

# Quality of Life Improvements and Spontaneous Lifestyle Changes in a Patient Undergoing Subluxation-Centered Chiropractic Care: A Case Study

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## ABSTRACT

**Purpose of study:** This case study is to report the improvement in quality of life experienced by a patient undergoing subluxation-centered chiropractic care.

**Clinical features:** A 36 year old male presented with primary health concerns of stress, eye pain and left leg pain of 14 years duration radiating to the foot and secondary complaints of gastritis, ulcers, nervousness, depression, lack of concentration and general loss of interest in daily life. The patient also smokes, does not exercise, eats a sub-optimal diet and rated his family and friends support, as well as job satisfaction as sufficient.

**Intervention and Outcomes:** We discuss the various analyses employed to evaluate vertebral subluxations, including paraspinal surface electromyography and thermography. Adjustive care included a combination of Network Spinal Analysis, Torque Release Technique and diversified structural adjustments to correct vertebral subluxations over a six month

period. We used visual analog scales, open-ended questions and selected items from the Self-Rated Health and Wellness Instrument to monitor health changes, as well as the positive improvements in quality of life as perceived by the patient himself.

**Conclusion:** This case study demonstrates that the correction of vertebral subluxations over an 11 month period was associated with significant improvements in the quality of life of the patient.

**Key words:** *chiropractic care, vertebral subluxation, quality of life, wellness, Network Spinal Analysis (NSA), Torque Release Technique (TRT)*

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## Introduction

The purpose of chiropractic is to optimize the health of the person who seeks our care. This professional objective is primarily realized through the correction of vertebral subluxation.<sup>1</sup>

The notion that the correction of vertebral subluxation is associated with improvements in quality of life has been anecdotally reported by chiropractors for a long time, but has remained ignored in the scientific literature. Only recently has this idea been tested and published.<sup>2,8,9</sup> Other studies are presently underway to further test the hypothesis that long-term correction of vertebral subluxation results in improvements of health and well-being.<sup>3,4,5,10</sup>

Intrinsic in the chiropractic paradigm of health is the notion that the correction of nerve interference and restoration of neural integrity is an essential component of health maintenance and enhancement.<sup>1</sup>

In recent years, it has become evident that the professional objective of health optimization involves a different paradigm than that of disease diagnosis and treatment. The chiropractic profession has recognized the need to not only document the effect of subluxation-centered chiropractic care on health and wellness, but also the need to develop new outcome measures which are better fitted to assess the health changes experienced by patients undergoing non-medical healing interventions.<sup>10</sup>

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The Self-Rated Health and Wellness Instrument is such an instrument that seems to have the potential to assess the impact of care on health and wellness<sup>2</sup>.

Although the correction of nerve interference has been hypothesized by chiropractors to be an important component in the enhancement of health and wellness, it is obviously not the only factor. Recent research has shown that health and well-being are multifaceted and include such concepts as psychological factors (empathy, self-esteem, personal control, ...), social factors (family and friends support), spiritual factors (sense of coherence).<sup>6</sup> This is expressed in the World Health Organization definition of health as being a “state of optimal physical, mental and social well-being, and not merely the absence of disease or infirmity.”<sup>11</sup> Although many researchers have brought some light on the issue of what health is, no authoritative definition of this concept has been achieved at this time.

It can consequently be affirmed with a high degree of certainty that the correction of vertebral subluxation is not, in and of itself, a sufficient intervention to allow a person to achieve “total health.” One very interesting hypothesis, however, is that patients under chiropractic care tend, as their subluxations reduce, to spontaneously take up lifestyle changes or health-enhancing activities. It has been said in traditional chiropractic philosophy that a healthy person makes healthier choices. The hypothesis that subluxation correction chiropractic care may promote positive lifestyle choices has been suggested by many practitioners but has only recently been documented more objectively.<sup>2,10</sup> Based on anecdotal clinical evidence, our personal experience tends to corroborate this hypothesis.

This case report documents the self-rated quality of life improvements experienced, and spontaneous lifestyle changes undertaken, by a 36 year old male undergoing subluxation-centered chiropractic care in an office setting, over an 11 month period. We discuss the various outcome measures used to monitor health and well-being, as well as the progress made by the patient throughout his care.

