Intersegmental Traction Tables

ATT-300 ATT-301
ATT-300 LAT

OPERATOR'S MANUAL

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1. INTRODUCTION

Your new **HCMI, Inc. ATT 300/301/LAT** has been designed and engineered to comply with the rigid standards of quality so necessary to successful practitioners worldwide. The reason: it combines high quality with affordability. With unmatched dependability and precision engineering, the **ATT 300/301/LAT** is the traction table of choice worldwide!

PURPOSE OF THE ATT 300/301

The **ATT 300** is an elector-mechanical treatment table specially designed for inter-segmental traction, spinal mobilization and back massage. The unit can be equipped with optional cervical and lumbar traction, allowing both static or intermittent traction. The **ATT 301** has the same features and options as the **ATT 300.** The only difference is the optional face slot with a protective cover. This gives an added benefit of a general purpose adjusting table in addition to intersegmental traction.

ATT 300 LAT INTERSEGMENTAL TRACTION TABLE

The **ATT 300 LAT** (Long Axis Traction) has cervical and lumbar traction capability. Both intermittent and static (kinetic) traction can be applied, either independently or simultaneously. Intersegmental traction can be added to the treatment, along with vibration if desired. Cervical traction can be applied from 10-55 pounds with 5-50 degrees angle of pull. Two separate cervical harnesses are supplied. Lumbar traction can be applied from 30-170 pounds in 10 pound increments and can vary from 0-50 degrees angle of pull. A hand held patient shut off switch adds safety. Also, with the traction hold timer, the recommended 3-1 hold time vs. rest time can be achieved.

The **ATT 300 LAT** instructions should be reviewed thoroughly by all qualified and trained personnel prior to any patient treatments. Be completely familiar with all recommendations and advisories. Confidence can be met if the traction straps are set up on staff members prior to patient treatments.

If any questions do arise relating to the operation of your **ATT Traction Device**, please contact the service department at **(800) 641-4107.**

Your new instrument is designed to provide you with years of service. With proper maintenance, your table will remain virtually trouble-free.

2: IMPORTANT SAFETY INSTRUCTIONS

1. Read all instructions in the operator's manual thoroughly before using the **ATT 300/301/LAT Intersegmental Traction Table**.
2. The **ATT 300/301/LAT** should be used by a qualified and trained health care provider.
3. Instruct patient on proper mounting and dismounting of the table.
4. Never leave the patient unattended while getting on or off the table.
5. Patients should not be allowed to sit on the table unless they are supervised by a qualified staff member.
6. Do not allow children to play on or around the table.
7. Always unplug the table before removing the table top.
8. Never place hands or fingers in front of or behind the rollers.
9. Follow the maintenance schedule provided in this **Operator's Manual**.

ELECTRICAL CONNECTION

A power supply of 120 volts, 60 Hz AC, 10 amps are required. For your personal safety, this instrument must be grounded. This device is equipped with a power supply cord having a three (3) prong grounding plug. To minimize possible shock hazard, it must be plugged into a mating three (3) prong grounding type wall receptacles, grounded in accordance with the National Electrical Code and local coded and ordinances. If a mating wall receptacle is not available, it is the responsibility and obligation of the customer to have a properly grounded three (3) prong wall receptacle installed by a qualified electrician.

WARNING:

***Fire, Electrical Shock and Personal Injury Hazard**
***An extension cord should not be used with this instrument!**
***Do not, under any circumstances, remove the power supply cord ground prong!**

3: LIMITED WARRANTY

Subject to the exceptions and upon the conditions stated below, **HCMI, Inc.** warrants that the **ATT 300/301/LAT** and its options, will be free from defects in material and construction for a period of one (1) year. In addition, the turn around motor will be warranted for a period of five years, and the aluminum rollers are warranted for the life-time of the table, used or not, to the original purchaser, after the date of sale. **HCMI, Inc.,** agrees that if any such product should prove to be defective within said warranty period, it will replace any defective part for a said warranty period. This warranty applies only if determination is made that the defect developed under normal and proper use.

The purchaser agrees to pay for all labor and/or parts determined to be not warranted and to pay all expenses accrued in doing said repairs.

It is expressly agreed that the above warranty will be in lieu of all warranties of fitness and of the warranty of merchantability and that **HCMI, Inc.** will have no liability for special or consequential damages of any kind or from any cause at all arising out of manufacture, use, sale, handling, repair, maintenance, or replacement of any of the products sold under this warranty.

Representation and warranties formed by any person, including dealers and representatives of **HCMI, Inc.,** which are inconsistent or in conflict with the terms of this warranty, will not be binding upon **HCMI, Inc.** unless reduced to writing and approved by the Board of Directors of **HCMI, Inc.**

Buyers will notify **HCMI, Inc.** in writing by registered mail also certified mail or return receipt requested, **within thirty (30) days of a breach of guarantee after discovery thereof; otherwise, such claims will be deemed to be waived.**

No product or device can be defective in whole or in part because of biological differences among individuals. Therefore, **HCMI, Inc.** does not represent or warrant under any circumstances that a particular result can or will be achieved by using its product or products. The choice of use of the product, the method or methods of use, the diagnosis of the patient’s condition and the application for the patient is solely the responsibility of the practitioner and not of **HCMI, Inc.**

4: PRODUCT INFORMATION

ATT 300/301 INTERSEGMENTAL TRACTION TABLE SPECIFICATIONS:

Length	72"
Width	22"
Height	25"
Weight	220 lbs.

POWER REQUIREMENTS:

Voltage:	110 V, 60Hz AC
Amperage:	Positioning motor, 1.4
	Vibrator motor, 0.5
	Roller motor 1.3
	Height adjustment motor, 1.6
	Heat pads (2), 107 watts each
	Relays, LEDs, Control, 100 mA or less

ATT 300 LAT TRACTION DEVICE:

- includes cervical traction for treatment of the cervical and upper dorsal areas allowing a flexion angle from ten (10) degrees to fifty (50) degrees in five (5) degree increments.
- included lumbar traction for treatment of lumbar and lower dorsal areas allowing a flexion angle from ten (10) degrees to fifty (50) degrees in five (5) degree increments.
- has the ability to apply lumbar and cervical traction simultaneously.
- has two (2) different traction modes; static and intermittent-allowing for a wide variety of conditions.
- is designed to apply traction smoothly and comfortably to the patient.
- is provided with a patient controlled **"Stop Treatment"** Safety Switch to give the patient the option to stop the treatment if they feel uncomfortable.

TRACTION TIMER:

The traction timer knob has a feature of giving the patient a seven (7) second rest time and a three (3) to sixty (60) or eighty (80) second hold time, depending on model of timer received. Adjust the time desired by turning the knob clockwise for an increase in holding time and turning the knob counterclockwise for a decrease in holding time.

