Rxercise: Maintaining Exercise Throughout Residency

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Medical training can be incredibly demanding, with high levels of stress, prolonged periods of sleep deprivation, and long work hours, leading to reduced quality of life and increased rates of burnout.[1] To address these issues, there has been ongoing work toward developing individual resilience and enhancing collaboration between programs and administrators to address systemic challenges.[2] We propose an innovative concept of 'Rxercise,' which frames exercise as a prescription for residents to help mitigate these challenges. Both burnout and sleep deprivation, which occur during residency, are associated with negative health consequences. In particular, sleep deprivation is associated with impaired cognitive and motor function, as well as worsened psychological, cardiovascular, and metabolic health.[3-5] Decreased sleep may thus be a contributing factor for mental health symptoms and burnout during residency. This perspective will discuss the benefits of exercise in mitigating the effects of sleep deprivation and combating stress and burnout throughout residency by suggesting feasible, evidence-based methods to integrate exercise elements into the daily routines of residents with the support of graduate medical education (GME) programs.

Benefits of Exercise During Residency

Research suggests that exercise among residents may curb the rate of burnout and improve quality of life.[6,7] In one study, a team-based, incentivized exercise program for residents significantly improved levels of fitness, quality of life, and burnout.[7] Studies have also shown that physicians and medical students who are more active are also more likely to counsel patients on the benefits of exercise, highlighting the importance of health care professionals to "practice what they preach."[8,9] Despite medical students and residents being trained to counsel patients regarding the beneficial effects of exercise, studies suggest there are low baseline rates of exercise among this group, with decreasing amounts of exercise as they progress through training.[6,10,11]

Research has demonstrated considerable benefits of exercise in mitigating the negative effects of sleep deprivation (online supplementary data). Particularly, short spurts of physical activities like stair walking have been shown to offset mood imbalances and undesired food cravings caused by limited sleep.[12,13] Exercise also affords physical health improvements during periods of sleep deprivation (online supplementary data). In one study of a group of healthy male volunteers, 24 hours of sleep deprivation increased glucose, insulin, and free fatty acid levels.[14] However, the group that performed 6 high intensity interval training (HIIT) sessions over a 2-week period before sleep deprivation mitigated these effects. In another study of healthy young men, sleep-deprived individuals experienced worsened glucose tolerance and mitochondrial function, which was mitigated in individuals performing HIIT training.[15,16] In the management of depression, exercise has shown effectiveness comparable to first-line treatments, with demonstrated reductions in suicidal behaviors.[17]

As such, exercise among medical residents, medical students, and physicians is crucial because it is associated with improved quality of life, reduced levels of burnout, mitigated negative metabolic and physical effects of sleep deprivation, and more frequent patient counseling on the topic.

A Framework for Promoting Exercise in Residency

The transition from medical school to residency is challenging, with increased work hours and responsibilities. Additionally, time constraints are a substantial limiting factor for regular exercise.[18] The challenge is how exactly exercise can be effectively and feasibly implemented into the work schedules of residents. Implementing exercise during residency should be a personalized approach to meet residents where they are. We present TABLE 1, outlining specific interventions that medical trainees can implement into their daily lives. These include daily examples of how residents can implement simple changes in their lives to improve

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Editor's Note: The online supplementary data contains a figure depicting the benefits of exercise on the negative health consequences of sleep deprivation.

TABLE 1
Suggested Resident-Based Interventions to Prioritize Exercise in Residency

Method	Description	Implementation Tips
Stair usage	Encouraging use of stairs over elevators for short distances.	Post signs near elevators promoting stair usage, consider stair-climbing challenges.
Standing/walking while studying	Using a standing desk, walking on treadmill, or eg, walking and listening to a podcast rather than a traditional seated desk.	Set a goal of standing/walking for >25% of study sessions.
Guided stretching/activity breaks	Implementing short stretching or bodyweight exercise breaks during extended work sessions.	Self-reminders at set intervals on the phone to have regular stretching and exercise breaks. Work with institutions to implement incentivized programs.
Home exercise routine	Developing exercise routine at home, if no access to gym or unable to commute due to time constraints.	Purchase affordable equipment such as stretching bands and free weights. Watch video guides online to build personalized exercise program.
Prioritizing fitness-based socialization	Joining a team-based sport or doing physical activity with friends.	Reach out to friends and colleagues with regards to different team-based fitness opportunities available.

their activity levels, such as using stairs at work, prioritizing social events around exercise, and taking short breaks during call shifts to perform exercises. For example, signs can be posted near elevators to promote use of stairs, and attendings on rounds can lead trainees to stairs when changing floors. Trainees, individually or as a group, can set timers for periodic stretching during the workday.

