

Better Application of Exercise Prescription with Adequate Supports to All People

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Abstract

The phrase “Exercise is Medicine” has been well-known. American College of Sports Medicine (ACSM) emphasizes the exercise prescription with recommendations of assessment for all occasions and for all. It includes the crucial concepts of FITT-VP, which stand for frequency, intensity, time, type, volume, and progression (pattern). When a physical therapist or trainer advises the subjects, the specific exercise goals would be set as feasible short-term goals. The formation of exercise habits would be more significant even if the goal cannot be achieved. From bio-psycho-social points of view, subjects will be supported by an adequate manner for a successful life with happy sports.

Keywords: American College of Sports Medicine (ACSM), Exercise prescription, FITT-VP, Metabolic equivalents (METs)

Introduction

The Olympic and Paralympic Games are scheduled for next year in Japan(1). Authors and collaborators have continued activities and research on sports medicine so far(2). As a matter of fact, we have covered various subjects including professional athletes, masters' athletes, high school and university students, healthy elderly, elderly with some disorders, patients with orthopedic diseases, and so on(3). The contents include a running method, stretching, pole exercise, fitness, and others(4). In this article, important tips for exercise prescription are described.

From the comment of the American College of Sports Medicine (ACSM), important tips for exercise prescription are summarized as follows(5).

- i. The subjects for exercise prescription are all people regardless of illness(6). The reason would be the presence of a positive effect on all people.
- ii. It is to specifically define frequency, intensity, time, type, volume, and progression(7).
- iii. Metabolic equivalents (METs) are an objective index for exercise intensity.
- iv. When prescribing exercise, it is recommended to make effective use of local social resources.

Exercise can not only reduce the prevalence of the cardiovascular disease, diabetes, and cancer but also bring various positive effects on improving mental health and quality of life(5). However, the lack of exercise has been increased in many countries. For the top four mortality risk factors worldwide, they are high blood pressure, smoking, and hyperglycemia, followed by decreased exercise(8). In actual clinical practice, it is rather difficult to teach specific advice even if medical staff can explain the importance of exercise. In this article, the authors describe how to put together an exercise prescription with efficacy.

The phrase "Exercise is Medicine" has been well-known(9). Exercise can prevent or treat multiple diseases and conditions. ACSM emphasizes the importance of exercise prescribing just like oral medicine, and recommends that physical activity would be assessed for all occasions and all(5). The purpose is to progress the health and to improve physical fitness such as body endurance, muscular strength/endurance, and flexibility. The specific prescription content is to make the definition of six items (FITT-VP)(10). They include frequency, intensity, time, type, volume, and progression (pattern)(5).

There are five types of exercise: i) aerobic exercise: walking, jogging, ii) strength training (resistance training), iii) stretching, iv) balance exercise: yoga and tai chi, v) sports activities. Among these, aerobic exercise becomes the basis of exercise prescription, and other contents will be combined(5).

Recommended levels of physical activity are explained by the World Health Organization (WHO) in three groups: ages 5-17, 18-64, 65, and older(11). We often teach in the latter two cases. The aerobic exercise should be $150 \text{ min} \leq$ per week for medium-intensity, or $75 \text{ min} \leq$ per week for high-intensity for at least 10 minutes(5). As for other exercises, strength training would be performed twice \leq a week. Especially for those 65 years \leq , exercises to strengthen balance and prevent falls are performed three times \leq a week, even if the target time is not reached(12).

When a physical therapist or trainer advises on the subject, the exercise intensity should be taught properly and clearly. Some indicators include METs, %HRR (heart rate reserve), and RPE (ratings of perceived exertion)(5). For selecting an index, a comprehensive judgment is needed based on the subject's age, basic physical fitness, physical activity, and health status. For example, a 50-year-old woman is shown with a resting heart rate of 70 and an exercise intensity of 40-50%. Target exercise heart rate = $(220-50-70) \times 0.4--0.5 + 70 = 110-120/\text{min}$. If the value of the RPE is 12-13, the target heart rate becomes 120-130/min. At this

level, subjective evaluation means that sweating and slight tachypnea can occur with a possible free conversation. Specific exercises include muscle training, fast walking, and underwater walking(13).

The exercise volume can be calculated from FIT (frequency, intensity, time) factors out of FITT-VP(10). The units are MET-min/week or kcal/week, which are used to estimate total energy consumption. 1 MET represents energy consumption at rest, and generally, the exercise of 500-1000 MET-min/week (1000 kcal/week) or more has been recommended. Although this level is rarely achieved(5), the addition of some exercise habits can reduce chronic illness and premature mortality(13). The important point is that the formation of exercise habits would be significant even if the goal cannot be achieved.

The description mentioned above has been the principle of fitness. Even if it is explained and applied to the subject as it is, it cannot bring behavioral changes in the actual practice. Therefore, to teach effective exercise prescriptions in a short time in the primary setting, the following six tips become useful tips(14).

