



Holladay

PHYSICAL MEDICINE

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Disc Disease

Non-Surgical Treatment of the Intervertebral Disc



**Spinal
Decompression
Center**

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Holladay Physical Medicine – Spinal Decompression Center
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Before surgery, consider this!

Patient Intake:

Patients who have had surgery recommended for spinal decompression are referred here first to see if the surgery can be avoided. The cost of this entire procedure is about 1/15th the cost of surgery for the condition. Patients often are able to remain at work or return to work in less than a week under this procedure whereas patients who have surgery often miss up to 6 week of work.

Patients are admitted for the procedure based on several factors. A variety of health care providers refer patients for this procedure. On referral, patients are given intake forms that measure the level of the symptoms. These measurements serve to demonstrate improvement during the course of the procedure. Only patients whose symptoms measurements reach a minimum threshold are admitted for the treatment.

For patients who have already had surgery and continue to have symptoms, this procedure has proven effective in continued decompression of the spine and relief of symptoms.

The Non-Surgical Solution for
**HERNIATED
DISCS**

INTRODUCTION:

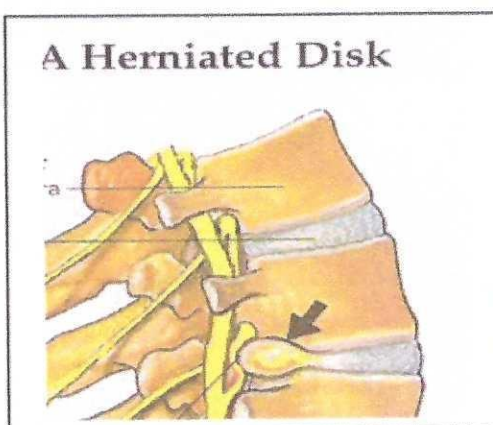
Welcome to a new concept for Non-Surgical Spinal Decompression. The Decompression Traction System (DTS) is an innovative treatment system for low back pain, sciatica, neck and arm pain. DTS is effective, safe and cost-effective, and offers hope for the millions of people who suffer from neck and low back pain every day.

Public demand and acceptance by chiropractors, physicians, insurance carriers and therapists is driving the expansion of Spinal Decompression Centers and is making it the standard of care for chronic neck and back pain. For sufferers of neck, low back pain and chronic low back pain, DTS can be the answer to ending years of discomfort.

Cervical and lumbar disc problems such as herniations and degenerative disc disease, and even injuries brought on by sports or work can be treated easily, comfortably and non-surgically with DTS.

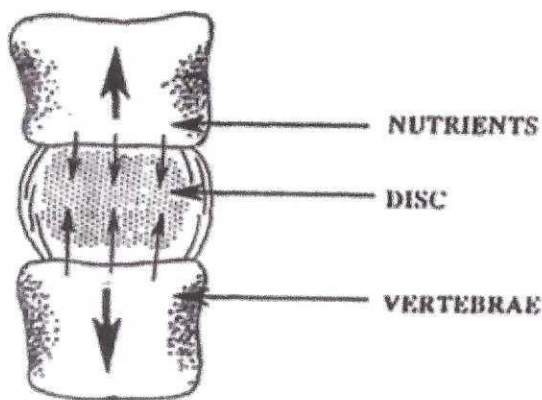
AXIAL DISC DECOMPRESSION TRACTION THERAPY

