

The Treatment of Chronic Athletic Injuries of the Low Back and Lower Extremity Utilizing Manipulation

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INTRODUCTION

The purpose of this study was to determine whether spinal manipulation and/or lower extremity manipulation could be effective in a specific clinical situation — the treatment of chronically injured athletes.

It was deemed important to set up a small pilot study that reflected exactly how a practitioner would deal with an injured athlete. Past trials of manipulation have been criticized because they did not resemble what actually occurs in a clinical situation. Participants were restricted to a few standard manipulations. They were not allowed to treat the participating patient as they normally would have(1).

MATERIALS AND METHODS

It is essential at this point to define some terms that are well understood in the chiropractic profession, but which may cause confusion to those practitioners not familiar with manipulation.

Manipulation – Manipulation includes many components:

1. *Specific Vertebral Manipulation*

This is defined as the manual application of a controlled force that is applied to an osteoarticular segment, causing a movement of the joint outside the physiological range but within the limits of anatomical integrity, and usually accompanied by a cracking noise. The thrust is directed in a precise direction, with adequate preparation; it is usually

- unique (not more than one move per visit at a particular level) (2).
2. *Specific Extremity Manipulation*
As above, but not usually accompanied by a cracking noise.
 3. *Mobilization*
This is a general, non-specific technique for inducing movement into a joint. The extremities are usually used as levers (3).
 4. *Soft Tissue Manipulation*
This includes the various types of massage of the soft tissues of the body, i.e., muscles, tendons, and ligaments. The types of soft tissue manipulation include kneading, stroking, and compression techniques. This study employed the compression technique. Basically, this involves using one of the fingers to maintain a firm pressure on a specific point on soft tissue. An oscillatory type of movement of the finger may also be used (4).

The effects of vertebral manipulation are beyond the scope of this paper. Basically, the effects are mediated through the nervous system, and the circulatory system. For an excellent review of this, please refer to «Modern Developments in the Principles and Practice of Chiropractic», by S. Haldeman, D. C., Ph. D., M. D. (5), and «Chiropractic Theories», by R. Leach, D. C. (6).

Trigger Points – This is a focus of hyperirritability in a tissue that, when compressed, is locally tender and, if sufficiently hypersensitive, gives rise to referred pain and tenderness, and sometimes to referred autonomic phenomena and distortion of proprioception. Types include myofascial, cutaneous, fascial, ligamentous, and periosteal trigger points (7).

Motion Palpation – This is the detection, by hand, of articulations of the body, that have a normal range of motion, a decreased range of motion, or an increased range of motion. This is the examination technique that is used to determine what articulations are to be manipulated (8,9,10).

Eighteen athletes were chosen who had a chronic, sport related injury. The injury involved the low back and/or a lower extremity. It was present for at least one month, and had not responded to previous physiotherapy and/or rest therapy. The injury was such that it kept the athletes from performing their particular event.

After taking a normal history, all athletes were examined as shown below:

General postural evaluation.
Range of motion studies of the spine and lower extremities.
Appropriate orthopedic tests.
Reflexes.
Sensation.
Muscle tests of the involved area.
Search for trigger points.
Motion palpation of the spine and lower extremities.
General physical examination.

Following examination, it was decided to manipulate the low back, the lower extremity, or both. This decision was based upon the information obtained in the examination.

The age range of the participating athletes was from 16 years to 42 years.

The mean age was 29.8 years.

The mean number of visits before an improvement in symptoms was noted was 7.4.

It can be seen from table I that, of the 18 patients —

9, or 50% were able to return to their activity, with no restriction.

7, or 38.9%, were able to return to their activity with some discomfort after training. — but no restriction on competing

2, or 11.1%, showed no improvement.

Discussion — There are two types of problems that have been dealt with in this study. The first involves low back pain and decreased mobility. Exam procedures listed will determine which structures are involved. If the structures involved are articular, motion palpation will determine which articulations are affected by showing the examiner how much motion is present.

Motion palpation will also tell the examiner whether or not the therapy has been effective in correcting the articular problem. It relies upon several facts:

1. The normal lumbar vertebral joint has four possible ranges of movement.
 - (1) Flexion
 - (2) Extension
 - (3) Rotation
 - (4) Lateral flexion

TABLE I

Results — The results of this study are tabulated below.

