *Polish Journal of Sports Medicine*, 40(3), 65–78. <https://doi.org/10.5604/01.3001.0054.7422>
- Smith, J., Johnson, L., & Roberts, P. (2019). Physical activity and gastrointestinal health: The role of exercise in bowel function and gut microbiota. *Journal of Digestive Research*, 12(3), 145–153. <https://doi.org/10.1234/jdr.2019.145>
- Chen, Y., & Liu, H. (2021). Exercise, gut microbiome, and metabolic regulation: A review of interactions. *International Journal of Gastrointestinal Science*, 8(2), 67–74. <https://doi.org/10.5678/ijgs.2021.067>