## Interventions

Analysis and adjustive procedures utilized in the management of this case were based mainly on four different chiropractic systems: Network Spinal Analysis, Torque Release Technique, Thompson Technique and Diversified structural adjusting. Elements of the various systems were selected as deemed appropriate by the author at various times in the evaluation and management of the case. Although no attempts were made to follow the specific protocol taught by any of the systems employed, the patient was managed from a tonal model of chiropractic.<sup>12</sup> Tonal models tend to see the spine and nerve system as a functional, dynamic unit. Particular attention is placed on vertebral motor segments receiving dural attachment which, when subluxated, are hypothesized to place the central nervous system under abnormal mechanical tension. The latter is thought to alter the tone of the nervous system and, consequently, its integrity.

Network Spinal Analysis (NSA), developed by Donald Epstein, D.C., was originally a system of classifying, prioritizing, and adjusting vertebral subluxations.<sup>7</sup>

In recent years, NSA has evolved into an approach to wellness that applies low force touch contacts to cue the nervous system to develop new strategies for living and healing. An other objective of NSA care is to trigger two “healing” waves which, when they develop, help improve spinal and neural integrity, adaptability and significantly advance wellness and quality of life.<sup>13</sup> Once the type of subluxation has been identified, a priority system of adjusting is initiated. This sequencing of adjustments is termed the Phasing system. Care is advanced through a series of Levels. Level 1 was used in the management of our patient.

Torque Release Technique (TRT), developed by Jay Holder, D.C., is a model and technique that was developed out of human population research involving subluxation-centered chiropractic in a residential addiction treatment facility<sup>14</sup>. TRT uses various indicators of vertebral subluxations and also prioritizes their correction into a system called Non/Linear Testing Priorities. The correction of vertebral subluxation is made through the use of an adjusting device, called Integrator. The Integrator possesses a pre-cocking, pressure sensitive tip with an automatic release mechanism. Its features also include a torque and recoil component.<sup>15</sup>

Thompson technique, developed by Clay Thompson, D.C., is both a system of analysis and adjustive procedures. The analysis relies heavily on prone leg length analysis and the correction is often performed on a special table made of segmental drop pieces that facilitates the adjustment.<sup>16</sup>

Diversified structural adjustive procedures include a variety of high velocity, low amplitude chiropractic maneuvers designed to bring an articulation past its physiological barrier and into its parapsychological space.

## Case Study

### *History*

A 36 years old male Peruvian presented with health concerns of stress, headaches, eye pain and 14 years left leg pain radiating to the foot with subjective loss of strength and sensation. Secondary health concerns included gastritis, ulcers, nervousness, depression, lack of concentration and general loss of interest in daily life. Patient had sought medical care, which helped manage the pain of gastrointestinal complaints. There was still however residual abdominal discomfort, gas, and bloating. He reported that the aforementioned symptoms were interfering with his work, family and social life.

The patient also had a history of alcoholism with several bouts of severe binge drinking which resulted in falls. During his binge drinking, he was also involved in several fistfights. The patient also mentions having been struck by a car 9 years earlier, with no further details. There is no history of hospitalization or surgery. Medications have been used in the past for gastrointestinal complaints. Presently, the patient self-medicates with unspecified over-the-counter pain killers on a regular basis. The patient has been smoking half a pack of cigarettes per week for the last 15 years. There is no physical activity (regular exercise) reported. Diet is sub-optimal with daily consumption of coffee, sugar-loaded sodas, fried food and dairy products. The patient is at the present time not using

any health-enhancing modalities (e.g. yoga, spiritual practice, healthy food choices). On a 4-points scale (poor, sufficient, good, excellent), family and friends support, as well as job satisfaction are reported as sufficient. Physical and mental health are perceived as poor.

### *Examination*

On postural analysis the patient presents a slight left occipital tilt, right low shoulder and hip. Cervical rotation is slightly decreased bilaterally. Static muscle palpation reveals significant tightness of the suboccipital muscles, left trapezius and lumbar paravertebral musculature. A ½ cm left functional short leg was present in the prone, leg extended position which is indicative of either a neuromuscular contraction of the extensor muscles of the lower spine and pelvis or pelvic malposition.