N	EVENT	SEX	a			b						c						
			RESULTS	ARTICULATION INVOLVED			MUSCLE INVOLVED											
			1	2	3	L	SI	HP	K	AN	F	PV	HS	Q	AD	GS	TA	GL
1	DISTANCE	F	x					x					x		x			x
2	DISTANCE	M		x							x						x	
3	DISTANCE	M	x			x												x
4	DISTANCE	M	x			x	x						x		x			
5	DISTANCE	M	x										x				x	
6	DISTANCE	M		x		x	x								x			
7	DISTANCE	M	x			x	x										x	
8	DISTANCE	F	x												x			
9	DISTANCE	F			x						x							
10	SPRINT	M		x		x	x					x						
11	SPRINT	M		x		x							x		x			
12	SPRINT	M	x			x							x					
13	SPRINT	F	x															x
14	L. JUMP	M		x			x		x						x			
15	L. JUMP	M			x						x	x						
16	WT. DSC.	M		x		x		x									x	
17	SQUASH	M		x					x									
18	FOOTBALL	M	x			x			x									
			4F															
			14M	9	7	2	9	6	1	3	1	3	1	5	3	5	3	2

a

Results

1 = pain-free with no restrictions on competing

2 = pain-free with some discomfort after hard training or competition, but with no restrictions on competing

3 = no improvement

b

Articulation involved

L=lumbar spine

SI=sacroiliac joint

HP=hip joint

K=knee joint

AN=ankle joint

F=foot

c

Muscle involved

PV=paravertebral

HS=hamstrings

Q=quadriceps

AD=adductors

GS=gastroc-soleus

TA=tibialis ant.

GL=gluteals

2. It has been shown that the last two movements probably do not occur in isolation, but occur together.
3. It has also been shown that lateral flexion of the lumbar spine will cause the spinous processes to approximate the concave side i.e. move towards the side to which the spine is laterally flexed (11).
4. The normal, unrestricted vertebral articulation has a springy feel at the end of its range of motion. It has a slight give to it, and is not painful (8).
5. Conversely, the fixated vertebral articulation has a hard end feel. It may or may not be painful (8).

Thus, the restricted joint, or joints, can be checked after manipulative treatment, to see if the range of motion has improved.

It can be appreciated that a chronic back pain can be aggravated by running. But can a fixated low back with no pain in some way contribute to injuries in the lower extremity?

It must be remembered that excessive vertical force transmission (VFT) can possibly lead to lower extremity problems (12). VFT depends, among other things, upon the angle at which heel strike occurs (13). This depends upon muscular control of the lower limb, and it has been shown that muscular activity is affected by fatigue (14).

If we have a lumbar spine that is not allowing for proper movement, the entire gait cycle can be affected, and possibly the individual may be more susceptible to leg injury, due to improper attenuation of VFT.

There is another area of the skeleton that may contribute to faulty mechanics of running — the Sacroiliac joint (14).

There is some controversy about whether this joint moves. However, recent articles have indicated that it does. Clinical experience with motion palpation and manipulation strongly suggests that this joint moves (15, 16, 17, 18).

The point to be emphasized here is that the mechanics of the lumbar spine and the sacroiliac joint may contribute to lower extremity problems in athletes.

The second type of problem that this study dealt with was lower extremity pain. Exam procedures listed will determine which structures are involved.

Trigger points or tender painful areas were located in tendons and muscles and treated by compression massage.

The following information regarding trigger points was taken from the book *Myofascial Pain and Dysfunction — The Trigger Point Manual*, by Travell and Simons (7):

- (1) Trigger point are very common, and can cause symptoms such as restriction of motion, muscle weakness, and severe pain.
- (2) Latent, long standing trigger points can be activated by minor overstretching of muscle, overuse, or chilling.
- (3) Trigger points may influence muscles at a distance. This can lead to confusion in diagnosis.
- (4) Often the response to therapy is immediate. There is a reduction in pain, and an improvement in motion of the involved muscle.

It was interesting to observe that many of the athletes were not aware of any pain in some of the muscles that were treated, until pressure was put on the affected areas.

This is in agreement with the concept of latent or silent trigger points suggested by Travell and Simons (7).

It was also observed that some of the most intensely painful trigger points were found in the adductor muscles. The adductors are unique during the running gait because they are continuously contracted, due to the float phase of gait (19).

Now, very close attention is paid paice to the adductors when treating athletes. Another observation was made when searching for trigger points. Invariably, the muscle containing the trigger points tested normally for strength, and was pain free (20).

However, the trigger points were most often found at the origin of the muscle; very often found at the insertion, and rarely found in the belly.

This may be due to the fact that the area of origin and insertion is a transitional area for histological tissue type, and is more susceptible to injury (21).

CASE PRESENTATION

Patient Number One — This patient was a 46 year old female marathon runner. She had had a chronic back problem and left leg pain for 3 years. Prior to the onset of the low back and leg pain, she had held a world record in the marathon for ther age group.

