



AIRBAC™

SCIENTIFIC STUDY



AIRBAK® TECHNOLOGIES CORPORATION

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AirBac backpacks use an innovative, patented air bladder system technology designed to redistribute weight of backpack contents to the waist, hips and lower back.

By shifting weight to the waist and lower back area, AirBac helps promote better posture and reduces stress on the spine. The effective result is making the load carried feel like half its weight.

Backpack injury studies support these findings. According to several studies we investigated, the conclusions support several main points. The first is that backpack loads should be positioned lower on the waist and hips. Another is that proper weight distribution promotes better posture. Most important was the perception of the individual wearing the backpack as to how the weight of the backpack felt on their back.

Using 3 different types of testing, a scientific study was performed to confirm these findings. The three methods used were surface electromyography, standing postural analysis and x-ray analysis.

(SEMG) is a technique whereby voltage-measuring electrodes attached to the surface of the skin are used to detect and/or infer various phenomena relating to muscular contractions. The development of sophisticated electronic instrumentation has permitted the use of surface EMG in most areas of ergonomics research and analysis involving muscle activity. This testing measures how well the motor nerves are working by reading the amount of current found in the muscles. It also measures muscle balance. Muscle balance is extremely important because the vertebrae in the spine depend on the muscles to move properly. If one or more of the vertebrae are out of their normal position, it disturbs nerve function. This disturbance creates muscle imbalance caused by an abnormal amount of electrical current in the muscles on either side of the spine. As a result of this disturbance, the muscles become weaker or stronger, tighter, or fatigued. The testing showed the effects of the variations of weight distribution between wearing the AirBac backpack filled with air compared to a "normal" non filled backpack.

The testing done through standing postural analysis utilized a computerized analysis of structural support developed by Foot Leveler, Inc, The findings also confirmed that the subjects wearing the AirBac filled with air had better weight distribution, posture and structural stability.

X-ray testing proved that the spinal alignment was much better with the AirBac backpack filled with air in contrast of a "normal" backpack without the air bladder technology

On the following pages you will see the reports from these tests that confirm these scientific findings.

SCIENTIFIC STUDY



The SEMG first test was used as a base comparison. The subjects were scanned without wearing a backpack. The results are displayed on following pages.



The second SEMG test was performed with the subjects wearing a "normal" backpack that was not filled with air. The results are displayed on following pages.



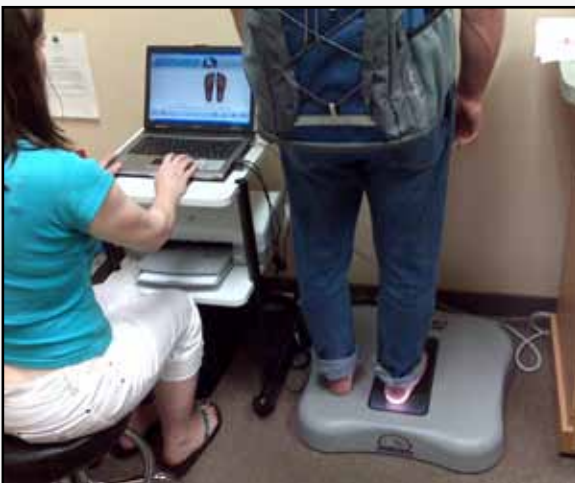
The third SEMG test was performed with the subjects wearing a AirBac backpack that was filled with air. The results are displayed on following pages.



The first standing postural analysis test was used as a base comparison. The subjects were scanned without wearing a backpack. The results are displayed on following pages.



The second standing postural analysis test was performed with the subjects wearing a "normal" backpack that was not filled with air. The results are displayed on following pages.



The third standing postural analysis test was performed with the subjects wearing an AirBac backpack that was filled with air. The results are displayed on following pages.

SCIENTIFIC STUDY



The first x-ray analysis test was performed with the subjects wearing a “normal” backpack that was not filled with air. The results are displayed on following pages.



The second x-ray analysis test was performed with the subjects wearing a “normal” backpack that was not filled with air. The results are displayed on following pages.



Several views were taken for posture analysis with and without the backpack filled with air. The results are displayed on following pages.

Spinal Decay

Your body reacts to uncorrected spinal trauma by changing the shape and function of affected joints.

TEXTBOOK NORMAL

- Graceful forward curve
- Equal disc spacing
- Normal turning and bending



Neck

SPINAL DYSFUNCTION CAN LEAD TO...

- Loss of curve
- Narrowing of disc spacing
- Impaired turning and bending



Phase 1

IF IGNORED CAN DETERIORATE TO...

- Roughening joint surfaces
- Bone spurs
- Reduced mobility



Phase 2

IF NEGLECTED CAN DEGENERATE TO...