With the patient prone and legs in the extended position, head rotation to the left resulted in lengthening of the short leg, a finding called Left Cervical Syndrome in Thompson analysis.<sup>16</sup> This phenomenon is indicative of a cervical vertebral subluxation. It is thought to be due to activation of the bulbo-reticular inhibitory area upon head rotation which results in a relaxation of the lower spine and pelvic girdle musculature. Upon bringing the extended legs into a flexed position, the short leg lengthens, a phenomenon referred to as Positive Left Derefield in Thompson. This corresponds to an ilium in which the posterior superior iliac spine has moved posteriorly and inferiorly (PI ilium).

Motion palpation reveals restriction of the left sacroiliac articulation, upper cervical complex (C1-C2 principally) as well as several fixations of the thoracic spine. Torque release analysis revealed positive pressure test for left lateral coccyx and right lateral atlas. A pressure test is considered positive when a short leg momentarily lengthens after a suspected subluxated vertebral segment is challenged (pushed) with a specific vector line.<sup>18</sup>

Network Spinal Analysis revealed heel tension of 4/5, defined as an increased in the resistance to ankle dorsiflexion. This phenomenon is thought to be associated with the presence of adverse mechanical cord tension. There is also bilateral adduction stress. Adduction stress is revealed by an increase resistance to hip adduction and is considered indicative of a second or third cervical motor segment involvement. The latter is also confirmed by the presence of a z-flick, which is a brief inferior-superior oscillatory motion of the legs upon bilateral head rotation.<sup>19</sup>

Complementary exams included lateral and AP lumbar, and AP, AP Open Mouth and lateral cervical x-rays, as well as paraspinal surface electromyography and thermal scans (using Insight 7000 Subluxation Station). Surface EMG is a scanning procedure employing hand-held electrodes which are placed over the skin of muscle tissue. It is used to collect and record electrical potential associated with muscle activity. The muscular activity of various spinal segments are then analyzed by a software program and compared to a normative database. The program then provides a read-out consisting of standard deviations from the normative data. The program also offers a comparative analysis of left and right side of the spine, which

reveal muscular imbalances. Surface EMG, as recorded with the Insight 7000, has been shown to be an objective measure of change in the assessment of the patient's progress.<sup>17</sup>

Thermal scan analysis is a measurement of infrared heat emission from the skin. In normal individuals, paraspinal thermal scan should be symmetrical from side-to-side. Thermal asymmetries indicate abnormal autonomic regulation associated with vertebral subluxation. Heat emission is also recorded, compared to a database and, as for the surface EMG, displayed graphically in the form of different colored bars representing standard deviations from the normative data.

Cervical x-rays reveal moderate loss of the cervical curve with no significant degenerative changes. Lumbar views are unremarkable.

Surface electromyography reveals overall moderate dysponesis. Dysponesis is a reversible pathophysiological state consisting of misdirected neurophysiologic reactions, consisting mainly of covert errors in action potential output from the motor and premotor areas.<sup>20</sup> Those are expressed by a specific pattern of paravertebral muscle facilitation. Thermal scans revealed severe dysautonomia in the form of sympathetic hyperactivity.

### *Chiropractic Care*

Based on the examination findings, it was determined that the patient was suffering from vertebral subluxation of C1-C2, left SI and adverse mechanical cord tension (with point of critical tension at C2 and lateral coccyx). Compensatory restrictions are present in the mid-thoracic spine. The patient was placed on an initial care plan with an adjusting schedule of 3 times per week for 2 months, twice per week for 2 months and once a week for 2 months.

Adjustive care consisted, in various sequence and timing, of Network Spinal Analysis low force touch contacts, Torque Release Technique Integrator instrument, pelvic drop piece adjusting and Diversified structural high velocity, low amplitude adjustments to the aforementioned vertebral subluxations. Thermal and sEMG scan re-evaluations were performed at 4 weeks (12 visits), 8 weeks (24 visits), 14 weeks (36 visits), 26 weeks (52 visits) and 42 weeks (56 visits). After week 26, the schedule was spaced by constantly adding one additional week to reach monthly visits. Scans are to be taken every three months to monitor the patient's neural integrity.

