

CHIROPRACTIC EFFECTS ON ATHLETIC ABILITY

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ABSTRACT

The aims of this study were to take a group of athletes, measure each athlete's athletic ability through a series of quantitative tests, and place half the athletes on a specific individualized program of chiropractic care for twelve weeks. The objective in choosing the particular tests was to measure aspects of athletic ability that would be minimally affected by cardiovascular and strength training. All athletes were re-evaluated

through the same ability tests after six weeks and the treatment group was evaluated again after twelve weeks. The changes in athletic performance between the treatment and control groups were statistically analyzed pre- and post-testing proceedings.

Key Words: Sports; Physical fitness

INTRODUCTION

Most chiropractic research on athletes has consisted of sports injury and rehabilitation through various types of chiropractic care.

Morley examined the effectiveness of manipulation of the spine and/or lower extremities in the treatment of chronically injured athletes. His study shows that restoration of joint mobility and reduction of trigger points resulted in a noticeable improvement in ability to perform a particular athletic event and a dramatic reduction in pain.¹

Green's study utilized Cybex equipment to evaluate musculoskeletal joint dysfunction. Treatment consisted of chiropractic manipulation in conjunction with physical therapy and specific exercise programs, weights and other state-of-the-art equipment. The results were most favorable in the rehabilitation of various joint dysfunctions.²

What research has not conjectured is spinal manipulation to correct spinal joint dysfunction or subluxation on the well or asymptomatic athlete and the effect of this manipulation on athletic performance.

The aims of this study were to take a group of athletes, measure each athlete's athletic ability through a series of quantitative tests, and place half the athletes on a specific individualized program of chiropractic care for twelve weeks. All athletes were re-evaluated through the same ability tests after six weeks and the treatment group was evaluated again after twelve weeks. The changes in athletic performance between the treatment and control groups were statistically analyzed pre- and post-testing proceedings.

MATERIALS AND METHODS

Athletes were recruited from local athletic clubs and college athletic departments in the Quad Cities of Iowa and Illinois. To be considered for the study, subjects had to present with no acute or chronic debilitating injuries, must be involved in some athletic endeavor, and must give informed consent to participation. Ages ranged from 18 to 42. Half of the subjects were female. A wide variety of sports were represented including football, baseball, volleyball, track, cross-country running, weight lifting, body building, rugby, and aerobic dancing. Subjects were randomly assigned to treatment or control group.

Fifty athletes were recruited and gave informed consent of inclusion. All athletes underwent a Palmer College of Chiropractic New Patient Examination including case history and comprehensive physical examination. Athletes in the experimental group also underwent George's test, correlated spinal analysis, chiropractic analysis and x-ray examination consisting of the Toggle series, A-P thoracic and lumbosacral, lateral thoracic and lumbosacral.

Athletic ability was divided into five categories: agility, balance, kinesthetic perception, power, and speed reaction. A series of tests to measure athletic ability were performed by both the control and experimental group. Each test is designed and documented to quantitatively evaluate one of the five categories of athletic ability. These tests and their objectives were:

SIDE STEP TEST: to measure the rapidity by which lateral movement can be made and changed to the opposite direction.³

DODGING RUN: to measure the agility of the performer in running and changing direction.⁴

RIGHT BOOMERANG RUN: to measure the agility of the performer in running and changing direction.⁴

MODIFIED BASS TESTS OF DYNAMIC BALANCE: to measure the ability to jump accurately and maintain balance during movement and after movement.⁵

VERTICAL POWER JUMP: to measure pure power of the legs in jumping vertically.⁶

STANDING BROAD JUMP: to measure the athletic power of the legs in jumping forward.⁷

DISTANCE PERCEPTION JUMP: to determine the ability of the performer to perceive distance by concentrating on the effort involved in a jump.⁸

HORIZONTAL LINEAR SPACE TEST: to measure the kinesthetic ability to determine a specific position along a horizontal line.⁹

NELSON HAND REACTION TEST: to measure the speed of reaction with the hand in response to a visual stimulus.¹⁰

NELSON SPEED OF MOVEMENT TEST: to measure combined reaction and speed of movement of the hands.¹⁰

NELSON CHOICE OF RESPONSE-MOVEMENT TEST: to measure ability to react and move quickly and accurately in accordance with choice stimulus. It is believed that this type of test simulates movement patterns found in a number of sports.¹¹

The objective in choosing the preceding tests was to measure aspects of athletic ability that would be minimally affected by cardiovascular and strength training.

The experimental group was then placed under an individualized program of chiropractic care while the control group was scheduled to be re-tested in six weeks and released. Evaluation of spinal joint dysfunction and subluxation complexes for the experimental group consisted of Palmer upper cervical and Gonstead x-ray analysis, thermoscribe pattern analysis, Derefield leg-check, static palpation, and motion palpation. All methods of analysis fall within the guidelines set by Palmer College of Chiropractic Clinic and Research Departments. Adjusting procedure and frequency were determined on a patient to patient basis, based on analysis and patient response. Adjusting techniques utilized were Toggle-recoil, Gonstead, Diversi-

fied, and Thompson. Following six weeks of chiropractic care, both the experimental and control (non-care) group were re-evaluated utilizing the same pre-care athletic ability tests. The experimental group continued under chiropractic care for an additional six weeks and again were evaluated.