- Severe bone remodeling
- Irreversible joint fusion
- Permanent loss of motion



Phase 3



Mid-back



Phase 1



Phase 2



Phase 3



Lower Back



Phase 1



Phase 2



Phase 3

A Relentlessly Worsening Process That Can Occur Without Noticeable Symptoms.

Through the testing techniques used in this scientific study, results are able to be confirmed through well researched knowledge of skeletal, muscular and nerve systems of the body.

Four important factors to consider before the tests are administered:

1. Do the Insight Millennium tests hurt?

Absolutely not. The tests do not utilize any needles, electrical shock, or heat whatsoever. They are receiving important information *from* your Central Nervous System.

2. Why does the chiropractor administer these tests?

Our purpose for administering these tests is to *detect and pinpoint abnormal function in the spine* which cannot be seen on X-ray. Abnormal spinal function causes abnormal Nervous System disturbance. The three standard tests will measure: 1) SEMG - the amount of electrical current in the muscles, 2) Thermography - skin temperature along the spine, and 3) Incliniometry - range of movement of the spine.

3. Why is it important to monitor the results?

Your chiropractor wants the best results for patients like yourself. He/she can easily monitor your changes through periodic progress exams. It has been proven that a very slight amount of pressure (the weight of a dime!)* can disturb the communication of the Nervous System *whether or not symptoms are present*. How can the chiropractor measure the results after removing pressure? The advanced technology of the Insight Millennium. This is vitally necessary to monitor how the spine is working. It is key to improving your health and well-being.

4. How will this test benefit me?

For years, a major concern of the public has been, "Why do I have to keep coming back when I'm pain-free?" or "How do I know if I'm getting the proper amount of adjustments?" Now you are able to actually see the changes, and it will be easier to understand the amount and type of care you are receiving. Because of this technology, your chiropractor can provide a "tailor-made" program to meet your specific health needs.

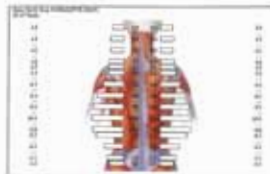
* Sharples, SF. Susceptibility of Spinal Joints to Compression Block. NINCDS Monograph 15, DHEW publication (ND) 76-998, 1975, pages 155-161.

Motor Nerves

Control Muscles

SEMG Scan

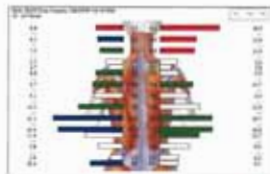
Measures Electrical Current of the Muscles



Normal SEMG Pattern

Normal Function
White Bars

Abnormal Function
Mild/Green Bars
Moderate/Blue Bars
Severe/Red Bars



Initial Exam



Re-Exam

Surface Electromyography (SEMG Scan)

Your muscles are controlled by nerves. The SEMG measures how well the motor nerves are working by reading the amount of current found in the muscles. Subluxations (misalignments) disturb the function of the nerve causing an abnormal amount of electrical current flowing to your muscles (indicated by colors and/or abnormal patterns).