### *Outcomes Measures and Evolution – See Appendix I*

Measure of quality improvement consisted of self-reported health changes and quality of life improvements including:

- A. Subjective changes taken during re-evaluations at 12, 24, 36 and 50 visits, which consisted of:
  - a. Three 10 cm Visual Analog Scale (0%-100%) asking to evaluate percentage of improvement in:
    1. Primary health concern(s)
    2. Secondary health concern(s)
    3. Overall health

- b. Four open-ended questions, which asked:
1. What changes have you experienced in your *symptoms*?
  2. What changes have you experienced in *yourself*?
  3. What else has changed in *your life* since you started chiropractic care?
  4. What activity can you do now that you could not do before?

B. On visit 24, to select and comment on, from a list of 24 items, those bodily systems, functions or life activities, in which the patient felt improvement had occurred.

C. On visit 36 and 50, retrospective survey of selected questions from the Self-Rated Health and Wellness Instrument<sup>2</sup> in Mental/Emotional State, Life enjoyment, Stress Evaluation and Overall Quality of Life.

D. Narrative letter submitted by the patient.

#### *Changes in Health Concern and Overall Health*

After the 6 months period, the patient experienced a (self-rated) 95% improvement in left leg pain, headaches and eye pain. The improvement was gradual with 30% after 12 visits, 50% after 24 visits and 60% after 36 visits (see Appendix I). It is interesting to note the “plateauing” effect of symptom changes between week 8 and 14, and then the marked amelioration to 95% after week 14.

This is possibly associated with the first awareness of a full, deep Respiratory Wave, a clinical phenomenon unique to Network Spinal Analysis that the patient experienced on week 15 of care. This phenomenon consists of a deep, harmonious full-spine “wave” of respiration that resembles a profound sigh. Epstein<sup>7</sup> has noted that the greatest change of vertebral subluxation indicators occurs in patients experiencing the Respiratory Wave. It has been shown that greater levels of self-reported wellness are reported by patients with an early awareness of the breath (respiratory wave).<sup>10</sup> It is not known however if this can be extrapolated to symptom changes as well. A similar pattern seems to be present in secondary health concerns and, to a much lesser extent, overall health.

However, the influence of external, unrecognized factors is also possible. There also seems to be a temporal correlation between improvement in health concerns and objective changes as measured by sEMG. Surface EMG pattern demonstrated no specific trend toward changes within the first 14 weeks of care. The first month of care showed decrease in global muscle facilitation (decrease of the dysponetic pattern).

The second month of care showed increase in facilitation. Whether this is due to internal factors such as internal pattern of dissipation specific to this individual (our own personal clinical anecdotal experience showed that about 20% of patients had an increase in muscle facilitation within the first month prior to a significant decrease) or to external factors such as increase in overall stress, is not known. The overall pattern decreases again in the third month of care. Thereafter, the overall changes stabilized, with a slight further improvement. From week 14 on, we may hypothesize that the

stabilization of the overall pattern on sEMG correlates to the resolution of vertebral subluxation pattern, a resolution that allowed for greater nerve system integrity and enhanced healing, which is expressed as maximal reduction of health concerns. (See Appendix II)

Re-evaluation at 42 weeks revealed a stabilization in thermal and sEMG scan and it was decided, in concert with the patient, that his wellness schedule consisted of monthly visits, unless severe physical, chemical or emotional stress occurred. The thermal scan pattern showed a different trend with a rapid decrease in dysautonomia within the first two months to a point of normalcy at 14 weeks.

Improvement in secondary health concerns include decrease in stress levels, nervousness, lack of concentration, irritability and apathy, as well normalization of digestive function. He perceived his overall health to be improved 100% at six months.

#### **Discussion**

The present case study warrants discussion of a certain number of points. First, chiropractic care was presented from a subluxation-centered perspective. This means that we did not purport to diagnose or treat diseases or conditions. In consequence we approached the patient from a psycho-social paradigm rather than a biomedical one. This is reflected in the history, examination and outcome measures used throughout care. This also explains why no traditional allopathic orthopedic or neurological exam were performed since, in our opinion, they do not provide information on vertebral subluxations. This approach allowed us to discover a patient whose health concerns affected him not only physically, but also in his work, family and social life, as revealed by the initial history. Extending our history to include such a more psycho-social type of questioning revealed that the patient perceived his social support system (family and friends) and job satisfaction as sufficient, and his physical and mental health as poor.

