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The Effect of Physical Activity/Exercise on Constipation in Sedentary Individuals

Kemal YUCE*

Department of Physiology, Faculty of Medicine, Agri Ibrahim Cecen University, Türkiye,

yuce2020@hotmail.com

ABSTRACT

Constipation is generally caused by decreased motility, decreased water consumption, a low intake of fibrous foods, anxiety and depression, the use of certain medications, and some neurological diseases. Constipation is a common problem in pregnant women, infants, the elderly, the disabled, people with sleep problems and people with psychological and neurological diseases. Although inadequate physical activity is an important factor in the occurrence of constipation in these people, most studies in the literature do not mention physical activity, or even if they do, they do not give it the value it deserves. This is because when gastrointestinal motility decreases due to inactivity, the nutrients consumed remain in the intestines for a longer time, accordingly, all water and fat content is excessively absorbed, hardens, and forced movement due to straining leads to rupture of the anus and inflammation of the intestine. Physical activity allows all abdominal muscles and the intestines to move up and down, increases gastric motility, increases gastric secretions, reduces the time food spends in the intestines, reduces depression and anxiety, and prevents inflammation of the intestines. The present study is the first to suggest that inactivity may be the cause of constipation and constipation-related diseases that occur in people with insufficient physical activity. This study aims to provide the information about why physical activity/exercise must be recommended as a complementary treatment for constipation in sedentary individuals.

Keywords: Physical activity, exercise, constipation, sedentary individuals

*** Corresponding Author's email:** yuce2020@hotmail.com

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Hareketsiz Bireylerde Fiziksel Aktivitenin/Egzersizin Kabızlık Üzerine Etkisi

ÖZ

Kabızlık genellikle hareket kabiliyetinin azalması, su tüketiminin azalması, lifli gıdaların az tüketilmesi, anksiyete ve depresyon, bazı ilaçların kullanımı ve bazı nörolojik hastalıklardan kaynaklanır. Kabızlık, hamilelerde, bebeklerde, yaşlılarda, engellilerde, uyku problemi yaşayanlarda ve psikolojik ve nörolojik hastalıkları olan kişilerde sık görülen bir sorundur. Yetersiz fiziksel aktivite, bu kişilerde kabızlığın ortaya çıkmasında önemli bir faktör olmasına rağmen, literatürdeki çoğu çalışmada ya fiziksel aktiviteden bahsetmemekte veya bahsetse bile hak ettiği değeri vermemektedir. Bunun nedeni, hareketsizlik nedeniyle gastrointestinal motilitenin azalması durumunda, tüketilen besinler bağırsaklarda daha uzun süre kalması, buna bağlı olarak tüm su ve yağ içeriğinin aşırı emilmesi, sertleşmesi ve ıkınma nedeniyle zorlanan hareketin anüs yırtılmasına ve bağırsak iltihabına yol açmasıdır. Fiziksel aktivite, tüm karın kaslarının ve bağırsakların yukarı aşağı hareket etmesini sağlar, mide hareketliliğini artırır, mide salgılarını artırır, yiyeceklerin bağırsaklarda kalma süresini kısaltır, depresyon ve anksiyeteyi azaltır, ve bağırsak iltihabını önler. Bu çalışma, hareketsizliğin, yetersiz fiziksel aktiviteye sahip kişilerde görülen kabızlık ve ona bağlı hastalıkların nedeni olabileceğini öne süren ilk çalışmadır. Bu çalışma, hareketsiz bireylerde kabızlık için tamamlayıcı bir tedavi olarak fiziksel aktivite/egzersizin neden önerilmesi gerektiği konusunda bilgi sağlamayı amaçlamaktadır.

Anahtar Kelimeler: Fiziksel aktivite, egzersiz, kabızlık, hareketsiz bireyler

Introduction

Constipation is diagnosed according to the Rome IV criteria. Functional constipation is diagnosed in the presence of two of the six Ramo IV criteria: straining during defecation, feeling of incomplete defecation, lumpy or hard stools, anorectal obstruction or feeling of obstruction, straining to defecate, and/or less than three defecations per week (Miller et al., 2018). There are two broad types of constipation: primary and secondary. Primary causes are Colon derived reasons. Extra-colonic reasons are secondary. There are two sorts of primary causes: obstructive disorders and transit disorders (Hedayat & Lapraz, 2019). Causes of secondary constipation include metabolic diseases (Hyperparathyroidism, Hypercalcemia, Hypothyroidism), myopathic conditions (Scleroderma, Myotonic dystrophy), structural abnormalities (Hemorrhoids, Anal fissures, Inflammatory bowel disease), neurologic diseases (Multiple sclerosis, Hirschsprung's disease, Spinal cord injury, Parkinson's disease), Psychological conditions (Anxiety, Depression), and Other (Pregnancy, Irritable bowel syndrome) (Hsieh, 2005). These factors cause constipation, and in turn, constipation causes the conditions related to them to worsen. Therefore, eliminating constipation with physical activity can alleviate the conditions related to these factors and start the healing process.