Muscle Balance

Symmetry



Initial SEMG Scan



Symmetry Pattern

Muscle Balance

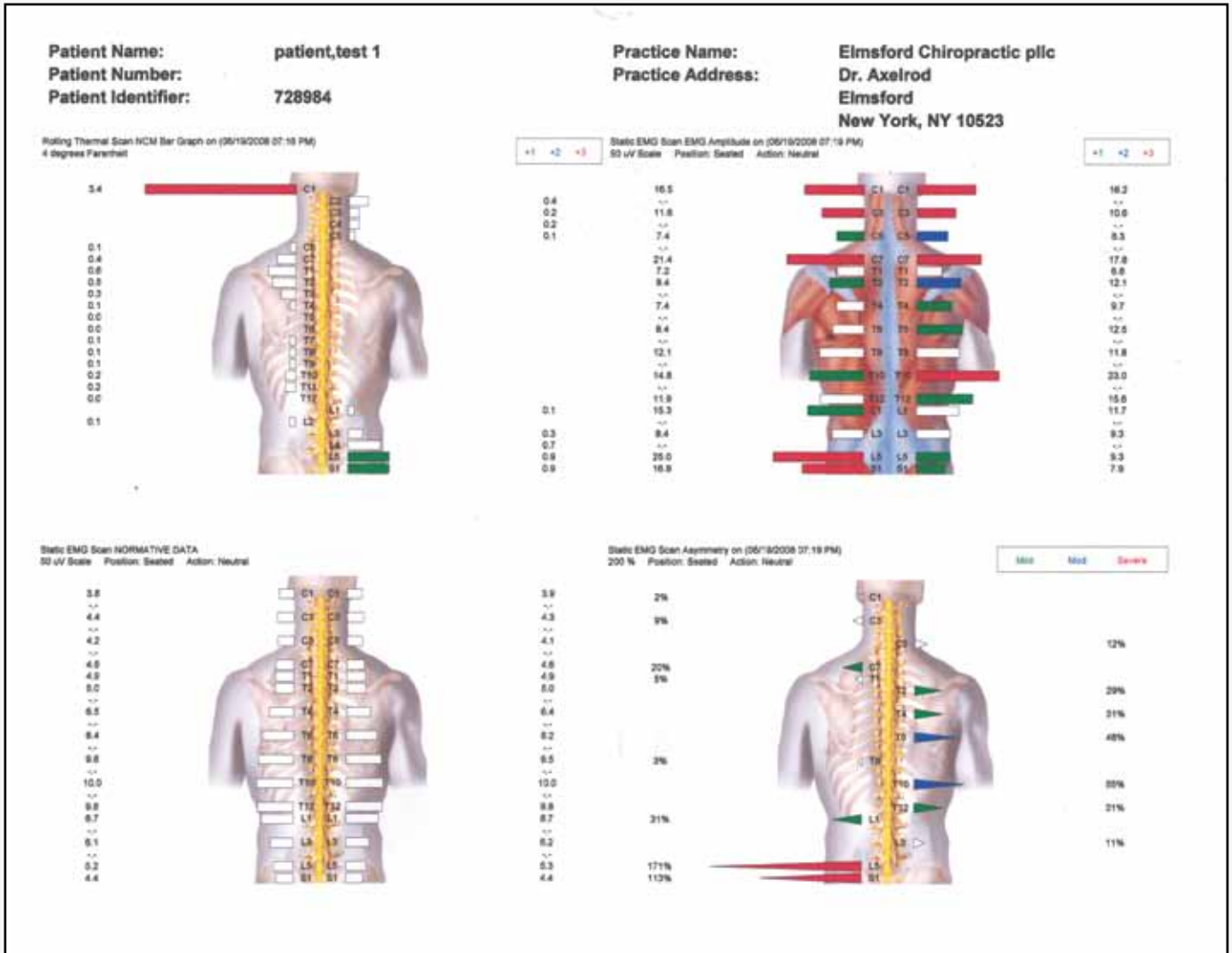
The percentage readings on the graph indicate areas where the muscles along the spine are pulling harder.

Muscle Balance (Symmetry)

Muscle Balance is extremely important because the vertebrae in the spine depend on the muscles to move properly. If one or more vertebrae are out of their normal position, it disturbs nerve function. This disturbance creates muscle imbalance caused by an abnormal amount of electrical current in the muscles on either side of the spine. As a result of this disturbance, the muscles can become weaker or stronger, tighter, or fatigued. The abnormal muscle pattern on the scan reveals an increased amount of tension/pull on one side compared to the other (similar to a Tug-of-War).

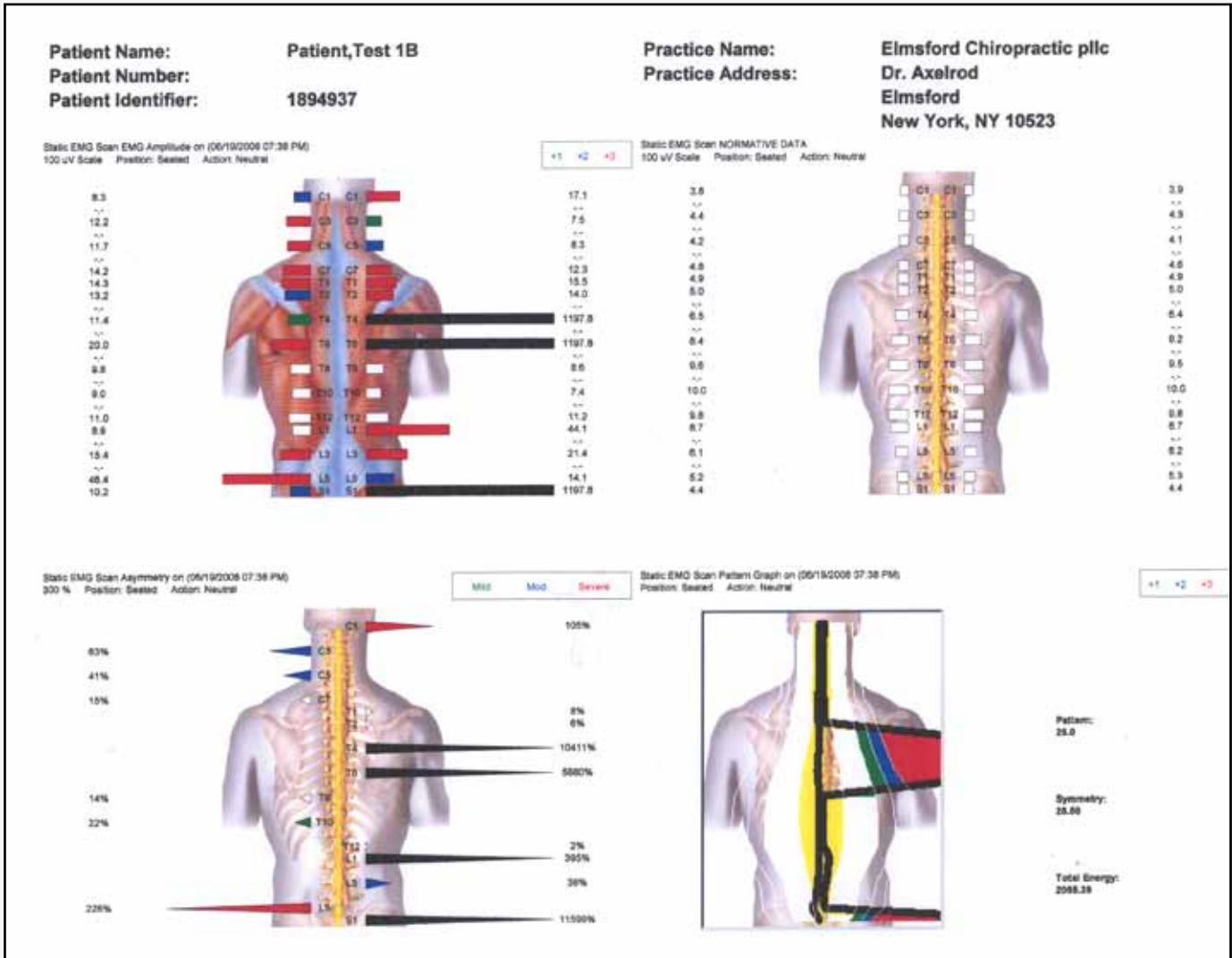
TESTING WAS PERFORMED USING THE STATE- OF-THE-ART INSIGHT MILLENNIUM SECOND GENERATION SUBLUXATION STATION