The outcome measures utilized revealed that throughout care the patient did not only improve physically, but also in his overall quality of life, with for example less family-related and work-related stress. He went from feeling “terrible” or “unhappy” with his personal life, his job, himself, and his life as a whole to being “mostly satisfied”. It is important to note the significance of positive changes in mental/ emotional state since it has been suggested that this category carries the biggest weight toward the feeling of “wellness” (defined as patient self-reported health).<sup>10</sup>

After 6 months of care, the patient was physically pain-free, did not have to use medications, had his hearing improved, more concentration and more energy to work (which is probably also related to an increase in productivity). Also important is the self-reported improvement in his family and social life, where he notes positive changes in his character, relationship with others and outlook on life. This suggests that by undergoing chiropractic care, the patient also indirectly improved the quality of life of the people around him. The societal implications of vertebral subluxation corrections have been investigated elsewhere.<sup>21,22</sup>

Secondly, the reduction of vertebral subluxations was evidenced by a significant decrease in dysponetic pattern demonstrated by overall decrease in muscle activity. Such a decrease in muscle activity has already been demonstrated in other types of adjustive care.<sup>17</sup> In this case, the same is also true of the thermal scan pattern. Those changes are of significance because our basic assumption was that our purpose was to optimize our patient's health, through the correction of vertebral subluxations. Our hypothesis for accepting our patient under care was that his quality of life was negatively impacted by the presence of vertebral subluxations and that reduction of vertebral subluxation would result in greater quality of life.

The improvement in surface EMG and thermal scan patterns demonstrate that the pattern of vertebral subluxation was indeed successfully managed. If his quality of life had improved, but the pattern of vertebral subluxation had not reduced, we would have had to conclude that the former was a consequence of variables not related to the latter. This is not the case. Although we cannot definitely exclude the influence of other variables, the correlation between subluxation reduction and improved quality of life make a good case for a causative relationship. Various other studies have also suggested that the improvement in neural integrity is temporally associated with improvement of overall quality of life.<sup>2, 3, 9, 10</sup>

Thirdly, the patient made a certain number of spontaneous lifestyle changes while under chiropractic care. Such changes include spontaneous smoking cessation, listening to classical music, start of regular exercise, relaxation and breathing exercises, as well as better nutritional choices. It is important to point out that we never told the patient to undertake such changes. We only provided resources and guidance to fulfill his newly discovered interests. It could be argued that those lifestyle changes, rather than chiropractic care, were the variable responsible for improved wellness. Healthy lifestyle does in fact promote wellness but, as the Network study suggests,<sup>10</sup> the chiropractic intervention weighted twice as much as a healthy lifestyle in promoting a sense of wellness. That same study also suggested that Network Spinal Analysis care did not only contribute directly to self-rated health and perceived wellness, but also indirectly by promoting positive lifestyle choices.<sup>10</sup> Whether this is due to enhancement in neural integrity or to the overall "office experience" is not known.

## Conclusion

We have reported on the improvements in quality of life and spontaneous lifestyle changes experienced by our patient. We used, as outcomes, instruments that were either derived from scientifically tested and accepted outcome measures (such as the visual analog scales), variation of instrument presently under investigation (survey derived from Self-Rated Health and Wellness Instrument<sup>2</sup>), as well as measures whose values have not, to the author's knowledge, been formally investigated in the scientific literature (such as the open-ended questions and narrative letter). However, as naïve as the employed outcome measures might have been, they suggest that this individual has experienced positive changes in his physical, mental, social state as well as overall quality of life.

Those changes are temporally related to the correction of vertebral subluxations (as demonstrated by sEMG and Thermal analysis). Although it is difficult to ascertain to which extent those changes are attributable to the correction of vertebral subluxations only – as other potentially unrecognized variables might also have had an influence – the previous chronicity of the health concerns strengthens the notion that the positive changes are, in fact, a consequence of chiropractic intervention. If one thing is certain, in the author's mind, is that this individual has, as a result of his encounter with chiropractic and a chiropractor, experienced remarkable changes in his quality of life and in his lifestyle. The commitment of the patient to his plan of care has been, in the author's opinion, essential to the success encountered.

Although no overall generalizations can be drawn from a single case study, we hope that this report will stimulate the writing of other cases that look at the changes in health, wellness and quality of life beyond the patients presenting complaints.

