



The Importance of Exercise in the Well-Rounded Physician: Dialogue for the Inclusion of a Physical Fitness Program in Neurosurgery Resident Training

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Exercise, diet, and personal fitness programs are essentially lacking in modern graduate medical education. In the context of long hours and alternating shift and sleep cycles, the lack of exercise and poor dietary choices may have negative consequences on physician physical and mental health. This opinion piece aims to generate important dialogue regarding the scope of the problem, the literature supporting the health benefits of exercise, potential solutions to enhancing diet and exercise among resident trainees, and possible pitfalls to the adoption of exercise programs within graduate medical education.

INTRODUCTION

The Accreditation Council for Graduate Medical Education mandates the mastery of 7 core competencies among physicians in training. The goal of modern graduate medical education is to instill its trainees not only with medical knowledge and procedural competency that allows individuals to function as independent physicians but also with an awareness of the importance of lifelong learning, interpersonal skills, and personal well-being that will ensure career success, longevity, and satisfaction.

The importance of personal health in both mind and body has long been known. Medical school curricula have become increasingly tailored to promote an ideal learning environment for students in a field in which medical knowledge continues to grow exponentially. Course work now includes education on patient differences and belief systems that allows physicians to be more sensitive to patient-specific needs as well as introspective teaching that promotes understanding of personal biases that may affect medical decision making. The importance of psychological health

in terms of learner depression and burnout have led to support programs in schools and residency programs. Now more than ever, residency training attempts to promote a strong and healthy mind, in which individual knowledge, confidence, satisfaction, self-respect, tolerance, and compassion are encouraged. However, the expansion of the mind during resident training may come at the expense of the body.

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THE DETERIORATION OF PERSONAL HEALTH DURING RESIDENCY TRAINING

Medical students are, in general, active individuals and exercise more frequently than the general population. Most exercise routinely with moderate-intensity activity of at least 2.5–4 hours per week.^{1,2} However, most studies evaluating the exercise habits of resident physicians have reported a significant reduction in exercise during graduate medical education.^{1,3–5} Reasons for the reduction in physical fitness include fatigue from long working hours and lack of time to participate in exercise.⁵

In addition, dietary habits may deteriorate during the long hours of residency training. In association with changes in sleep patterns, this may predispose resident physicians to weight gain.⁶ A Brazilian study of resident physicians⁷ showed that many were overweight or obese and many self-reported weight gain during residency, particularly in males. However both male and female residents reported poor diets, with high intake of sweets and saturated fats and low intake of vegetables and fruits.

Key words

- Fitness
- Resident education
- Wellness

Abbreviations and Acronyms

RED: Resident exercise and dietary

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Citation: *World Neurosurg.* (2016) 90:380–384.
<http://dx.doi.org/10.1016/j.wneu.2016.03.024>

Journal homepage: www.WORLDNEUROSURGERY.org

Available online: www.sciencedirect.com

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Sleep deprivation and poor sleep quality from long work hours, rotating shifts, and interrupted sleep are commonplace.⁸ With changes in resident duty hour regulations to help limit fatigue and reduce medical errors, there has been an unclear effect on resident sleep quality.⁹

BURNOUT AND RESIDENT ATTRITION

The percentage of resident physicians reporting burnout during training is unacceptably high. Burnout, a term used to describe feelings of emotional exhaustion, low self-accomplishment, and depersonalization associated with the work environment, is gaining ground as an important marker for resident well-being. Burnout is reported in most resident physicians on surveys, regardless of the specialty. From 47% to 70% of residents report burnout during training.¹⁰⁻¹⁵ Residents who report burnout and personal distress are probably more likely to make medical errors^{16,17} and report suboptimal care for their patients.¹⁸ Residents with burnout may be more likely to display unprofessional behaviors.¹⁹ In addition, burnout and personal distress are associated with resident attrition (quitting or changing residency programs or specialties).

Attrition among surgical residents is not uncommon. In the specialty of general surgery, it has been suggested that about 1 in 5 residents fail to complete residency training.^{20,21} One study of attrition rates across clinical specialties reported rates approximating 2%–7%.²² In neurosurgeons, attrition rates approximate 15%.²³ In 1 survey of general surgery residents, nearly 60% of residents had strongly considered leaving their program. Sleep deprivation was the most cited reason for considering leaving, and support from other residents was one of the most common reasons for deciding to stay.²⁰ These studies suggest that programs that help to improve team-building support structures and mitigate poor quality sleep may reduce resident distress and attrition.

