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**Ashok Kumar Sharma**  
Assistant Professor, Dept. of  
Physical Education, C.D.L.U,  
Sirsa

## Comparison of flexibility and explosive strength among throwers and jumpers

**Ashok Kumar Sharma**

### Abstract

The most important purpose of this study was to evaluate the flexibility and explosive strength among jumpers and throwers. A whole number of sample were 40 athletes in which 20 throwers and 20 jumpers and similarly separated in to two assembly. The age cluster of the sample ranged under 18 and 22 years. The sample was chosen from Haryana State who had contributed at state level of competition. To check out the explosive strength, standing broad jump and for flexibility bend and reach test has been used. Result originated that jumpers have extra explosive strength than throwers and also jumpers have extra flexibility than throwers.

**Keywords:** Flexibility, Explosive Strength, Throwers, Jumpers.

### Introduction

Flexibility or limberness refers to the absolute range of movement in a joint or series of joints, and length in muscles that cross the joints to induce a bending movement or motion. Flexibility varies between individuals, particularly in terms of differences in muscle length of multi-joint muscles. Flexibility in some joints can be increased to a certain degree by exercise, with stretching a common exercise component to maintain or improve flexibility.

Quality of life is enhanced by improving and maintaining a good range of motion in the joints. Overall flexibility should be developed with specific joint range of motion needs in mind as the individual joints vary from one to another. Loss of flexibility can be a predisposing factor for physical issues such as pain syndromes or balance disorders. Gender, age, and genetics are important for range of motion. Exercise including stretching often improves flexibility.

Many factors are taken into account when establishing personal flexibility: joint structure, ligaments, tendons, muscles, skin, tissue injury, fat (or adipose) tissue, body temperature, activity level, age and gender all influence an individual's range of motion about a joint. Individual body flexibility level is measured and calculated by performing a sit and reach test, where the result is defined as personal flexibility score.

Your routine in the gym can have a drastic affect on your ability to touch your toes. The exercises in your workout combined with nutrition, hydration, and lifestyle choices can all have an impact on your flexibility. Improving your bending ability is crucial for more than just preventing injury. In fact, flexibility training is an important aspect of gaining strength and size. The typical lifter spends most of their day outside of the gym hunched forward over a computer further deteriorating any chance at proper posture. Outside of just preventing injury, having better posture helps to show off the muscular physique you worked so hard to build. Proper flexibility also goes hand in hand with full range of motion exercises like squats and dead lifts, which are major muscle builders. Having tight hips and shoulders is a limiting factor for proper form on these exercises and can limit your program.

Flexibility is needed to perform everyday activities with relative ease. To get out of bed, lift children, or sweep the floor, we need flexibility. Flexibility tends to deteriorate with age, often due to a sedentary lifestyle. Without adequate flexibility, daily activities become more difficult to perform. Over time, we create body movements and posture habits that can lead

**Correspondence:**  
**Ashok Kumar Sharma**  
Assistant Professor, Dept. of  
Physical Education, C.D.L.U,  
Sirsa

to reduced mobility of joints and compromised body positions. Staying active and stretching regularly help prevent this loss of mobility, which ensures independence as we age. Being flexible significantly reduces the chance of experiencing occasional and chronic back pain.

It is important to include flexibility training as part of your clients' regular fitness routines. Improved flexibility may enhance performance in aerobic training and muscular conditioning as well as in sport. There is scientific evidence that the incidence of injury decreases when people include flexibility training in their routines due to the enhanced ability to move unimpeded through a wider ROM. The only exception to this would be when there is an excessive or unstable ROM, which may increase the likelihood of injury. When used appropriately, flexibility training allows clients to become more in tune with their body. It is a form of active relaxation that can improve both mental and physical recovery.

Stretching may take a back seat to your exercise routine. You may think that stretching your hamstrings and calves is just something to be done if you have a few extra minutes before or after pounding out some miles on the treadmill. The main concern is exercising, not stretching, right?

Not so fast. Although studies about the benefits of stretching are mixed, stretching may help you improve your joint range of motion, which in turn may help improve your athletic performance and decrease your risk of injury. Understand why stretching can help and how to stretch correctly.

An athlete's ability to run a fast 40 yard dash, dunk a basketball, kick a field goal, or take down an opponent in hand to hand combat are all highly determined by explosive strength. By definition, Explosive Strength refers to the ability to exert strength or force as rapidly as possible in a given action (Siff). Explosive Strength is dependent on Rate of Force Development (RFD), which simply stated means the speed at which force can be produced.

Before taking the necessary steps in your training to improve explosive strength, you must first determine if you already have established a sufficient base of Relative Strength for the given task. Relative strength is the maximum force exerted in relation to body weight or muscle size. While no specific guidelines exist as to how strong is "strong enough" before the law of diminishing returns comes into play, it's important to note that I've witnessed athletes who have participated in plyometric (jumping) programs making literally no improvement in explosive strength.

you'd think that to improve your vertical jump you must simply do that in training. But this is only one small piece of the puzzle. It's possible that in the prior scenario I have mentioned (in which there was no improvement in vertical jumping ability despite the implementation of plyo jumps training) the athlete did not possess adequate relative strength. This would have enabled him to apply more force, and ultimately to jump higher. For this individual it would be important to have a look at which muscles are responsible for jumping ability and develop a plan to strengthen those obviously weak areas. In other words, a guy who is squatting 100 lbs, is not going to get a significantly better vertical jump simply by adding some jumps to his training; he's just too weak to jump very high.