- Detects Areas Of Nerve Disturbance
- Documents and Monitors Results
- Provides Visual Print Out of Scans



The first test was taken of the subjects with no backpack being worn. The results show little or no stress on the spine and low muscle activity.

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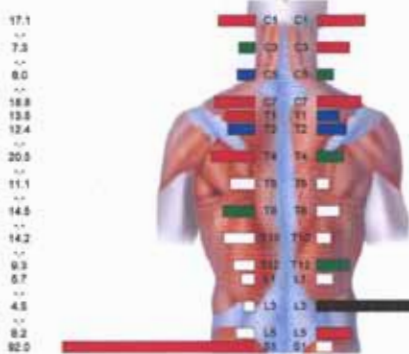


The second test was taken of the subjects with “normal” backpack being worn. The results show more level of stress on the spine and higher muscle activity due to the compensation of the improper weight distribution of the backpack.

Patient Name: Test ,Patient 1C-air
Patient Number:
Patient Identifier: 3420500

Practice Name: Eimsford Chiropractic pllc
Practice Address: Dr. Axelrod
 Eimsford
 New York, NY 10523

Static EMG Scan EMG Amplitude on (05/19/2008 08:11 PM)
 100 uV Scale Position: Seated Action: Neutral



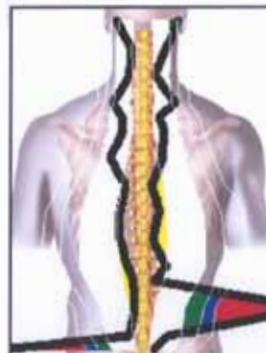
Static EMG Scan NORMATIVE DATA
 100 uV Scale Position: Seated Action: Neutral



Static EMG Scan Asymmetry on (05/19/2008 08:11 PM)
 300 % Position: Seated Action: Neutral



Static EMG Scan Pattern Graph on (05/19/2008 08:11 PM)
 Position: Seated Action: Neutral



Pattern: 25.0
 Symmetry: 42.14
 Total Energy: 278.24

The third test was taken of the subjects with AirBac backpack filled with air being worn. The results clearly show much lower level of stress on the spine and lower muscle activity due to the proper and equal weight distribution of the backpack.

A study by Northeastern University (June '01) reported that the average student has a VAS (Visual Analog Scale) pain level of 4.3 with a high percent reporting in the range of 8-9. The students who wore an air filled backpack for six weeks had a VAS pain level of 1.8, a 50% reduction in pain.

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PATIENT INFORMATION

Patient Name: Test Patient 1
DOB: 10/01/1965
Height: 5 ft. 9 in.
Weight: 205 lb.
Gender: M
Examination Date: June 19, 2008
Examiner: DR BRETT AXELROD

The images below are:

- Actual foot scan from your exam
- Foot scan of a balanced, symmetrical foot
- Colorized digital version of your foot scan
- Colorized digital version of a balanced, symmetrical scan

The red on the colorized digital versions of the scans shows where the greatest amount of pressure is being exerted. Comparing your scan to a balanced, symmetrical foot scan is the best way to see if your feet could be contributing to postural imbalances.

