



# Developing Exercise and Improving Physical Performance by Sports Equipments—A Practical Study to Improve Upper Body Strength of 7th-grade Boys

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## Abstract

Upper limb strength is an important component of human strength. But because of the current lifestyle and physical activities, students can not hold up. Also, they have weak flexion and extension. In addition, they can not hold up for a long time. To solve these problems, the author reflects on P.E. teaching from the practical point of view, starting from the analysis of the muscle composition of the upper limbs, and developing a series of upper limb strength exercise with single and double bar equipments. The developed exercise is suitable for the characteristics of seventh grade boys, emphasizing the combination of exercise diversity and operability, and the combination of basic and extended exercise, which have positive significance for the improvement of upper limb strength exercise methods. In the last three years, more than half of the seventh grade boys could not pull up one pull-up test, and many of them could not even hold the bar with both hands. This reflects that the problem of weak upper body strength of boys is very serious. This is a huge challenge for both front-line P.E. teachers and the majority of boys above middle school. Students need to improve their pull-up abilities by practicing every day, instead of a few of P.E. lessons. So it's important for P.E. teachers to explore "student-centered" and "multiple forms" of learning and practice methods.

## Keywords

Bar assist, upper body strength, exercise method

## 1. Problem formulation

In P.E. teaching, the development of upper body strength is very important. Developing upper limb strength and improving students' physical fitness are important to improve pull-up performance. Pull-up is a hanging strength exercise to overcome their own gravity, which mainly tests the upper limb strength level of boys in 7th grade and above, and is also an important reference standard to measure the physical fitness of boys. However, seventh-grade boys have weak arm strength, poor body coordination, boring pull-up exercises, low interest in practice, and difficulty in finding immediate success, and other factors become its "synonym" or "excuse".

The author's analysis of the relationship between upper body strength and pull-ups reflects the following.

### 1.1 Students can't hold up: upper limb strength support ability is weak.

In the usual physical education, due to the weak upper limb strength support ability of students and the individual

differences, it is difficult for many obese and heavy students to complete even the most basic bar support. According to the individual differences of students, enhance the students' upper limb strength support ability can be completed from simple to difficult, and from two people to help and protect to personal completion of a long time support, to strengthen the support ability.

## **1.2 Students have weak flexion and extension: upper limb flexion and extension are weak.**

Flexion and extension is the main expression of the ability to respond to the contraction of the upper limb muscles and is related to the dimension of the muscle fibers. In the usual physical education, due to the weak upper limb strength flexion and extension ability of students, most students can not complete the flexion and extension action. According to the individual differences of students, enhance the upper limb strength flexion and extension ability of students can be from equipment to assist to personal completion of flexion and extension movements. And can persistently flexion and extension action practice (Beijing Normal University, 2022).

## **2. The overall thinking of upper limb strength development**

It is urgent to sort out various forms of learning and practicing methods, and only through the accurate guidance of physical education teachers and students' "hands-on" practice can independent learning and practicing be implemented. Due to the "special" and "continuous" nature of pull-ups, it is a very difficult task to cultivate students' ability to learn and practice independently in the short term.

### **2.1 The overall principle of upper limb strength exercise method development**

There are millions of methods of upper body strength exercises for 7th grade boys, but how to make the methods more suitable for the needs of 7th grade boys' upper body strength development and improve the appropriateness and operability of the exercises. Therefore, we develop the following principles.

#### **2.1.1 The principle of equal emphasis on movement methods and practice methods**

Movement methods and practice methods are the effective means of implementation in the process of forming movement skills. This is the main teaching activity in the usual physical education. The effective improvement of movement methods and practice methods is not only conducive to students' better mastery of technical movements, but also conducive to improving students' classroom teaching efficiency. In the process of developing upper body strength exercise methods, we need to focus not only on the perfection of movement methods, but also design exercise methods that meet the physical and psychological needs of junior high school students from the perspective of overall development (Shang Yongheng, Li Fubing, & Lei Yaofang, 2017).

#### **2.1.2 The principle of combining diversity and operability**

Diversity and operability is the embodiment of the effective practice methods of the means of practice in the usual physical education. This is the main practice method for students to practice in physical education. The perfection of diversity and operability exercise methods not only increases students' interest in practicing upper limb strength, but also strengthens students' initiative to complete the exercises. It is very important in the process of upper limb strength exercises methods development (Li Hang, 2006).

### **2.2 Ideas for the development of upper limb strength exercise methods**

The idea of developing an exercise method for upper body strength is very important. It is the integration of the overall exercise methods, and it is important to improve the upper body strength of 7th graders based on the single bar double bar equipment. We developed three plates, two categories, and three types of material development ideas to clarify the path for subsequent exercise content development.

#### **2.2.1 Simultaneous development of the three sections**

Mainly from the support exercises, flexion and extension exercises, suspension exercises three sections of the overall thinking, with different means of exercise to stimulate the interest of students to practice upper limb strength, with different exercise methods to stimulate the improvement of individual differences.