Modern medical treatments for constipation include discontinuation of active drugs, use of fibrous foods, gastrointestinal excitomotors, laxatives, osmotic agents, lubricants, probiotics, and botulinum toxin injections (Desprez et al., 2022; Gong et al., 2024). All of these are aimed at eliminating the symptoms rather than treating the cause and may have harmful effects over time (Leung et al., 2011;

Passos et al., 2022). Low physical activity is an independent risk factor for constipation (Everhart et al., 1989; McCrea et al., 2008). Physical activity are the primary preventive and protective administrations against many chronic diseases, especially constipation (Booth et al., 2012). Exercise alleviated fluoride-induced damage to intestinal morphology, prevented the development of duodenal inflammation, altered the synthesis of tight junctions, and reorganized the intestinal microbiota (Fu et al., 2022). Eight weeks of aerobic exercise improved intestinal mucosal barrier dysfunction, restored villus height and mucosal thickness in diabetic rats (Li et al., 2022). Our aim in this study is to provide evidence that inactivity, inadequate motility, and the conditions that lead to these conditions lead to constipation and constipation-related health problems, and that physicians should offer exercise as a complementary treatment to these patients.

The effect of Physical Activity on Constipation in Sedentary Individuals

The effect of physical activity on constipation in elderly individuals

Constipation is a common condition affecting one third of individuals over the age of 65 and 50% of individuals over the age of 85. The substances used in the treatment are stool bulking agents and softeners, osmotic substances, stimulants and prokinetic and secretory agents and laxatives (Pont et al., 2019). The most commonly used substances in the treatment are laxatives. Lifestyle adjustments are also worth considering for treatment, but most people do not see this as an absolute solution. In addition, patients try exercise and different foods. However, it should be noted that physical or economic conditions may prevent patients from changing these factors, which may affect the outcome of treatment (Munch et al., 2016). Increasing adequate fluid intake of the elderly can also be considered as one of the lifestyle changes as low fluid intake, which may be an indicator of hypohydration, is also a cause of constipation, and a significant relationship has been reported between fluid deprivation of 2500 to 500 ml per day and constipation (Arnaud, 2003).

Constipation is not a physiological consequence of normal aging. In addition to decreased mobility, the use of medications and changes in diet contribute to the occurrence of constipation. Management of chronic constipation includes counseling on intestinal training, keeping a stool diary to record the nature of intestinal movements, increasing physical activity, and increasing fluid and dietary fiber intake (Hsieh, 2005; Ross, 1995). Decreased activity will increase the risk of constipation. Elderly patients in wheelchairs, sedentary or with limited physical mobility are deprived of exercise for long periods of time and experience decreased intestinal peristalsis. When stool remains in the intestine for too long, more water in the stool will be absorbed, resulting in hard stools, triggering and aggravating constipation. In addition, decreased activity can cause atrophy of the abdominal muscles, decreased muscle strength, and difficulty holding one's breath and defecating. Constipation due to decreased activity is most common in weak and chronically bedridden elderly patients (Zheng et al., 2018). A study of people aged 45 to 75 years found that as physical activity (activity 30-60 min/day and strenuous acticity 60 min/day) increased, the risk for all types of gastrointestinal complaints, including constipation, decreased (Ohlsson & Manjer, 2016). In another study, pysical activity was categorised using the International Physical Activity Questionnaire (No Activity, Inactive, Minimal Activity, Active) and the Rapid Assessment of Physical Activity (Sedentary, under activity and activity). Physical activity was associated with a lower prevalence of constipation (Fitzpatrick et al., 2023).

The effect of physical activity on constipation in individuals with Parkinson's disease.

Parkinson's disease is among the neurological diseases in which constipation is observed. Intestinal transit time was found to be significantly prolonged in a rotenone-induced experimental animal model of Parkinson's disease (Sheikhpour et al., 2023). One of the studies explaining the effect of exercise on the slowed motility and constipation seen in Parkinson's patients addressed the issue through the intestinal flora as intestinal flora is also one of the determining factors in the occurrence of constipation.