The pain prevented her from running at a competitive level, and she was advised to give up running.

Previous treatment was massagc and pain killers.

Relevant Exam Findings:

Extreme fixation of the left Sacroiliac joint.

Trigger points in the left Gluteus Maximus, left medial hamstrings, and left adductors — all at the insertions.

Improvement was slow — 10 visits passed before a noticeable improvement occurred.

This patient is back competing now, and recently placed second in the Athens Marathon — for her age group.

Patient Number Five — This patient was a 24 year old marathon runner who had right achilles tendinitis and pain of the left hamstring. It had been present for 3 months, and prevented him from training. Prior to the injury, he had qualified to be invited to run in the upcoming New York Marathon. He had to decline because of this injury. He had also spent 4 years at an American university on a scholarship for his running ability.

Previous treatment had included physiotherapy and had been somewhat successful, but not enough to enable him to train.

Relevant Exam Findings:

Pain upon palpation of the right achilles tendon.

Pain upon palpation of the insertion of the left medial and lateral hamstring.

Pain upon testing the left medial and lateral hamstring - equally painful.

Some fixations of the lumbar spine on the left.

A dramatic improvement was noted after 6 treatments. He was gradually building back to his pre-injury training schedule, with no problems.

Patient Number Ten — This patient was a 16 year old sprinter who had low back pain and stiffness for 7 weeks.

He was unable to compete effectively.

He had not responded to rest or heat.

Relevant Exam Findings:

Fixations in the lumbar spine bilaterally.

Fixations in both Sacroiliac joints.

Review of his running style on video showed very little rotary movement of the upper body.

An improvement in mobility was noted after 4 visits. There was also a marked and rapid decrease in pain and stiffness. He was able to train and compete again.

Patient Number Seven — This patient was a 40 year old long distance runner who had left inguinal pain of 2 years duration. It interfered with his training.

Previous treatment included ultrasound and heat.

Relevant Exam Findings:

Fixation of the left sacroiliac joint, and right lumbar spine.

The left adductors were weak when tested.

The left adductors were extremely painful when palpated at the origin.

After 5 visits there was a noticeable decrease in the adductor tenderness. He was able to run again without pain after a further 7 visits.

Patient Number Fifteen — This patient was a 21 year old male long jumper who had pain in the right ankle after training or competing. His right foot was his take-off foot. He had been one of the best jumpers in the area.

Previous treatment had included heat, ultrasound and massage.

A bone scan had been negative.

Relevant Exam Findings:

Pain upon pressure over the lateral talo calcaneus, and calcaneo cuboid articulations.

Treatment consisted of compression massage.

After 10 visits, there was no change.

As soon as he would train, the pain returned. It was suggested that perhaps his style was faulty.

Patient Number Sixteen— This patient was a 41 year old weight lifter and discus thrower. He was also a coach for the discus. He had left inguinal pain, and left hip pain. He also had decreased mobility of his left hip.

The pain and restriction prevented him from competing or training normally.

Previous treatment included ultrasound and rest, manipulation under anaesthesia, hydrotherapy, and fitness training.

He was currently taking brufan daily for the pain.

Relevant Exam Findings:

Fell from a tree and fractured left femur-age 9.

Fixation of the lumbar spine on the left.

Pain upon pressure of the left tensor fascia lata, left adductors, and left lateral hamstrings-all at the origins.

Pain upon pressure of the left gluteus medius.

Weakness upon testing of the left iliopsoas, left quadriceps, left lateral hamstrings, left tensor fascia lata, left adductors, and left gluteus medius.

Positive Fabere test left.

X-ray evidence of degeneration of the femoro - acetabular joint.

After 7 visits there was a noticeable increase in the range of motion of

the hip. It took another 12 visits before he could reduce the bruise to once a week.

He can now train normally, and occasionally feels discomfort if he trains hard.

CONCLUSION

It has been shown that there may be a potential for treating chronic athletic injuries of the low back and lower extremity by manipulation. For the small group that this study included, the results were very encouraging.

There were problems in the experimental design. They arose due to the difficulty in obtaining participants. Hopefully, enough interest will be generated so that a follow up study can be done, with better conditions and more participants.

Several questions have arisen from this pilot study. Can injuries in athletes be related to decreased mobility of the lumbar spine and the sacroiliac joint? Does the spine's mobility affect the biomechanics of running sufficiently to contribute to leg injuries?

The author is currently involved in a research programme at the University of Surrey, England, to try and answer these questions.

There is now worldwide interest in the use of manipulation for treating athletes. The United States, Canada, and Australia have officially appointed team chiropractors, and the results have been very good.

Hopefully, there will be an interest in Europe.

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