Since jumping uses virtually every muscle in the body it would be important to implement a resistance training program that includes the entire body. Don't believe me? Some estimates indicate that the deltoid (shoulder) muscle contributes as much as 10-15% of the height attained by a vertical jump (hint: try jumping with your hands clasped behind your back and compare it to the height you can get by allowing your shoulders to swing your arms upwards, and you'll see what I mean). To break things down further it would be imperative to identify the prime movers in the given task (in this case the vertical jump) and put extra focus on improving strength in those areas. In the vertical jump example this would include the hamstrings, gluts, quadriceps, spinal erectors and abdominal muscles. Just to note: research has shown calves to offer very little contribution to vertical jumping ability. The movements, which target the aforementioned areas, would be variations of the squat and dead lift along with unilateral work such as several of the lunge and step-up variations.

The strength, or potential, of an explosive is the total work that can be performed by the gas resulting from its explosion, when expanded adiabatically from its original volume, until its pressure is reduced to atmospheric pressure and its temperature to 15°C. The potential is therefore the total quantity of heat given off at constant volume when expressed in equivalent work units and is a measure of the strength of the explosive.

Explosive strength is measured by, for example, the Trauzl lead block test.

An explosion may occur under two general conditions: the first, unconfined, as in the open air where the pressure (atmospheric) is constant; the second, confined, as in a closed chamber where the volume is constant. The same amount of heat energy is liberated in each case, but in the unconfined explosion, a certain amount is used as work energy in pushing back the surrounding air, and therefore is lost as heat. In a confined explosion, where the explosive volume is small (such as occurs in the powder chamber of a firearm), practically all the heat of explosion is conserved as useful energy. If the quantity of heat liberated at constant volume under adiabatic conditions is calculated and converted from heat units to equivalent work units, the potential or capacity for work results.

### **Objectives of the Study**

1. To find out the flexibility of throwers.
2. To find out the flexibility of jumpers.
3. To find out the explosive strength of throwers.
4. To find out the explosive strength of jumpers.

### **Hypothesis of the Study**

1. There will be no significant difference of flexibility between throwers and jumpers.
2. There will be no significant difference of explosive strength between throwers and jumpers.

### **Procedure and Methodology**

#### **Sampling**

The present study was conducted on 40 athletes in which 20 throwers and 20 jumpers and similarly separated in to two assembly. The age cluster of the sample ranged under 18 and 22 years. The sample was chosen from Haryana State who had contributed at state level of competition.

### Procedure

For measuring the flexibility, first of all the instructions were given in both group of twenty players. The demonstration has been given to check out the explosive strength, standing broad jump and for flexibility bend and reach test has been used. When it was ensured that the subject has understood the whole procedure, three trials for both flexibility and explosive strength were given. The data was noted down for each trial and best trial was selected.

### Result and Discussion

**Table 1:** Comparison of flexibility among throwers and jumpers

Throwers				Jumpers			
Groups	N	Mean	S.D	N	Mean	S.D	t-value
Under 18	10	21.85	5.75	10	20.43	5.97	2.87
Under 22	10	24.94	5.92	10	23.38	6.39	2.63

\*significant at 0.05 level

From table No.1 shows that comparison of flexibility between jumpers and throwers of fewer than 18 and 22 years age groups. The mean values of under 18 years age group of throwers and jumpers were found to be (21.85 and 20.43), respectively and under 22 year age group were found to be (24.94 and 23.38), respectively. In statistically results were initiated to be significant in under 18 and non significant in 22 years age groups ( $t = 2.87$  and  $2.63$ ), respectively. The results shows under 18 and 22 years age groups jumpers have better flexibility than throwers.

**Table 2:** Comparison of explosive strength among throwers and jumpers

Throwers				Jumpers			
Groups	N	Mean	S.D	N	Mean	S.D	t-value
Under 18	10	5.93	1.04	10	6.29	1.34	1.46
Under 22	10	7.35	0.93	10	7.82	1.01	2.06

\*significant at 0.05 level

From table No.2 shows that comparison of explosive strength between jumpers and throwers of fewer than 18 and 22 years age groups. The mean values of under 18 years age group of throwers and jumpers were found to be (5.93 and 6.29), respectively and under 22 year age group were found to be (7.35 and 7.82), respectively. In statistically results were initiated to be significant in under 18 and non significant in 22 years age groups ( $t = 1.46$  and  $2.06$ ), respectively. The results shows under 18 and 22 years age groups jumpers have better explosive strength than throwers.

### Conclusion

The results found that fewer than 18 & 22 years age group jumpers have more explosive strength & flexibility than throwers.

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