

*An important report about.....*

# **The Myths and Fallacies of**

**Stretching and.... *THE***

***TRUTH***

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## **Myths and Fallacies of Flexibility**

By

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Stretching and flexibility are two of the most controversial topics in sports. Flexibility is often either trained to death or not trained at all. Most sports require some amount of flexibility, but some sports, such as gymnastics, require extreme levels of this performance component. Grappling and mixed martial arts (MMA) in particular are known for extreme positions requiring great flexibility. However, grappling and MMA also require power, strength, and stamina, and these qualities may not necessarily be synergistic in their development. Developing one component may come at the price of another, especially when it comes to flexibility (Kokkonen, Nelson, and Cornwell 1998; Schilling and Stone 2004).

### **All Flexibility Is Not Created Equal**

Many coaches and athletes already include some form of flexibility training in their workout programs. A predominant training theory has been to improve flexibility in order to enhance combative performance and reduce the likelihood of injury. The most common method of developing flexibility in grappling and MMA is static stretching. Traditionally, static stretching has

been recommended as a method of increasing prevent flexibility, improving performance, and preventing injury (ACSM 1998). However, recently the efficacy of static stretching for increasing flexibility to improve performance and reduce injury has been questioned (Santana 2004; Schilling and Stone 2004).

Flexibility refers to the range of motion about a joint. Few would argue against the importance of healthy joint movement and proper range of motion (ROM) in normal function and optimal athletic performance. However, the jury is still out on what is "healthy" and "proper." One quick look at any anatomy book or rehabilitation textbook reveals the anatomical ROMs assigned to the joints of the body. These ROMs have been labeled as "normal" and serve as the standard for what is healthy and proper. However, blindly applying these ROM standards to flexibility and training can lead to a misguided training methodology.

Flexibility development has to be looked at from a comprehensive, holistic context. We must ask ourselves certain fundamental questions, such as what role flexibility plays in our sport, what levels of flexibility are needed, what type of flexibility is needed, what is the best way to train the flexibility needed, and at what price the development of flexibility comes. Asking these questions can guide our training discussion, though we must be prepared for the Pandora's box that may be opened when using critical thinking to answer questions

such as these. Before we start to put together a conceptual model for flexibility training in grappling and MMA, here are some of the questions we need to ask:

1. What role does flexibility play and what levels of flexibility are needed in successful grappling and MMA?
2. Does increased flexibility result in improved performance and injury prevention in grappling and MMA?
3. What kind of flexibility is needed, active or passive?
4. Is passive ROM developed through static stretching related to active ROM used in grappling and MMA?
5. Can we get flexibility through methods of training outside of conventional static stretching techniques?

In order to have a clear direction in training, we must address these questions. However, as mentioned, getting to the absolute truth behind each of the questions is difficult. Since any position on flexibility can be supported by some research, we will base the discussion on a consistent blend of research and our field observations, coaching experiences, and common sense. We believe that when research and field observations meet, we are on the right track to making good training decisions. Combining field observations and research truly provides a more holistic perspective of training.

### **What Role Does Flexibility Play and What Levels Are Needed?**

There is no doubt as to the importance of flexibility in grappling and MMA. All you have to do is look at a half nelson, a wizard, an armbar, or a kneebar and you will see some of the extreme ROMs necessary to successfully compete in grappling and MMA. The need to control and hold these extreme positions is one of the reasons why static stretching has been used to develop flexibility for grappling and MMA. However, there is a difference between the flexibility needed in these combative situations and the flexibility developed by static stretching. Grappling and MMA athletes must not only be able to attain extreme ROMs, they must be able to control the ROMs—the extreme ROMs needed in grappling and MMA require muscular forces to control them. These extreme positions are mainly controlled via eccentric muscular contractions (i.e., the muscle produces forces while elongating). Later we will discuss the importance of eccentric control in flexibility.

### **Does Increased Flexibility Result in Improved Performance and Injury Prevention?**

Most grappling and MMA athletes and coaches use static stretching to gain the flexibility needed to survive the extreme positions previously mentioned. They assume that increasing ROM via static stretching will result in improved performance and reduce the

chances of injury. Although this conclusion may seem logical, it is misguided.