In addition, exercise importantly changed the structure and composition of the intestinal flora and improved intestinal motility (Wang et al., 2023). Sleep disorders also occur in Parkinson's disease patients (Menza et al., 2010). Both excessive sleep and insufficient sleep lead to constipation as mentioned above. In other words, the cause of constipation in Parkinson's disease patients may be sleep disorders caused by the disease. In this context, this study found that constipation and possible REM sleep behavior disorder (pRBD) were strongly associated with future decline in some cognitive measures in Parkinson's disease patients, especially in men. According to this findings, pRBD and constipation screening at an early stage may help to better understand how cognitive abnormalities develop in later stages of Parkinson's disease. Another important factor is that the antidepressants and antihistamines used here can cause constipation (Kong et al., 2020). As a result, many conditions that develop in Parkinson's patients can lead to constipation. Exercise has the potential to support both the non-motor (constipation, depression, apathy, fatigue) and motor (balance, strength, gait) aspects of Parkinson's disease, as well as the secondary complications of inactivity (osteoporosis, cardiovascular) (van der Kolk & King, 2013).

The effect of physical activity on constipation in pregnant women

Prevalence rates of constipation were found to be 24%, 26%, 16%, and 24% in pregnant women during the first, second, and third trimesters and at 3 months postpartum, respectively (Bradley et al., 2007). Studies have shown that the prevalence of functional constipation in pregnant women is associated with pre-pregnancy body mass index, age, exercise, diet, psychological factors, occupation, threatened miscarriage in early pregnancy, and a history of constipation (Shi et al., 2015). Gastrointestinal symptoms such as constipation can be attributed also to gastrointestinal motility disorders caused by increased levels of female sex hormones, especially increased progesterone (Keller et al., 2008; Verghese et al., 2015).

It is clear from this article as a whole that exercise leads to positive changes in a significant number of these factors. there are studies indicating that women who exercise during pregnancy may have a reduced incidence of varicose veins, improved bladder control, reduced incidence of constipation, less heartburn, improved sleep, and fewer leg cramps (Hammer et al., 2000). While light physical exercise seems more sensible during pregnancy, it should be remembered that there are claims that intense exercise can worsen constipation (Cullen & O'Donoghue, 2007).

Studies on this topic are insufficient, therefore it is not possible to provide more in-depth information. Identifying this gap is scientifically significant, and researchers are invited to work on this subject.

The effect of physical activity on constipation in individuals with sleep disorders

Specifically, both children and adults with a history of sleep disorder were found to have an increased risk of all-cause constipation. Additionally, it was found that patients who slept poorly had a higher likelihood of experiencing constipation. Lastly, it was discovered that individuals with sleeplessness had the highest chance of being constipated. Constipation is more likely to occur when sleep is inadequate, of low quality, or both. These results highlight how crucial it is to identify sleep disturbances in both children and adults as a separate risk factor for constipation (Tian et al., 2024)**.** Four groups were created based on the length of sleep: very short sleep (less than five hours per night), short sleep (five–six hours per night), normal sleep (seven-eight hours per night), and long sleep (nine hours per night) in a different study. Type 1 or Type 2 of the Bristol Stool Scale was used to diagnose chronic constipation. Compared with normal individuals, constipated male participants had shorter sleep duration and constipated female participants had longer sleep duration. Excessive sleep duration in men or insufficient sleep duration in women was associated with neither increased nor decreased risk of constipation (Yang et al., 2022). Another study on shift workers found a significant association between insomnia and constipation (Yun et al., 2022). Multivariate analysis revealed that those reporting poor sleep quality were associated with

an increased risk of irritable bowel syndrome compared with those reporting good sleep quality. Similarly, those reporting moderate or poor sleep quality were associated with an increased risk of functional constipation (Ohkuma et al., 2024; Xu et al., 2022). Leptin was decreased and ghrelin was increased in participants with short sleep. These variations in ghrelin and leptin are probably going to make you feel more hungry and explain the increase in body mass index observed with short sleep duration. Changes in appetite-regulating hormones with sleep restriction may contribute to obesity in western countries where chronic sleep restriction is frequent and food is readily available (Chaput & Tremblay, 2009; Spiegel et al., 2004; Taheri et al., 2004).