5: INSTALLATION PROCEDURES

UNCRATING PROCEDURE

1. Remove all exterior crating material.

Caution: **Table covering is very susceptible to tearing. Use caution when using sharp tools!**

2. Remove the table top.

3. Remove any table accessories - knee pillow, cervical pillow, traction bars, etc.

4. Remove the 2" x 4" board bracing the roller assembly.

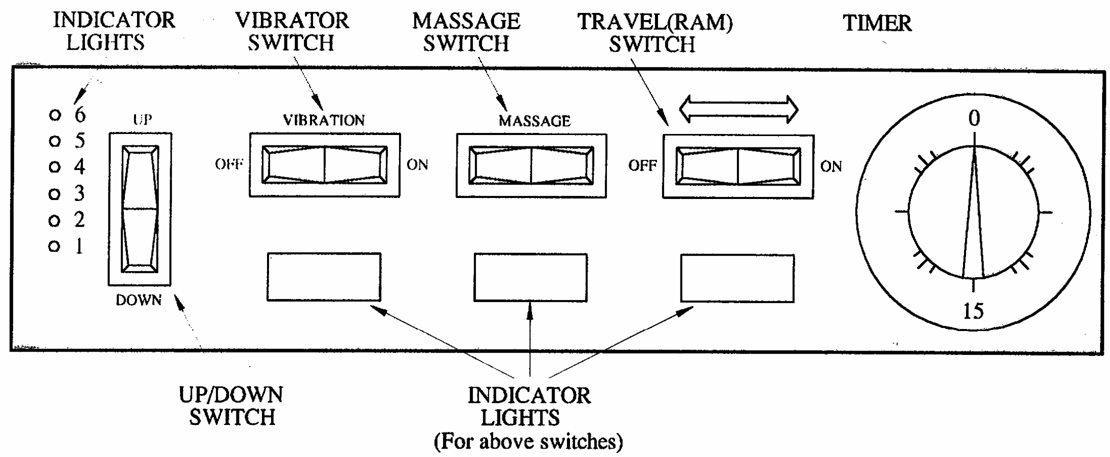
5. Remove the two (2) sheets of raw plywood supporting the roller assembly.

6. Carefully reposition power cord through the bottom of the table.
Note: Move the table to its proper location before removing the power cord.

7. Plug power cord into properly grounded 110 volt outlets.
Do not use any extension cords with this device.

8. Finish reading the Operator's Manual.

6: CONTROL FUNCTIONS



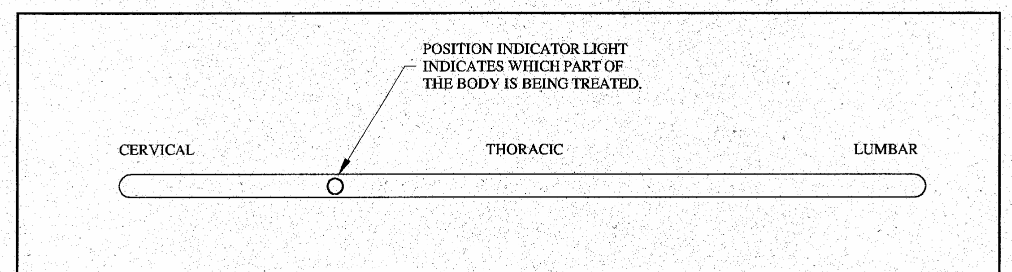
The **Position Indicator Panel** is found to the left of the controls. It is labeled “Cervical,” “Thoracic” and “Lumbar.” The **‘red’** button indicates the treatment position of the rollers to the patient. To treat a specific area on the patient, turn travel switch **“ON.”** When button reaches desired area, turn travel switch **“OFF”**. An eight (8) inch area will be continually treated.

The **LED Actuator Lights** indicate the roller height. The **“UP”/“DOWN”** switch controls the height of the rollers. The **‘red’** LED lights suggest the level of pressure by numbers one (1) through six (6), the lowest pressure being one (1) with the most pressure being six (6). When two lights are lit at the same time, this shows the halfway mark. For example, when LED lights two (2) and three (3) are lit at the same time, this would suggest a setting of two and one half (2 ½).

The **Vibrator Switch and Light** have two (2) positions. The **“ON”** position will apply a soft tissue massage to the patient through the rollers. The **“OFF”** position allows no vibration to be felt.

6: CONTROL FUNCTIONS (continued)

The **Massage Switch and Light** have three (3) positions. By pressing the button over to the right, a clockwise roller rotation is gained. By pressing the button to the left, a counterclockwise roller rotation is gained. When centering the switch to the **"OFF"** position, the rollers remain stationary.



TREATING A SPECIFIC AREA ON PATIENT

Turn travel switch on.When position indicator light reaches desired area,turn travel switch off.An eight (8) inch area will be continually treated.

CAUTION: Rapidly reversing the massage switch may cause damage to the motor or drive train. Pause briefly in the **"OFF"** position when changing rotation.

The **Travel Switch and Light** have two (2) positions. The "**ON**" position allows the drive gear to engage so that the rollers will traverse 28" in a longitudinal direction reversing in a continuous alternating movement. The '**red**' button will suggest the position of the rollers. The "**OFF**" position keeps the drive gear stationary.

The **Timer** has a zero (0) to thirty (30) minute range. Turning the timer past the five (5) minute increment will begin the main switch for the drive mechanism. A bell will sound and automatically shut the unit off when the timer returns to zero (0).

6: CONTROL FUNCTIONS (continued)

OPTIONAL:

The **Heat Control** has a setting of seventy (70) to one hundred twenty (120) degrees. Turning the knob in a clockwise motion intensifies the heat setting. Turning the knob counterclockwise causes the heat to decrease to less intensity. Always keep check on the patient to assure that the heat setting is at a comfortable degree. Heat automatically shuts off when the timer returns to zero (0).

7: CONTRAINDICATIONS

Contraindications of localized intersegmental traction are:

1. Skin irritations that might be aggravated by the rollers, such as:
   SHINGLES
   SUNBURN
   BOILS
   BRUISES

2. Phlebitis: (inflammation of a vein).

3. Fractures of a bone or suspected fractures.

8: ASSISTING PATIENT ON TABLE

< The doctor or **trained** staff should always place the patient on the table. Do **not** allow the patient to get on the table by his/herself. This could cause strain to the patient or a loss of balance. Also, assistance needs to be met so the patient does not put pressure on the roller area of the table with his or her arm.

< The Patient should check clothing for keys, wallet, or any other items that may cause discomfort from the rollers during treatment.

< To be assured that discomfort or strain does not come to the patient while being helped onto the table, the pressure rollers should be in the lower position. (The table automatically has this feature unless a malfunction exists).

< Position the patient on the unit so that the base of the spinal column (sacrum) is located at the end of the roller-slot. Change the position of the patient **ONLY** if a specific treatment for the spinal column is suggested.

< Keep the lights dim and avoid bright lights glaring into the patient's eyes.

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9: ASSISTING PATIENT OFF TABLE

Caution the patient not to get up from the table alone so as to prevent a strain that can void the treatment or a chance of becoming lightheaded that can develop from laying down which can cause imbalances.

SEVEN EASY STEPS TO HELPING PATIENT OFF TABLE

1. **Brace your knee against the table.**

2. **Extend your left forearm across patients' chest and have patient grasp your arm near the elbow.**

3. **Have patient hold your arm and not apply any strain to sit upright.**

4. **Put your right hand under the patients left knee.**

5. **As patient pulls on your arm, pivot the patient on the buttocks by pulling on the left knee and gently swing the legs off the table.**

6. **The patient quickly and easily comes to a sitting position.**

7. **Allow patient to get balance before coming to a full standing position.**

.

10: USING ATT 300 LAT

PATIENT SET-UP FOR CERVICAL TRACTION

Note: Slippage can result in improper occipital pull and give patient discomfort. Follow directions closely for proper harness installation.

1. Have patient remove their shoes. Position him/her on the cushion near the end of the articulation span in the lumbar area of the table.

2. Assist the patient in attaining a supine position; the top of the head being aligned with the seam at the head of the table.

3. If using the cervical pillow, position it to the patient before continuing patient set-up. Normally the pillow will not be used for cervical traction.

