Assessing The Comparative Effects Of Stretching Exercises On Upper Body Flexibility

Temesgen Ayaleneh Birhan
Lecturer, Department of Sport Science
College of Natural and Computational Sciences
University of Gondar
Gondar, Ethiopia
Email: temesgen2nd@gmail.com

Abstract
The general objective of this study was aimed at an assessment on the comparative effect of stretching exercises (Static, Dynamic and Proprioceptive Neuromuscular Facilitation (PNF)) on improving upper body flexibility. This study was exploratory research to gain background information and better understand and clarify a problem through document analysis. Data collection was performed qualitatively by review of different literatures. The use of this principal data collection instrument was intended to explore a range of both qualitative and quantitative information. Many studies have evaluated various effects of different types and durations of stretching. Most authors suggest that 10 to 30 seconds is sufficient for increasing flexibility but no increase in muscle elongation occurs after 2 to 4 repetitions. Several authors also have compared static and dynamic stretching on ROM, strength and performance. Both static and dynamic stretching appears equally effective at improving ROM acutely or overtime with training. But some researchers report static stretching after warm up decreases performance. The others report no change or an increase in performance at all. There are many factors that should be considered when comparing the effects of stretching exercises. The most effective type of stretching exercise is highly depends up on the type of specific sport event. Other factors are age and sex. To make a great change in upper body flexibility it’s much recommendable to use PNF stretching exercise. Because it does not only improve upper body flexibility instead it also improves both muscular and nervous system.

Key words: Dynamic Stretching, Static Stretching, Proprioceptive Neuromuscular Facilitation (PNF), Range of Motion (ROM)

Introduction
Background of the Study
Most authors define flexibility either as range of motion, or, more precisely, as range of motion at or about a joint. The latter is preferred because, by itself, range of motion is too broad. Structures other than anatomic joints, including very inflexible nonbiological structures (e.g., planets), may be said to have significant ranges of motion. (2).

Flexibility exercise should also be incorporated in to normal exercise program, which may involve resistance (strength) training and cardiovascular exercise (walking, jogging, swimming and cycling). So it can be improved both the quality and quantity of muscle, joints and overall health. That being said, stretching exercises are an effective way to compliment to physical activity routine for a greater flexibility.

Statement of the Problem
The task of assessing the comparative effects of stretching exercise on upper body flexibility was not that much easy. Even though all types of stretching exercises have significant effect on body flexibility, the gap is comes from which type of stretching exercise have an immediate and significant improvement in upper body flexibility. So, this study tried to determine the comparative effect of static, dynamic and PNF stretching on upper body flexibility. Therefore, this study was designed to answer the following research questions.

- What is the effect of stretching exercise on upper body flexibility?
What literatures conclude about which type of stretching exercise among static, dynamic and PNF has the highest effect on upper body flexibility?

Which type of stretching exercise is more effective in upper body joint flexibility?

Objective of the Study
General objective of this study was aimed at an assessment on the comparative effect of stretching exercises (Static, Dynamic and Proprioceptive Neuromuscular Facilitation (PNF)) on improving upper body flexibility. Furthermore, this study was carried out to achieve the following specific objectives:

♦ To evaluate the effect of stretching exercise on upper body joint flexibility.
♦ To assess different literatures and experiences about the effect of stretching exercises on upper body flexibility.
♦ To study the comparative effect of static, dynamic and PNF stretching on upper body joint flexibility.

Significance of the Study
✓ This study provides possible effects on undergoing a reaction to reach conclusions towards the type of stretching exercise which have a greater effect on the improvement of upper body flexibility.
✓ It helps to assess an effect of stretching exercise on upper body flexibility; more over it serves as an initial concept for those who want to study related cases.
✓ It provides helpful information about the effective type of stretching in improving upper body flexibility in particular and whole body flexibility general.

2. Material And Methods
Study Design
This study was exploratory research to gain background information and better understand and clarify a problem through document analysis. Because it relies on secondary research such as reviewing available literatures, journals and books.

Source of Data
The researcher was used different data sources according to the nature of the problem. The primary data was collected through assessing different literatures.