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## Appendix I

Percentage Improvement reported on Visual Analog Scale (VAS):

Visits (weeks)	12 (4)	24 (8)	36 (14)	50 (26)
Primary Health Concern	30%	50%	60%	95%
Secondary Health Concern	50%	50%	60%	95%
Overall Health	50%	50%	80%	100%

### *Open-ended questions*

#### **What changes have you experienced in your symptoms?**

“No more leg pain nor headaches” [12 & 24 visits]

“I have overcome my stress, nervousness, lack of concentration, loss of interest, irritability and apathy” [36 visits]

#### **What changes have you experienced in yourself?**

“spiritual, physical and mental changes” [12 visits]

“more interest in life” [24 visits]

“general change; changes in all aspects of myself” [36 & 50 visits]

#### **What else has changed in your life since you started chiropractic care?**

“I think everything has changed” [12 visits]

“My character” [24 visits]

“My relationships with others” [36 visits]

“I look at life with more optimism” [50 visits]

#### **What activity can you do now that you could not do before?**

“I was doing everything wrong, now I have improved” [12 visits]

“I was doing everything halfway, now I do things better” [24 visits]

[nothing reported at 36 visits]

“Concentrate when I read” [50 visits.]

#### **Positive Changes in Functions at 24 visits.**

Of the 24 questions, the patient reports positive changes in the following:

<i>Body system(s) or function(s) improved</i>	<i>Patient's comment</i>
Sleep	I am well-rested (after sleeping)
Stress level or ability to handle stress	Better
Energy Level	I can work more
Athletic Ability	I have more resistance
Skin Appearance	Better (told by people around me)
Digestion	It is fine now
Flexibility	Better

## Retrospective self-rated survey

### 1. Mental/Emotional State

Rate the following questions on a frequency scale of 1-5  
1= never; 2= rarely; 3= occasionally; 4= regularly; 5= constantly

	PRE CARE	NOW	# VISITS
1. If pain is present, how distressed are you about it	5	2	36
2. Presence of negative or critical feelings about yourself	5	2	50
3. Experience of moodiness or temper or angry outbursts	5	2	36
4. Experience of depression or lack of interest	5	1	36
5. Being overly worried about small things	5	1	50
6. Difficulty thinking or concentrating or indecisiveness	5	2	50
7. Experience of vague fears or anxiety	5	3	36
8. Being fidgety or restless; difficulty sitting still	5	2	50
9. Difficulty falling or staying asleep	1	1	36
10. Experience of recurring thoughts or dreams	N/a	N/a	50

N/a = No answer

### 2. Stress Evaluation

Evaluate your stress relative to the following, with  
1= none; 2=slight; 3=moderate; 4= pronounced; 5=extensive

	PRE CARE	NOW	# VISITS
1. Family	4	2	36
2. Health	4	1	36
3. Work	4	2	36
4. General Well-being	4	1	36
5. Coping with daily problems	4	2	36

### 3. Life Enjoyment

Rate the following questions on a degree scale of 1-5, with  
1= not at all; 2= slight; 3=moderate; 4=considerable; 5=extensive

	PRE CARE	NOW	# VISITS
1. Openness to guidance by your "inner voice/feelings"	N/a	N/a	50
2. Experience of relaxation or ease or well-being	1	4	36
3. Presence of positive feelings about yourself	2	4	50
4. Interest in maintaining a healthy lifestyle	3	5	36
5. Feeling of being open and aware/connected when relating to others	1	3	36
6. Level of confidence in your ability to deal with adversity	1	3	36
7. Level of compassion for, and acceptance of, others	N/a	N/a	50
8. Incidence of feelings of joy and or happiness	2	4	36
9. Level of satisfaction with your sex life	3	4	50
10 Time devoted to things you enjoy	2	4	50



#### 4. Overall Quality of Life

Evaluate your feelings relative to the quality of your life, with

1= terrible; 2= unhappy; 3=mostly dissatisfied; 4= mixed; 5=mostly satisfied; 6=pleased; 7=delighted

	PRE CARE	NOW	# VISITS
1. Your personal life	1	5	36
2. Your wife/husband (significant other)	N/a (single)	N/a	36
3. Your job	2	5	36
4. Your co-workers	4	5	50
5. Your handling of problems in your life	1	5	50
6. Your physical appearance – the way you look to others	1	5	50
7. Your self	2	5	36
8. The extent to which you can adjust to changes in your life	1	5	36
9. Your life as a whole	2	5	50
10. The extent to which your life has been what you want it to be	N/a	N/a	50

#### Narrative Letter

In his narrative letter the patient relates his history of health problems and some of the improvements in his symptoms.