Test Patient 1's Actual Foot Scan



Left

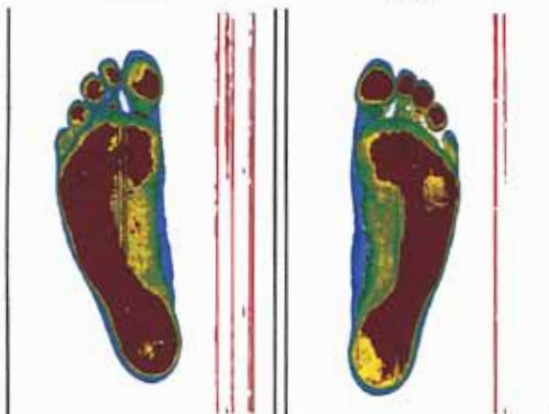
Right

Balanced, Symmetrical Foot Scan



Left

Right



Test Patient 1's Colorized Digital Scan



Balanced Colorized Digital Scan

The first test was taken of the subjects with no backpack being worn. The results normal pressure on the heel and ball of the feet.

PATIENT INFORMATION

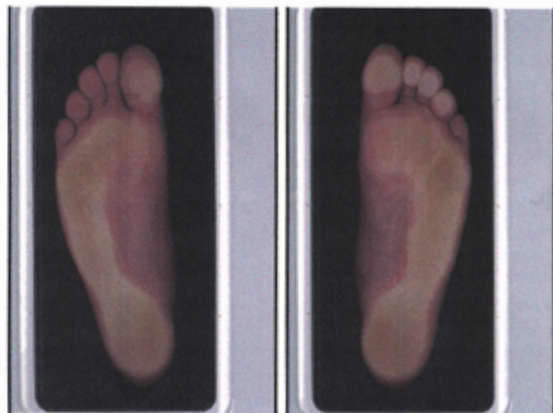
Patient Name: Test Patient 1B
DOB: 10/01/1965
Height: 5 ft. 9 in.
Weight: 205 lb.
Gender: M
Examination Date: June 19, 2008
Examiner: DR BRETT AXELROD

The images below are:

- Actual foot scan from your exam
- Foot scan of a balanced, symmetrical foot
- Colorized digital version of your foot scan
- Colorized digital version of a balanced, symmetrical scan

The red on the colorized digital versions of the scans shows where the greatest amount of pressure is being exerted. Comparing your scan to a balanced, symmetrical foot scan is the best way to see if your feet could be contributing to postural imbalances.

Test Patient 1B's Actual Foot Scan



Left

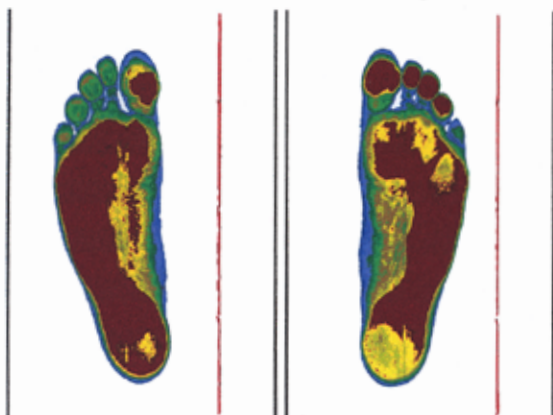
Right

Balanced, Symmetrical Foot Scan

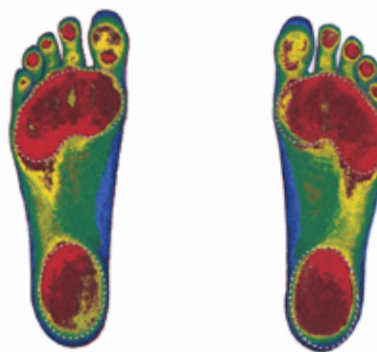


Left

Right



Test Patient 1B's Colorized Digital Scan



Balanced Colorized Digital Scan

The second test was taken of the subjects with backpack without air filled being worn. There is no pressure on right heel due to a forward compensation of his body and stress of the weight distributed on the spine.