Methods and Procedures of Data Collection
Data collection was performed qualitatively by review of different literatures. The use of this principal data collection instrument was intended to explore a range of qualitative information.

Assessing the comparative effects of stretching exercises on upper-body flexibility was the purpose of this investigation and the influence of static and dynamic stretching and proprioceptive neuromuscular facilitation (PNF) on upper- muscular body performance was also assessed and analyzed. Different written materials such as books and journals were assessed to obtain sufficient information.

Methods of Data Analysis
Document analysis was also implemented qualitatively.

3. Results And Discussion
3.1 Analysis of Documents
Many studies have evaluated various effects of different types and durations of stretching. Outcomes of these studies can be categorized as either acute or training effects. Acute effects measure the immediate results of stretching, while training effects are the results of stretching over a period of time. Stretching studies also vary by the different muscles or muscle groups that are being examined.
and the variety of populations studied, thereby making interpretation and recommendations somewhat difficult and relative. (22)

The effectiveness of stretching is usually reported as an increase in joint ROM (usually passive Range of motion); for example, shoulder or hip ROM is used to determine changes in latissimusdorsi (back muscle) length. Static stretching often results in increases in joint ROM. Interestingly, an increase in ROM may not be caused by increased length (decreased tension) of the muscle; rather, the subject may simply have an increased tolerance to stretching. Increases in muscle length are measured by “extensibility”, usually where a standardized load is placed on the limb and joint motion is measured. Increased tolerance to stretch is quantified by measuring the joint range of motion with a non-standardized load. This is an important question to consider when interpreting the results of studies: was the improvement based on actual muscle lengthening (i.e., increased extensibility) or just an increase in tolerance to stretch? (18)

According to Chan and colleagues, 8 weeks of static stretching increases muscle extensibility; however, most static stretching training studies show an increase in ROM due to an increase in stretch tolerance (ability to withstand more stretching force), not extensibility (increased muscle length). (9)

Static stretching is effective at increasing ROM. The greatest change in ROM with a static stretch occurs between 15 and 30 seconds. (22)

Most authors suggest that 10 to 30 seconds is sufficient for increasing flexibility. In addition, no increase in muscle elongation occurs after 2 to 4 repetitions. (25)

Most pre-contraction stretching is associated with PNF-type contract-relax or hold-relax techniques using 75 to 100% of a maximal contraction, showed that sub maximal contractions of 20 or 60% are just as effective, and thus supporting the effectiveness of post-isometric relaxation stretching. (13)

Interestingly, ROM increases are seen bilaterally with pre-contraction stretching, supporting a possible neurologic phenomenon. (21)

The specific phenomenon associated with an increase in flexibility following a pre-stretch contraction remains unclear. Many have assumed that muscle experiences a refractory period after contraction known as ‘autogenic inhibition’, where muscle relaxes due to neuro-reflexive mechanisms, thus increasing muscle length. Interestingly, electromyographic (EMG) studies have shown that muscle activation remains the same or increases after contraction. (10)

Some researchers have speculated that the associated increases in ROM are related to increase stretch tolerance rather than a neurological phenomenon. (19)

3.2 Comparing stretching modes

Several authors have compared static and dynamic stretching on ROM, strength, and performance. Both static and dynamic stretching appears equally effective at improving ROM acutely or over time with training. (11)

Several authors also found no improvement in performance when comparing static and dynamic stretching. In contrast to static stretching, dynamic stretching is not associated with strength or performance deficits, and actually has been shown to improve dynamometer-measured power as well as jumping and running performance. (15)

The literature is conflicting regarding the effects of warm-up stretching prior to exercise. Static and dynamic warm-ups are equally effective at increasing ROM prior to exercise. (7) Some researchers report static stretching after warm-up decreases performance. (16) The others report no change or an increase in performance at all. (14) While static stretching is generally followed by an immediate decrease in strength, static stretching performed before or after warm-up does not decrease strength. (7)

A pre-stretch (PNF-type) contraction has been associated with greater acute gains in ROM compared to static stretching in many studies. (12)