4. To position the cervical harness, use both hands and put points toward the cervical area.

5. Gently place the harness under the head. Tilt the harness toward the cervical area. Occiput should be positioned in the center of the back wings and patients' ears are to be lying flat.

6. Assist the patient in gently lowering the chin toward the chest. Center the chin strap over the mentum of the chin. The patient should hold their finger over the center of the chin strap while you complete the attachment. Gently, but firmly, use your left hand to tilt the back of the harness up into the cervical area. Pull back the harness on the left side and smooth the chin strap over the velcro pad wherever it falls into place.

7. Attach the chin strap to the right side of the cervical harness by using your left hand and pull the right wing toward the top of the patient's head. Tilt the front of the harness into the cervical area. Smooth the chin strap over the velcro pad wherever it falls into place.

8. Lengthen the cervical attaching straps by pushing down on the buckle while pulling on the hook end of the strap. Pull the strap straight out and place the hook at the end of the hole in the cervical spreader bar. Before adjusting the flexion angle, test the harness fit by pulling gently, but firmly, on the cervical straps.

10: USING ATT 300 LAT (continued)

PATIENT SET-UP FOR CERVICAL TRACTION (continued)

9. Adjust the flexion angle for cervical traction by pulling out on the knob in the back of the cervical traction scale - ten (10) to forty (40) pounds. Each hole represents approximately a five (5) degree flexion angle change.

10. To ensure that traction is evenly applied, gently remove the slack from the cervical straps and confirm that they are equal length. Allow the patient to hold the controlled **"Stop Treatment" Safety Switch**, which can be used if treatment becomes uncomfortable at any time

11. To apply traction, be certain that the traction switch is turned **"OFF"**. When the unit is at full extension, pull evenly on each strap until the correct poundage is indicated by the numbered ten (10) to forty (40) scale. Fine tuning for the exact poundage can be accomplished by turning the knob at the lower end of the cervical traction bar.

RECOMMENDATIONS AND ADVISORIES FOR CERVICAL TRACTION

- Cervical straps should not be attached to the cervical spreader bar when positioning the harness to the patient as it will restrict the movement of the harness making it difficult to obtain the proper harness position to the patient.

- Using the cervical pillow during treatment will change the flexion angle. Recheck the angle with patient hook-up. In most cases the pillow will not be used except in cases of excessive upper dorsal curvature.

- To allow patient to receive proper support to the cervical curve, it is suggested that a small towel be rolled up and placed in the cervical area. This will fill the voided space between the cushion board and the cervical spine and give the patient added comfort.

- When removing the cervical harness, remove the chin strap gently and allow the patient to sit up. Follow the steps outlined on page thirteen (13), section nine (9) of this manual for proper procedures.

10: USING ATT 300 LAT (continued)

PATIENT SET-UP FOR LUMBAR TRACTION

1. When preparing the patient for lumbar traction, the pelvic belt should be put to the patient while in a standing position. See figure on page eighteen (18). Steps are as follows:
   - Position the crest of the illium in the center of the harness wings with the traction belt strap centered in the back between the patient’s legs.
     Note: The traction belt strap should be on the outside, not touching the patient’s body.
   - Secure the harness with the velcro closures, crossing it downward. The thoracic belt must be used for proper counter traction. Have the thoracic belt properly positioned on the table before the patient lies down.

2. Once the patient is properly positioned on the table, adjust the pelvic harness due to body changes in the supine position. Check the position of the pelvic harness with reference to the illiac crest, which should be located in the center of the belt. Secure by placing wing with velcro up diagonally across the body and hold in place with the right hand. With the left hand, pull the free wing across diagonally and secure in place.
   Note: Be sure the fit is firm enough to cause the soft tissue to be depressed inward.

3. Slide the lumbar into the lumbar traction carriage slot. The best position is just below the patient’s knees. When placing the bar, the fixation holes should be directed caudal.

4. To attach the pelvic belt to the lumbar bar, connect the hook to the eye in the center of the scale (forty (40) to one hundred sixty (160) pounds). To adjust the tension, turn OFF the traction unit at its fullest extension. Pull approximately fifty (50) pounds of pressure on the scale. Turn the traction unit ON. This will begin the relax side of the cycle. More pressure can be attained by pulling on the pelvic belt strap approximately one (1) inch at a time until desired pressure is reached.
   Note: One (1) inch on pelvic strap equals approximately five (5) pounds of pressure.

5. Place traction leg bolster under the patient’s knees to help flatten the lordotic curve and increase comfort and therapeutic effects.

10: USING ATT 300 LAT (continued)

PATIENT SET-UP FOR LUMBAR TRACTION (continued)

6. The thoracic belt is always used as counter traction when tractioning the lower torso or extremities. Place the thoracic belt so that the lower edge of the ribcage is centered in its wings. Cross the thoracic belt wing over the patient's body in the same diagonal pattern as the pelvic belt. The center of the belt wing should align with the lower part of the last rib. This should be repeated with the other wing and securing the velcro. The lower part of the belt should depress the soft tissue area between the ribs and the hips.

7. Fasten the thoracic belt to the head of the table by inserting the straps in the hold-down cleats. Pull all slack from the harness. Secure the velcro closures on both sides. Confirm that the pressure is being evenly applied to both sides of the rib-cage and not to the abdomen. A pad is included with the harnesses to be used with the thoracic belt for added patient comfort to the rib-cage.

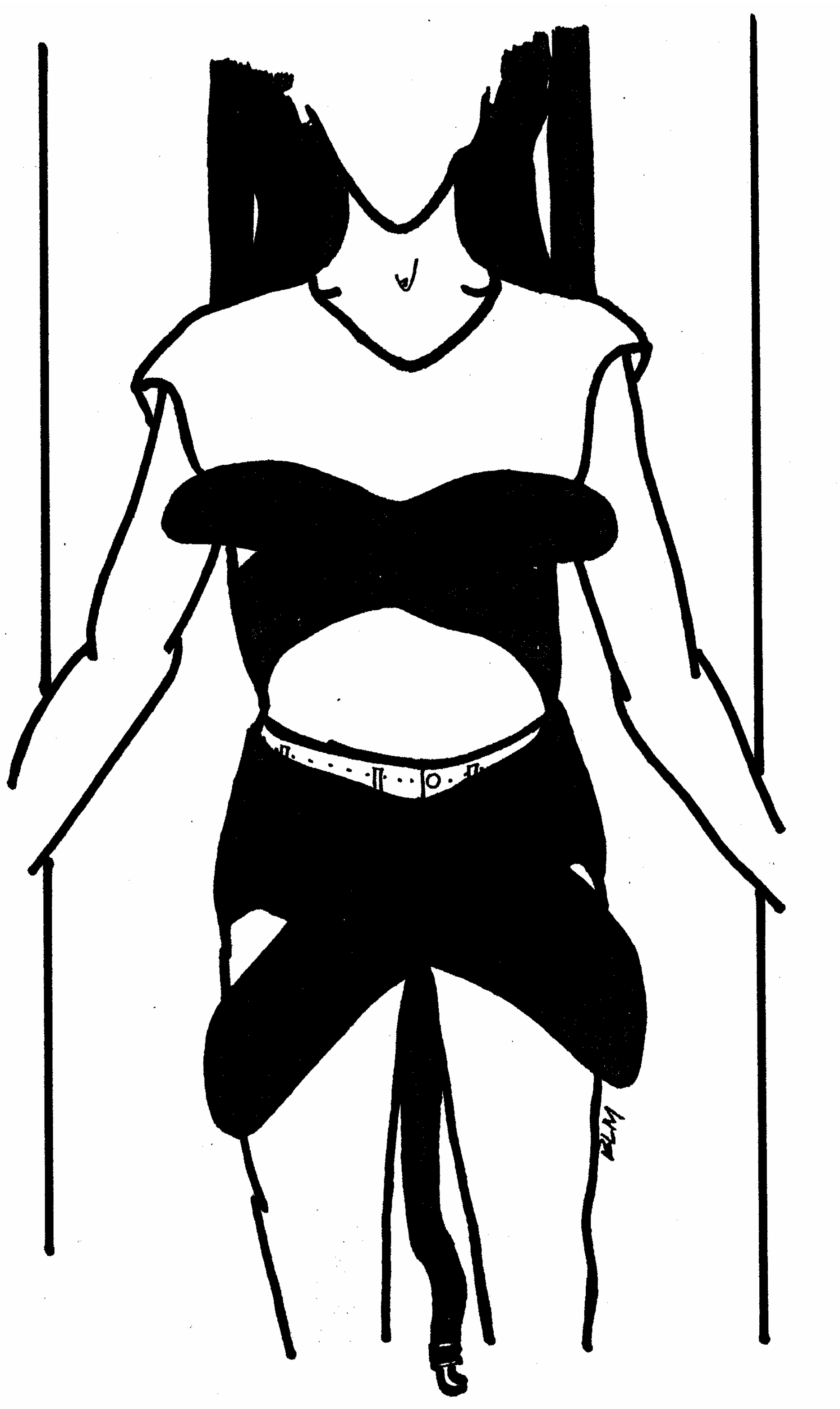
8. Allow the patient to hold the controlled "Stop Patient" Safe Switch which will allow the patient to stop treatment at any time.