The one thing all the research agrees on is that if you stretch a muscle it will elongate and ROM will increase. However, stretching and elongating a muscle has not been associated with much of anything other than immediate increases in ROM. It remains unclear as to how long a muscle will stay elongated and what effect that has on long-term performance. However, there is ample scientific literature showing that the elongation that occurs as a result of static stretching can hinder a muscle's ability to produce force for up to an hour after stretching (Fowles, Sale, and MacDougall 2000; Young and Elliott 2001). This is one of the main reasons why the current trend in the strength and conditioning field is to avoid static stretching before strength- and power-dominated events (Schilling and Stone 2004). In some instances the general use of static stretching is greatly reduced altogether (Santana 2004).

Research from the armed forces also indicates that more flexibility is not necessarily better in terms of predicting or preventing injuries. This large body of work indicates that injury may be caused by too much or too little flexibility, and in some instances, increased flexibility may actually increase the rate of injury (Jones and Knapik 1999; Thacker, Gilchrist, Stroup, et. al 2004). Furthermore, research reviews that have looked at

stretching and injury prevention show no correlation between stretching and injury prevention. Although little research has been done specifically on stretching as an injury-prevention tool, strong scientific evidence indicates that increased flexibility and stretching before an event does not prevent injury or improve performance (Thacker, Gilchrist, Stroup, et. al 2004; Shrier 1991; Kokkonen, Nelson, and Cornwell 1998; Knudson, Magnusson, and McHugh 2000; Macera 1992; Van Machelen 1992). In general, the use of stretching as a prevention tool against injury has been based on intuition and unsystematic observation instead of scientific evidence (Thacker, Gilchrist, Stroup, et. al 2004). At the moment, the scientific research does not support increasing ROM through static stretching as a method of reducing injuries or enhancing performance.

As previously mentioned, achieving extreme ROM through static stretching (i.e., passive ROM) is not the same as controlling the extreme ROM encountered in grappling and MMA (i.e., active ROM)—these are two different forms of flexibility. Although the end product may look the same, the process, and therefore the training, is totally different. The ROM gained through static stretching is thought to result from increased muscle compliance. However, the compliance of a passive muscle and the compliance of an active muscle are not related. Furthermore, an active muscle has a lower compliance but absorbs more energy. The absorption of

energy, especially the eccentric phase of muscle action, is a major component of muscle performance. Therefore, the increase in muscle compliance gained from static stretching does not equate with a reduction in injuries or increase in performance (Shrier 1991).

As we can see, the scientific literature has yet to precisely identify the mechanisms by which muscles stretch and to what degree this stretch enhances performance or reduces injury. Admittedly, much of the current stretching myths and fallacies have been perpetuated by anecdotal observations and traditional practices handed down over generations. We believe much of the problem in the scientific literature is lack of communication with field practitioners developing practical protocols. Much of the protocols used in flexibility studies and flexibility are not indicative of the protocols that fighters, or anybody else for that matter, would follow. For example, some studies involve stretches up to 2 minutes (Fowles, Sale, and MacDougall 2000). I have personally never witnessed anyone stretching a muscle for that long—have you? The results of such a study have to be questioned when it comes to interpreting them and making training recommendations. Many flexibility studies encounter such problems in protocols, subject selection, and testing. Nonetheless, it is what we have and we must be educated on its accomplishments and shortcomings. Only after understanding all of the issues involved

in the study of flexibility can we make better sense of the data and use to it improve our practical applications.

So, where does that leave the strength and conditioning or combative athlete? Our scientific knowledge of flexibility is limited and many pieces of the puzzle are still missing. It isn't that static stretching has no place in performance training; we simply have not been able to scientifically identify to what degree it is an effective path to functional flexibility and performance.

We believe that a better approach to training the functional flexibility that a combat athlete needs would be a comprehensive strength training program that develops functional ROM as well as strength. That is, we address all the components of combative movements in our strength training so that we cover the entire spectrum of ROMs, speeds, and loads the muscles will see during practice or competition. We will also discuss some of our field observations as well as some of our favorite exercise we use to develop flexibility.