However, several studies show similar increases in ROM and performance when comparing pre-contraction stretching and static stretching. Both acute static stretching and pre-contraction stretching have been shown to decrease strength. (20)
3.3 Well-rounded Exercise Programs

For a general fitness program, the American College of Sports Medicine (ACSM) recommends static stretching for most individuals that is preceded by an active warm-up, at least 2 to 3 days per week. Each stretch should be held 15-30 seconds and repeated 2 to 4 times. \(^{(17)}\)

Many exercise studies on older adults include stretching exercises as part of a well-rounded exercise program. Unfortunately, there is no clear dose-response for flexibility training in older adults because stretching interventions are often combined with strengthening, balance, and cardiovascular activities, making it difficult to isolate stretching’s effectiveness. Ten weeks of static stretching of the trunk muscles was able to increase spinal mobility (combined flexion and extension ROM) in older adults. \(^{(23)}\)

Furthermore, the effectiveness of type of stretching seems to be related to age and sex: men and older adults less than 65 years respond better to contract-relax stretching, while women and older adults over 65 benefits more from static stretching. \(^{(24)}\)

3.4 Warm-up for Sports and Exercise

Stretching performed as part of a warm-up prior to exercise is thought to reduce passive stiffness and increase range of movement during exercise. In general, it appears that static stretching is most beneficial for athletes requiring flexibility for their sports (e.g. gymnastics, dance, etc.). Dynamic stretching may be better suited for athletes requiring running or jumping performance during their sport such as basketball players or sprinters. \(^{(8)}\)

Summary

This study tried to assess the comparative effects of stretching exercises on improving upper body flexibility. Based on the assessment of literatures done throughout this study, the result can be categorized as either acute or training effects. Acute effects measure the immediate results of stretching, while training affects the results of stretching over a period of time. The effectiveness of stretching is usually reported as an increase in joint range of motion (ROM). Static stretching often results in increases in joint ROM and its greatest change in ROM occurs between 15 and 30 seconds as it is shown in literatures.

As results of document analysis shows most authors suggest that 10 to 30 seconds is sufficient for increasing flexibility but no increase in muscle elongation occurs after 2 to 4 repetitions. Several authors also have compared static and dynamic stretching on ROM, strength and performance. Both static and dynamic stretching appears equally effective at improving ROM acutely or overtime with training. But some researchers report static stretching after warm up decreases performance. The others report no change or an increase in performance at all.

A pre-stretch (PNF-type) contraction has been associated with greater acute gains in ROM compared to static stretching in many studies. However, several studies show similar increases in ROM and performance when comparing pre-contraction stretching and static stretching. Furthermore, the effectiveness of type of stretching seems to be related to age and sex.

Conclusion

Based on the major findings of the study, the following points are stated as conclusion.

- The most effective type of stretching exercise is highly depends up on the type of specific sport event. Other factors are age and sex.
- It appears that static stretching is more important for athletes requiring flexibility for their sports (e.g. gymnastic, dance, etc.) and dynamic stretching may be better suited for athletes requiring running or jumping performance during their sport such as basketball players or sprinters.
- To increase ROM, all types of stretching exercises are effective, although PNF-type stretching may be more effective for immediate gains in improving total body flexibility in general and upper body flexibility in particular.
**Recommendations**

By considering the major findings and conclusions of the study, it is important to state the following points as a recommendation.

- To avoid decrease in strength and performance that may occur in athletes due to static stretching before competition or activity, dynamic stretching is recommended for warm ups.
- To be more beneficial from effects of stretching exercises on body flexibility, it is better to use all types of stretching exercises during pre and post workouts.
- Types of stretching exercises should be specifically identified and applied depends up on the specific sport event.
- To make a great change in upper body flexibility it’s much recommendable to use PNF stretching exercise. Because it does not only improve upper body flexibility instead it also improves both muscular and nervous system.
- Emphasis of future researches about effects of stretching exercises on flexibility needs to be experimental and it is highly expected from professionals of physical education and sports and related fields to guide and educate on the importance and value of stretching exercises on improving total body flexibility.

**References**