Axial Disc Decompressive Traction Therapy



Research indicates the discs may be responsible for a significant

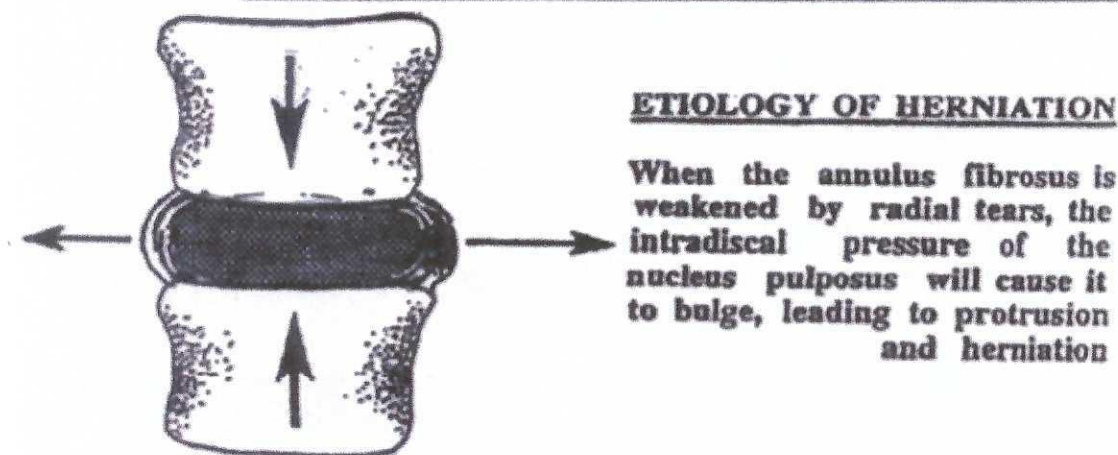
percent of lumbar/leg and neck/arm pain. Simply stated, compression (and flexion) increase end-plate, disc (and facet) stress and can lead to inflammatory responses, damage, annular compromise (circumferential and radial tears) and possible extrusion of nuclear material. Research also indicates not all disc pain can be diagnosed by static imaging (MR) nor do the majority of those with MR findings have pain (as many as 29% of prolapsed discs are not generating pain at the time of the MRI). In theory many mechanical discogenic pathologies can be treated with DTS axial decompression. (For our purposes decompression refers to a reduction of intradiscal pressure and a centripetal effect that improves osmotic exchange, circulation and thus healing).⁴⁴ Since the disc is an avascular structure, it doesn't receive fresh blood and oxygen with every beat of the heart. Bogduk reports nutrient supply to the disc is "barely adequate for normal requirements" and the disc's inner portion has the most precarious nutrient supply.⁴² Discs require diffusion created by motion and pressure reducing positions to restore nutrients and enhance healing.



Typically back pain with referred pain is an indication for decompression and as those referred symptoms diminish, it is an excellent clinical sign treatment is effective. However studies suggest some prolapsed and severely degenerated discs may have

negative IDP (intradiscal pressure) due to a disturbed hydrostatic mechanism. In these cases creating negative IDP by traction to gain a centripetal effect becomes more nebulous (but as long as no increase of symptoms occurs treatment is still warranted for a test period of a few weeks). Generally in cases with a patent annulus (the disc's outer annulus is still 'intact') centralization of pain can be an excellent clinical indication the treatment is viable. 1 Centralization is a recognized prognosticator of good clinical outcomes in disc cases. Patients often report centralization during or soon after a DTS treatment, thus giving the clinician a viable indicator for a good prognosis and reducing the potential for surgical intervention.

COMPRESSION "DECOMPRESSION" * & HERNIATION



Recumbent positions (both prone and supine) decrease intradiscal pressures in comparison to standing and sitting 3. However, focused, mechanical Y-axis traction improves the discs' healing response via decompression more quickly and with fewer disuse side-effects than prolonged bed rest. There is a suggestion in the literature that extruded nuclear material may be "drawn in" by the reduction of intradiscal pressures and/or the tightening of the posterior longitudinal ligament. This concept however is not

uniformly accepted due to the limited number of studies able to differentiate the natural history of disc herniation vs. the direct effect of treatment. Of course whether the disc is the sole source or just a component of the pain is often impossible to prove in many cases.

Many authorities conclude it's not so much something is structurally improved, but an inflammatory response to injury or foreign matter is reduced. We must keep in mind also that many studies suggest less than 5% of patients are good surgical candidates and many back surgeries (and injection procedures) fail to show any long-term value. 5 Thus passive non-surgical procedures that limit side effects and allow progression to active care should be the focus of treatment in that population of patients who fail to improve on their own.

As a passive therapy, decompression has definite limitations in curing chronic musculoskeletal conditions. Its value is most specifically in helping discogenic back/neck and referral pain, not acute muscular back pain or those related to posture. (other types of therapeutic intervention may be more appropriate). Loss of local muscle control & endurance, abnormal posture, cyclical flexion with compression (not to mention genetic influences) are the probable source of most disc damage and degeneration. 48 A passive therapy therefore has little effect on truly fixing the underlying problem.

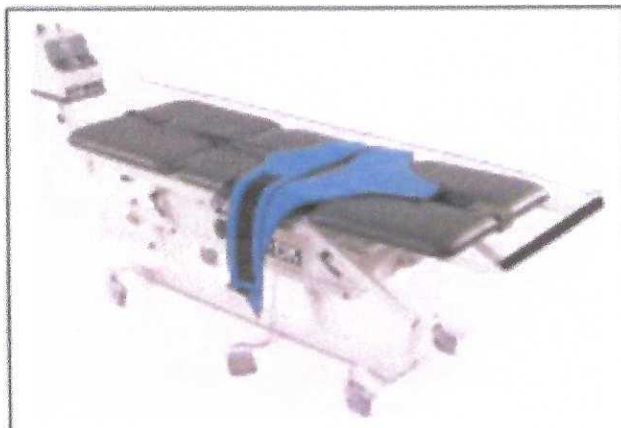
However, a temporary reduction in intradiscal pressure through cyclical stretching can apparently have a profound effect on the healing process via increased contact with the blood/nutrient supply and cellular migration (so called phasic, non-linear effects)

as well as neurological changes generated by soft tissue stretch. Decompressive traction of a “compressive disc lesion” matches treatment to diagnosis and as such is a very reasonable passive therapy.