Residency programs should also take steps to facilitate exercise among their trainees, for which we highlight further suggestions in TABLE 2. Specifically, programs could incentivize activities for residents, subsidize costs, partner with local institutions, and encourage team-based activities. For example, institutions could partner with nearby fitness organizations to negotiate reduced rates for residents or group classes that fit resident schedules. Institutions can regularly organize "run/walk" and other events at feasible times for resident participation. In a study of hospital employees, a workplace exercise program significantly improved multiple health metrics, including lean body mass, respiratory function, vitality, and life satisfaction.[19] As a general guideline, we would suggest attempting to maintain the American College of Sports Medicine Physical Activity Guidelines, which recommends aerobic (endurance) activity for at least 30 minutes a day, 5 days a week, and resistance (strength) training for a minimum of 2 days a week.[20]

TABLE 2
Suggested Program-Based Interventions to Prioritize Exercise in Residency

Method	Description	Implementation Tips
Team-based, incentivized exercise program	One study demonstrated that a team-based, incentivized program involving self-reported exercise and gym attendance, survey completion, wellness examination completion, and improvements in objective fitness parameters improves physical activity, and quality of life.[7]	Set up quarterly incentivized exercise programs to promote healthy competition—can implement during orientation week.
Fitness organization partnerships	Partner with local gyms for discounts or group classes for residents. Alternatively have personal trainers or physiotherapists visit the hospital for short seminars.	Negotiate group rates or specific class timings that fit resident schedules.
Residency run/walk events	Organize 5K walk/run teams or challenges.	Organize monthly or quarterly, encourage participation with incentives.
Resident fitness advocates	Appoint or elect a "fitness advocate" for the resident body who can plan and promote regular fitness events.	Nominate individuals who are passionate about fitness. Provide them a small budget or resources to organize events or sessions.
Walking rounds	Convert some rounds into walking meetings, especially when the weather is nice.	Prioritize patient-free discussions on teaching points.

Healthy adults do not need additional screening before starting low intensity (eg, walking) exercise or when modestly increasing activities from their current baseline.[20,21] Adults with chronic health conditions (eg, diabetes mellitus, cardiac) should consult a health care clinician before new exercises. Programs should facilitate these consultations by adopting the policy that primary care and other medical appointments are considered excused work absences and not confined to vacation time. If available and affordable, consulting with personal trainers or physical therapists (particularly for those with prior injuries or specific conditions) and joining exercise classes can promote safe form, reduce injuries, and enhance the overall experience. Lower-cost or no-cost options include online videos and programs. As financial barriers may be a limiting factor for many activities, institutional subsidies for exercise programs may improve accessibility. This would likely benefit institutions as well as residents: one study identified exercise as having the potential to increase work engagement, reduce job-related anxiety, and improve emotional exhaustion.[22]

Chronic sleep deprivation is associated with increased risk of musculoskeletal injuries and also disrupts postural balance.[23-25] While there is a lack of evidence as to how to mitigate this association, one solution would be to reserve exercises requiring a close focus or good balance until after sleep has been restored. If exercise is performed before sleep restoration, we suggest prioritizing warm-up, ensuring proper form, and performing familiar exercises.

Exercise provides substantial benefits throughout a physician's career, and particularly during residency, through potential positive effects on mood, overall health, and burnout. Currently, residency is a time of low physical activity. Despite the challenges of integrating exercise during demanding trainee schedules, there are strategies for residents to consider, particularly if promoted by programs and faculty, as well as institutional interventions, such as exercise spaces, that require more investment. Currently there is an evidence gap in how to sustainably implement exercise into the routines of residents. Future research should focus on successful strategies for both individual and institutional approaches, for the benefit of residents and their future patients.

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