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Consensus

Consensus statement of Chinese experts on exercise prescription (2023)

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ABSTRACT

Exercise prescriptions play a vital role in the prevention and treatment of chronic diseases. A consensus regarding exercise prescription is important for physical health. The "Consensus statement of Chinese experts on exercise prescription" (hereinafter referred to as "Expert Consensus") divides exercise prescription into two categories: fitness exercise prescription and medical exercise prescription. Traditional Chinese fitness exercises, exercise risk, exercise prescription, and basic precautions for exercise prescription are explained.

1. Background

This consensus was proposed by Professor Guoping Li and other experts in October 2021 and was officially released in January 2022. Led by Professor Guoping Li, a core expert group comprising nine experts were organized. More than 30 experts from multiple disciplines, including sports medicine, sports science, rehabilitation medicine, cardiac-cerebral vascular medicine, endocrine medicine, orthopedics, health management, neuropsychiatry, oncology, traditional Chinese medicine, disease prevention and control, and national traditional sports, were gathered by the Chinese Exercise Rehabilitation Medical Education Committee, to provide their insights on the consensus. Within a year, the core expert group formed this consensus after thoroughly considering the feedback and recommendations provided by the experts and delving deeply into the modifications suggested in the two rounds of meetings held in Sanya and Qingdao and several rounds of online conferences.

2. Introduction

The concept of exercise promoting health has enormous social and economic potential, and the demand for exercise prescriptions has increased. The promotion of exercise prescription is essential for improving fitness and for preventing and treating chronic diseases. Nevertheless, in current routine clinical diagnosis and treatment, the formulation and implementation of exercise prescriptions remain weakly linked. Therefore, a consensus on exercise prescription is both urgent and important.

2.1. Promoting exercise prescription is conducive to the construction of healthy China

The "Healthy China 2030" Planning Outline issued by the Central Committee of the Communist Party of China and the State Council indicates that promoting the construction of healthy China is an important foundation for building a healthy society. The exercise prescriptions for different groups of people with various physical conditions should be improved, disease management and health service models of physical medicine should be promoted, and the benefits of scientific fitness should be fully utilized in national health promotion, chronic disease prevention, rehabilitation, and other areas.

Exercise prescription technology can effectively reduce the incidence of chronic diseases and sports injuries. The "Guidelines on Physical Activity and Sedentary Behavior" issued by the World Health Organization

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Abbreviations

WHO	World Health Organization
CVD	Cardiovascular disease
FITT-VP	Frequency, intensity, time, type, volume, and progression

(WHO) in 2020[1] and the "Guidelines for Physical Activity in Chinese Population" issued in 2021[2] emphasize that everyone benefits from regular exercise, regardless of age, sex, or physical condition. Regular exercise helps reduce the risk of obesity,[3] diabetes,[4] hypertension,[5] cardiovascular disease (CVD),[6] cancer,[7] osteoarthritis,[8,9] and osteoporosis.[10–13] Additionally, it relieves emotional stress, improves sleep quality, and promotes mental health. Although moderate exercise is beneficial to health, excessive exercise can cause injuries and induce cardiovascular events in some people.[14–17] The implementation of exercise prescriptions will also greatly improve health literacy and contribute to a healthy lifestyle.

2.2. Exercise prescription embodies the medical concept of prioritizing function

Exercise prescription promotes cardiorespiratory endurance, muscle strength, joint flexibility, and core stability, supporting the motor function of general population. Exercise prescriptions emphasize the quantity, quality, and function of exercise, highlighting the advantages of active exercise on health and overall fitness.

Exercise prescription embodies the medical concept of active health, reduces overreliance on medical interventions, such as drugs and surgery, and promotes self-healing ability. Exercise prescription should be a basic professional skill for physicians. Implementation of exercise prescription technology can improve the effects of clinical treatment and realize the medical concept of functional priority. Promotion and implementation of exercise prescriptions can improve the clinical efficacy of functional medicine.

Exercise prescriptions need to be standardized to reduce early-stage overuse and misuse. However, the promotion of exercise prescriptions faces significant challenges and misconceptions. For example, the important role of traditional Chinese sports in exercise prescription needs to be guided, quality control and supervision of exercise prescriptions need to be standardized, and the training and certification system needs to be improved. Therefore, expert consensus plays an important guiding role in the formulation and implementation of standardized exercise prescriptions.

3. Overview of exercise prescription

3.1. Definition of exercise prescription

The term exercise prescription, first used by the American physiologist Peter Karpovich in the 1950s, was officially adopted by the WHO in 1969.[18] The 10th edition of the American College of Sports Medicine Exercise Test and Exercise Prescription Guidelines[19] proposed the FITT-VP (frequency, intensity, time, type, volume, and progression) principle of exercise prescription.

With the continuous promotion and practice of exercise prescription in China in recent years and based on an in-depth study of new issues and experiences, this expert consensus group modified the definition of exercise prescription as follows: exercise prescription is a personalized active exercise program that combines short-term, long-term, local, and global goals for disease prevention and health promotion. It is formulated by a well-trained and qualified exercise prescription professional based on basic health information, physical activity level, medical tests and diagnosis, exercise risk screening,[20] exercise tests, and other objective prescription results. Standardized exercise methods were used in conjunction with the prescribed exercise frequency, intensity, time, progression, volume (weekly), and precautions.

3.2. Classification of exercise prescription

Exercise prescription is typically divided into the following classifications: cardiorespiratory endurance, resistance, and flexibility, based on the type of exercise and target population (i.e., healthy children and adolescents, adults, older adults, the population with chronic disease, and the population with bone and joint injuries).[21–23] In order to promote the development of exercise prescription in medical institutions, this expert consensus divides exercise prescription into fitness exercise prescription and medical exercise prescription according to exercise purpose, application scope, and service population. Fitness exercise prescriptions serve the healthy population and chronic disease risk groups, whereas medical exercise prescriptions serve patients with chronic disease, patients with sports injury, and perioperative patients.