SCIENTIFIC STUDY

PATIENT INFORMATION

Patient Name: Test Patient 1B
DOB: 10/01/1965
Height: 5 ft. 9 in.
Weight: 205 lb.
Gender: M
Examination Date: June 19, 2008
Examiner: DR BRETT AXELROD

The images below are:

- Actual foot scan from your exam
- Foot scan of a balanced, symmetrical foot
- Colorized digital version of your foot scan
- Colorized digital version of a balanced, symmetrical scan

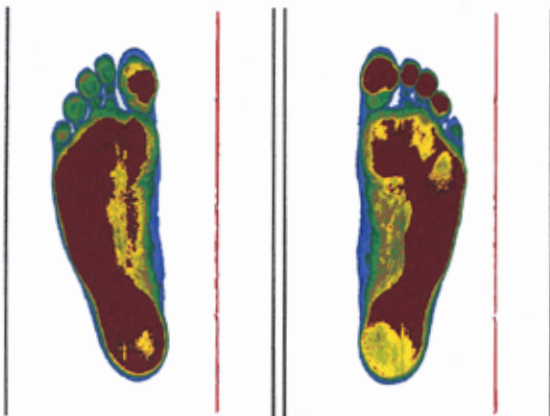
The red on the colorized digital versions of the scans shows where the greatest amount of pressure is being exerted. Comparing your scan to a balanced, symmetrical foot scan is the best way to see if your feet could be contributing to postural imbalances.

Test Patient 1B's Actual Foot Scan



Left

Right



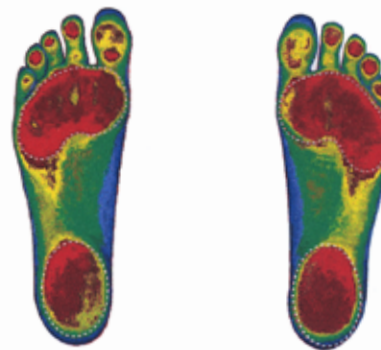
Test Patient 1B's Colorized Digital Scan

Balanced, Symmetrical Foot Scan



Left

Right



Balanced Colorized Digital Scan

The second test was taken of the subjects with backpack without air filled being worn. There is no pressure on right heel due to a forward compensation of his body and stress of the weight distributed on the spine.

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The spine is bent forward due to the stress on back from the weight.



The spine now much straighter and more towards the correct position.



Back leaning back due to over compensation for heavier weight.



Back in much straighter correct position.



The X-Rays to the right show the back in correct anatomical position (correct posture). As a result, there is less stress on the spine leading to less wear and tear on the joints and ligaments.

• Back-to-school season
a barometer for retailers
(page 17)



MMR

MASS MARKET RETAILERS

THE GLOBAL NEWSPAPER FOR SUPERMARKET DRUG, DISCOUNT CHAINS

BACKPACKS HAVE BECOME MUST-HAVE

All that extra gear children are toting in their backpacks has many doctors worried. The American Academy of Orthopedic Surgeons reports that backpacks that are too heavy or worn incorrectly can injure a child's muscles or joints.

According to the U.S. Consumer Product Safety Commission, approximately 21,000 backpack related injuries were treated at hospital emergency rooms, doctor's offices and clinics in 2003 (the latest year for which figures are available), more than half of them involving school-age children 19 and under. Many of them involve strains to the shoulder, neck and back.

The American College of Sports Medicine recommends that parents choose backpacks that are appropriate to the size of their children. Backpacks ideally should not weigh more than 10% of the child's weight, with 15% as the maximum.

Other recommendations include choosing backpacks with wide, padded and adjustable straps, and ensuring that the bottom of the backpack rests no more than 2 inches below the child's waist. Compartments and dividers that help position contents can help, as does putting heavier items in the bottom center of the bag.

Change in posture when wearing backpacks, including leaning forward or backward, can be a sign that the bag is too heavy.

Some suppliers are offering more ergonomic backpacks designed to be easier on children's backs. Innovative Products Sales & Marketing Inc.'s AirBac backpacks contain proprietary air bladders that allow them to conform to the natural curve of the spine. In addition, the air bladders help shift the weight in the backpack from the wearer's shoulders and upper back to the lower back.

NEW YORK - TARGET Corp. put backpacks in the spotlight at the beginning of this year's back-to-school season.

The discounter, known for its creative advertising campaigns, ran a series of television commercials featuring music from the infamous 1992 rap hit "Baby Got Back." Instead of praising large derrieres, as the original song did, the version in the commercial has new lyrics that proclaim, "I like backpacks, and I cannot lie..."

The focus on backpacks is appropriate, because they have come to symbolize the back-to-school season. In fact, a number of charitable organizations have donated backpacks full of school supplies to needy students. Office Depot Inc., which launched its National Backpack Program in 2001, this year donated more than 300,000 backpacks containing basic school supplies to underprivileged and "at risk" children around the country.

School children rely on back packs for more than just toting books, paper and pens, experts say. Electronics - from cell phones to laptops to iPods - have become must-haves for many students, and backpacks are increasingly designed with such gadgets in mind. Many feature padded compartments for laptops, or separate pockets for cell phones or CD players. Many of the bags also have small holes that students can thread their earphones through, allowing them to keep the player in their gag while still listening to music.

AirBac

TROY CHRISTY
President/CEO
www.airbac.com

Adolescent standing postural response to backpack loads: a randomized controlled experimental study. Grimmer K, Dansie B, Milanese S, Pirunsan U, Trott P.