Although irritable bowel syndrome is not the same as constipation, it is a disorder that has many common aspects with constipation and causes constipation. Therefore, a study conducted on irritable bowel syndrome is important and gives an idea about its relationship with constipation. In this context, in a study associating irritable bowel syndrome with sleep and physical activity, sedentary individuals and shorter (7 hours/day) or longer (>7 hours/day) sleep duration were each positively associated with increased irritable bowel syndrome risk, and physical activity was associated with lower irritable bowel syndrome risk. Among individuals sleeping 7 hours per day, replacing 1 hour of sedentary individual with equivalent light physical activity, vigorous physical activity or sleep reduced the risk of irritable bowel syndrome by 8.1%, 5.8%, and 9.2%, respectively. For individuals sleeping more than 7 hours per night, light and vigorous physical activity were associated with a 4.8% and 12.0% lower risk of irritable bowel syndrome, respectively. In conclusion, sedentary lifestyle and inadequate sleep duration are risk factors for irritable bowel syndrome, and physical activity attenuates this (Gao et al., 2024). As the information above shows, impaired sleep quality and quantity are associated with constipation. Chronic resistance exercise improves all aspects of sleep, with the greatest benefit being on sleep quality (Kovacevic et al., 2018). As a result, exercise can have a positive effect on regulating sleep, thereby reducing constipation.

The effect of physical activity on constipation in infants

Constipation is a common problem in children, accounting for approximately 3% of all primary care admissions and 25% of referrals to pediatric gastroenterologists. Although polyethylene glycol is generally effective, most children require long-term treatment, with approximately 50% experiencing at least one recurrence within the first 5 years after initial improvement (Quitadamo et al., 2024). Constipation may require referral to a specialist, depending on the condition. Patients with severe constipation benefit from medications, but surgical intervention may be required if symptoms persist. Despite surgical intervention, disruptions in anorectal structure during this process can have lasting effects that can affect quality of life (Maselli et al., 2024).

Constipation in Infants: Constipation initially leads to reluctance to breastfeed, restlessness and lethargy in infants, while in later stages it leads to weight loss, dehydration, complete refusal of feeding, increased inactivity, sleepiness and irritability (Carson & Lyles, 2024). The frequency and consistency of stools do not alter when kids drink more water than they typically do. Therefore, encouraging children to drink more water may only help with constipation if the child's voluntary fluid intake is below average for their age and activity level. Mineral waters high in magnesium sulfate and fluid consumption have been demonstrated to alleviate constipation in healthy newborns, despite the fact that sulfate in drinking water has no discernible laxative action. Consequently, fluid restriction and fluid loss and thus dehydration or hypohydration increase constipation. Therefore, it is important to prevent dehydration to prevent constipation (Arnaud, 2003). Constipation can be caused by cow's milk allergy (Vandenplas et al., 2015). In addition, constipation in infants may also be caused by Hirschsprung's disease and dyshesia (Bolia et al., 2020). While supplementing infant formula with pro-, pre- and/or synbiotics reduces the prevalence of constipation, their effectiveness in constipated infants has been reported to be disappointing. There is limited evidence for the addition of magnesium to infant formula to treat

constipation (Steurbaut et al., 2023).

Since the physical activity ability of newborn infants consists of limited movement of the joints, no study has been found that addresses the relationship between constipation and physical activity in these babies. However, in newborns, constipation may be caused by limited mobility and excessive sleep. In addition, although these people have limited mobility, it is considered beneficial to move their joints, especially their feet, as much as possible and to massage their backs by stroking them. Of course, care should be taken not to damage the children's joints, and information should be obtained from pediatricians about which movements should be made and how.