RESULTS

After six weeks, both groups, control and experimental, had a change in the average score on each of the 11 tests. The 11 tests are quite different and scores on them are hard to compare directly as they are scored in different units and with some tests a positive and others, a negative change was predicted. It seemed most appropriate to compare the change in average score for the two groups, in relation to each of the 11 tests, keeping in mind that any change could be in the predicted or opposite direction.

In the control group there was a change in the average score in the predicted direction in 8 of the 11 tests. In three cases, the changes were in the opposite direction. Of the 11 changes, 8 involved a change of less than 3 percent. If the signs are adjusted so a change in the predicted direction has a positive sign and a change in the opposite direction has a negative sign, sum the 11 average changes, divide by 11, an Index of Average Athletic Ability Improvement (IAAAI) can be derived as a percentage of improvement. In the case of the control group, the IAAAI is 4.5 percent (Table 1), which might reflect the benefit of having a second opportunity to perform the same tests.

In the experimental group, the average changed in the predicted direction on all 11 tests, and all the improvements were over 3 percent. The derived

Table 1: Comparison of Average (Mean) Scores on 11 Athletic Ability Tests, Before and After A Six-Week Time Period.

Test:	Control Group: n=22				Experimental Group: n=24			
	Begin. Aver.	End. Aver.	% of Diff.	Direction of Diff.	Begin. Aver.	End. Aver.	% of Diff.	Direction of Diff.
1. Side Step	26.59	26.98	1.45%	Predicted	27.77	30.29	9.00%	Predicted
2. Dodging Run	6.10	5.93	-2.68%	Predicted	5.90	6.50	-6.77%	Predicted
3. Right Boom	13.30	13.00	-2.22%	Predicted	12.83	12.15	-5.26%	Predicted
4. Saas	80.55	78.20	-2.93%	Opposite	70.08	87.20	24.44%	Predicted
5. Dist. Jump	6.54	5.20	-6.35%	Predicted	5.26	4.56	-7.50%	Predicted
6. Sorts. Sp.	2.02	1.56	-23.03%	Predicted	1.82	1.56	-15.01%	Predicted
7. Vert. Jump	11.64	11.53	-0.88%	Opposite	14.08	14.69	4.29%	Predicted
8. Stand. Jump	70.57	70.50	-0.10%	Opposite	79.25	81.96	3.42%	Predicted
9. Hand React.	3.95	3.92	-0.80%	Predicted	4.02	3.26	-18.91%	Predicted
10. Speed/Move.	9.69	8.19	-15.47%	Predicted	9.57	8.43	-11.97%	Predicted
11. Choice/Resp.	2.09	2.08	-0.87%	Predicted	2.10	1.90	-9.72%	Predicted

Table 2: Comparison of Average (Mean) Scores on 11 Athletic Ability Tests, Before and After A Twelve-Week Time Period. (Control Group Data is The Same Six-Week Data in Table 1)

Test:	Control Group: n=22				Experimental Group: n=22			
	Begin. Aver.	End. Aver.	% of Diff.	Direction of Diff.	Begin. Aver.	End. Aver.	% of Diff.	Direction of Diff.
1. Side Step	26.59	26.98	1.45%	Predicted	26.70	30.10	12.73%	Predicted
2. Dodging Run	6.10	5.93	-2.68%	Predicted	6.06	6.53	-6.60%	Predicted
3. Right Boom	13.30	13.00	-2.22%	Predicted	13.11	12.28	-6.33%	Predicted
4. Saas	80.55	78.20	-2.93%	Opposite	69.00	86.75	25.72%	Predicted
5. Dist. Jump	6.54	5.20	-6.35%	Predicted	5.41	4.74	-12.47%	Predicted
6. Sorts. Sp.	2.02	1.56	-23.03%	Predicted	1.69	1.24	-26.67%	Predicted
7. Vert. Jump	11.64	11.53	-0.88%	Opposite	13.34	14.28	7.33%	Predicted
8. Stand. Jump	70.57	70.50	-0.10%	Opposite	75.96	79.24	4.31%	Predicted
9. Hand React.	3.95	3.92	-0.80%	Predicted	4.06	2.83	-30.46%	Predicted
10. Speed/Move.	9.69	8.19	-15.47%	Predicted	9.90	6.15	-37.86%	Predicted
11. Choice/Resp.	2.09	2.08	-0.87%	Predicted	2.10	1.96	-11.46%	Predicted

IAAAI is 10.57 percent (Table 1).

The control group was disbanded after the first six week period, so further comparison of their improvement is not available and it is not possible to rule out the improvement as a factor of learning.

Of the 24 subjects in the original experimental group, 20 agreed to continue in the experimental program for another six weeks. At the end of the second six weeks, the subjects were retested. On all 11 tests, they showed additional improvement (Table 2). The 12-week IAAAI was 16.7 percent.

T-tests were performed on the pre and post scores on the individual tests. The control group showed significant improvement ($p < .0005$) on the Dodging Run and on Speed/Movement.