Centre for Allied Health Research, University of South Australia City East Campus, North Terrace, Adelaide 5000, Australia. karen.grimmer@unisa.edu.au

BACKGROUND: Backpack loads produce changes in standing posture when compared with unloaded posture. Although 'poor' unloaded standing posture has been related to spinal pain, there is little evidence of whether, and how much, exposure to posterior load produces injurious effects on spinal tissue. The objective of this study was to describe the effect on adolescent sagittal plane standing posture of different loads and positions of a common design of school backpack. The underlying study aim was to test the appropriateness of two adult 'rules-of-thumb'-that for postural efficiency, backpacks should be worn high on the spine, and loads should be limited to 10% of body weight. **METHOD:** A randomised controlled experimental study was conducted on 250 adolescents (12-18 years), randomly selected from five South Australian metropolitan high schools. Sagittal view anatomical points were marked on head, neck, shoulder, hip, thigh, knee and ankle. There were nine experimental conditions: combinations of backpack loads (3, 5 or 10% of body weight) and positions (backpack centred at T7, T12 or L3). Sagittal plane photographs were taken of unloaded standing posture (baseline), and standing posture under the experimental conditions. Posture was quantified from the x (horizontal) coordinate of each anatomical point under each experimental condition. Differences in postural response were described, and differences between conditions were determined using Analysis of Variance models.

RESULTS: Neither age nor gender was a significant factor when comparing postural response to backpack loads or conditions. **Backpacks positioned at T7 produced the largest forward (horizontal) displacement at all the anatomical points.** The horizontal position of all anatomical points increased linearly with load.

CONCLUSION: **There is evidence refuting the 'rule-of-thumb' to carry the backpack high on the back. Typical school backpacks should be positioned with the centre at waist or hip level.**

AirBac specifically redistributes the weight to the lower back hip and waist level.

Subjective perceptual methods for comparing backpacks in the field.
Legg SJ, Barr A A, Hedderley DI.

Centre for Ergonomics, Occupational Safety and Health, Department of Human Resource Management, Massey University, Palmerston North, New Zealand.

Subjective perceptual methods have provided useful information in the laboratory about small differences in backpack design when physiological and biomechanical comparisons are ineffective, but have never been used in the field. This study therefore evaluated, in a controlled field trial with 10 male participants, the suitability of quantitative and qualitative subjective perceptual approaches to distinguish between subtle design differences in two backpacks, each loaded to 15 kg. In addition,

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initial quantitative subjective impressions about the two backpacks during a 15 min simulated 'in-shop' trial were compared with post-field trial backpack preference. In the simulated 'in-shop' trial the participants 'tried out' the backpack in a manner that was very similar to the way that they would normally try out a backpack as if they were considering buying one in an 'outdoor' shop. It included donning and doffing the pack several times and walking around the room wearing the backpack. In the controlled field trial, participants carried the two backpacks for approximately 15 min around a 1313m hilly outdoor track at a self-selected walking pace which elicited a moderate exercise intensity. Seven participants preferred backpack A. Three preferred backpack B. The qualitative approach, which required participants to provide free-format written responses to semi-structured open-ended questions immediately after the field trial, successfully identified specific reasons underlying participants' preferences.

The main reasons for preferring backpack A were better balance, weight distribution, stability up and down hill and over obstacles, fewer pressure points on their back and easier strap location and adjustment.

AirBac specifically redistributes the weight to the lower back hip and waist level and takes the pressure off the back. It uses easy to adjust straps.

Correlation between backpack weight and way of carrying, sagittal and frontal spinal curvatures, athletic activity, and dorsal and low back pain in schoolchildren and adolescents. J Spinal Disord Tech. 2004 Feb;17(1):33-40. PMID: 14734974 [PubMed - indexed for MEDLINE] Koroivessis P, Koureas G, Zacharatos S, Papazisis Z.