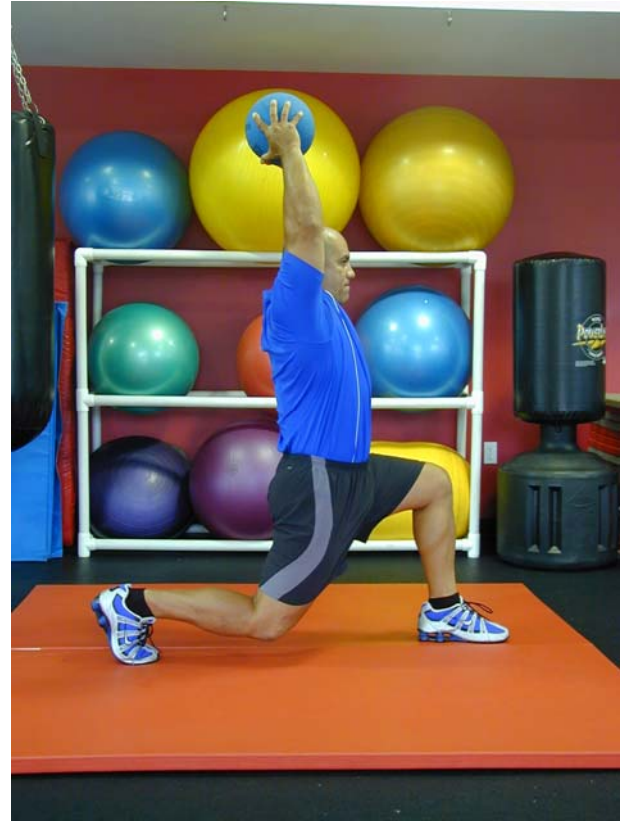
Stability Ball Rollouts on the wall provide excellent shoulder ROM for beginners. This progression can eventually lead to the more advanced floor progression.



Stability Ball Rollouts on the floor provide monster strength and ROM at the shoulder joint. This exercise also requires a ironclad core!



The stability ball Pec Deck exercise is not only a great strength exercise for the chest, it is also a perfect ROM exercise that develops functional flexibility in the entire chest and shoulder musculature.



The medicine ball cheerleading lunge is an advanced lower body strength exercise. It develops strength in the hips, legs and core, while providing excellent functional flexibility in the hip flexors.

A review of the science clearly indicated that our practical approach must not necessarily be directly proven by science, since there are many uncertainties in this body of knowledge. Strength and conditioning professionals, as well as combative athletes, must base their practice on science, but not necessarily have it proven by science. A unique blend of practical experience with a thorough understanding of scientific principles is the magic combination that brings about deliberate success in training. We will support some of the scientific references we provided in the reference section and share with you some of our field observations and training methods that have provided excellent results. Our goal is to provide you with what we consider to be our magic combination of science and combined 50 years of competitive and coaching experience.

Flexibility is a fundamental but elusive performance component. Most sports require some degree of flexibility, but some sports, such as grappling and mixed martial arts (MMA), require extreme levels. The question still remains, what is the best way to train for flexibility in these sports? The traditional training method has been static stretching, but extreme ROM achieved through static stretching, or passive ROM, is not the same as the extreme ROM encountered in grappling and MMA, or active ROM. Although the end product may look the same, the process is totally different, which means the training is totally

different. The ROM gained through static stretching is thought to result from increased muscle compliance, but the compliance of a passive muscle and of an active muscle are not related. Furthermore, an active muscle has a lower compliance but absorbs more energy, and energy absorption is a major component of muscle performance. The increase in muscle compliance gained from static stretching thus does not equate with a reduction in injuries or increase in performance (Shrier 1991).

### **Field Observations**

Any position on flexibility can be supported by some research. However, we believe that when research and field observations meet, we are on the track to a more holistic perspective of training. Field observations support much of the scientific data on flexibility. When looking at the relationship between flexibility and performance, we have not been able to correlate general flexibility with specific performance success in our grapplers and fighters. We have also noticed that most of our explosive fighters are not incredibly flexible. Some of our most explosive and dominant fighters are tight by most measures; few can grab their ankles, put their head between their knees, or grab their hands in an over-and-under pattern behind their back.

In addition, we have not been able to correlate injuries to lack of ROM. Instead, there seems to be a better correlation

between weakness and injuries. We don't mean gym weakness seen in weightlifting, we mean the functional strength that is seen in the ability to handle one's own bodyweight and that of an opponent. We do see an improved injury profile once our fighters participate in our comprehensive strength and conditioning programs. We attribute our reduction in injuries not only to enhanced muscular strength, but also to conditioning. We believe that a conditioned fighter is an injury-resistant fighter.