EXERCISE EFFECTS ON SLEEP, DISTRESS, AND FATIGUE

Exercise is important for physical health. Exercise is an effective means of losing weight, maintaining a healthy body weight, and preventing disease.²⁴ Lack of exercise has clearly been linked to the development of chronic diseases.²⁵ The beneficial effects of exercise on health-related quality of life are well documented.²⁶⁻³⁰

Exercise is an effective therapy for depression in young adults.³¹ Exercise interventions may be beneficial in reducing the symptoms of depression.³² Patients who engage in regular exercise often report improved sleep quality, higher sleep efficiency, and shorter sleep latencies.³³⁻³⁶ Further, exercise is beneficial in reducing the symptoms of fatigue in certain patient populations, such as those with cancer-related fatigue.^{37,38} In addition, physical activity may improve self-esteem and feelings of self-worth in young adults.³⁹ These studies suggest that individuals engaging in routine physical activity may benefit from improved self-esteem, decreased depressive symptoms, reduced fatigue, and better quality sleep.

Evidence supports the benefit of interventions designed specifically for increasing physical activity and healthy behaviors. Systematic reviews of interventions that promote physical activity have a positive effect on self-reported activity⁴⁰ and may result in

persistent improvements in physical and mental quality of life in healthy individuals.⁴¹ Similar to exercise, dietary interventions may also improve quality of life.⁴²

BENEFITS OF EXERCISE IN PHYSICIANS AND TRAINEES

Although there are limited published data on the health and well-being benefits of physical activity on physicians, there are some data supporting a positive effect of exercise. Physicians with healthy behaviors are more likely to be satisfied with their occupation.⁴³ A study⁴⁴ has suggested that restful sleep and exercise have a positive effect on personal well-being in residents. Further, physicians who are engaged in regular exercise are more likely to counsel their patients regarding the benefits of physical fitness.⁴⁵

A PROPOSAL FOR A RESIDENT EXERCISE AND DIETARY PROGRAM

We have designed a resident exercise and dietary (RED) program to be implemented as a pilot study for our neurosurgery residents at the Medical University of South Carolina. This program was designed with direct input and oversight from the residents within the program, who have provided voluntary consent to proceed.

Baseline psychological, health, and general fitness metrics will be obtained before the start of the program. These include resting vital signs, weight, physical fitness tests (eg, time to run a mile, number of push-ups in 2 minutes), serum blood work (lipid panel), InBody body composition testing (fat and lean mass), and psychological screening tests including the 8-item Personal Health Questionnaire Depression Scale (PHQ-8), Generalized Anxiety Disorder 7-item Scale, and Quality of Life Scale. All residents will track their activity with a daily log. The program will be implemented in 5 2-month phases, with each phase adding to the previous requirement. Exit testing will be performed.

Moderate physical activity may consist of circuit weight lifting, running, or cross-fit, volleyball, basketball, soccer, and dodgeball. Sessions will last 45 minutes with a 15-minute cool-down period. Attendance will be encouraged but will not be mandatory.

The dietary intervention will be the offering of free breakfast during didactic sessions to all staff and residents within the department. Breakfast items will include only healthy options, such as fruit, vegetables, and yogurt. This will help to promote healthy eating habits for 1 meal a day for trainees, free of charge. Nutrition and fitness lectures will be incorporated into the resident lecture series.

Residents will be provided with a wrist actigraphy device that they will be asked to wear to help monitor their personal activity levels. This will allow residents to track their distance traveled, calories burned, and vital signs in response to activity. Further, this device allows for determination of total time asleep, number of times restless, and number of awakenings such that residents can track their sleep behavior. The goal of this device will be to provide constant feedback to the trainees regarding their health and behavior.

Qualitative and quantitative evaluations will be performed both before the intervention and after the program has been under way for 3 months to assess the benefits of the program in terms of quality of life, well-being, and physical health. Any interested

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