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Review Article

Objectives, Principles, and Methods of Strength Training for Horses

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ABSTRACT

The use of the horse for athletic competition involves conditioning and training for specific types of performance. The present review focuses on one of the four main components of basic fitness, strength. First, some concepts, such as, the different types of contractions are presented in order to fully understand this article. Then, five main objectives of general training are established: to improve or maintain maximum performance, preparing the horse for the competition; to delay onset of fatigue; to improve skills or work capacity; to minimize the incidence of injuries or metabolic disorders; and to maintain willingness and enthusiasm for exercise. Furthermore, we have developed seven principles of training based on scientific literature and our own experience, which are (1) to avoid or to minimize the incidence of injuries; (2) overcompensation; (3) periodization; (4) progressive loading; (5) individuality; (6) specificity; and (7) unity. Finally, several methods of strength training are presented to be used in different disciplines. In conclusion, there is a need for research about strength training in horses. Most of the conditioning programs used nowadays are based in empirical knowledge. In this paper, we present objectives, principles, and methods of strength training for horses based on human strength training applied to horses and based on our experience and some other authors. Until further researcher, we recommend trainers to use this article as a guide when designing the training program of their horses and developing the strength exercises of each session.

1. Introduction

The use of the horse for athletic competition involves conditioning and training for specific types of performance. In contrast to developments in human athletes, selection of individuals [1] and training strategies for the equine athlete are based largely on subjective judgment and empirical traditional training methods [1,2] with too little influence from scientific knowledge [3]. Furthermore, it has been suggested that conventional techniques are not always adequate. In addition, the performance of, for example, racehorses [4] and elite event horses [5] could be improved; and injury rates reduced [6] by the use of more scientific protocols. Moreover, Rose and Evans [7] asked if training a horse was art or science, they concluded that the combination of both is necessary to produce better results for performance and fitter horses. Although they focused on the racehorse, this conclusion can be extrapolated to other disciplines. In 2011, Campbell [3] stated that there is still too

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little influence from scientific knowledge into equine conditioning programs. There are not scientific protocols designed for strength training on horses that can help the hard work of the trainers and/or riders. It may be for several reasons, but we believe that the high economical cost of this research and the difficulty of evaluating strength on a horse may be the main reasons. In this review, we would try to bring science and empiric knowledge together.

A horse trainer has an extremely difficult task, regardless of whether the job is to prepare a racehorse, eventer, endurance, or other type of performance horse. Every trainer must prepare the horse to perform to its full potential regardless of the discipline. The horse must be kept healthy and ideally not be undertrained or overtrained. It should be presented at competition with no muscle, skeletal, respiratory, or other body system disease that could reduce or limit performance [2].

Preparation of the horse in any kind of competition involves a combination of conditioning and schooling. Schooling develops neuromuscular coordination and mental discipline, whereas conditioning induces physiological and structural adaptations that maximize performance and maintain soundness [8]. There are two main aspects of fitness and conditioning that we should take into consideration when training a horse: (1) fitness of the cardiovascular and respiratory systems and (2) fitness of the musculoskeletal system [9]. Other aspects also important in training a horse, although interrelated with the two above mentioned are proper energy expenditure and gait, and efficient thermoregulation. “Fitness” is a rather vague expression, but in general, it is the ability to complete the required amount of physical activity without fatigue, stress, or injury. Any horse that is used for high-level competition or weekend trail riding should be fit for the task.

Strength is one of the four main components of basic fitness which also include, speed, stamina, and flexibility. There are also other components of fitness that are important for the horse performance such as, coordination, agility, and balance. We should take into consideration that strength improvement is also highly dependent on neuromuscular control which is also related to coordination and speed. In humans, it is well stablished that the first improvements in strength in a training programs are related to neuromuscular adaptation, musculoskeletal adaptation take longer [10]. There are many different kinds of exercise tests to evaluate fitness of the horse [2,11–13]. These kinds of tests evaluate cardiovascular, respiratory, and muscle (metabolic) systems. To our knowledge, there are not exercise tests that evaluate the strength of the horse. The only way we could evaluate the strength of a horse is by a biopsy. This is due to an existing relationship between muscle mass and muscle strength. This relationship is explained by the physiological cross-sectional area of a muscle, defined as the sum of the cross-sectional area of their constituent muscle fibers. Hence, larger muscles will have an increased capacity for powerful contractions [14]. However, this kind of measure is not really practical in the trainer’s routine.

In the present review, we will focus on the strength part of the conditioning training. However, because every exercise requires more than one component of fitness, other components as well as schooling will be also taken into consideration. For example, jumping one fence requires at least, strength, flexibility, coordination, and balance. Furthermore, it is recommended that supplying exercises (exercises that improve flexibility) should be performed in conjunction with a strength training in other to maximizing the horse’s athletic ability and for minimizing the risk of injury [15]. To our knowledge, there are not scientific articles about strength training in horses. Recently, Sommer et al [11] published an article about training of show jumping horses. However, they did not evaluate the strength of these athletes.

The main goal of this article is to provide guidance to trainers and riders about training horses for sport performance in general and strength conditioning training in particular because there is very little information about this type of training in the literature.

2. Objectives of Training

Objectives should be individualized to each individual and specific for each discipline, as will be mentioned in training principles. However, there are some basic objectives presented by different authors:

(1) To minimize the incidence of injuries or metabolic disorders [7,16,17]. For us, this will be the main objective in any discipline.
(2) To improve or maintain maximum performance, preparing the horse for the competition [7,16–18].
(3) To delay onset of fatigue [7,17,18].
(4) To improve skills or work capacity [7,16–18].
(5) To maintain willingness and enthusiasm for exercise [7,18].

The emphasis placed on each of these aspects varies, depending on the type of horse and activity being undertaken. For example, a horse trained for show jumping requires more improvement of biomechanics skills and strength fitness than a horse being trained for endurance events where an improvement in stamina is the main aim [7].

Regarding to the goals of strength training, there are some considerations that should be taken, adapted from humans [19]. Strength training programs may be used to increases in muscle size, strength, power, speed, local muscular endurance, balance, coordination, and flexibility and rehabilitation from injury (in this review will not focus on rehabilitation). Most programs should aim to collectively improve several of these components in an integrative approach as opposed to only focusing on one of them.

3. Musculoskeletal Adaptations to Training

The musculoskeletal system of the horse is highly developed and specialized, allowing the horse to travel long distances to feed itself and to attain high speed to evade predators. One of the major reasons for training horses is to increase musculoskeletal strength that would prevent injuries [20]. Injury results when the load applied to a structure exceeds its capacity to sustain it. So in order to reduce injury, the structure is required to increase its