THE PROCEDURE



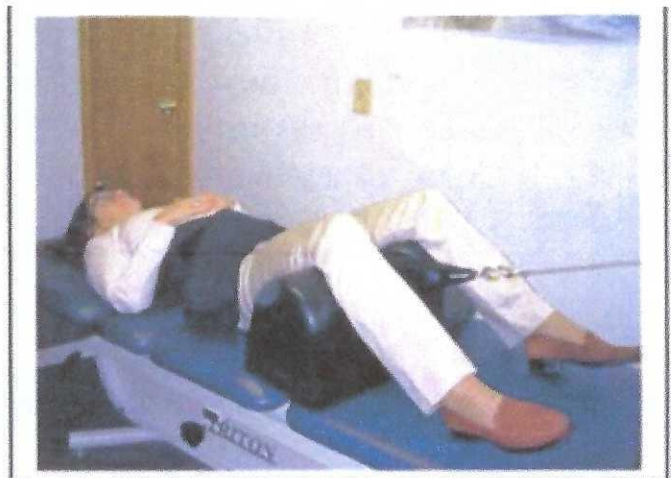
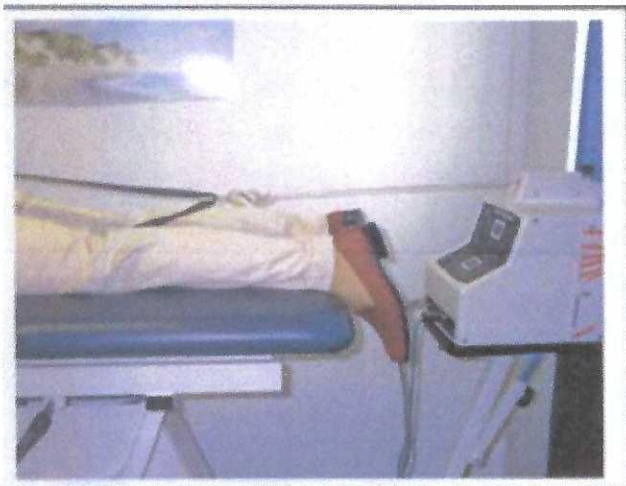
Patients who are qualified to enter the Spinal Compression Center are measured and fitted to the treatment unit. Both prone and supine protocols are available for lumbar decompression. Cervical decompression is done in the supine position. Precise positioning for each patient condition is critical for outcomes to be in the high 80% region. Compliance is expected at 100% from every patient who is accepted into the center so that excellent results can be a reasonable expectation.



The specific treatment protocol is determined by the doctor at the intake examination and evaluation. The computer controls the variations in the traction allowing for spinal decompression and eliminating muscle reaction and subsequent compression typical of traditional or conventional traction devices. The preprogrammed patterns for ramping up and down the amount of axial distraction allows for complete levels of spinal decompression and disc hydration.



Proper patient positioning and specific technique ensure expected results.





FREQUENCY:

The frequency of treatment has been set based on the outcome measurements following a study of a variety of protocols. We use the frequency that produces the best long term results and thus the least amount of cost for the patient. When any patient is qualified for the treatment following the intake examination, it means that we expect that patient to respond very favorably by strictly following the protocol completely. Once any patient begins the treatment, we expect complete compliance to the treatment schedule. Partial compliance has shown to produce limited results, extended time in treatment, increased cost of treatment and frustration. It is critical to understand the treatment protocol and frequency in order to commit to it. When followed completely, our results are extremely good.

Treatment Protocol:

Weeks 1, 2	Daily for 6 days
Weeks 3, 4, 5, 6	3 per week alternate days
Weeks 7, 8, 9, 10	2 per week
Weeks 11, 12	1 per week

Patients who have been admitted to the program with a qualified condition and who have followed the protocol completely have responded 86.8 % of the time.

Following the completion of the protocol as above, most patients choose to continue with preventive treatment once each month or two. Our 5 year follow-up study on patients who have done this prevention shows a very low 6% recurrence of symptoms.

INDICATIONS:

Patients who have any of the following symptoms may qualify for the procedure. Specific measurements and findings will be evaluated to see if your condition will respond favorably. Only patients with conditions that are very likely to respond are admitted into the centers for treatment.

