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# Functional Eccentric Training, Part 2

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In the second part of this two part article on functional eccentric training we will take a look at the potential downsides of eccentric training, some of the traditional eccentric training techniques, and newly emerging systems available for eccentric training.

## Negative Effects of Eccentric Training

As anyone who has done heavy eccentric weight training can attest, **eccentric training can result in severe delayed onset muscular soreness, aka DOMS**. In addition, research has proven that initially eccentric training can result in significant decreases in muscle strength and decreased proprioception during the acute period of 1 - 4 days after the training sessions. This is an important consideration for many populations including athletes who have competition scheduled around eccentric training sessions; seniors who could be put at increased fall risk from these effects; and de-conditioned people beginning an exercise program. **These negative effects can be eliminated by a gradual introduction to eccentric training, including starting with lower levels of eccentric load along with making gradual increases in eccentric load and total time under eccentric load.**

The good news is that the body can tolerate exercise during muscle soreness, and in fact three separate research studies have shown that training sore muscles does not hurt recovery. Furthermore, muscles rapidly adapt to eccentric training stimulus such that if a person continues training after a session that produces lots of DOMS they will likely not experience it again as long as they continue training on a regular basis.

## Traditional Eccentric Training Techniques

Since the introduction of Nautilus equipment by Arthur Jones there has been a fascination with and appreciation of the power of eccentric training to produce powerful results and several techniques

have been developed to allow trainers to provide effective eccentric training, including various techniques for negative accentuated resistance training and plyometrics.



**Negative accentuated training** is often done using standard selectorized training equipment by selecting a resistance level of about a 10RM. The concentric portion of the exercise is done using both arms or both legs with a brief pause at the point of full concentric contraction while using one arm or leg to perform the eccentric portion of the exercise smoothly and slowly. In this way the single side gets enough load to provide a true eccentric challenge and benefit. **Another method is for a trainer or trainers to add weight or provide increased manual load during the eccentric/negative portion of the repetition when doing free weight or bodyweight exercise.**

Another key method for effective eccentric training is **plyometrics training which uses the Strength the Shortening Cycle (SSC)** and rapid eccentric loading to produce more forceful concentric contractions. **In plyometrics a rapid eccentric load is immediately followed by a forceful concentric contraction.** One example of a lower body plyometric exercise is having a person step

[Back to Table of Contents](#)



## ACROSS THE GAMUT

off of a 12 - 20 inch platform landing on both legs then immediately and vigorously jumping up as high as possible. An example of an upper body plyometric exercise is having a person lay on bench and having a trainer drop a weighted medicine ball down from a height onto the exerciser's hands that absorbs the kinetic energy of the ball. Then the exerciser immediately throws the ball forcefully up into the air as far as possible. There are many other plyometric exercises, and plyometrics can be a very powerful training method.

### New Eccentric Training Methods

The challenge with traditional methods of eccentric training such as plyometrics and heavy negatives is that these methods pose significant risk of injury and require careful preparation and skilled coaching in order to obtain the benefits while avoiding injury. In addition, these techniques are simply not appropriate for the vast majority of the population for these reasons. However, several companies have designed highly effective training technologies that allow safe, easy to use and effective eccentric overload by itself or in conjunction with concentric training.

One of these technologies is called X-Force ([www.x-force.se](http://www.x-force.se)). X-Force technology utilizes a weight stack that pivots during the change from concentric to eccentric action on each exercise. In the starting concentric position the weight stack is angled at 45 degrees. Then at the end of the concentric portion the weight stack automatically pivots 45 degrees to a standard 90 degree position such that the resistance increases 40% during the eccentric portion of each repetition. This technology allows for optimal concentric AND eccentric loading in a very safe fashion and is a true game changer for resistance training.

Through a different mechanism Maxout ([www.maxoutcorp.com](http://www.maxoutcorp.com)) allows a greatly increased load during the eccentric portion of exercise and

can be retrofitted to existing single station selectorized weight training equipment. Maxout technology was developed by Dr. Michael MacMillin who is the head of the strength laboratory of the University of Florida. Like X-Force, Maxout allows for safe and effective eccentric and concentric loading using standard selectorized weight training stations.

Another emerging technology that is very useful for effective eccentric training is Blast Biofeedback Based Strength Training ([www.biologic-engineering.com](http://www.biologic-engineering.com)) which allows the use of elevated levels of resistance during the eccentric phase of each exercise without risk of injury along with variable resistance customized to the user.

Yet another effective technology for safe and effective eccentric overload is Exerbotics ([www.exerbotics.com](http://www.exerbotics.com)) that provides the ability to train and precisely measure maximum overload concentrically and eccentrically using compound, multi-joint movements.

Recently another eccentric training product has been developed called reACT - Rapid Eccentric Anaerobic Core Trainer ([www.reacttrainer.com](http://www.reacttrainer.com)). reACT utilizes a completely different approach from the other technologies listed above, and it provides an eccentric training modality that also allows for improved balance, stability and integrated movement patterns that are truly unique. reACT uses a platform which rotates in a reverse elliptical pattern which forces the lower body to absorb the kinetic energy of the platform with no impact. By controlling the platform speed and posture the level of challenge can be precisely matched to the user so that it can be used by a wide range of abilities from seniors who are de-conditioned to Olympic athletes.

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[Back to Table of Contents](#)

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## 'Tis the Season for Fall Prevention

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[Back to Table of Contents](#)

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[Back to Table of Contents](#)

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