Research Bites, September 2021, by Mary Yoke, PhD, FACSM, MA, MM

Covid-19 and Physical Activity Maintenance

New research is continuously emerging on Covid-19 and its variants. As it turns out, several new studies have also recently been published regarding the ramifications of Covid-19 on physical activity and sedentariness. A longitudinal study by Yang and Koenigstorfer, published in the *Translational Behavioral Medicine* journal (1), explored changes in physical activity (PA) before and during the Covid-19 pandemic; the authors were particularly interested in the influence of smartphone apps on physical activity.

I imagine that all readers of this journal have been affected by fitness facility closures, social/physical distancing, and the necessity of wearing masks even while exercising, due to the pandemic. These inconveniences, among others, have influenced many people to reduce or abandon their previous physical activity routines. But by how much? And how have fitness apps mitigated the declining physical activity situation, if at all?

In the Yang and Koenigstorfer study, 431 participants (49% female) completed a total of two surveys in 45 U.S. states. Most respondents were younger adults (average age: 39.1 years); 69% of participants had at least a bachelor's degree, and 47% were overweight or obese. All were required to own a smartphone and had downloaded at least one PA app.

Online self-reported surveys were conducted in two waves: 1) between March 12 and March 17, 2020, and 2) at least 4 weeks after U.S. states responded to the Covid-19 pandemic by imposing lockdowns and other restrictions (the dates varied by state). This design ensured that participants had each experienced lockdown for at least 28 days between data collection points. For both survey waves, the International Physical Activity Questionnaire Short Form (IPAQ-SF) was used to measure physical activity and sedentary time, as well as the intention to be active. Additionally, surveys were constructed to ascertain each participant's preferred PA app and how educational, motivational, and enjoyable the app's features were; frequency of PA app use was also measured.

Were there any differences in the data collected at the two Covid-related time points? The answer is yes. There was a significant decrease in moderate PA and vigorous PA between the onset of Covid-19 and after lockdowns and restrictions were imposed by the various states. Calculations indicated that moderate-to-vigorous PA decreased by 18.2% during lockdown. Walking (defined by the authors as having a lower-intensity than either moderate or vigorous PA) and sedentary time apparently did not change significantly between the two time points, although slight changes were measured, with minutes per day of walking decreasing and minutes per day of sedentary time increasing gradually over time. Regarding physical activity app usage, results showed that the more participants used a PA app, the more

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active they were during lockdown. PA apps that included gamification features were particularly likely to cause increased physical activity, whereas educational and motivational app features did not predict PA change in the current study.

What are the take-home messages for health/fitness professionals? First, this study showed that mobile health technology may help with the increasing epidemic of physical inactivity, especially during the Covid pandemic. Let's encourage our clients and participants to use their smartphones, smart watches, and activity trackers to reduce sedentariness and get moving. We can also suggest that they check out gamification features such as points, levels, and badges which have been shown to increase enjoyment and motivation. Let's employ technology for our benefit and the benefit of others!

Secondly, Yang and Koenigstorfer found evidence that physical activity levels did in fact decrease, at least during the early phase of Covid-19 lockdown. This fact indicates an increased opportunity for health/fitness professionals to use our skills, knowledge, and passion for movement to improve population health and well-being, and to help people experience the abundant benefits of physical activity.

Combined Foam-rolling and Stretching Effects

Have you ever wondered about the efficacy of foam rolling when combined with stretching? In a study published in 2021 (2), researchers Konrad, Nakamura, Bernsteiner, and Tilp performed a meta-analysis of 12 research papers in order to compare the combined effect of foam rolling and stretching to foam rolling alone and stretching alone. The authors were interested in which protocols resulted in an increased range of motion (ROM) and/or improved performance.

Konrad et al screened 169 research studies and found that 12 published studies met the criteria for inclusion in their subsequent meta-analysis of combined foam rolling and stretching effects. Altogether, 267 participants (mean age: 22.9 years), a majority of whom were athletes (52.8%), were included in the final meta-analysis.

Results: there was no significant difference between the combined stretching and foam rolling group and the stretching alone group—both groups showed an average increase in ROM of 6.83% and 5.26%, respectively. The authors also analyzed subgroup variables included in the various studies, such as static stretching, dynamic stretching, vibration foam rolling, and non-vibration foam rolling; no significant differences in ROM were found between these conditions, either. Not surprisingly, there *was* a significant difference in ROM between the combined stretching and foam rolling group and the control group (control group participants neither stretched nor participated in any foam rolling). Outcome measures included scores in the sit and reach test, active hip flexion, passive hip flexion, active knee flexion, passive knee flexion, and straight leg raise ROM.

In terms of performance, there was again no significant difference between the combination group and the stretching alone group, although when comparing the order in the combination groups, it was found that slightly better results were obtained when foam rolling was followed by stretching, and not the other way round. According to the authors, the bottom line is really that stretching, foam rolling, and a combination of both modalities are all effective in improving ROM. Improved athletic performance however, may best be served by implementing foam rolling and then (preferably) dynamic stretching.

Injury Prevention during Basic Military Training

The subject of injury prevention and physical activity always seems to be relevant for health/fitness professionals, and a recent article by Dijksma et al (3) helps us gain perspective on what is required to prevent injuries and drop-out, not only in the military, but for athletes and the general population. The authors identify seven key evidence-based principles of load management that can minimize the risk of musculoskeletal injuries.

In basic military training, recruits must be able to "jump over obstacles, move with agility, carry heavy loads, drag heavy loads, run long distances, move quickly over short distances, climb over obstacles, lift heavy objects, and load equipment." Even though recruits must meet general health requirements to be eligible for entry into the military, they apparently nevertheless enter with varying degrees of fitness. Asking them to do too much, too soon can result in overuse injuries, discouragement, and lost time and money. To address this problem, Dijksma et al propose measuring daily training load by multiplying training duration (external load) by RPE (internal load); in this way sudden and dramatic increases in training load can be avoided, along with the increased possibility of musculoskeletal injuries. When weekly loads exceed 5,000 arbitrary units (using the above calculation) the risk of injury is significantly increased.

Here are the seven principles of load management reviewed and discussed in the Dijksma et al article:

1) In basic military training, establish a moderate chronic load instead of large load fluctuations. This can be done by using accelerometers and/or session RPE reports.

2) Minimize the week-to-week changes, especially in the early weeks of training. Progression that is excessively fast can provide a mismatch between training loads and the functional capacity of recruits, leading to injury and undue psychological stress.

3) Do not exceed the workload ceiling of safety for the sport; as mentioned above, this has been identified as approximately 5,000 arbitrary units for a weekly training load in basic military training.

4) Ensure that a minimum training load is maintained. Low training loads followed by high loads constitute a risk factor for injury.

5) Avoid inconsistent "boom-bust" workload patterns. This can happen when a person takes a break/vacation from training and then goes all-out when returning back to exercise.

6) Ensure that training loads are proportionate to the workload demands of the sport/activity. Heart rate and RPE have been suggested as appropriate measures for quantifying training load in basic military training.

7) Monitor the athlete throughout the latent period. The latent period, approximately 28 days, is the time between intense loading and the time of the first injury symptoms. Military personnel, athletes, and even the general public need to be watched and carefully listened to after high-intensity training, in order to make any necessary adjustments in the program so that a latent injury doesn't morph into a more serious problem.

As you can see, much of what the authors call load management is really about proper progression. Avoiding too much, too soon, especially in the early days of training, is key if our goal is to prevent musculoskeletal injuries, burnout, and drop out.

References:

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