PILOT STUDY

The effects of selected asanas in Iyengar yoga on flexibility: Pilot study

Daniel James Amin, M.Sc., B.Sc., QTLS, GSR*, Maureen Goodman, B.Sc

Centre for Human Performance, University Centre Doncaster, Melton Road, High Melton, Doncaster DN5 7SZ, UK

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Summary In recent years the practice of yoga has gained popularity as a form of physical fitness and exercise, and has been said to improve strength and flexibility. The main objective of this research project was to evaluate the effects of a six week Iyengar yoga intervention on flexibility. N = 16 low to moderately active females (52.37 ± 7.79 years) attended Iyengar yoga practice for a total of 6 weeks, consisting of one 90 min session per week. Lumbar and hamstring flexibility were assessed pre and post-intervention using a standard sit and reach test. The results show a significant increase in flexibility, indicating 6 weeks of single session yoga training may be effective in increasing erector spinae and hamstring flexibility. This is important when considering that much of the population find it difficult to attend more than one session a week into their training schedule.

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Introduction

Yoga is believed to be 4000–8000 years old, which was developed in India and is an ancient science of movement to improve life both mentally and physically (Lalvani, 1996). The word “Yoga” is derived from a Sanskrit word meaning to ‘unify’ or ‘join’ and there are many forms of yoga which differ in specific practices while maintaining the purpose of directing the mind and body (Kraftsow, 1999). Over time the definition of yoga has expanded to include a wide range of disciplines, philosophies and practices. Common elements of many forms of yoga include postures (asanas) which are designed to develop strength, flexibility, balance and the co-ordination of the mind, body and breath using controlled breathing exercises (pranayama) and meditation (Kraftsow, 1999). The general aims of yoga practice are the development and integration of the body, mind and breath to produce structural, physiological and psychological effects; the development of a strong and
flexible body which is free of pain; and a balanced nervous system enabling all physiological systems to function optimally with a calm and clear mind (Iyengar, 1995).

The most recognisable form of yoga practiced in the West is Hatha yoga, which concentrates on physical health and well-being. It involves the practice of postures (asanas) for strength and flexibility, breathing techniques (pranayama) to develop self-awareness and meditation help to calm the mind (Lalvani, 1996). Iyengar yoga is a style of Hatha yoga with key aspects of correct alignment of the body and sequencing of the postures with the use of props such as blocks, belts and chairs (Iyengar, 1995).

Yoga has been practiced for potential health benefits such as arthritis, depression and lower back pain (Tilbrook et al., 2011). The stretching routines performed during yoga practice have also been shown to improve conditions such as anxiety, depression and neck pain (Hoyez, 2007). The practice of Yoga may help the body become more flexible, giving the muscles and joints greater range of motion as yogic stretching is proposed to help release lactic acid from the muscle cells into the bloodstream so that it does not hinder muscular contraction (Ghoncheh and Smith, 2004; Williams et al., 2005).

Flexibility is an important element of physical fitness hence stretching of skeletal muscle to improve flexibility is practiced by both competitive and recreational sports people (Corbin and Noble, 1980). Adequate range of motion is essential for performing everyday tasks, supports good posture and muscle relaxation and can help improve performance and reduce injury (Plowman and Smith, 1997; Holcomb, 2000; Williams et al., 2005).

Galantino et al. (2004) conducted a study into the effects of a modified yoga protocol on flexibility and balance in patients with chronic lower back pain (CLBP). Twenty-two participants ($M = 5, F = 17$) aged between thirty and sixty years undertook twelve weekly, 1 h yoga practice adapted for CLBP, for a total of six weeks. Significant improvements were reported by results for sit and reach (64%) and functional reach (90%) from the yoga group, while only 20% of the control group reported improvement on these measures. Munoru and Rintaugu (2011) investigated the effects of a twelve week yoga intervention on shoulder and hip range of motion and compared the strength differences between left and right sides of the chest, shoulder and leg muscles pre and post yoga intervention in adult females. Findings from the results show a significant increase in flexibility of hip flexion and extension, hip abduction and shoulder flexion ($p < 0.05$), whereas bilateral strength for each side showed no significant difference.

Tilbrook et al. (2011) however, have reported that in recent years, despite yoga being shown to be a more popular form of exercise to elevate some health conditions, even the most motivated individuals find it challenging to incorporate a daily or weekly yoga session into their training regime. This is important to be aware of, as several key investigations into the effect of yoga on flexibility have focussed on multiple sessions per week (Balk, 2009; Tran et al., 2001) which may not be possible from a real-world perspective.

The purpose of this study is to determine the effects of six weeks yoga practice, consisting of only one 90 min session per week, on lower limb flexibility in low to moderately active female adults.

## Methodology

### Subjects

A group of healthy volunteers ($n = 16$) were recruited by poster advertisement from an ongoing yoga class to participate in the study; no incentives or rewards were offered. The criteria required for the study was for females to have no existing medical conditions, any musculoskeletal conditions or severe osteoporosis, which is a contraindication to performing a sit and reach test. All subjects were low to moderately active females aged between 40 and 65 years ($m = 52.37$ years $\pm 7.79$) who had practiced yoga for a minimum of 2 years. Low to moderate exercise consists of 30 min moderate intensity of 3–5 sessions per week (American College of Sports Medicine, 2012) individuals should have a raise heart rate but still able to hold a conversation. Information gathered from completed health questionnaires identified the subject’s level of physical activity as participating in regular exercise of between 2 and 3 h per week and were instructed not to participate in any other form of yoga during this study. The subjects all gave informed consent and ethical approval came from the related institution’s board of ethics. All 16 subjects completed the study.

### Procedures

Assessment and intervention took place within the regular community hall where the yoga class practiced each week. Prior to assessment, all subjects performed a 3 min warm up and static stretch routine, emphasizing the lower body; before testing the subjects were given a demonstration of the procedure by the investigator. Immediately after stretching the flexibility tests were performed in a random design. All measures were assessed on the same day for each subject; the subjects were allowed 30 s rest between each test. The subjects were tested before and after the six week yoga training programme.

### Flexibility assessment

Sit and reach tests (Figs. 1 and 2; Neiman, 2007) are commonly used within the health and fitness industry to evaluate hamstring and lower back flexibility (Hui and Yuen, 2000), the procedure is simple and easy to administer, requires minimal skills training and is particularly useful in a large scale field setting. It has been found to have acceptable test-retest reliability and moderate criterion-related validity (Ayala et al., 2012). Standardised procedures were followed for the sit and reach test using American College of Sports Medicine (2012) guidelines with the outcome assessor blind to the purpose of the study. The investigator had considerable experience (7 years) of facilitating a variety of fitness tests including the sit and reach test. Subjects begin by sitting on the floor with footwear removed; legs are extended with knees straight, bottom of the feet placed flat against the box. Subjects placed hand over hand, and reached forward along the measuring line as far as possible, each subject served as their own control. The average of three trails was used for