- Neck Pain
- Arm Pain
- Cervical Disc Disease
- Low Back Pain
- Sciatica
- Leg Pain and Numbness

- Lumbar Disc Disease
- Pre-Surgical Patients
- Post-Surgical Patients with Failed Back Syndrome

MORE

Decompressive traction is to be contrasted from mobilization traction methods by 1) the characteristics of the “pull”, 2) adhering to protocols [shown to more consistently create the effect], 3) the intention of doing more than mere mobilization of tissue.

Obviously the force, time, position and numerical reproducibility necessary to create significant decompression are not accommodating to “hands-on” treatment methods.

Any low back/leg or neck/arm pain syndrome generated from the discs and facets (usually of gradual onset > 1 week duration) not related to a disease process, canal stenosis or acute strain/sprain injury is theoretically treatable by this therapy. Manual axial traction should be utilized as a preliminary screening test for tolerance. The initial acute inflammation stage (very guarded movements) should be reduced by other means, in most cases, prior to beginning DTS. Contraindications are similar to manipulation, however since mechanical 'stretch' creates no impact, osteoporosis (<45% loss) may not be directly contraindicated. (This holds true overall for frail and elderly patients who could potentially be injured by manipulative thrusts). Disc fragmentation, calcification, severe arthritis, spondylolisthesis (+2 grade); pregnancy (>3 months) and any surgical intra-spinal appliances are all relative contraindications. Inter-spinal appliances are direct contraindications as is any bone compromising disease.

Our clinical findings suggest the DTS will create a relatively quick initial response. Patients who will do well tend to feel a sense of relief (which can be direct pain cessation or a centralization of pain) within 2-6 sessions. Full relief, if attainable, will usually not exceed 18 sessions. (Rarely a stubborn pain syndrome may continue to improve slowly over 18+ sessions). Often patients will be treated 4-6 sessions and be relieved enough to start active rehab (the Stabilizer™ Pressure Biofeedback initially). Their DTS treatments may continue for several further sessions before discontinuing or reducing the frequency. Some patients will improve initially then experience a worsening with continued treatment. If reduction of force/time or active rehab fails to resolve the problem (and surgery is not a serious option), beginning the DTS again after a 1-2 week layoff can often renew the improvement. Typical frequency for treatment is 3-5 times per week. (My experience suggests it can also be an excellent supportive/palliative treatment for those cases where pain relief is marked but prone to exacerbations even in the face of active rehabilitative measures. This is not to suggest 'therapy dependence' but some patients may be best served with a supportive type of care).

CONTRAINDICATIONS:

Some conditions do not respond to the process and some would be aggravated. These conditions are offered other avenues of care. Current plain film x-rays are required to rule out contraindications before admission to the centers.

- Spinal Tumors

- Spinal Infections
- Vertebral Fractures
- Ankylosing Spondylitis
- Spondylolisthesis (for lower back)
- Severe Medical Conditions
- Pregnancy (for lower back)
- Osteoporosis
- Spinal Fusion with Retained Hardware
- Cauda Equina Syndrome
- Loss of Bowel or Bladder Function

Healing of the Intervertebral Disc

Several factors have been shown to be critical in the healing of the disc. Each is important to achieve actual healing and not just the reduction of pain.

1. Decompression
2. Control of the Inflammatory process
3. Restoration of function of the spinal motor unit
4. Removal of aggravation
5. Nutritional Support

Post treatment MRI studies show disc disease is a reversible process. Complete compliance to each of the five items above can create an environment for best results. The first three items require professional management and the next two require commitment by the patient. Life style changes must occur to prevent the disc from becoming inflamed again. Adherence to the entire nutritional protocol is necessary to make this a reality. There are three basic

steps in the nutritional protocol: First, elimination of toxicity; Second, proper consumption of whole foods and supplements as needed and Third, correction of the auto-immune response reaction. The nutritional recommendations are a critical element to completing the reversal of the disc disease, growing new cartilage and preventing a chronic problem. As this is a process involving many life style changes, you will need to commit time each day to study this concept. You need to do it. If you did not, you would not have disc disease.

First, go to our web site: www.holladayphysicalmedicine.com and select the Spinal Decompression Clinic then select “Lumbar Disc Disease Video.”

Next, watch the video on “Making New Cartilage”

Now, from the home page, select “Forms” and complete all forms for areas of your concern. You will need to print the forms, complete them, scan them and then email them back.

As you can see, there are many options to help you learn about overall health which is a key component to growing new cartilage and improving your immune system.