He also states:

“The benefits that I am experiencing today are the following:

1. I have no more pain at all
2. I have stopped taking medications
3. I spontaneously stopped to smoke (I find it unpleasant)
4. I listen to classical music (something I never did before)
5. My hearing has improved (despite the lesion I have in my right tympani)
6. I can concentrate better when I read.
7. I have more energy to work.
8. My social and family relationships have improved.

Today, I am learning to:

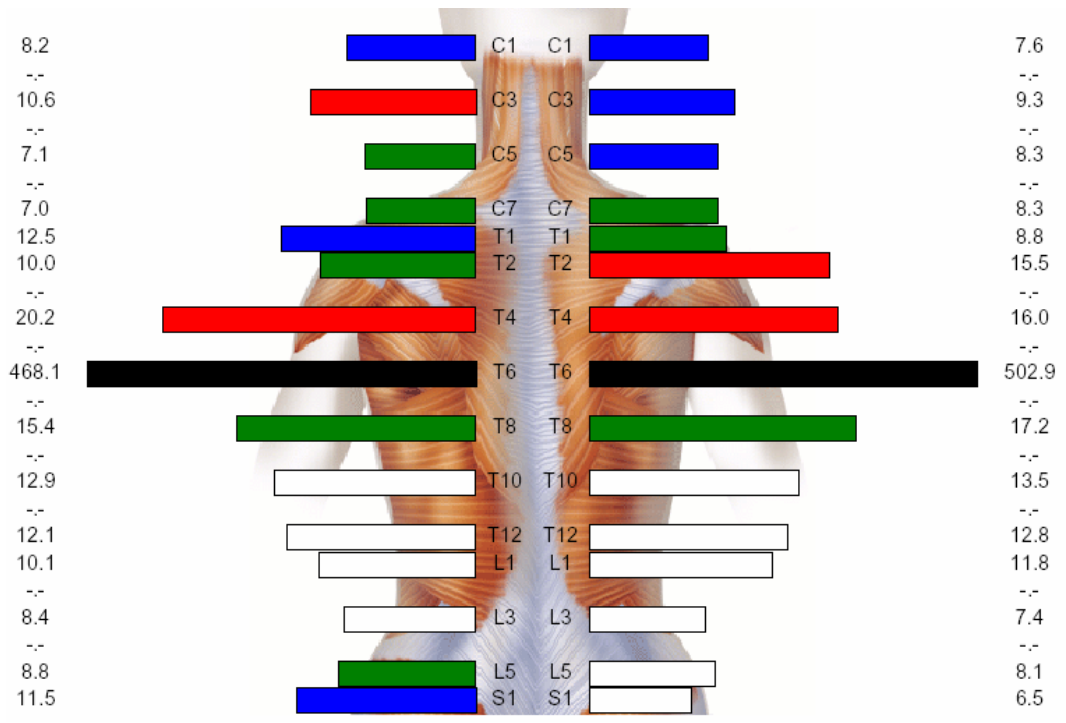
1. Feed myself properly
2. Practice regular exercise
3. Practice relaxation and breathing exercises.

In summary, I am learning to live a different lifestyle.