#### **2.2.2 Two categories of differentiation**

The main differentiation is from basic and extension to differentiate the individual differences of students. Teach students according to their needs in order to make them successful in the exercises and stimulate their interest in upper body strength. And to improve students' skills based on the basic exercises.

### 3. The development of upper body strength exercise methods for seventh grade boys

#### 3.1 Development of a series of supportive exercises for upper limb strength

##### 3.1.1 Upper limb strength support basic exercises

Double bar straight arm support. Before the exercise, choose a double bar appropriate to the height of the students, after the students hold the bar with both hands, the feet instantly force upward stirrups off the ground, after holding the bar with both hands will stand the body straight straight arm support on the double bar.

**[Exercise requirements]** In the double bar straight arm support exercise, students are clearly required to straighten their arms, elbow joints shall not be bent, chest, abdomen, buttocks, so that the body in a vertical shape on the double bar, the only standard action, in order to make the students' arm strength and upper limb muscle groups to get the most effective exercise, and greatly reduce the chances of joint sprain (Yu L. F. et al., 2015).

##### 3.1.2 Upper body strength supportive expansion exercises

Students can perform extended exercises to enhance their upper body strength ability based on the basic exercises of upper body strength support.

**Table 1. Support exercises**

Serial number	Exercise name	Exercise requirements
1	Double bar: interlinear support	Walk on top of the double bar with your hands instead of your feet. Hold the double bar with both hands, power up with both feet at the same time, support the bar with straight arms, make sure your upper body is perpendicular to the bar surface after getting on the bar, and use alternate hands to support on the bar at an even pace.
2	Double bar: bar support swing (from the front end of the bar to the back end of the bar)	When doing the movement practice of support swing, students need to do straight arm top shoulder, tight waist not hip flexion, swing with the shoulder as the axis, do not shrug the shoulder, stand up. When swinging back and forth to master the rhythm, from a small swing practice, the student's upper limb strength requirements are very high, the strength of the upper limb determines the torso swing amplitude and rhythm.
3	Double bar: left and right bar change support on the bar (from the left bar to the right bar by changing hands)	When doing the exercise of supporting the left and right bar change, students need to support on the left bar, and then both hands in turn change hands to the right bar for support. Pay attention to the shift of body weight when changing the bar.
4	Single bar: straight arm support between rows	Walk on top of the bar with your hands instead of your feet. Hold the bar with both hands, power up with both feet at the same time, support the bar with straight arms, make sure your upper body is perpendicular to the bar surface after you get on the bar, and use alternate hands to support yourself on the bar at an even pace.
5	Combination: Double-bar marching support + obstacle run	Walk on top of the double bar with your hands instead of your feet. Hold the double bar with both hands, power up with both feet at the same time, support the bar with straight arms, make sure the upper body is perpendicular to the bar surface after getting on the bar, and use alternate hands to support on the bar at an even pace. After dropping the bar, students perform an obstacle run (across the mat).

The extended exercises not only can stimulate students' interest in practicing, but also can come in three types of exercises to improve skills, enhance upper body strength, and cultivate students' will quality of unity and cooperation.

## 3.2 Development of a series of upper limb strength flexion and extension exercises for 7th grade boys

### 3.2.1 Upper limb strength flexion and extension basic exercises

Incline pull-ups. The author emphasizes that before performing the incline pull-up exercise, care should be taken to select a low bar that matches the height of the student, with the height of the bar flush with the student's chest. Students face the low bar, stand in a natural position, separate their hands shoulder-width apart, hold the bar, extend their legs forward, and press their feet by their peers, so that the entire foot surface is on the ground, and ensure that the arms are at a 90° angle with the torso, so that the body naturally tilts down, and on the basis of this standard posture to do flexed arm pull, when the lower jaw reaches the top of the bar, extend the arm to recover, this is a set of standard movements (Chen Qichen, 2018).

**[Exercise requirements]** In the pull-up bar exercise, students should be required to lift their chests and heads, tighten their waists and bellies and pay attention to the elbow joints on both sides of the body to consciously clench, so as to ensure the standard of practice, but also to prevent students from straining their arms. At the same time, the jaw position must reach the top of the bar when doing the flexion pull, and ensure that the entire foot surface on the ground, only the standard in place to reap the best results of the exercise.

### 3.2.2 Upper limb strength flexion and extension expansion exercises

Based on the basic exercises of upper limb strength flexion and extension, students can perform extended exercises to enhance their upper limb strength ability.