RECOMMENDATIONS AND ADVISORIES FOR LUMBAR TRACTION

- Some practitioners prefer to position the thoracic harness so that the belt wings cross upwards toward the opposite shoulder rather downwards across the mid-line of the bottom of the ribcage. May we suggest that regardless of the method used, proper respect for the patient's comfort and well being be of primary concern. **Note:** It is very important that the thoracic belt not slip up under the arms or over the chest of the patient.

- We recommend that the thoracic belt straps attached to the head of the system be loosened and hang free prior to each patient being harnessed. This will eliminate unwanted movement during traction and secure each patient properly.

10: USING ATT 300 LAT (continued)



11: PREVENTATIVE MAINTENANCE

The following list covers all areas of the **ATT 300 Intersegmental Traction Table** that should be checked, cleaned and have worn parts replaced during a preventive maintenance routine. Maintenance and lubrication schedules are listed below. These procedures are listed below and it is suggested that a maintenance routine every six (6) months should be conducted.

GENERAL CLEANING

1. Clean and wipe off any dust accumulation inside the cabinet along with all parts.

2. Inspect rollers to see that they are turning smoothly and quietly.

3. Check the drive chain to see that it is taut.

4. Check switches for proper operation.

5. Check for proper illumination of LED's on the front panel of the **ATT 300**. Any LED's that do not illuminate should be replaced.

6. Apply two (2) drops of multipurpose oil in the oil ports of the bronze bushings located on the upper ram assembly.

LONG AXIS TRACTION ASSEMBLY

The **ATT 300** with **Long Axis Traction (LAT) Table** contains a remote patient stop button. This assembly should be checked for any wear or interruption of the protective wire insulation. Operation of the stop button should be checked for proper function. Press the button, traction should stop and the traction bars should return to home position.

CAUTION:
Never service this apparatus with the motors running. Turn off switches and disconnect the power cord for full protection.

11: PREVENTATIVE MAINTENANCE (continued)

UPHOLSTERY CARE AND CLEANING

For proper care and cleaning of the upholstery material, use a mild soap and water combination or a good commercial cleaner specifically recommended for vinyl or **Naugahyde.** Use of those cleaners not specifically recommended for vinyl will dry the material, resulting in the upholstery becoming hard and brittle. Avoid use of cleaning agents containing alcohol. ***Improper cleaning of the material will cancel the warranty.***

The lack of keeping upholstery cleaned can harm the material causing it to become brittle. Routine cleaning will extend the life of the upholstery.

12: SERVICE INFORMATION

All **ATT 300/301/LAT** units are tested before leaving the factory. Under normal conditions the machine will operate for years without a service requirement. If the unit does need service, it can be repaired by an adapted mechanic. Some suggestions are:

- An appliance service technician
- Electrician

Names can normally be found in the yellow pages telephone directory. Feel free to have the mechanic call our service department at the factory if advice is needed.

COMMON PROBLEMS:

1. **Electrical switch failure.** The source of this problem can be found in the following switches:

- Timer (can be bridged by an electrician)
- Roller height (replaceable snap-in)
- Roller travel (replaceable snap-in)
- Roller rotation (replaceable snap-in)

2. **Roller LED light fails.** The solution to this problem is to move the magnet assembly that is secured to the actuator motor toward the reed switches. If more than two (2) LED lights are on at one time, move the magnet assembly downward to the direction of the floor.

3. **Bumping/noise during treatment.** Possibly one of the following:

   a. Drive chain is slack. The solution being to loosen four (4) bolts/nuts that hold the roller motor in place. Apply pressure to roller motor and tighten bolts.

13: PARTS REPLACEMENT

NOTE: (Refer to Warranty Information in this manual.)

When replacing worn parts, use genuine **HCMI, Inc.** replacement parts by contacting our service department. When ordering replacement parts:

- ♦ Ask for the service department.
- ♦ Have the model/serial number of the unit ready to give to the service representative.
- ♦ Specify the part by number/description.

We are here to help if a problem should arise. Always feel free to contact our service representative for assistance at **417-864-6511**.

INSTRUCTIONS FOR DAMAGED MERCHANDISE

The contents of this shipment have been checked and packed by experienced personnel. Articles damaged in transit should be reported at once to the delivering carrier and a claim must be filed by you. We can neither be responsible for, nor can we accept the return of merchandise damaged in transit.

