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The Effects of Yoga on Muscular Endurance in McPherson College Athletes

Colby Westbrook

ABSTRACT

My experiment was set up to compare the effects of yoga on muscular endurance vs. the effects of weight training. A key component of muscular endurance is the ability to develop slow twitch muscles and keep lactic acid build up at a minimum. Yoga exercises will train your slow twitch muscles through the workouts, and they will also help keep lactic acid down. Lactic acid build up is a result of exercising in anaerobic conditions. This happens when too much energy is expended and an adequate amount of oxygen cannot be delivered to the muscles. A key component of yoga is the emphasis of breathing techniques while exercising. My experiment consisted of three groups each containing three test subjects. There was a control group, a weight training group, and a yoga group. The students that participated in each group were tested on four different occasions. There was a test done before the experiment to get a baseline, and then testing took place every two weeks after until the six week experiment concluded. Each test subjects were tested to determine their maximum output for three different exercises: push-ups, pull-ups, and dips. The only weight used in these tests were the subjects own body weight. As expected, those tested in the control group showed a general unchanging amount of maximum reps throughout the experiment. The effects on muscular endurance in the yoga group and the weight training group both showed similar increases in maximum rep output over the duration of the experiment.

Keywords: *Lactic acid, muscular endurance, yoga.*

INTRODUCTION

Yoga is something that is increasing in popularity at fitness centers and gyms across America. It is an activity to help with stress that also provides a workout. There are many other benefits such as increased flexibility, increase muscle tone, and can help prevent injuries.

Athletes train year round to improve themselves and keep their bodies in top shape. To reach the full potential of your body, it is important that you understand how your body works on a muscular level. When you understand how your body works, you will be able to train more effectively and efficiently.

Muscular endurance is highly important for athletes who need to sustain energy for a long period of time. There are two key factors that play a role in muscular endurance: 1) the development of your slow twitch muscles and 2) the amount of lactic acid build up. Although the muscle strengthening effects of yoga will help with slow-twitch muscle development, the main focus will be the ability to decrease the lactic acid build up.

Whether someone is an athlete or a casual exercise enthusiast, the development of muscular endurance goes a long ways in one's ability to sustain a workout. My experiment was done to measure and differentiate the effects of the two different types of workouts on muscular endurance.

If a muscle becomes too fatigued, there is an increased risk for injury. Having had several severe injuries, all of which required surgical repairs, it was important to me to determine the better method of keeping muscles primed for prolonged exercise.

Being that yoga puts so much emphasis on breathing during exercise, it was my theory that this increased focus of delivering oxygen to muscles during exercise would provide a greater amount of muscular endurance.

MATERIALS AND METHODS

This experiment included three groups: (1) Control Group, (2) Weight Training Group, and (3) Yoga Group. Each group was comprised of three students. The groups were tested a total of four times; the first testing was a baseline test before the six week workout programs. The next three tests were done after the second, fourth, and sixth week of the workout programs.

The subjects were tested on three different exercises: (1) Push-ups, (2) Pull-ups, and (3) Dips. The reason I chose these three exercises is because they are all exercises preformed with the same weight every time; the subjects own bodyweight. On the day of testing, each subject was asked to perform as many repetitions of the exercise until failure. The order of testing was the same every time, and the same 3 minutes of resting in between testing was given each test day.

My methods for recording the results was simply counting the maximum reps of each exercise and recording it next to the subject's name.

The control group preformed no type of exercise outside of their daily routines. These subjects only exercised when they were tested. The weight training group lifted four days a week for approximately an hour each workout. The yoga group met two days a week and trained for approximately 45 minutes each time. The yoga group was instructed by Professor J.D. Bowman. All testing was done in the sports center on campus at McPherson College.

RESULTS

P = Push-Ups, U = Pull-Ups, D = Dips

CONTROL				
	BL	**WK 2**	**WK 4**	**WK 6**
Subject 1	P - 18 U - 5 D - 10	P - 17 U - 6 D - 11	P - 20 U - 6 D - 12	P - 21 U - 6 D - 12
Subject 2	P - 15 U - 7 D - 12	P - 17 U - 6 D -14	P - 17 U - 6 D - 13	P - 15 U - 8 D - 13
Subject 3	P - 11 U - 1 D - 6	P - 11 U - 1 D - 5	P - 13 U - 2 D - 6	P - 12 U - 1 D - 6

Weights				
	BL	**WK 2**	**WK 4**	**WK 6**
Subject 1	P - 29 U - 10 D - 18	P - 31 U - 10 D -20	P - 34 U - 11 D - 23	P - 35 U - 13 D - 26
Subject 2	P - 33 U - 14 D - 22	P - 33 U - 13 D - 24	P - 35 U - 15 D - 25	P - 38 U - 12 D - 25
Subject 3	P - 18 U - 6 D - 13	P - 19 U - 7 D - 15	P - 18 U - 6 D - 15	P - 21 U - 9 D - 16

Yoga				
	BL	**WK 2**	**WK 4**	**WK 6**
Subject 1	P - 18 U - 4 D - 10	P - 21 U - 5 D - 12	P - 20 U - 6 D - 12	P - 21 U - 6 D - 12
Subject 2	P - 22 U - 4 D - 12	P - 25 U - 6 D - 15	P - 25 U - 6 D - 18	P - 27 U - 7 D - 19
Subject 3	P - 6 U - 0 D - 4	P - 8 U - 0 D - 6	P - 12 U - 0 D - 7	P - 15 U - 1 D - 9

DISCUSSION

After the six week experiment, the results were consistent with my hypothesis that yoga has the greatest effect on muscular endurance. I tested this by measuring the percent increase of maximum repetitions from baseline through six weeks of every subject on every exercise.

For the push-up tests the control group showed an overall average increase of 8.5%; the weight training group showed a 17.5% increase; and the yoga group showed an increase of 63.13%. This represents a 45.63% greater increase in the yoga subjects over the weight training subjects.

The control group showed an average increase of 6.67% on the pull-up tests versus 65.71% and 75% increases for the weight training group and the yoga group respectively. The difference in average percent increase between the weight training and yoga group for dips was a 9.29% greater increase for the yoga subjects.

For the dip exercise, the control group again had the lowest increase, followed by the weight training group and then the yoga group. There was an average increase of 9.44% in the control group, 27.05% in the weight training group, and 67.78% in the yoga group.

The total percent increase of maximum reps on all three exercises showed an overall average increase of 36.75% for the weight training group versus a 68.64% increase for the yoga group. This means that the overall increase in muscular endurance in the yoga group was nearly twice as much as the increase for the weight training group.

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