4. Formulation of exercise prescription

4.1. Principles and contents of exercise prescription

The FITT-VP principle should be applied when formulating prescriptions for exercise. Exercise type is the key to the safety and effectiveness of exercise prescriptions, which should conform to scientific norms. The exercise intensity should be set within a safe and effective range. The exercise time should determine the recommended minimum effective volume. Weekly frequency was the suggested unit for exercise frequencies.

The formulation of exercise prescriptions must proceed gradually to maximize the benefits of exercise while minimizing its risks. We should consider not only external factors, such as schedule, natural environment, climate and social environment, available sports equipment, equipment and facilities, and sports competition rules, but also internal factors, such as nutrition, sleep, disease and deformity, personality, psychology, knowledge, and beliefs.

Medical exercise prescriptions should focus on various factors that may cause cardiovascular and sports injuries. Fitness exercise prescriptions should concentrate on the volume of exercise to encourage physically inactive people to participate and form the habit of exercising.

The purpose of traditional Chinese fitness exercises, including Taijiquan, Baduanjin, Wuqinxi, Yijinjing, Liuzijue, and other Qigong fitness exercises, is to strengthen the body, eliminate disease, and prolong life.[24–29] Following the motion principle of FITT-VP,[30] the specific motion that fits the target population can be adjusted to complement the spirit and exercise of the body. When formulating a prescription, the combination and compatibility of actions are determined to form a traditional sports prescription, with the priority of harmony between humans and nature.

4.2. Assessment of exercise risks

Exercise risks can be divided into three categories based on the nature and degree of body injury: risk of CVDs, sports injuries, and sports diseases.

First, the risk of cardiovascular events during exercise was assessed. The assessment of the risk of cardiovascular events during exercise includes: 1) physical activity level; 2) heart rate, blood pressure, electrocardiogram, blood lipid and blood glucose levels; and 3) symptoms and signs of cardiovascular, metabolic, and kidney diseases. The clinical diagnosis and physical activity levels of individuals must be considered. The main indicators include 1) cardiorespiratory endurance (observing cardiovascular responses to different exercise loads)[31–33]; 2) body composition or body mass index, 3) muscle strength and endurance, 4)

flexibility, and 5) balance.

Assessment of sports injury risk should also be considered during exercise prescriptions. The assessment of sports injury risk focuses mostly on individual factors, such as history of sports injury, level of physical fitness, and skill level. A detailed medical history, thorough physical examination, and necessary imaging should be performed. Exercise prescribers should also be aware of the risks of exercise-related disorders, such as exercise-induced heat stroke, dehydration, rhabdomyolysis, and anemia.

5. Implementation of exercise prescription

5.1. Prescribers of exercise prescription

Exercise prescribers should be trained before providing recommendations to clients and should make recommendations considering the risks of sports and exercise. Personnel with medical qualifications and training should be the ones providing exercise prescriptions.

5.2. Executors of exercise prescription

Exercise prescriptions should be developed by rehabilitation therapists, sports rehabilitation therapists, and fitness coaches. Implementing an exercise prescription requires cooperation and communication among team members.

Fitness exercise prescriptions can be performed either indoors or outdoors. Self-monitored referrals to a fitness center or health management institution under the guidance of professionals are also available. Medical exercise prescriptions can be referred to professional departments, such as chronic disease fitness centers and exercise rehabilitation clinics under the guidance of professionals.

5.3. Follow-up, effect evaluation, and adjustment of exercise prescription

The preventive and therapeutic effects of exercise demonstrate a dose-effect relationship. Therefore, compliance and training are necessary for improving long-term health and fitness.

The follow-up and adjustment of exercise prescriptions should be performed under the guidance of health professionals. Follow-up may be conducted at least once a month for the first 3 months after implementing an exercise prescription. The development of intelligent remote information assessment and intervention systems based on the diagnostic and treatment guidelines is encouraged.

Two perspectives may be used to assess the effectiveness of the exercise prescription: 1) if set goals were accomplished and 2) if any new sports injuries emerged or existing injuries worsened.

During the implementation of an exercise prescription, regular assessments should focus on recovery from diseases and injuries and the improvement of body structure and function. Regular exercise is an important part of individual and population health and should be recommended at every health visit.

5.4. Scope of application of exercise prescription

Exercise prescriptions have a wide range of applications. It can be utilized for people with chronic diseases, those with sports injuries, perioperative patients, those at risk of chronic diseases, and healthy people.[34,35] People with chronic diseases include those with CVDs, metabolic diseases, malignant tumors, and neuropsychiatric diseases. People with sports injuries and perioperative persons include those with various kinds of chronic or acute injuries of the motor system and those who require rest and recovery from surgery. Populations at risk for chronic diseases include those with risk factors, such as a sedentary lifestyle, hypertension, glucose metabolism disorders, obesity, and dyslipidemia.

Submission statement

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The expert group of the consensus statement of Chinese experts on exercise prescription (2023)

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Authors' contributions

Guoping Li: Writing – review & editing. **Zhengzhen Wang:** Writing – review & editing. **Yuefeng Hao:** Writing – review & editing. **Jinghua Qian:** Writing – original draft. **Bo Hu:** Writing – original draft. **Yan Wang:** Writing – original draft. **Xijuan Luo:** Writing – original draft. **Yu Ning:** Writing – original draft. **Feng Lin:** Funding acquisition.

Conflict of interest

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