The above evaluations will determine if any additional ingredients may be necessary, but to begin, a considerable shift in nutrition will need to take place in your body. This happens gradually and we use the following products to make it work:

For Specific Cartilage Replacement: **For General Nutrition:**

Calcifood
Ostrophin
Ostarplex
Betacol
Ostarplex
Glucosamine Synergy
Zypan

Catalym
Calcium Lactate
Tuna Omega 3 Oil
Min Tran

You should begin each of these now to realize the best results from your treatment.

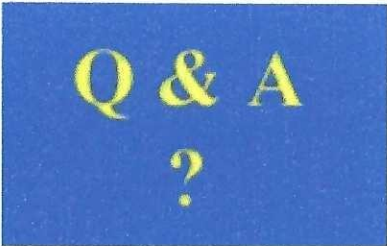
After the first week of treatment and the symptoms begin to subside, it is critical to continue with the indicated treatment procedures and then focus on the addition of the nutritional items and the switch over to whole foods. The combination of these items will aid in the improvement of circulation to the area surrounding the disc, help control the inflammatory process and stimulate regeneration of disc cells. It takes several weeks for nutritional treatment to affect the cellular level in the normal individual. In cases where discs are inflamed and muscle spasm is present, cellular metabolism may be slowed considerably in order to deal with the inflammatory process. Thus, nutritional support for this kind of condition is a long term process. It does, however; make long lasting changes. If lymphatic function is hampered at all in these damaged areas, some systemic detoxification may be necessary. It is critical that lymphatic drainage is fully functioning in the area of injury or disease in order for the process to work properly and completely.

In the area where the disc space has been decompressed and detoxified, growth and healing can begin to occur. Patients who employ all 5 areas of treatment have much better results with the initial healing process and have far less recurrence of the problem.

COSTS:

DTS Therapy is covered by most insurance policies, either in whole or in part. Generally, the cost of DTS is about 1/15th the cost of back surgery which now ranges from \$16,000 to \$86,000 depending on what procedures are performed. In addition to the direct costs of the surgery, work loss time and post-surgical rehabilitation costs are considerable. Workers Compensation coverage varies by state. The cost for our program is simple and straight forward. The procedures used in the treatment portion of the protocol are commonly accepted physical medicine modalities usually included in most insurance health care policies to some degree. Most carriers use a set fee schedule for these procedures that is considerably higher than our contracted fees for the entire protocol. For example, the protocol calls for computerized axial traction, (average Insurance Fee Schedule is \$48.92); electrical stimulation, (\$38.05); Hot Pack Fomentation, (\$21.74) ; making a total visit cost of \$108.71. Our per visit fee is \$75 and we offer a contracted price per visit when paid at or prior to the service of \$50. The cost of the whole food supplements to assist in the growth of cartilage is roughly \$350 per month.

Contract agreements to pay for the entire protocol are available to qualified patients.

A blue square containing the text "Q & A" in yellow, with a yellow question mark below it.

Questions and Answers

Most people have many questions about non-surgical spinal decompression and the patented decompression traction system (DTS). We recommend that anyone who is interested in this process investigate all the options when it comes to you and your family's health. Here are some of the common questions that we hear from our patients.

What is a board certified chiropractic orthopedist and why should I go to one?

The chiropractic orthopedist is a chiropractic physician holding a license by the state to practice chiropractic medicine. He has extensive, specialized training in physical examination and treatment procedures emphasizing primarily the neuromusculoskeletal structures of the body, including the spine and the extremity joints. This involves conditions affecting bones, joints, muscles, tendons, ligaments cartilage and related nerve structures.

The chiropractic orthopedist handles both acute health problems such as automobile accidents and sports injuries as well as more chronic conditions including arthritis, scoliosis, and fibromyalgia using advanced procedures of x-ray, magnetic resonance imaging (MRI) and computed tomography imaging (CT), electro diagnostic

studies, diagnostic ultrasound, nerve conduction studies (EMG) and clinical laboratory procedures are used to assist in the diagnostic process.

In the course of treatment, the chiropractic orthopedist applies manipulative/adjustive procedures along with other treatment options such as physiologic therapeutics, nutritional counselling, structural supports, corrective devices, exercise and rehabilitation regimens, preventive care advice and home therapy programs for patient health.

What is DTS and how does it work?

DTS (Decompression Traction System) is a patented process that employs three very important procedures: 1) gentle traction that stretches the spine and decompresses discs. Pressures in the lower lumbar spine can be as high as +170 mm of mercury during many common daily activities. DTS Treatment is able to reduce the pressure in the lumbar spine down to levels of -160 mm of mercury, allowing fluids and nutrients to re-enter the disc; reducing swelling and relieving the pressure on compressed nerves. Simply put, DTS breaks the pain cycle caused by bulging or degenerated discs and helps the body heal itself. Patients are treated fully clothed and are fitted with harnesses that fit around their pelvis and thorax as they lie either face down or face up on a traction device. A Certified SDC technician operates the computerized device. 2) electrical stimulation of the affected area to restore normal circulation and increase interstitial fluid support of the injured areas. 3) Biofeedback Stabilization which re-educates supportive musculature that has failed as a primary cause of the condition. This stabilization and eventual rehabilitation

provides for gradual relief of the symptoms, as well as long term correction. Each treatment takes about 45 minutes. Most patients find DTS to be comfortable and relief of pain can usually be noticed in the first few sessions.

