



# A Summary of the Status Quo of Research on the Application of Elastic Band Resistance Training in Sports Training

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## Abstract

The elastic band is a relatively commonly used resistance training tool. Compared with other expensive and bulky equipment, the elastic training band has the characteristics of simple structure, easy to carry, and low price. In the movement, it can simulate the movement trajectory during the movement process, and cooperate with the special training movement, the training effect is better, and it is more conducive to the improvement of the technical level. Elastic band resistance training is more used in sports training. Compared with other training, elastic band has greater flexibility and can assist the human body to complete various confrontation exercises of different difficulty and intensity. Now elastic band resistance training resistance training is widely used in sports training. This article combs and discusses the elastic band resistance training at home and abroad to provide theoretical basis and practical application for sports training. Band resistance training is suggested to be researched in many areas of athletic training.

## Subject Areas

Sports Science

## Keywords

Elastic Band, Resistance Training, Exercise Training

## 1. Overview of Research on Resistance Training

Resistance training: Also known as strength training, resistance training. It usually refers to the process in which the body overcomes resistance to achieve muscle growth and strength, and is an effective way to develop skeletal muscle

strength [1]. Resistance training is an important part of improving sports performance and national fitness. Resistance training is regarded as an effective way to increase muscle strength, size and endurance.

There are three main categories of resistance training methods: isotonic training, isometric training and isokinetic training. According to the muscle contraction method, resistance training can be divided into two types of contraction: static contraction and dynamic contraction. Dynamic contraction includes isotonic contraction and isokinetic contraction. Isotonic contraction is divided into concentric contraction according to the change of muscle length. And eccentric contraction, including fixed load exercises (dumbbells, barbells) and variable load exercises (elastic bands). Static contractions are isometric contractions (hanging, support). It can also be divided into single-joint exercises and multi-joint exercises. Generally speaking, multi-joint exercises are more beneficial than single-joint exercises. Multi-joint exercises can stimulate multiple muscle groups [2] [3]. The order of resistance training is first large muscle groups and then small muscle groups, first multi-joint exercises and then single joint exercises, first low intensity and then high intensity [4].

## **2. Research Purpose**

This study introduces elastic band resistance training, sorts out and discusses elastic band resistance training at home and abroad, and provides more theoretical basis and practical basis for sports training.

## **3. Current Research Status of Application of Elastic Band Resistance Training in Sports Training at Home and Abroad**

### **3.1. Application of Elastic Band Resistance Training in Domestic Sports Training**

#### **3.1.1. Application of Elastic Band Resistance Training in Badminton Training**

Li Hengzhi and Li Chunlei [5] demonstrated in their paper that by testing the impact of elastic band load recovery time on the post-activation sensitivity of 14 national badminton youth athletes under the condition of 10% - 15% BW, the results showed that the load was 10% - 15% special pace sprint training with an elastic band in the BW interval tied around the waist, two sets of 50 m sprints, and a 90-second interval between sets can induce PAP at intervals of 4 minutes, 8 minutes, and 12 minutes, and improve the sensitivity test scores of young badminton players.

#### **3.1.2. Application of Elastic Band Resistance Training in the Training of Female Football Players**

Liang Zhicheng [6] demonstrated in his paper that 18 randomly selected female football players from a junior high school were intervened through 12 weeks of resistance training with elastic bands. The number of repetitions is 3 - 5, the heart rate is maintained at 140 - 160 beats/min throughout the process, and the

total training time is 40 - 45 minutes. The subjects' body composition indicators and special physical fitness indicators were tested after 8 weeks and 12 weeks of training respectively. The results show that 12 weeks of elastic band resistance training can better improve the body composition of middle school female football players and improve their specific physical fitness. Among them, vertical jump, 30 m sprint, sideline kick and 12 min running are used as special physical fitness indicators to monitor middle school girls. Football training effects may be more sensitive to changes. This demonstration shows that 12 weeks of elastic resistance training can have an impact on the body composition and specific physical fitness of junior high school female football athletes.