**Table 2. Flexion and extension exercises**

Serial number	Exercise name	Exercise requirements
1	Double bar: bar push-ups	There is a difference between bent leg and straight leg on the bar push-ups. Ankles back on the double bar. Core tense torso vertical. Bend the arms, the same points as the push-ups, in order to focus on the exercise of the pectoral muscles, increase the depth can be.
2	Double bar: Double bar arm curl	Hold the bar with each hand, support both arms on the bar, head straight, chest and shoulders, torso and upper limbs perpendicular to the bar. Slowly bend the elbow joints while extending the shoulder joints to gradually lower the body to the lowest position. After a short pause, the two arms are raised with force to restore.
3	Single bar: flexion arm drape	Hold the bar with both hands, starting from the body drape. When lifting, the lower jaw must exceed the surface of the bar; remain stationary.
4	Combination: inter-row flexion arm drape competition	Hold the bar squarely with both hands, starting from a body drape. When lifting up, the lower jaw must exceed the surface of the bar; remain stationary. Students will compete as a group in a marching competition, with the group with the shortest time winning.

Expanded exercises not only can stimulate students' interest in practice, but also can come to improve skills, enhance upper body strength and cultivate students' will quality of unity and cooperation in the three types of exercises.

## 3.3 Development of a series of upper body strength suspension exercises for 7th grade boys

### 3.3.1 Upper limb strength suspension basic exercises

Bar straight arm drape. Before the exercise, choose a bar appropriate to the height of the students, after the students hold the bar with both hands, the feet instantly force upward stirrups off the ground, after holding the bar with both hands will stand straight body straight arm support on the bar.

**[Exercise requirements]** In the bar straight arm draping exercise, students are clearly required to straighten their arms, elbow joints must not be bent, chest, abdomen, buttocks, so that the body is in the shape of a figure perpendicular to the bar, in order to make the students' arm strength and upper limb muscle groups to get the most effective exercise, and greatly reduce the chances of joint sprain.

### 3.3.2 Upper limb strength suspension expansion exercises

Students can perform extended exercises to enhance their upper body strength ability based on the basic exercises of upper body strength suspension.

**Table 3. Suspension exercises**

Serial number	Exercise name	Exercise requirements
1	Single bar: Hanging swing power exercise	Hold the bar with both hands, take the hip joint as the fulcrum, swing back and forth with no force on both legs, swing both legs back and spread the hips, then swing both legs forward quickly and flex the hips forward. At the moment of this swing, quickly bend the hips and brake quickly, while both arms quickly bend the elbows and pull up hard to the position of the eyes or jaw over the surface of the bar, then repeat the exercise.
2	Single bar: straight arm drape between rows	Walk on top of the bar with your hands instead of your feet. Hold the bar with both hands, power up with both feet at the same time, support the bar with straight arms, make sure your upper body is perpendicular to the bar surface after you get on the bar, and hang on the bar with alternate hands at an even pace.
3	Combination: Single-bar inter-row straight-arm drape + obstacle run	Choose a bar that is appropriate to the height of the students, after the students hold the bar with both hands, the feet instantly force upward from the ground, from the front to the back end of the bar after the obstacle running exercises.

The extended exercises not only can stimulate students' interest in practicing, but also can come in three types of exercises to improve skills, enhance upper body strength, and cultivate students' will quality of unity and cooperation.

### 3.4 Seventh grade boys pull-ups to break the "0" value of the practice method

When students improve their physical ability, it will be relatively easy for them to perform pull-up exercises. In the course of teaching, we found that students have an understanding of the exercises, but it is still difficult to break the "0" exercise. So how to break the "0" value? We can use the mat as an aid to help students improve and break through the "0" value by performing a variety of mat exercises.

**Table 4. Breakthrough exercises**

Serial number	Exercise name	Exercise requirements
1	<b>Double foot support exercises</b>	Choose a bar that is appropriate to the height of the student, and after the student holds the bar with both hands, stand with both feet on the mat and instantly power upward to stir off the ground. Highlights. 1. Straight arm, hip down seat 2. Hands and feet at the same time force
2	One-legged support exercises	Choose a bar that is appropriate to the height of the student, and after the student holds the bar with both hands, stand on the mat with one foot and instantly power upward to stir off the ground. Highlights. 1. lower limbs as far as possible without force 2. legs into a tucked position
3	Abdominal Tightening Exercises	Choose a bar appropriate to the height of the students, after the students hold the bar with both hands, stand on the mat with both feet, and instantly force the abdomen. Highlights. 1. Upper swing with hip joint as the center 2. Tighten the abdomen quickly, put the leg to stabilize

#### 4. Suggestions for teaching methods

Physical education teachers vary the practice methods by changing the teaching environment to increase the fun of the exercises. Pay attention to the level and safety of the exercise settings, also pay more attention to the training of upper body strength teaching methods, so that students can seriously exercise more upper body strength techniques, and really master every detail and every link of the skill method, so that students can do it accurately and at the same time with confidence and expectation, in order to really accomplish the goal of this project. Through the systematic training on the single and double bars, really comprehend where the core key issues of this project lie, prevail in upper limb strength, put precision in the movements, lift all obstacles, and really realize where the teaching philosophy advocated by its new standards lies, improve students' physical fitness and achieve good exercise results, achieve efficient classroom.

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