Our field observations regarding the use of static stretching as a preevent preparation modality are equally revealing. Our MMA fighters and wrestlers do not statically stretch before their practices or matches and our injury profile is excellent for noncontact injuries. Furthermore, from an injury-prevention viewpoint, we have observed that most of the noncontact injuries in our MMA fighters and grapplers do not occur at the beginning of the match, but rather at the middle or end of the match. This injury profile indicates that there is a fatigue component to the injury. If a muscle has been taken to a specific length or tension several times without injury, then the length in and of itself could not be responsible for the injury. This type of injury points our training in the direction of enhancing strength and endurance, not increasing ROM.

To illustrate how we integrate flexibility into our strength training programs, we would like to share two of our favorite

exercises: the reaching lunge (RL) and the T-stabilization (T-stab) push-up. Both exercises include a unique blend of strength and flexibility. Each can also be modified to match any application. The bottom position of the RL resembles a static hamstring stretch. It can be performed in all three planes of motion to address the multiplanar nature of functional ROM. The stance, speed, and range of movement can be tailored to meet the specific capabilities and training goals of any individual. The RL can also emphasize any muscle group within the kinetic chain. For example, reducing knee and spinal flexion can increase the ROM demands of the hamstrings. This concept of *isolated integration* was first identified by Gary Gray, the father of modern functional training. Using dumbbells with the RL can provide an excellent combination of ROM and strength. The RL progression is a staple in our training model and is one of the reasons we have a near-perfect record against hamstring injuries.

The T-stab push-up is another of our staple exercises that incorporates functional strength and flexibility. It too looks like a chest stretch, except with more versatility. It can also be modified to suit the capabilities and goals of any individual. For example, the upper-body support can be elevated using a fixed barbell at about waist height and the rotation reduced to attenuate the intensity of the movement. Conversely, a lower support position such as the floor, the use of a weighted vest,

and increased rotation can provide a more advanced training stimulus.

### **Conclusion and Recommendations**

We do not feel that static stretching is absolutely ineffective and has no place in fitness and performance training. However, we have not been able to identify to what degree it is effective, whether it is the most effective path to functional flexibility and performance, and where its exact place is in the training scheme. We certainly acknowledge it as a tool in the rehabilitation setting. We can also accept it as a feel-good modality and have no objections to its everyday use for that purpose. We often roll on medicine balls and biofoam rollers for a few minutes before workouts for that reason; it loosens us up and makes us feel good. However, we do find it alarming when coaches and organizations insist on static stretching as the best or only method of preparation for improving functional ROM and reducing injuries. We believe the best flexibility method is still an ideological figment.

Instead of doing static stretching we rely on our comprehensive strength training to take us to the ROM we will see in combat. All the components of combative movements are addressed in our strength training so that we cover the entire spectrum of ROMs, speeds, and loads the muscles will see during

practice or competition. When we do perform static stretching, we perform very short (5-10 seconds) static stretches 20 to 30 minutes away from the practice or fight. Leading to the event, we perform functional range-of-motion exercises and more explosive related movements.

In summary, our field observations clearly indicate that static muscle compliance and active muscle compliance are not related (i.e., muscle compliance is a big component of ROM). Our observations also indicate that active muscle compliance is more important to MMA and grappling performance goals. Over the last decade we have combined dynamic flexibility into our strength movements and have more or less removed all static flexibility from our day-to-day training. The results are without question; over 500 case studies show a success rate of better than 90% against noncontact and overuse injuries in the absence of static stretching. This is not necessarily the best or only way to train; it simply illustrates that there may be many ways to do things right.

1. Shrier, I. 1999. Stretching before exercise does not reduce the risk of local muscle injury: A critical review of the clinical and basic science literature. *Clin J Sport Med* 9:221-227.