### **3.1.3. Application of Elastic Band Resistance Training in Volleyball Training**

Raouf Hammami *et al.* [7] demonstrated in their paper that eight weeks of elastic band resistance training can provide sufficient stimulation to improve the strength (CMJ and SLJ) and dynamic strength (1RM) as well as front-to-back balance of adolescent male volleyball players. The above parameters are related to volleyball performance, therefore, we can say that eight weeks of resistance training with elastic bands improved the performance of young volleyball players. Reaction intensity (RSI) and other parameters related to equilibrium (horizontal CoP displacement, displacement velocity, rocking area) do not change with EBT. The pre-sent evidence in this study may help strength and conditioning professionals plan in-season training for adolescent volleyball players to improve their performance. This is the application of elastic band resistance training in volleyball training.

## **3.2. Application of Elastic Band Resistance Training in Foreign Sports Training**

### **3.2.1. Application of Elastic Band Resistance Training in Football Training**

JAMIE J. GHIGIARELLI *et al.* [8] demonstrated in their paper that when elastic bands and heavy chains are incorporated into offseason and in-season training cycles, athletes can gain a unique and feasible way to increase strength and strength variables. These methods are especially useful in exercises that mimic ballistic movements, such as explosively performed bench press or squat movements. Variable resistance training techniques also allow strength practitioners additional flexibility in exercise prescription and exercise selection. Modifications to traditional exercise of this nature may enhance athlete compliance, motivation, and interest in physical activity. This study shows that the application of elastic band resistance training in football training can not only improve football-specific strength but also increase athletes' interest in football.

### **3.2.2. Application of Elastic Band Resistance Training in Descending Jump Training**

Hsien-Te Peng *et al.* [9] demonstrated in their study that the purpose of this

study was to investigate the use of elastic straps attached to the waist and heels and released at the beginning of the push-off phase as an additional weighted eccentric load during a descending jump. Influence on kinematic and dynamic properties. The main finding was that attaching 20% of the body weight load of the elastic straps to the waist and heels provided additional tension from the elastic straps, allowing the lower extremity joint extensors to counterbalance the tension during the air and landing phases. This increases jump height, reactive power index, leg stiffness, hip and knee flexion, and ankle plantarflexion angle of the lower extremity during initial foot contact and ankle dorsiflexion activities. On the other hand, this reduces the peak ground reaction force on impact, eccentric work, and hip flexion range of motion from 40 and 50 cm drop heights during descending jumps. This confirms our hypothesis that placing elastic belt loads of 20% body weight on the waist and heels can improve descending jump performance while reducing ground impact during descending jumps.

#### **4. Suggestions for the Development of Elastic Band Resistance Training in Sports Training**

##### **4.1. Elastic Band Resistance Training Should Follow the Corresponding Principles**

Appropriate exercise methods should be used for different groups of people. For example, teenagers are in the peak period of physical development, so they should be distinguished from strength exercises for adults. Do not pursue high-strength exercises, and use your own gravity or fast strength exercises as the main method.

##### **4.2. Corresponding Training Plans Should Be Developed for Elastic Band Resistance Training**

There are many kinds of elastic bands on the market at present. Coaches should select according to the training content and formulate plans for athletes' targeted training program [10].

#### **5. Future Prospects of Elastic Band Resistance Training in Sports Training**

Elastic band resistance training plays an important role in the field of rehabilitation. For example, elastic band resistance training can effectively improve the lower limb muscle strength and balance ability of elderly patients. It is a safe, effective and economical exercise training method suitable for elderly patients [11]. And it is gradually being applied to the field of sports training as mentioned above, such as badminton, football, and volleyball. However, elastic band resistance training is expected to be further developed, and it is expected to be applied to many sports training fields.

#### **Conflicts of Interest**

The author declares no conflicts of interest.

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