RESALE OR DISPOSAL

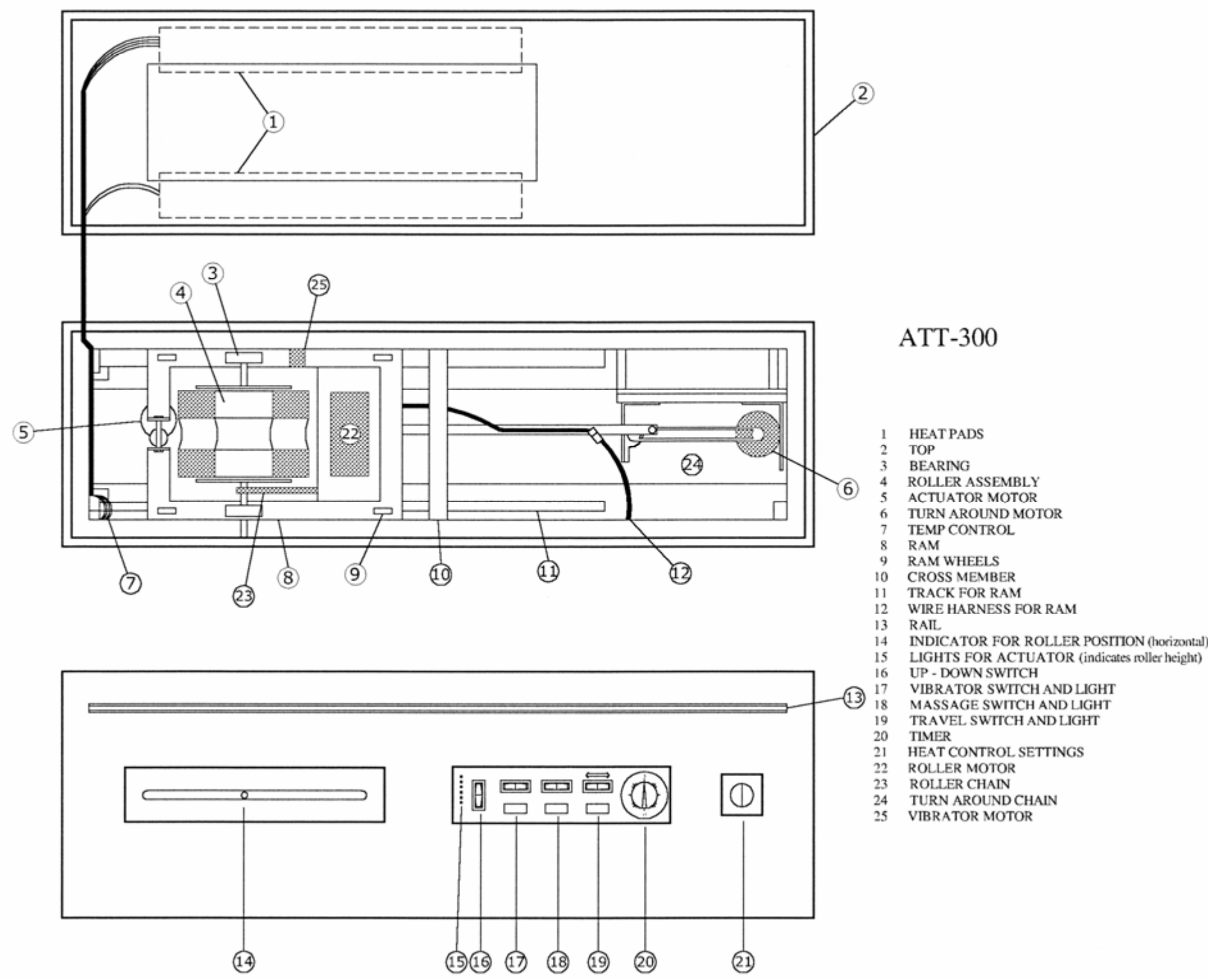
A chiropractic table is considered a medical device by the Food and Drug Administration. Therefore, it is necessary that **HCMI, Inc.** be notified if your table is sold, destroyed, or otherwise disposed of.

Please notify in writing to:

HCMI, INC.
2146 E. PYTHIAN
SPRINGFIELD, MO 65802

Please include the unit serial number, the person that the table was sold to, or the reason for disposal. Thank you for your cooperation.

14: ATT 300 HOUSING ASSEMBLY



15: THE VALUE AND USE OF INTERSEGMENTAL TRACTION STABILIZING CARE

How to know when the spine is stabilized: When the soreness and tenderness over the spinal column is gone, the spine is stabilized.

In the original preliminary chiropractic examination, soreness and tenderness over the spinal column is noted and this is the objective finding for measuring change. We are not talking about soreness and tenderness associated with a subluxation... we are talking about soreness and tenderness associated with the splinting effect of the intrinsic muscles of the spine. The long muscles associated with the spinal column, in a sense, serve as guy wires and give and sway in much the same way as guy wires on a tall radio transmitter antenna and are not involved in instability.

When the spine is unstable these small intrinsic muscles splint the spinal bones. This, of course, causes fixations and hardened ligaments, and when the spine is in a state of flexion, forces the elasticity and further subluxations, fixation and hardening of ligaments.

So, what happens is that as each fixation becomes worse, it leads to fixation in other areas of the spine and further compounds the problem.

In effect, these small intrinsic muscles are trying to do the work of the normally elastic ligamentous structure. So the purpose of stabilizing care is to get the proper balance between the white and yellow fibers so that the ligaments can properly hold the spinal bones in place. When this is accomplished, you have a flexible and stable spine. To repeat, the spine is as stable as it is going to be when pain and tenderness over the spinal column is diminished or gone completely. Nature uses this spinal tenderness over the spine to warn the doctor and patient of instability. You can make a differential diagnosis of pain over the spine as regard to instability and other spinal problems. For instance, pain which extends out along the nerve root is due to nerve root irritation rather than instability and fixations, and splinting of the intrinsic spinal muscles. Pain due to sprain can be differentiated in that you have muscle spasms over a considerable area, you have swelling, you have congestion you have redness and you have pain on motion which indicates the large muscles are involved. Pain due to organic reflexes occur along the back but are lateral to the spine itself. It occurs out further than the transverse tips of the spin, as a rule, and is associated with other than interior pain; such as over the gall bladder region, or over the appendix, or over the stomach in cases of stomach ulcers. Tenderness due to a fixation, to instability and to muscle splinting is not increased upon motion or changes on posture or position, but is only apparent on palpation.

15: THE VALUE AND USE OF INTERSEGMENTAL TRACTION STABILIZING CARE (continued)

Ligaments

Ligaments shall be defined her in the broad sense of being a band of tissues binding or supporting a joint.

Taber's Cyclopedic Medical Dictionary, 10th Edition, Taber, Clarence Wilbur, p. L-25

"Ligament......

1. A band or sheet of strong fibrous connective tissue connecting the articular ends of bones serving to bind them together and to facilitate or limit motion.
2. A thickened portion or fold of peritoneum or mesentery which supports a visceral organ.
3. A band of fibrous connective bones, cartilages and other structures and serving for support of for attachment of fascia or muscles.
4. A cord-like structure representing the vestigial remains of a fetal blood vessel."

Webster's New Collegiate Dictionary, Woolf, Henry Bosley, Ed., p. 664

"Ligament.....

1. A tough band of tissue connection the articular extremities of bones or supporting an organ in place.
2. A connection or unifying bond."

Dorland's Illustrated Medical Dictionary, 24th Ed., Daly, Lloyd W., Ph.D., p. 819

"Ligament.....A band of tissue that connects bones or supports viscera."

16: THEORY ON JOINT STABILIZATION

Transcript of Part of A Lecture on the Theory and Role of White and Yellow Tissues in Joint Stabilization

By Rolla J. Pennell, D.C., Ph.C., Sc.D.

Let's review again the fundamentals of what it is that holds the vertebrae in place. What is it? Who said "muscles"? Hold up your hand. You're wrong! What is it? "LIGAMENTS!"

Ligaments hold the bones in their place. All right. And there are how many kinds of ligaments? Two. The big story is the yellow and white ligaments. The chiropractor that doesn't know and doesn't tell the story about the yellow and white ligaments is only working in the relief phase. The patient, as well as the doctor, must know the story behind the yellow and white ligaments.

In the human body, from the day you are born to the day you die, there is a conflict around each and every joint in which the body is constantly changing the tissue structures. And there is normally a balance of white structures for STRENGTH and yellow structures for ELASTICITY. The yellow ligaments act like my wristband. If you've got a leather wristband, throw it away! Get one that stretches and has some "elastic" in it so you can explain this to you patients. It is the yellow elastic ligament that holds that joint "snug" and after an injury ... or after a long stretch or postural strain ... or after a long period of time, a weakening takes place. Then something happens. If I stretch my wristband, what then happens to my watch? It will fit "loosely" around my wrist instead of tightly, and it would be more subject to subluxation or dislocation, wouldn't it? Although the strength to the band is there, the elasticity is gone ... so we explain this to the patient:

> "As a result of your injury", "as a result of passage of time", or "as a result of age", etc., you've lost the elasticity of the joint. And unless we do something to rejuvenate the normal elastic tone of the joint, then you are going to have a reoccurrence and worsening of the condition and we'll be back working with the same problem again."