Is DTS better than surgery?

In most cases, DTS is better than surgery. This is due to the fact that surgery has inherent risks and physically alters the spine by removing all or part of the disc when sometimes, the disc is not the only part of the spine causing the problem. Although this can reduce the pressure on the nerve, and relieve the back pain, the surgery tends to place more stress on the healthy discs above and below. Complications from surgery can be severe and may result in debilitating conditions. Clinical Studies show that DTS is successful in about 8 out of 10 cases.

If I've already had back surgery, can I still have DTS?

Having back surgery does not prevent you from having DTS unless you have fixed surgical hardware used to fuse the spine. In fact, clinical studies show that DTS provides relief for patients who have had one or more back surgeries.

Will DTS help a slipped disc?

A bulging or "herniated" disc is sometimes incorrectly referred to as a "slipped" disc. DTS succeeds at treating bulging or herniated discs over 70% of the time.

If I go on DTS, how many treatments will I need, and how quickly can I expect to get better?

The number of treatment sessions required depends upon the diagnosis and the overall severity of your condition. One treatment session is about 40 minutes long. The total number of treatments averages between 20 and 32 sessions during the initial phase. Some difficult cases may require additional sessions. Relief from pain varies with each individual and their physiology. However, most patients will experience some pain relief within the first few treatments.

Are there any reasons that I can't go on DTS?

There are a few individuals that cannot take advantage of this treatment. These people have conditions such as:

- Tumors
- Fractures
- Advanced Osteoporosis
- Pregnancy
- Certain conditions (diseases) that compromise the structural integrity of the spine and discs. These conditions are present in only a small percentage of the population.

If DTS works so well, how come I haven't heard more about it?

DTS is a relatively new medical procedure in the United States. The therapy has worked for thousands of patients, and over 2800 patients per day, worldwide, are now being treated. The awareness of DTS is growing every day, as physicians and healthcare providers learn about DTS and the phenomenal results it has achieved in numerous clinical studies. As a result, DTS is now becoming the standard of care for chronic low back pain.

How is DTS different from traction or the other treatment claiming to decompress the spine?

Although traction devices can stretch the lower back, they have not demonstrated the ability to decompress the lumbar discs and spinal nerves like DTS. Traction tables have a small electric motor in the table. Frequently, DTS research is found on traction table websites. DTS also employs electrical stimulation and a biofeedback routine that creates permanent healing and support. Unlike any other system, the DTS protocol is the whole package.

Why should I consider DTS Therapy?

DTS is a Non-Surgical Treatment for Low Back Pain and the only treatment that delivers DTS's decompression. DTS Therapy has been proven safe and effective in numerous clinical studies. Many patients are being treated with DTS Therapy every day. Other so-called 'decompression treatments' simply do not provide all three aspects of DTS necessary to accomplish both relief and restoration of spinal function without compression. DTS Therapy is non-invasive and without the risks and complications associated with surgery, injections and anesthesia. DTS is painless and patients can remain at light duty work while undergoing treatment. DTS is also easy and convenient. Sessions last about 45 minutes a day, for 15 - 20 days.

Why should I consider seeing the chiropractic orthopedist?

The chiropractic orthopedist focuses practice primarily to neuromusculoskeletal structures, and remains up to date of the latest research and developments through continuing education and

recertification by attendance at chiropractic orthopedic conventions and seminars.

The chiropractic orthopedist is often used by medical practitioners for consultation, by the legal profession and the insurance industry for evaluation and treatment of patients, and the courts for the giving of expert testimony.