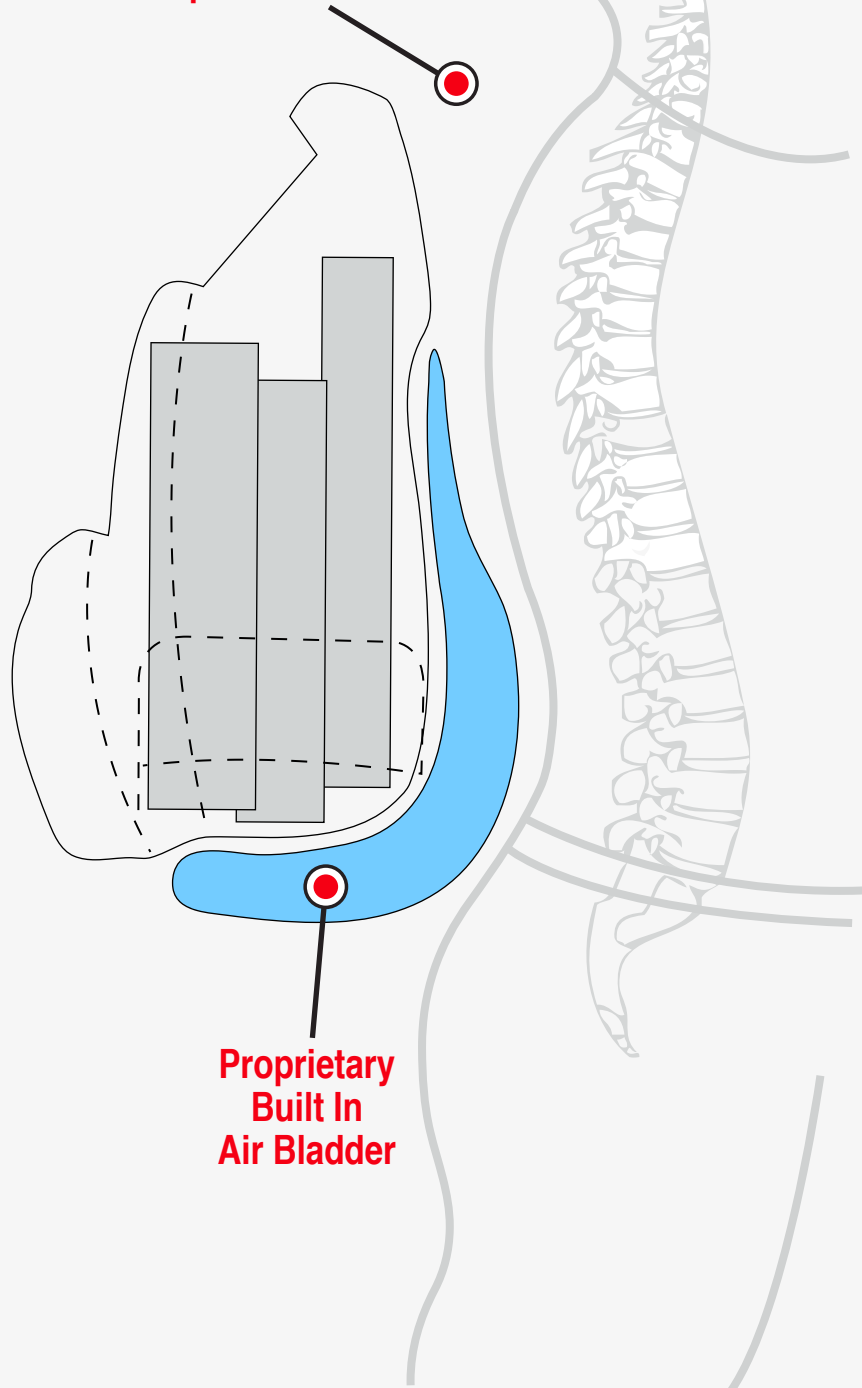
Orthopaedic Department, Spine Unit, General Hospital Agios Andreas Patras, Greece.
koroivess@otenet.gr

STUDY DESIGN: Cross-sectional study using logistic and multinomial logistic analysis. **OBJECTIVES:** To investigate the influence of backpack carrying on spinal profile shoulder and trunk. **SUMMARY OF BACKGROUND DATA:** No similar investigations. **METHODS:** A randomly selected sample of 1263 students aged 12-18 years were asked for dorsal (DP) and low back pain (LBP) during the school period and holidays. Debrunner's Kyphometer and Scoliometer were used to measure craniocervical angle (CCA), thoracic kyphosis, lumbar lordosis, and shoulder shift (BL). Upper trunk shift from plumbline were recorded. **RESULTS:** Girls suffer from DP more often and of much more intensity pain than boys in school period and in holidays. Backpack carrying decreased CCA and changed shoulder and upper trunk shift. Asymmetrically backpack carrying increased DP and LBP. BL-shift increased DP. DP and LBP increased with coronal trunk shift. Sagittal trunk shift increased LBP. Asymmetrically carrying of backpacks increased back pain and shoulder shift in holidays. Coronal trunk shift while carrying backpacks asymmetrically increased back pain in holidays. Asymmetric backpack carrying is associated with high intensity pain. Frontal trunk shift is associated with high intensity pain.

CONCLUSION: Backpack carrying, particularly asymmetrically, results in shift of upper trunk and shoulder and cervical lordosis, which furthermore seem to increase back pain in school period and holidays. Symmetric backpack carrying is recommended.

AirBac specifically redistributes the weight to the lower back hip and waist level and takes the pressure off the back.

**Adjustable Straps With
Extra Cushioning Allows
Weight To Rest On
Top Of Buttocks**



**Proprietary
Built In
Air Bladder**



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