So what is it that stimulates the production? What is it that actually turns white ligaments to yellow ligaments (rejuvenates them, so to speak)? What stimulates the formation of the yellow tissue to replace the white tissue? It's motion, but more that just motion; just motion won't do it. You must activate by "stretch" the proprioceptive reflexes. If you activate the stretch and the proprioceptive reflexes, at the same time you stimulate in and around the joint the production or reproduction of the yellow tissue, and this is why it is that the ballet dancers who want to learn to stretch until they can kick as high as their heads, do what? They kick and they activate and stretch the proprioceptive, and they do it again and again until they can kick their foot over their

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16: THEORY ON JOINT STABILIZATION (continued)

heads. We call this, in general terms, stretching. But do they actually only “stretch” ... are we actually only stretching muscles out? No, it has stimulated a production for the regeneration of the yellow elastic ligament type fibers to replace the white fibers until we gain additional yellow elastic fiber, and at that time - and this explains why people over a gradual period of time, can learn to bend over backwards - their vertebrae are stretched beyond the normal range of motion but when they straighten up again, they just spring back into position into the NORMAL position because of the increased yellow elastic fibers. This is why the chiropractor must take the time to explain the fundamental physiology of the white and yellow ligaments to the patient. Then the patient understands why they are coming for the 2cd phase of treatment ... which is to stabilize the condition. Rejuvenation of yellow elastic fibers play a major role in stabilizing any spinal condition.

17: SOURCE REFERENCES

TREATMENT MODALITIES
Source - Posture And Pain
Kendall and Boyton

"Heat massage, stretching movements, strengthening exercises and supportive measures are the essential modalities employed in the treatment of faulty conditions of muscles, while use of supportive measures applies to the treatment of faulty conditions of muscles, ligament, bones and nerves."

THE PROPRIOCEPTORS OF MUSCLES, TENDONS AND JOINTS
Source - The Physiological Basis of Medical Practice
Best & Taylor

"The receptors in the situations mentioned respond to mechanical stimulation, e.g., pressure or stretch. These types of stimulus are furnished by the strains and stresses set up in the muscles, tendons and joints during muscular contraction."

> The sensory endings in the various situations mentioned above are of four main types: (1) Muscles spindles, (2) Golgi corpuscles, (3) Pacinian corpuscles, and (4) unencapsulated nerve endings."
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> "The Golgi corpuscles are situated in tendons and consist of a bundle of tendinous fibers surrounded by a lymph space and enclosed within a fibrous capsule. Afferent nerve fibers enter the organ near its center and ramify upon its constituent fibers. Tension is the adequate stimulus for these receptors."

"The Pacinian corpuscles are oval bodies composed of concentric laminae, like the "skins" of a sectioned onion. The afferent fiber penetrates to the center of the corpuscle. Pressure is the adequate stimulus. These receptor organs are found in tendons, joints, periosteum, especially beneath tendinous insertions, in faciae covering muscles and in subcutaneous tissues. They are also found in the mesentery."

CONCERNING THE WHITE AND YELLOW TISSUES
Source - Textbook of Physiology
Ziethout & Tuttle

"Each tissue has its own characteristic structure, being composed of cells which, for any given tissue, are the same kind and have fairly definite general characteristics and constant

17: SOURCE REFERENCES (continued)

arrangement. A tissue may, therefore, be defined as a group of more or less similar cells and a certain amount of intercellular material formed by the cells. The tissues are usually classed into four groups: (1) Epithelial tissue, know as covering tissue; (2) Connective tissue, known as holding tissue; (3) Muscle tissue, known as contracting tissue, and (4) Nerve tissue."

HISTOLOGIC STRUCTURE OF CONNECTIVE TISSUES
Source - Gray's Anatomy, 28th Ed.

"The fibers of connective tissue are of two primary types, collagenous and elastic. The unit fibrils of collagen are very minute, made visible only by the electronic microscope. When they are combined into fine fibers, just visible with a light microscope, they are called reticular fibrils. When combined into larger bundles they form the white, glistening collagenous fibers. These collagenous fibers form the bulk of tendons, ligaments and fascia, where they are pliable but tough and practically not extensible. The elastic fibers are stretchable and rubbery, as their name implies. They vary in thickness and length but seem to be homogeneous rather than composed of unit fibrils such as collagen."

"Except where they are attached, the tendons have a sheath of delicate fibro elastic connective tissue and the larger ones have a stroma of this internal septa as well."

"Ligaments resist tensions predominantly in one direction and their collagenous bundles accordingly are mainly parallel; they lack the glistening whiteness of tendons, however, because there is a greater admixture of elastic and fine collagenous fibers woven among the parallel bundles."

CARTILAGE
Source - Gray's Anatomy, 28th Ed.

"Cartilage is divided, according to the composition of its matrix, into hyaline cartilage, white fibrocartilage , and yellow or elastic fibrocartilage.

FASCIAE
Source - Gray's Anatomy, 28th Ed.

"The Subcutaneous Fascia - The inner layer is a thin membrane which ordinarily has no fat and has a generous amount of elastic tissue."

17: SOURCE REFERENCES (continued)

"The deep fascia is represented characteristically by the gray felt like membranes immediately covering the muscles. It comprises a rather intricate series of sheets and bands which hold the muscles and other structures in their proper relative positions."

"A band of fascia may act as a ligament."

PROPRIOCEPTIVE FACILITATION IN THERAPEUTIC EXERCISE
Source - 2nd Edition Revised, Volume 3
Therapeutic Exercise
Sidney Licht, MD.

"This voluntary activity leads not only to hypertrophy and beneficial chemical changes in the muscles themselves but also to improvement in transmission of voluntary impulses through the central nervous system to excite these muscles."

"Repeated excitation or a pathway in the central nervous system results gradually in easier transmission of nerve muscles through that pathway. This is brought about by a decrease in synaptic resistance and is the basis for the formation of habits and for learning."

Note: The same principles of facilitation and stimulation applies to ligaments.

"When voluntary contraction of the quadriceps is inadequate for weight-bearing in spastic paralsis, repeated tapping of the patellar tendon just before exercise of the quadriceps may be helpful in facilitation voluntary motion through enhanced spasticity."

"Right reflexes have also been utilized in facilitation of voluntary movement. These may be applied in the techniques of resistive balancing, which are effective not only in facilitating paretic muscles but also in accelerating training of essential motor functions. In resistive standing balance, the standing patient is pushed slowly in varying directions in an attempt to throw him off balance, while he voluntarily resists the effort. This results in voluntary resistive exercise or many muscle groups in complex balancing patterns, facilitated by the righting reflexes through stimulation of the labyrinth in the inner ear. Resistive balancing can be of value, not only for standing but also for head balance, sitting, crawling and kneeling balance, for standing with crutches and in various foot positions to develop balance in the postures essential for gait."

17: SOURCE REFERENCES (continued)

CONNECTIVE TISSUE
Source - Textbook of Physiology
Zoethout and Tuttle

"Connective tissue includes many diverse structures, the more important forms being white fibrous, yellow elastic, areolar and adipose tissue and bone, dentine and cartilage."

"Yellow Elastic Tissue - The fibers of this tissue are thick and branches. They contain a protein, known as elastin, which is not affected by boiling. As the name indicates, the tissue possesses a great deal of elasticity and is, therefore, found in such membranes as the pleura (covering of the lungs) and the peritoneum, in the walls of the air tubes, arteries and to a lesser extent, veins; it is also found in the vocal cords."