Constipation in Children: Risk factors for childhood constipation can be genetic and psychological. In addition, intestinal functions can also be affected by dietary habits. The general constipation rate was determined as 7.2% in children. This rate was 7.3% in boys and 7.2% in girls. Parental concern for constipated children was 90% and the medical consultation rate was 23.2%. In school children aged 7-12, never using the school toilet and having problems controlling their intestines after the age of 2 were found to be important risk factors for constipation. Constipated children were less likely to consume fruit and vegetables than non-constipated children, while their consumption of dairy products, biscuits and pasta was higher (Inan et al., 2007). Gluten is another example of constipation due to dietary habits. In a study in which functional constipation was determined in 12% of children at 24 months of age, it was found that children with functional constipation were more likely to have been exposed to gluten before the age of 6 months, while children without functional constipation were more likely to have been exposed to gluten after the age of 6 months. In addition, when comparing those who were exposed to gluten after 6 months of age in both groups, it was determined that the constipated group had a higher rate of exposure to gluten. Therefore, functional constipation was found to be significantly associated with early gluten exposure. As a result, exposure to gluten within one year after birth was found to be significantly associated with functional constipation (Kiefte-de Jong et al., 2010). Therefore, eating habits definitely affect the development of constipation in children. When the symptoms of constipation in children was examined, large stools, infrequent painful defecation, abdominal pain and fecal incontinence were detected. In addition, as far as treatment is concerned, fecal disimpaction and maintenance therapy should be the mainstays of pharmacotherapy in order to stop stool from reaccumulating. Rectal or oral medicine can be used to successfully treat a patient. For the youngster, these two treatments appear to be equally upsetting and successful. As a result, the treatment plan should be decided upon after the child and/or parents have discussed the benefits and drawbacks of each option (Hoekman & Benninga, 2013). A study from Iceland found that 40% of constipated children had recurrence of symptoms, 27% had to seek medical attention more than once and 33% received medication rectally. In a study of girls aged 10-18 years, when non-constipated individuals and constipated individuals were compared, the physical activity rate of non-constipated individuals was 42%, while the physical activity rate of constipated individuals was 35%. Therefore, for older children, physical activity may lessen the chance of constipation (Seidenfaden et al., 2018). In another study evaluating constipation using Rome III criteria, similar results were found regarding the recurrence of symptoms and the importance of physical activity. In this study, the constipation group had a history of constipation in infancy, which recurred later, had selective eating habits, lack of exercise, and displayed a reserved posture (Chang et al., 2013). The rising incidence of functional constipation in children may be related to their decreased levels of physical exercise. In a study of preschool children in the Netherlands, three categories for the data were: vigorous, moderate, and light activity. Children with vigorous activity had notably less functional constipation at age 4 than children with moderate and light physical activity. Children with more than 60 minutes/day of physical activity, as recommended by the World Health Organization, had significantly less functional constipation in the fourth year of life (Driessen et al., 2013). While dietary habits are a significant factor in the development of constipation in children, physical activity appears to be effective in preventing it.

The effect of physical activity on constipation in patients with anxiety and depression

Individuals with anxiety and depression have little desire to move, and the medications they use cause inactivity. For this reason, we considered them sedentary individuals and included them in the study. Anxiety and depression are complex emotional processes with physiological, neurological and subjective aspects in addition to cognitive evaluations (den Boer et al., 2001). There is a relationship between depression and functional constipation. A cross-sectional study of 3,362 adults found that people with depression were at increased risk of constipation (Adibi et al., 2022). Treating depression may be beneficial in improving quality of life in patients with severe constipation, as the severity of constipation was associated with physical and mental quality of life in patients with major depressive disorder (Albiani et al., 2013). Depression itself can cause constipation, as can Paroxetine, which is used to treat depression (Dobbels et al., 2002). The risk of depression was found to be 27% lower in men who reported exercising 3 or more hours per week compared to those who reported not exercising at all (Artal, 1998). People with high levels of physical activity were found to have a reduced risk of depression and a reduced likelihood of developing anxiety compared to those with low levels of physical activity (Wanjau et al., 2023). Progressive relaxation exercise did not affect cortisol levels and vital signs, but appeared to be an effective, safe and feasible practice by reducing pain and anxiety and relatively increasing tissue oxygenation (Ozhanli & Akyuz, 2022). In conclusion, anxiety and depression can cause constipation, physical activity/exercise can eliminate anxiety and depression, and since the cause of constipation is eliminated, the problem of constipation can be solved.

Conclusion and Recommendations

Constipation occurs in sedentary and low-inactive pregnant women, those with physical disabilities, mental disabilities, depression, anxiety, Parkinson's disease, sclerosis, excessive sleepiness, newborns and the elderly. The cause of this constipation is basically the decrease in intestinal motility due to low physical activity, excessive absorption of water and fat from foods that spend too much time in the intestines, resulting in excessive hardening, and the problems caused by the forced movement of the over-hardened stool in the intestines. Physical activity/exercise prevents constipation in these people by increasing gastric motility in general, reducing depression and anxiety in particular, transforming the intestinal microbiota, and rearranging the intestinal structure. Therefore, recommending exercise as a complementary treatment against constipation and constipation-related diseases (irritable bowel syndrome, anal fissure, hemorrhoids, intestinal inflammation) seen in sedentary and low-inactive people will be beneficial in treating constipation and constipation-related diseases as a whole.

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Conflict of Interest

There is no conflict of interest in this study.

Authors' Contributions

The article was written by the corresponding author.

Ethics Approval

Because this study is a review, it does not require ethics committee approval.

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