Patients who have suffered from conditions that have not responded favorably to previous treatment may seek a doctor with specialized training in advanced non-surgical orthopedic procedures and diagnostic methods.....**That doctor is the Chiropractic Orthopedist.**

RESEARCH

RESEARCH PROJECT:

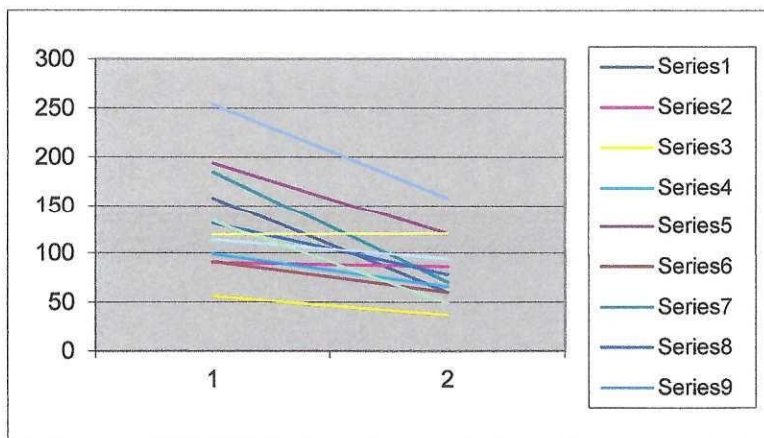
14 patients were admitted into the study. The group was divided into the neck and arm pain group and the low back and leg pain group. Intake measurements included modified Oswestry low back and neck pain questionnaires, Activities Discomfort Scale and a quadruple visual analogue pain scale. Each item was scored and a total is recorded against which the exit scores are compared. Here are the results of the initial phase of the study with follow-up planned.

The three outcomes assessment tools were scored and totaled for each patient on intake and after three weeks of decompression. It

is interesting to note that the measured results parallel the perceived or reported improvement in all but one case.

Spinal Decompression Study Results

Average		135.33	83.17	0.36	63.75
<u>PatientComplaint</u>		<u>Intake Score</u>	<u>Exit Score</u>	<u>% Measured</u>	<u>% Reported</u>
1	Low back and leg	158	60	0.62	75
2	Low back and leg	90	86	0.04	0
3	Low back and leg	56	37	0.34	85
4	Neck and Arm	99	66	0.33	95
5	Low back and leg	194	120	0.38	40
6	Neck and Arm	91	60	0.34	50
7	Low back and leg	185	70	0.62	85
8	Neck and Arm	131	78	0.40	70
9	Neck and Arm	114	94	0.18	70
10	Low back and leg	133	49	0.63	100
11	Low back and leg	119	120	-0.01	10
12	Low back and leg	254	158	0.38	85

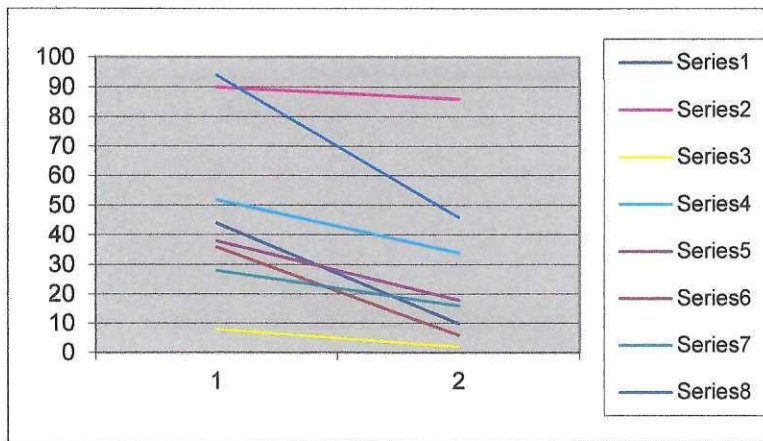


Using a single tool, the Revised Oswestry form for low back and neck, it is noted that improvement parallels in all but one case, the combination of the three tools.

Oswestry Low Back

Average	42.29	24.57	0.53
<u>PatientComplaint</u>	<u>Intake Score</u>	<u>Exit Score</u>	<u>%Improvement</u>

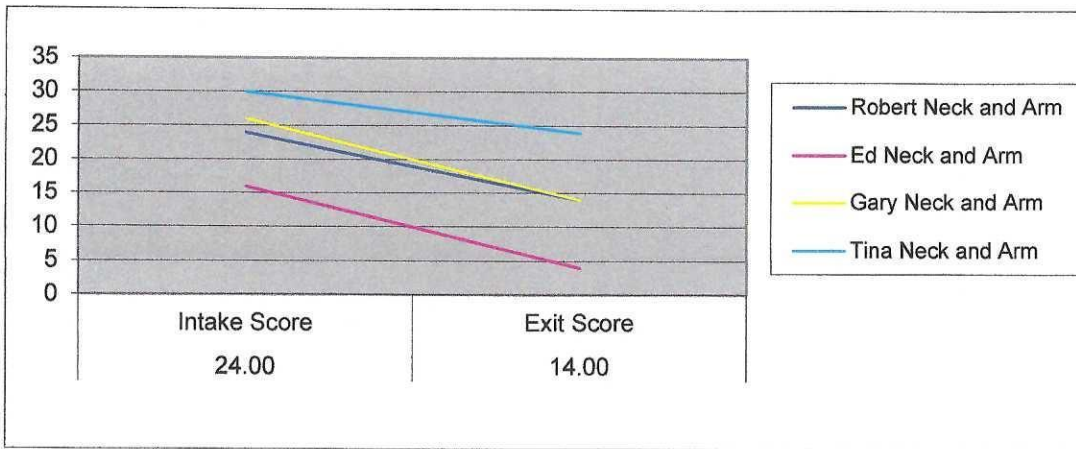
1	Low back and leg	44	10	0.77
2	Low back and leg	90	86	0.04
3	Low back and leg	8	2	0.75
4	Low back and leg	52	34	0.35
5	Low back and leg	38	18	0.53
6	Low back and leg	36	6	0.83
7	Low back and leg	28	16	0.43
8	Low back and leg	94	46	0.51



