

Edmundo Esparza, MS4 Jay Lohrey, MD

RESEARCH QUESTION

In patients receiving neoadjuvant therapy prior to a potentially curative resection of a gastrointestinal cancer, is a virtual exercise program better than an in-person exercise program at maintaining health?

BACKGROUND

The effects of exercise in cancer patients have been studied extensively in the setting of primary and adjuvant therapy. However, there has been little investigation into the relationship between exercise and neoadjuvant therapy. This study aims to add to the existing literature by providing a reproducible, conclusive exercise regimen that help preserve or improve performance status and quality of life using clinically relevant straight forward measurements. Given the recent changing medical culture and increasing technical capabilities, this study also aims to provide that regime in a virtual effective format that will lead to not only further clinical trials evaluating the efficacy of exercise in cancer therapy, but also provide a therapeutic tool to improve patient care in the post COVID-19 era.

METHODS

A review of cancer and exercise literature was performed in order to identify and analyze observational literature on exercise's effects on cancer patients during treatment and survivorship. The search was conducted using the PubMed and Academic Search Ultimate databases. Reference lists of identified articles were also reviewed for relevant publications. The databases were searched using the key words "cancer exercise" combined with each of the following terms: "quality of life," "neoadjuvant therapy," "adjuvant therapy," "survivorship," "telehealth" and "physiologic effects." Additionally, the exercise program was developed with a licensed cancer exercise trainer from UT Southwestern's Moncrief Cancer institute. Similarly, a statistician was consulted when designing the study that would adequately test for noninferiority of a virtual exercise program.

Having an exercise program for cancer patients that can be delivered through a virtual program is beneficial in decreasing exposure to immunocompromised patients, allows for increased compliance, as well as makes it more accessible for patients of differing SES levels.