"Areolar Tissue - This tissue is composed of a loose network of white and yellow fibers and a ground substance containing cellular elements. It is the most abundant of all the various kinds of connective tissue. It penetrates the muscles, nerves, and glands and forms sheaths around them. It also occurs beneath the skin and in the walls of the alimentary, respiratory and urogenital tracts."

PAIN ASSOCIATED WITH FAULTY BODY MECHANICS
Source - Posture and Pain
Kendall and Boynton

"Stretch-weakness is the effect on muscles of remaining in an elongated condition beyond the neutral physiological rest position, but not beyond the normal range of muscle length."

"Over-stretch is stretch beyond the normal range afforded by the muscle length."

Ligaments: "Composed mainly of bundles of white fibrous tissue. They are pliant and flexible, so as to allow perfect freedom of movement, but strong, tough and inextensible, so as not to yield readily to applied force. Some ligaments consist entirely of yellow elastic tissue, as the ligamenta flava which connect together the ligament is intended to act as a substitute for muscle power."

Superficial Fascia: "Found immediately beneath the integument over almost the entire surface of the body. It connects the skin with deep facia .....Composed of white fibers and yellow elastic fibers."

17: SOURCE REFERENCES (continued)

Pain Mechanisms and Treatment Indications
"A posture may appear to be good but the stiffness or tightness that is present may so limit mobility that position cannot be changed easily. The lack of mobility, which is not apparent as an alignment fault but is observed only in tests for flexibility, may be the more significant fault."

"In a root lesion, pain tends to extend form the origin of the nerve to its periphery. The cutaneous sensory involvement is on a dermatome basis. A peripheral nerve involvement is often distinguished by pain below the level of lesion, following the course of the nerve.

STRAIN OF MUSCLES ON LIGAMENTS
Source - Posture and Pain
Kendall and Boynton

"Strain is the effect of an injuries tension. It may result from a prolonged, continuous tension, or from a sudden undue tension. Forces within the body which exert tension on muscles or ligaments are chiefly those arising from a distortion of boney alignment or from some unusual muscle pull. Therefore, muscle tension is described in conjunction with muscle spasm, or faults of alignment and mobility.

AN EXCERPT FROM DR. McELHANNON'S BOOK "A GUIDE TO PHYSIOTHERAPEUTICS" THAT GIVES SPECIAL GUIDELINES ON ADMINISTERING TRACTION TO THE PATIENT.

Chapter Three

TRACTION

At my clinic in Anaheim Hills, California, I have found traction to be the most valuable adjunctive treatment for a variety of neuro-musculo-skeletal disorders. Regardless of whether it is an acute intervertebral disc problem or chronic discogenic disease with secondary radiculitis, traction had proven time and time again to obtain outstanding and remarkable results.

There are, however, some contraindications to traction. They include: 1. Primary or metastatic malignancy; 2. Cord compression; 3. Infectious disease of the spine; 4. Cardiovascular disease; 5. Arthritis; 6. Old age; 7. Pregnancy; 8. Active peptic ulcers; 9. Hernia; 10. Aortic aneurism; and 11. Gross hemorrhoids.

Traction would be indicated in conditions where you wanted to achieve: 1. Distraction of the vertebral bodies with enlargement of the intervertebral space producing an inward suction effect on the disc; 2. Streching of muscles and ligaments with a tautening of the posterior longitudinal ligament exerting a centripedal affect on the adjacent anulous fibrosis; 3. Separation of the apophisial joints; 4. Enlargement of intervertebral foramina.

There are two types of motorized traction useful in controlling neuro-musculo-skeletal disorders. Motorized intersegmental traction, such as a Body Tone, is one type of traction which is quite effective in treating myofascitis or myofibrositis. The elevation of the roller system should be raised to 15 to 20 mm. for women and 20 to 40 mm. for men to achieve an effective paravertebral massage. The roller height should be adjusted to lift and stretch the paravertebral musculature and to elevate spinal segments to promote the breakup of spinal fixations. However, motorized intersegmental traction is not nearly as effective as motorized long axis traction for the treatment of neurological deficits produced by discogenic disease or severe myospasms.

The most common mistakes that doctors or therapists make during the application of long axis traction are to either set the patient up with the wrong poundage, the wrong time, and/or the wrong angle of pull and then state that, “traction hurt the patient”. Traction, however, is only as dangerous as the doctors or therapists who use incorrect traction procedures.

With discogenic disease the proper angle of pull, proper time and proper amount/poundage of pull are essential in obtaining maximum results. Follow these simple and effective traction procedures and you will find you are able to achieve amazing results with many of your more difficult cases.

ANGLE OF PULL:

In cervical traction the angle of pull will vary between 5 and 50 degrees. To affect the occiput and cervical vertebrae one through three, the angle of pull must be 5 to 15 degrees, respectively. To affect cervical vertebrae 4 through 7 and dorsal vertebrae 1, 2 and 3, the angle of pull must be 30 to 50 degrees respectively. In effect, the lower you treat in the cervico-thoracic spine, a greater angle of pull is required, up to 50 degrees, for maximum and consistant results.

The proper angle of pull for treating thoraco-lumbar conditions varies between 15 and 50 degrees. To affect the lower thoracic and lumbar vertebrae 1 through 3, the angle of pull must be 15 to 30 degrees respectively. To affect lumbar vertebrae 3 through 5 and the first sacral segment, the angle of pull must be 30 to 50 degrees, respectively. Again as in the cervico-thoracic spine, the lower in the spine you treat, the greater the angle of pull required.

Angle of pull guidelines for hyper or hypolordotic conditions of the cervical and lumbar spine are as follows: Hypolordosis of the cervical spine should be treated with angles of pull from 5 to 10 degrees. Hyperlordosis of the cervical spine should be treated with angles of pull from 30 to 50 degrees. Hypolordosis of the lumbar spine should be treated with angles of pull from 15 to 30 degrees and hyperlordosis of the lumbar spine should be treated with angles of pull from 30 to 50 degrees.

Commit these angles of pull to memory because it is imperative that you learn them to achieve maximum results for your patients. In my opinion, the correct angle of pull is more critical in traction than the poundage given.

PROPER TIME:

When considering the proper time for traction we must consider three factors. They are the duration of each traction treatment, the duration of the patient's treatment schedule and the proper time for each hold - rest cycle.

The length of a traction treatment is normally 20 minutes. This 20 minute time period should be adhered to steadfastly. A treatment less than 20 minutes will not achieve desired results and too long a treatment may be uncomfortable for the patient.

The world wide average treatment schedule for patients undergoing traction for discogenic involvement is estimated a approximately 10 treatments. At our clinic we average between 10 to 20 treatments. We have found we achieve greater results by continuing traction for this extended time period.

To begin traction we require the patient to return 3 days consecutively to achieve a quicker response and to monitor the patient through any reactive phase. Following the first three initial treatments, the patient is placed on a schedule of 3 treatments a week for 6 to 8 weeks.

The initiation of traction treatments should begin following a period of time in which the patient has undergone manipulative therapy to correct gross spinal rotation and lateral flexion malpositions. Once a patient is put in traction, manipulation should be discontinued. It is my experience and opinion that manipulation following traction is both contraindicated and counter productive to the care of the patient.