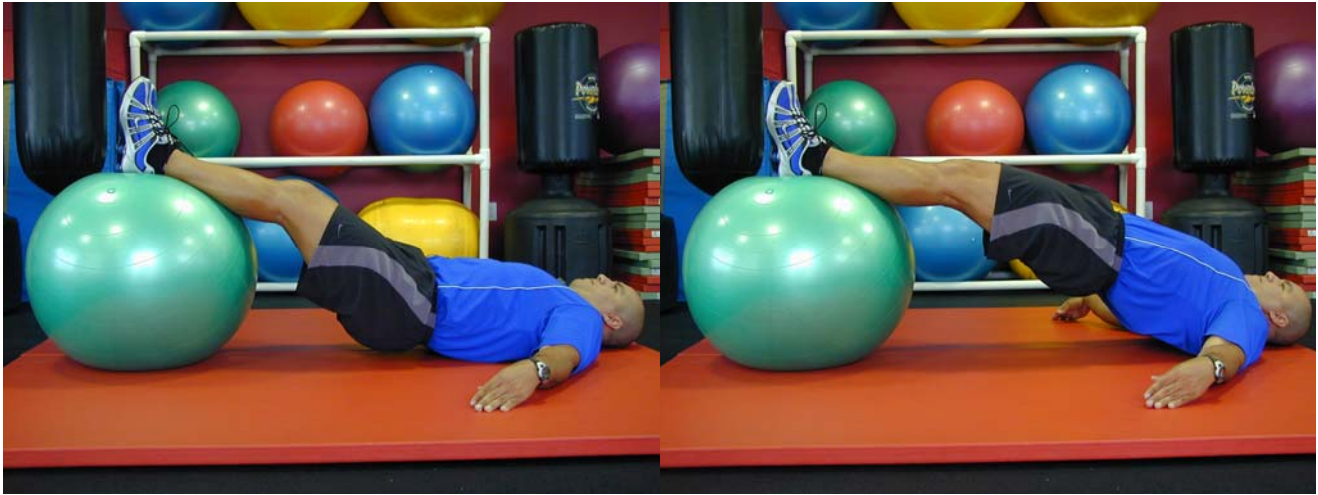
## PICTURES for Flexibility



Dumbbell reaching lunges are a favorite for developing hamstring, hip and lower back strength, while simultaneously developing excellent ROM in the hips and hamstrings.



The push-up can be used in a variety of ways to develop strength and ROM in the upper body. The rotational contra-lateral toe touch and T-Stabilization progression are some of our favorites.



Stability ball bridges are a standard in the world of rehabilitation and we use various versions of this exercise extensively to develop strong backs and hamstrings. However, using a reflex called “reciprocal inhibition” the contraction of the hips and hamstrings provide excellent ROM training for the hip flexors.



The inchworm is a monster exercise requiring super strength and ROM in the core and upper body.

1. American College of Sports Medicine (ACSM). 1998. The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness and flexibility in healthy adults. *Med Sci Sports Exerc* 30:975-991.
2. Fowles, J.R., D.G. Sale, and J.D. MacDougall. 2000. Reduced strength after passive stretch of the human plantar flexors. *J Appl Physiol* 89:1179-1188.
3. Jones, S., and J. Knapik. 1999. Physical training and exercise-related injuries: Surveillance, research and injury prevention in military populations. *Sport Med* 27:111-125.
4. Knudson, D.V., P. Magnusson, and M. McHugh. 2000. Current issues in flexibility fitness. *Pres Council Phys Fitness Sports* 3:1-6.
5. Kokkonen, J., A.G. Nelson, and A. Cornwell. 1998. Acute muscle stretching inhibits maximal strength performance. *Res Q Exerc Sport* 69:411-415.
6. Macera, C.A. 1992. Lower extremity injuries in runners: Advances in prediction. *Sports Med* 13:50-57.
7. Santana, J.C. 2004. Flexibility: More is not necessarily better. *NSCA Journal* 26(1).
8. Schilling, B., and M. Stone. 2004. Stretching: Acute effects on strength and power performance. *NSCA Journal* 21(1): 44-47.

9. Shrier, I. 1999. Stretching before exercise does not reduce the risk of local muscle injury: A critical review of the clinical and basic science literature. *Clin J Sport Med* 9:221-227.
  10. Thacker, S.B., J. Gilchrist, D.F. Stroup, and C.D. Kimsey, Jr. 2004. The impact of stretching on sports injury risk: A systematic review of the literature. *Med Sci Sport Exerc* 36(3): 371-378.
  11. Van Mechelen, W. 1992. Running injuries: A review of the epidemiological literature. *Sport Med* 14:320-335.
- Young, W., and J. Elliott. 2001. Acute effects on static stretching, proprioceptive neuromuscular facilitation stretching, and maximum voluntary contractions on explosive force production and jumping performance. *Res Q Exerc Sport* 72:273-279.