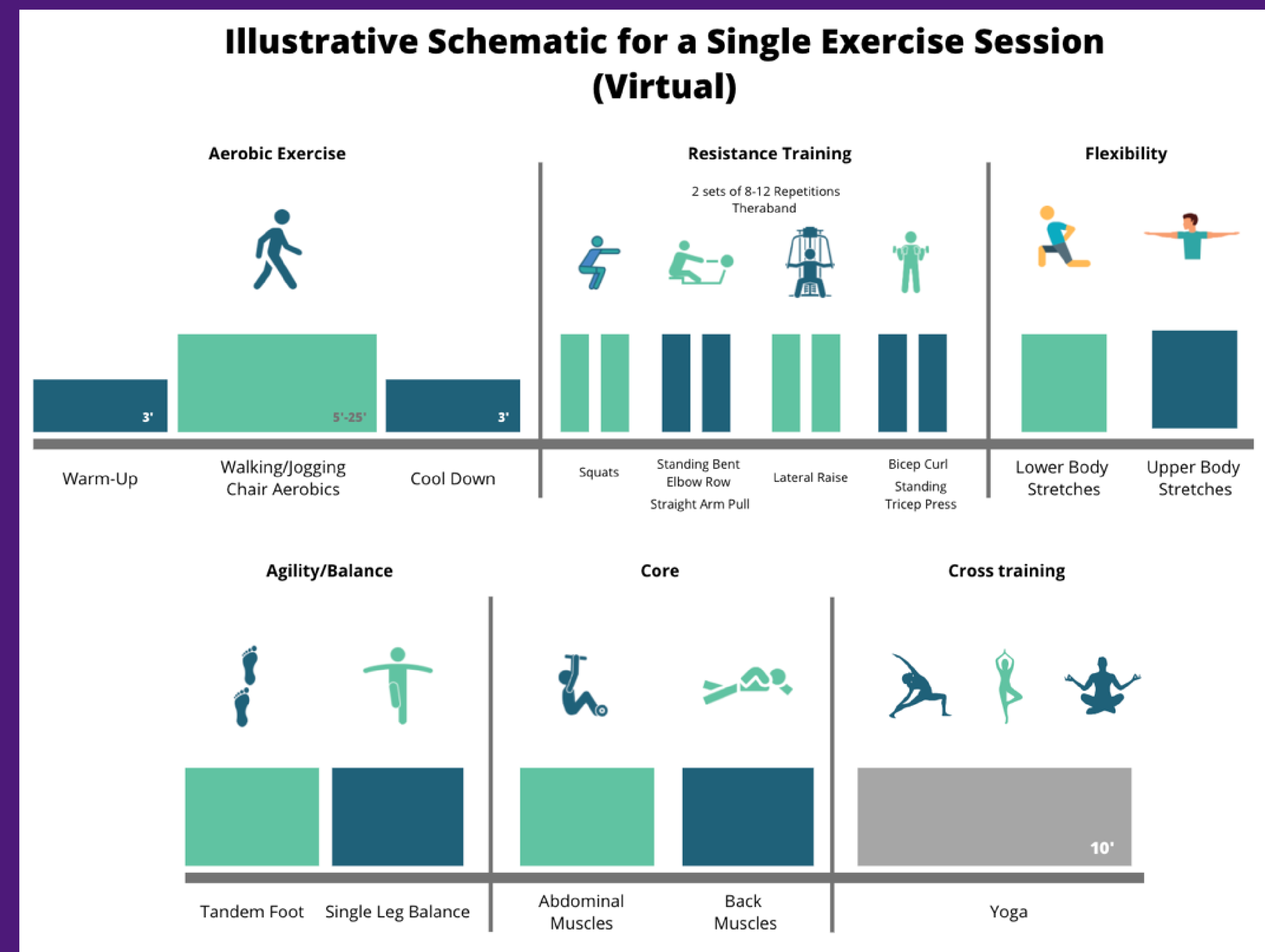


Figure 1: Virtual Exercise Program Graphic

Outcome	Aerobic Only	Resistance Only	Combination (Aerobic + Resistance)
Strong Evidence	Dose	Dose	Dose
Cancer-related fatigue	3x/week for 30 min per session of moderate intensity	2x/week of 2 sets of 12-15 reps for major muscle groups at moderate intensity	3x/week for 30 min per session of moderate aerobic exercise, plus 2x/week of resistance training 2 sets of 12-15 reps for major muscle groups at moderate intensity
Health-related quality of life	2-3x/week for 30-60 min per session of moderate to vigorous	2x/week of 2 sets of 8-15 reps for major muscle groups at moderate to vigorous intensity	2-3x/week for 20-30 min per session of moderate aerobic exercise plus 2x/week of resistance training 2 sets of 8-15 reps for major muscle groups at moderate to vigorous intensity
Physical Function	3x/week for 30-60 min per session of moderate to vigorous	2-3x/week of 2 sets of 8-12 reps for major muscle groups at moderate to vigorous intensity	3x/week for 20-40 min per session of moderate to vigorous aerobic exercise, plus 2-3x/week of resistance training 2 sets of 8-12 reps for major muscle group at moderate to vigorous intensity
Anxiety	3x/week for 30-60 min per session of moderate to vigorous	Insufficient evidence	2-3x/week for 20-40 min of moderate to vigorous aerobic exercise plus 2x/week of resistance training of 2 sets, 8-12 reps for major muscle groups at moderate to vigorous intensity
Depression	3x/week for 30-60 min per session of moderate to vigorous	Insufficient evidence	2-3x/week for 20-40 min of moderate to vigorous aerobic exercise plus 2x/week of resistance training of 2 sets, 8-12 reps for major muscle groups at moderate to vigorous intensity
Lymphedema	Insufficient evidence	2-3x/week of progressive, supervised program for major muscle groups does not exacerbate lymphedema	Insufficient evidence
Moderate Evidence			
Bone health	Insufficient evidence	2-3x/week of moderate to vigorous resistance training plus high impact training (sufficient to generate ground reaction force) 3-4 times/week for at least 12 months	Insufficient evidence
Sleep	3-4x/week for 30-40 min per session of moderate intensity	Insufficient evidence	Insufficient evidence

Figure 2: ACSM graphic regarding exercise and cancer

RESULTS

A virtual cancer exercise was developed with a licensed cancer exercise trainer. This program was adapted from an existing regimen used in-person with patients at Moncrief Cancer Institute. This program covers all current ACSM guidelines. Moreover, an investigative study, designed with statisticians from UT Southwestern was developed. The study was designed to investigate the noninferiority of virtual exercise programs as compared to in-person regimens. This study also includes practical methods for testing patients' fitness prior to surgery.

FUTURE DIRECTIONS

Cancer exercise is undoubtedly a growing field. There is much to parse out from understanding the physiologic effect exercise can have on a tumor microenvironment to understanding its role as a treatment adjunct. Our study has seen many changes, but we believe the current design aims to answer many important questions. For starters, it looks specifically at patients undergoing neoadjuvant therapy but also assess the validity of delivering these programs via a virtual platform. We believe the study is adequately designed with our only issue having been recruitment. We suggest following the study design but conducting it as a multi-center study. Our study required many modifications, but we believe the current design answers many important questions and leads to others. It suggests a standardized virtual supervised exercise platform in the neoadjuvant setting. We suggest further validation against live patients as suggested in our initial study. We suggest therapeutic and diagnostic exercise tolerance testing throughout the course of the disease from the time of diagnosis, through their treatment and beyond.

Acknowledgments

A special thank you to my preceptor and mentor Dr. Jay Lohrey and the rest of the UTSW MCI team including Melissa Irek, Emily Berry and Mitchell Swaim.

A huge thank you to Professor Michael Bernas for his help these past four years.