There are two different modes of long axis traction. The first is static traction. Static traction pulls continuously for the desired length of each treatment, (20 minutes). It is preferred over intermittent traction for patients with acute discogenic disease, severe radiculitis or severe myospasms. Never put a patient in intermittent traction who has severe myospasms. You may increase the spasm by doing so, as well as increase the chances for disc rupture.

Intermittent traction, on the other hand, does not hold for the entire 20 minute treatment. Instead, it pulls or holds for a 30 second cycle, followed by a release or rest cycle of 10 seconds. If your traction table has an adjustable hold/rest cycle, I recommend you adjust it to a 30 second hold cycle with a 10 second rest cycle. Clinically this particular 3 to 1 hold/rest cycle has the greatest results and is considered the current state of the art for intermittent traction therapy. It is referred to as the “three to one ratio”.

If your traction table does not have the capability of putting a patient in intermittent traction or does not have an adjustable hold/rest cycle to achieve the desired 3 to 1 ratio, your results will be lessened somewhat. “I prefer the ATT-300 Long Axis Traction table due to the fact that you can adjust the hold/rest cycle to obtain the 3:1 ratio as well as adjust the angle of pull.” James McElhannon, D.C./M.D.

PROPER POUNDAGE:

Two rules of thumb for proper poundages for traction are:

1. Never start traction of the cervical spine with less than 15 pounds.
2. Never start traction of the lumbar spine with less than 50 pounds.

Traction with less poundage than recommended will not overcome most muscular reactions that accompany spinal nerve root pressure and discogenic disease. In fact, starting traction with less poundage could be detrimental to your patient by initiating reflex spasms in the associated musculature.

When patients are started at these poundages, and are seen on the schedule recommended, (daily x 3 followed by 3 times a week for 6-8 weeks), your patient should be much improved after the first 3 to 5 treatments.

If the patient continues to get better, continue with the traction at the same poundage. If the patient has not responded, increase the poundaged by 10# for 3 treatments. Never increase the poundage less than 10 pounds and never more than 10 pounds. For example, if your patient was started in cervical traction at 15 pounds and 3 days later they were only slightly better or not responding, then increase the poundage by 10 pounds (to 25 pounds). However, if they have responded well with loss of symptomatology, continue your treatments at the same poundage of 15 pounds.

Let me reiterate: If your patient does not improve with traction treatments, re-evaluate your poundage and angle of pull. You will find that you will be better off by increasing the poundage by 10 pounds as opposed to decreasing it by 10 pounds. Too little traction will do more harm than too much traction. The general consensus is that the proper maximum poundage for traction is just what the patient can tolerate to achieve maximum results.

We have done away with the old procedure concerning traction poundages. The old procedure was 5% of the patient’s body weight for cervical traction and 25% of the patient’s body weight for lumbar traction. This was a very cumbersome procedure to deal with and created more problems than it ever solved.

There are certain maximum poundages not to exceed. The maximum poundage for cervical traction is 60 pounds and these higher poundages are for larger male patients. Lumbar traction can be increased to as high as 125 pounds, although results are usually obtained prior to reaching this level.

Although starting poundages for traction on adults are relatively standardized at 15 pounds for cervical traction and 50 pounds for lumbar traction, the starting levels for children are somewhat altered. Poundages used on child patients should be adjusted down to slightly less weight to accommodate their age sex, size and weight.

PATIENT PREPARATION PRIOR TO TRACTION:

Once gross spinal misalignments have been corrected, make sure the patient understands two things. First, make them aware that they will be undergoing traction therapy and that when traction is begun there may be a reaction or an increase in their symptomatology. This is not a contraindication for traction and should be expected to some degree. However, do not stop traction should this happen. It is a normal reaction due to stretching of muscles, ligaments and tendons that may have been inactive for some time. Explain to the patient that this is a temporary reaction which should dissipate quite rapidly in subsequent treatments. If this vital information is not told to the patient and should he/she react to traction, you will undoubtedly lose some patients due to your lack of communication.

Second, make them aware that they will be required to be seen 3 days in a row to start traction in order to monitor and help them through any reactive period. This will also allow you to achieve quicker results. Therefore, never start traction on a Friday or Saturday if your office is not open on Sundays.

ACCOMPANYING MODALITIES FOR TRACTION:

Always use some form of heating modality prior to placing a patient in traction. In our clinic we use either shortwave diathermy or ultrasound over and/or around the affected area. This relieves muscle spasms and pain, making the muscle more supple. Consequently, less traction poundage is needed to overcome the resistance of the associated muscles and ligaments.

In cases with radiculitis secondary to a cervical or lumbar discopathy, the use of electrical muscle stimulation following traction is recommended. This is done to decrease any possible muscular reaction as well as to passively exercise the associated musculature and promote rehabilitation of the muscles. By doing this you are able to directly treat the soft tissue around the involved vertebral joints without putting the joint through the range of motion which may further aggravate the affected nerve roots. In our office we have clinically found a surging faradic current obtains the best results and is always done after traction just prior to the patient leaving the office.

Traction is also very effective in the treatment of scoliosis. In our clinic we have seen dramatic reductions in scoliotic curves in a matter of 6 to 8 weeks using traction with no increase in the curves on subsequent checkups. Procedures for treatment of scoliosis will be dealt with separately in another chapter.

HOME TRACTION UNITS:

In office traction is always preferable and should be given in the horizontal or prone position with the proper angle of pull and proper poundage, but home traction units are often used to achieve maximum results. However, we advise against the use of ‘over the door’ traction because research has proven that this form of traction actually increases nerve root irritation and compression at the intervertebral foramen rather than decreasing them. If you insist on using the ‘over the door’ traction units, make certain the patient sits facing the door. More commonly the doctor has the patient facing away from the door which is incorrect as this will lift the chin and close the intervertebral foramina.

Inversion traction is simply that. The patient is either placed in a contraption hanging by his ankles, knees or hips and is turned upside down.

Inversion traction has become very vogue of late. You can buy the units almost anywhere from mail order catalogues to swap meets, which is my primary objection. This becomes extremely unsupervised traction. People are buying the units from salespeople with no medical training and who invert prospective buyers without any sort of medical or spinal evaluation. More often than not, the salespersons, either through neglect or lack of knowledge, fail to advise the buyer of the contraindications of traction or the serious side effects which may occur following such traction. Inversion traction should not be performed on patients who have hiatal hernias, hypertension or marked cardiovascular diseases, pace makers, pinned hips, ankles or knees, or glaucoma.

Inversion traction can help in the relief of many conditions such as simple muscle and ligament strains and sprains. It also helps relieve disc compressions, allows some of the disc resiliency to return to normal and promotes joint separation throughout the sine, when used properly. The patient should never start inversion traction in the totally inverted position. Instead, he should start at approximately a 45 degree angle of inversion each day for 3 to 5 days and progress to an increased angulation over a period of time to avoid any reactions.

Although some relief may be gained by inversion traction, it is by no means as effective nor should it be substituted for horizontal motorized long axis traction where you, the doctor, have control over traction poundages and angles of pull.

IN SUMMARY:

Long axis traction is by far the single most valuable adjunctive tool the chiropractic profession has at its disposal to treat discogenic problems if used with the proper procedures we have outlined in this chapter. When using traction, make sure it is initially given 3 days in a row, followed by 3 treatments a week for 6 to 8 weeks. Apply proper angles of pull and proper poundage. Explain to the patient what effects you expect to achieve and what initial side effects to expect. Use the proper pre and post traction physical therapy modalities and you will also achieve maximum results for your patients.

Note: Some type of bolster should always be placed under the patient's knees to flatten the lordotic curve while traction is being given to enhance the effectiveness of the traction.