- i. Establish a physical activity vital sign (PAVS) to confirm the amount of exercise for one week. (How many days a week, minutes at a time for the moderate exercise?)
- ii. Explain the health benefits of exercise (reducing the risk of lifestyle-related diseases)(13).
- iii. Set and present specific exercise goals (starting with feasible short-term goals).
- iv. It is recommended that you measure and record your exercise (steps, distance, time, etc.).
- v. Talk together about specific exercises (walking, swimming, exercise bike, etc.).
- vi. Introduce social resources that contribute to exercise (sports gyms, civic hobby circles, etc.)(12).

In this way, counseling will facilitate smooth and effective instruction.

One example of instruction is described as follows: First 2 weeks; walking 20 min 3 times/week and Squat exercise 10 times x 2 sets 2 times/week, 3rd and 4th weeks; walking 30 min 3 times/week, Squat and Abs exercises each 10 times x 2 sets, 2 times/week(14).

Regarding the third factor, it is better not to set a higher goal from the beginning from a psychological point of view. The situation is different for each subject. In other words, first of all, it is important to select a feasible short-term goal from the interview and to experience a successful experience at first(12). After that, gradually increasing the strength and time, and raising the target level would be recommended.

In summary, the authors have coached sportsmen, subjects, and patients of various backgrounds. The most important matter is to keep exercise safe, fun, and effective(8). How can the behavior change be sustained for long? To observe them from a bio-psycho-social point of view, to understand their exercise in the integrative aspect, and to continue to convey the importance would be the tips for a successful life with happy sports.

Conflicts of Interest: None.

References

1. Murakami M and Bando H. Half foot training footwear for safer and faster running from Masters Athletes to professional athletes. *Neurophysiol and Rehab* 2019;2:24-25.
2. Bando H, Moriyasu A, Murakami M. Recent trends of common factors of geriatric medicine and rehabilitation medicine. *J Helath Med Res* 2020;2:1-3.
3. Murakami M, Bando H, Moriyasu A. Various Human Movements can be compared to the Concept of Three Spherical Surfaces as Head, Lung and Pelvis. *Jour Orthop Re There* 2020;JORT-105.

4. Moriyasu A, Bando H, Murakami M. Pole exercise would be clinically effective through increasing thoracic spinal mobility. *J Phys Med Rehabil* 2019;1:03. DOI: [gsl.jpmr.2019.00003](https://doi.org/10.1016/j.jpmr.2019.00003)
5. American College of Sports Medicine (ACSM). Riebe D, Ehrman JK, Liguori G (eds). *ACSM's guidelines for exercise testing and prescription* 10th ed. Lww, Philadelphia, 2017;ISBN-13:978-1496339072, ISBN-10:9781496339072.
6. Barker K, Eickmeyer S. Therapeutic Exercise. *Medical Clinics of North America* 2019. doi:[10.1016/j.mcna.2019.10.003](https://doi.org/10.1016/j.mcna.2019.10.003)
7. Chen FT, Hopman RJ, Huang CJ, et al. The Effect of Exercise Training on Brain Structure and Function in Older Adults: A Systematic Review Based on Evidence from Randomized Control Trials. *J. Clin. Med.* 2020;9:914.
8. Gelius P, Tcymbal A, Abu-Omar K, et al. Status and contents of physical activity recommendations in European Union countries: a systematic comparative analysis. *BMJ Open* 2020;10:e034045. doi: [10.1136/bmjopen-2019-034045](https://doi.org/10.1136/bmjopen-2019-034045)
9. Lobelo F, Stoutenberg M, Hutber A. The Exercise is Medicine Global Health Initiative: a 2014 update. *British Journal of Sports Medicine* 2014;48:1627–1633. doi:[10.1136/bjsports-2013-093080](https://doi.org/10.1136/bjsports-2013-093080)
10. Bushman BA. Developing the P (for Progression) in a FITT-VP Exercise Prescription. *ACSM's Health & Fitness Journal* 2018;22:6–9. doi:[10.1249/fit.0000000000000378](https://doi.org/10.1249/fit.0000000000000378)
11. Vuori I. World Health Organization and Physical Activity. *Progress in Preventive Medicine* 2018;3:e0012. doi:[10.1097/pp9.0000000000000012](https://doi.org/10.1097/pp9.0000000000000012)
12. Lee PG, Jackson EA, Richardson CR. Exercise Prescriptions in Older Adults. *Am Fam Physician* 2017;95:425-432.
13. Warburton DER, Bredin SSD. Health benefits of physical activity: a systematic review of current systematic reviews. *Curr Opin Cardiol* 2017;32:541-556. doi: [10.1097/HCO.0000000000000437](https://doi.org/10.1097/HCO.0000000000000437)
14. Bowen PG, Mankowski RT, Harper SA, et al. Exercise is Medicine as a Vital Sign: Challenges and Opportunities. *Transl J Am Coll Sports Med* 2019;4:1-7.