Assisted Jumps and Overspeed Training

The purpose of assisted jumps training is to expose the central nervous system to faster time programs stored with the muscle-tendon systems. Assisted jumps training requires an external support system in the form of an overhead bungee cord or elastic bands. The athlete is attached to the overhead bungee and their body weight is strategically decreased while they perform various plyometric exercises. These conditions make it possible to achieve such shortened muscular firing rates, ground contact times, and time programs within the central nervous system. Assisted jumps training can be comparable to a more commonly used speed development method called overspeed training.

Overspeed training for sprinting elicits similar neural and muscular responses to those found with high-velocity jump training. The premise behind overspeed sprinting is that having an athlete sprint at supramaximal velocities will enhance CNS firing rates, reduce the inhibitory mechanism within the neuromuscular system, and increase stride frequency. Overspeed training enables an athlete to experience sprinting speeds and reduced ground contact times not otherwise possible via traditional means.

Commonly used methods of overspeed training include downhill sprinting and sprinting while being pulled by a bungee cord device. As with assisted jumps training, it is suggested that overspeed training enhances timing mechanisms and creates new motor programs. A variety of studies have found that overspeed has both an acute and chronic effect on increased horizontal velocity.

Assisted Jumps Training Research

Assisted jumps training is far from a novel concept. Its use can be traced back to the 1970s, and perhaps even earlier. However, very little research and practical application of the method has been performed. Before discussing specific programming concepts, we will talk about some of the relevant research on the topic.

Giovanni Cavagna was the first to study the effects of assisted jumping. In a study for Aerospace Medicine in 1972, he demonstrated that jumping in low-gravity conditions (using a suspension device) decreased time of force production as compared to normal jumping conditions. Subjects using the assisted device demonstrated force output similar to that of non-suspended subjects, but in reduced time.
Yu Imachi of Japan emerged as the pioneer in the research of assisted jumps training. In an early study, 20 male high school volleyball players were divided into three training groups and tested on their vertical jump height. After a 10-week training period, the assisted jumps training groups using protocols of minus 10% and minus 20% body weight had improved vertical jump performance significantly greater than that shown by participants in the group performing plyometric training under normal conditions. Each subject performed 10 maximal effort vertical jumps with 15 seconds of rest between each jump, three times per week. A similar study was performed using female athletes and showed similar results.

In a more recent study, Imachi compared takeoff velocities and force production of assisted jumping with that of free jumping exercises. The results indicated that assisted jumps training did not improve the maximal force production of the athletes. Instead, the improved jumping ability was a result of greater takeoff velocity.

Brazilian jumps specialist Nelio Moura is perhaps the best-known contemporary proponent of assisted jumps training. Although little is known about his protocols for using the method, there are several videos of Olympic champion long jumper Irving Saladino using the device in training. I have had several email conversations with Nelio regarding the method and he mentioned that he uses it all year and with athletes of all age groups. Nelio has had incredible success over a long time span and we should highly respect his opinion on such training.

**Programming Assisted Jumps Training**

![Force-Velocity Curve for Resisted and Assisted Jumping](image)

Figure 2. Force-Velocity Curve for Resisted and Assisted Jumping

When performing assisted jumps, it is important to realize that the increased jump height is not an acute effect, as you are being assisted by elastic energy. Let us address how ‘reducing’ body weight works in reality. It is true to say that the stretch–recoil from
the bungee will indeed lead to greater vertical displacement of your center of mass. Consequently, during the landing phase of each jump you will experience a greater stimulus for increased forces (and thereby passive eccentric loading), which is initially directed in the Achilles tendon. Following this, the bungee will progressively develop tension and dampen the loading around the knees and hips as they respond to the greater landing forces.

This “assistance” means that the knees and hips do not flex excessively and are able to develop sufficient eccentric musculotendinous loading to promote a faster coupling time and maintain a respectable ground contact time. This moderate amount of damping through the knees may allow you to more safely perform repetitions with reduced risk of jumpers’ knee. Over the course of a training phase you will adapt to increased passive landing forces (but undoubtedly still lower than actual impact forces in the long, triple and high jumps), while still generating high (but not excessive) eccentric loads in the Achilles and Patellar tendons. This gives the stretch reflexes the sensation of an appropriate level of overload and fast coupling time into the concentric phase.

Successful training programs must adhere to a combination of principles relating to readiness and response. It is therefore impossible to single out a particular training method or exercise protocol when determining performance improvements. However, based on research and case studies performed by ourselves and other jumps and sprint coaches, we can confidently state that Assisted Jumps Training is a method that fits naturally within the scheme of a program. It can be programmed much like other highly intense plyometric exercises.

Due to the velocity component, it is best grouped with maximum velocity development such as fly sprints or activities of that nature. We recommend implementing the method after the athlete’s general preparation phase and using it throughout the competitive season. The neural demands make it a potential primer exercise during competition weeks; however, we would reduce volume considerably during this time. Potential exercise choice is limited to those in a vertical plane; otherwise, regular plyometric choices can be utilized.
### Logistics and the Assisted Jumps Device

If you are considering making your own assisted jumps device, the most important factor is the ability to adjust the bungee cord tension. Different athletes will require slightly different adjustment settings when trying to achieve a specific reduction in body weight. We have used devices that are attached to a pulley system on a wall that can be easily adjusted. Although this is a great setup, it is only practical if you plan on creating a semi-immovable device and have a permanent space for it.

The parts needed for a device similar to this include a basic bungee cord, a belay system, a carabineer, a rope, and a harness. We recommend the device that we currently use, which is very simple and almost made specifically for this purpose. This assisted pull-up device, found in a local sports store, is easily movable and very simple in design. Simply attach a harness and it works perfectly as an assisted jumps training device.
Figure 3: Assisted Jumps Device

Figure 4: Assisted Jumps Device
**It’s Time to Add Assisted Jumps Training to Your Training Program**

Heavy resistance training develops muscular strength and rate of force development properties that can increase the potential for power production. Plyometric and ballistic training impact the velocity component and the efficiency of the stretch-shortening cycle. Assisted jumps training is able to create new time programs with the central nervous system enhancing fire rates and other intramuscular coordination qualities. Understandably, research on assisted jumps training has been very limited up to this point. While we find great value in case studies, we also understand their limitations. However, from the findings we do have, it seems safe to assume that optimal training for speed and power should incorporate all three of these training methods.

To date, the positive findings appear consistent and should lead to enough interest for coaches to implement this method into their training program—at the very least, for the sake of variety. Successful training methodologies often share similar, if not identical, characteristics. These include characteristics such as intensity, specificity, overload, heavy, light, slow, fast, short or long recovery, etc. Coaches understand exactly where these fit into their plan and there is little argument over their place. We program many facets of the training program across a wide spectrum, from non-specific to specific, slow and heavy to light and fast, static to dynamic, simple to complex, and more. We understand the need for variety and progression and, for the most part, we understand how the different training methods promote specific adaptation.

The discussion of strength development will always be a favorite pastime of coaches, but the speed and velocity components of movement and technical application clearly serve a far greater importance. With that being said, it is surprising that assisted jumps training and overspeed sprinting are not more widely used. If your reasoning is that it’s a time and logistics issue, that’s a poor excuse.

Assisted jumps training truly doesn’t require expensive equipment or fancy devices, and almost all facilities have the necessary space and ceiling requirements. Perhaps the reason for its exclusion is a lack of awareness. If you are obsessed with jump development, you will leave no stone unturned in your pursuit of higher heights and farther distances. We hope that this article will inspire you to at least research further and experiment, in the way that most training methods began their journey to acceptance and normalcy. Good luck!
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