After six weeks and twelve weeks, the experimental group showed significant improvement ($p < .0005$) on all the tests except the Distance Jump, the Horizontal Linear Space Test, and the Standing Broad Jump.

DISCUSSION

Athletic ability is a very broad term that can have varied interpretation. This study interpreted athletic ability as the areas of performance that are not directly enhanced through routine training programs; that is, the inherent ability of the athlete. Since there is no single test to evaluate athletic ability, it was defined as the combination of five subcategories: agility, balance, kinesthetic perception, power, and speed/reaction time. As there are specific quantitative tests to measure each sub-category, objective parameters could be used to measure the level of athletic performance pre and post chiropractic care. By comparing the change between the scores of the first and second and first and third testing procedures, we could evaluate the effectiveness of the chiropractic care on the athletes as it related to their change in scores.

The objective of this study was to assess the change in overall athletic ability, not so much each specific category of athletic ability. The focus was more on the average percent change of all eleven ability tests which is represented by the Index of Average Athletic Ability Improvement. Both groups, control and experimental, had changes in overall average scores on the 11 ability tests. Graph 1 indicates the experimental group showed a 6.12 percent greater overall improvement than the control group after six weeks. If we can assume that chiropractic care is the cause of the change in performance, we must assume that the diagnosis and correction of subluxation complexes in the subjects are the reasons for their improved performance.

Since all subjects presented asymptomatic with no acute or chronic problems, results support that the subluxation complex can exist without the manifesta-

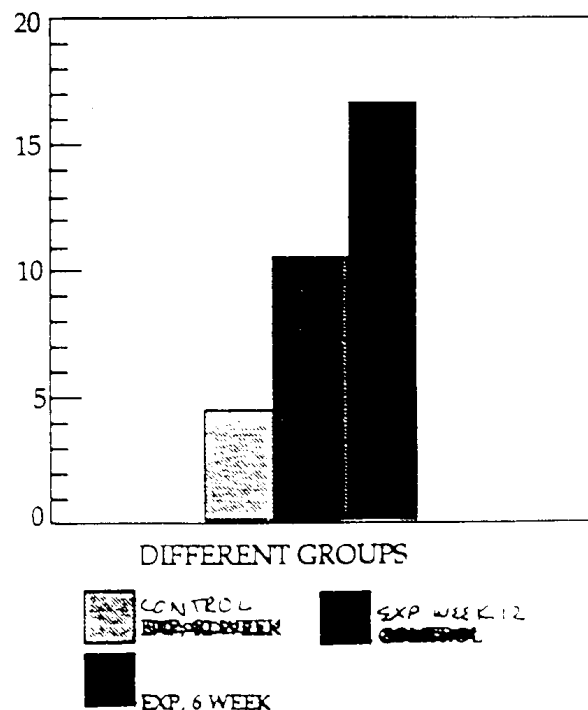
tion of symptoms and still cause a decrease in the body's ability to perform to its potential. The data also supports that the correction of the subluxation complex enables the body to function and perform at a higher level. Of course, there is extensive literature with varied theories on how and why this takes place. More research is needed in this area but the physiological reasons why chiropractic care enhances athletic performance were not the goal of this study.

On the subject of professional sports and world-class athletic competition, this raises another interesting question. How many professional and world-class athletes have been performing well below their true potential due to existing asymptomatic subluxations, and believe they are at peak performance because they are fit, well-trained, and are void of symptoms and debilitating injury. One can only speculate the rewriting of the record books should all world-class and professional athletes undergo a program of chiropractic care.

Another question to be considered is when does the athletic performance improvement plateau? As Graph 1 demonstrates, there was continued improvement of the experimental group after 12 weeks of chiropractic treatment. In fact, there was more overall average improvement after 12 weeks than after 6 weeks. Whether improvement would ever cease is still unknown and not within the time limitations of this study. Logically speaking, it would seem that improvement would have to level off at some time, but more research is also needed in this area.

GRAPH 1

Index of Athletic Ability Improvement



CONCLUSION

It has been shown that there may be a potential for enhancing athletic ability through chiropractic treatment, ~~when the goal of that treatment is to diagnose and correct existing subluxation complexes, symptomatic or not.~~ For the experimental group of athletes that this study included, the results were encouraging.

Pilot projects, especially ones that are clinical in nature, often suffer from design problems. This one is no exception. Completely asymptomatic athletes were difficult to obtain. The control group should have been continued through the entire 12 weeks.

Several questions have arisen from this pilot study: Does the chiropractic adjustment to remove subluxation complexes enhance athletic ability? How much can the athlete improve over an extended duration of treatment? Clinically, for the experimental subjects in this study, the answer to the first question is "yes". The second question can only be answered by further experimentation.

Good science requires replication. It is our hope that this pilot study will become the basis for more research. Emphasis on athletic competition in this country has escalated to disproportional heights in dollars and in personal sacrifice. Potential rewards have pushed the competitive athlete to disregard physical consequences to get the competitive edge. Hopefully, with further research and public awareness, athletes will realize there is a natural method to enhance athletic performance.

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