The neck patients all responded well but not with as high an average as the low back patients.

Neck Oswestry

		Average	24.00	14.00	0.46
<u>Patient</u>	<u>Complaint</u>	<u>Intake Score</u>	<u>Exit Score</u>		
1	Neck and Arm	24	14	0.42	
2	Neck and Arm	16	4	0.75	
3	Neck and Arm	26	14	0.46	
4	Neck and Arm	30	24	0.20	



Following the three-week study, patients will continue to undergo decompression at variable rates based on improvement. The outcome measurements will be taken again in one month to see if decompression is maintained as well as perceived improvement.

LITERATURE REVIEW

A BRIEF SYNOPSIS OF RESEARCH ON LUMBAR and CERVICAL TRACTION

1) Bogduk, N,: **The Anatomical Basis for Spinal Pain Syndromes.** JMPT 6:Nov.Dec1995. There is no scientific basis for the belief muscles are a source of chronic pain. However controlled studies show how common disc and facet pain is accounting for more than 70% of chronic back pain.

2) Komari H, et al.: **The Natural History of Herniated Nucleus with Radiculopathy.** Spine 21: 225-229, 1996 77 patients verified on pre-post MRI with signs and symptoms of herniation, underwent non-surgical intervention including pelvic traction. Changes in herniation and good-excellent symptomatic improvements were noted in over 82%. The authors draw the

conclusion improving the disc's contact with the blood supply accounts for healing of herniation.

3) Onel, D et. al.: CT Investigation of the effects of Traction on Lumbar Herniation. Spine 14: 82-90, 1989. 30 patients with lumbar herniations were tractioned in a CT scanner at >50% body weight for ~20 min. Hernia retraction occurred in 70% and good clinical improvements were seen in over 93%. The authors concluded improved blood flow was the source of healing. Additionally they speculated a force.

4) Parsons, WB previous studies showing traction doesn't create negative intradiscal pressures perhaps used too light **Cumming, JDA: Traction in Lumbar Disc Syndrome.** Can Med Jour 77:7-10, 1957. 100 patients with disc syndrome unresponsive to manipulation were treated with high force traction (+80lb). 86% of patients had good-excellent outcomes 12 had poor outcomes but most had pain for an extended duration.

5) Saal, JA Saal, JS: Nonoperative Treatment of Herniated Lumbar Disc w/ Radiculopathy. Spine 14 (4): 431-437, 1989. 58 subjects had an inclusive conservative program including traction (when initially shown to reduce leg symptoms). Overall 86% had good-excellent results.

6) Mathews, JA: Dynamic Discography: A Study of Lumbar Traction. Annls of Phys Med, IX (7), 265-279, 1968. 3 patients with a ruptured lumbar disc had contrast medium and radiographic images taken during and after a lumbar traction procedure. The protrusions were shown to lessen considerably with the 30 minute prone traction sessions and a dimpling of the outer annulus suggested a negative intradiscal force was created.

7) Lidstom, A Zachrisson M: PT of the low back pain and sciatica. Scan J our of Rehab Med, 2: 37-42, 1970. Intermittent supine traction with $\pm 50\%$ body-weight, (10) 20 minute sessions with added exercises showed considerable improvement in over 90% of the 62 patients.

8) Hood, LB Chrissman, D: Intermittent Traction in the Treatment of Rupture Disc Plays Ther 48: 21, 1968. 40 patients with neurological signs were treated with traction on a friction-free table with 55-70lbs for 20 minutes. Good-excellent results were seen in 55%.

9) Mathews JA et. al.: Manipulation and traction for Lumbago and Sciatica. Physio Pract 4: 201, 1988. A controlled trial of traction with manipulative techniques. Traction force Applied at ~ 100 lbs for 20 minutes leading to substantial relief in over 85%.

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