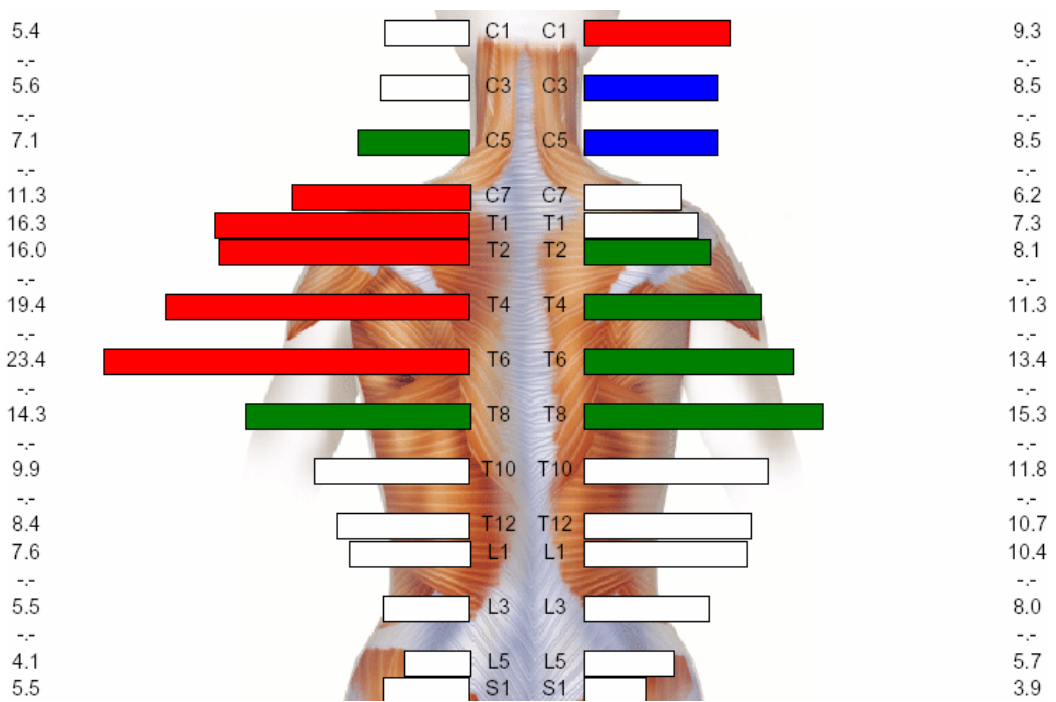
I know that I have still much to learn and improve; but I am convinced that I am on the right track, success is in my own hands”

**Appendix II**

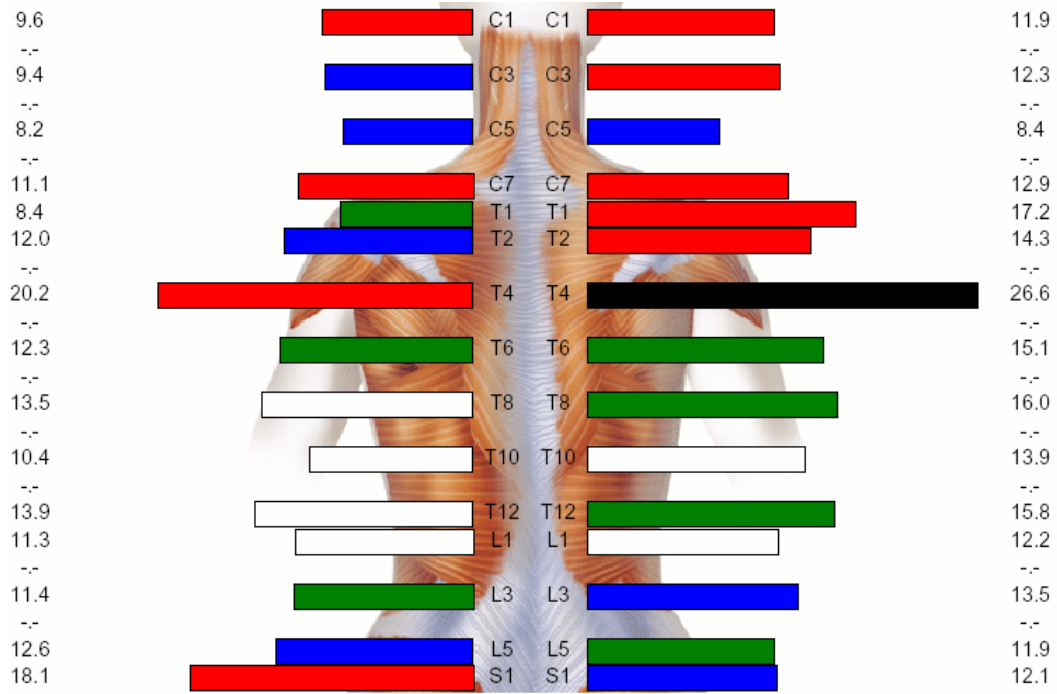
sEMG Scan 1



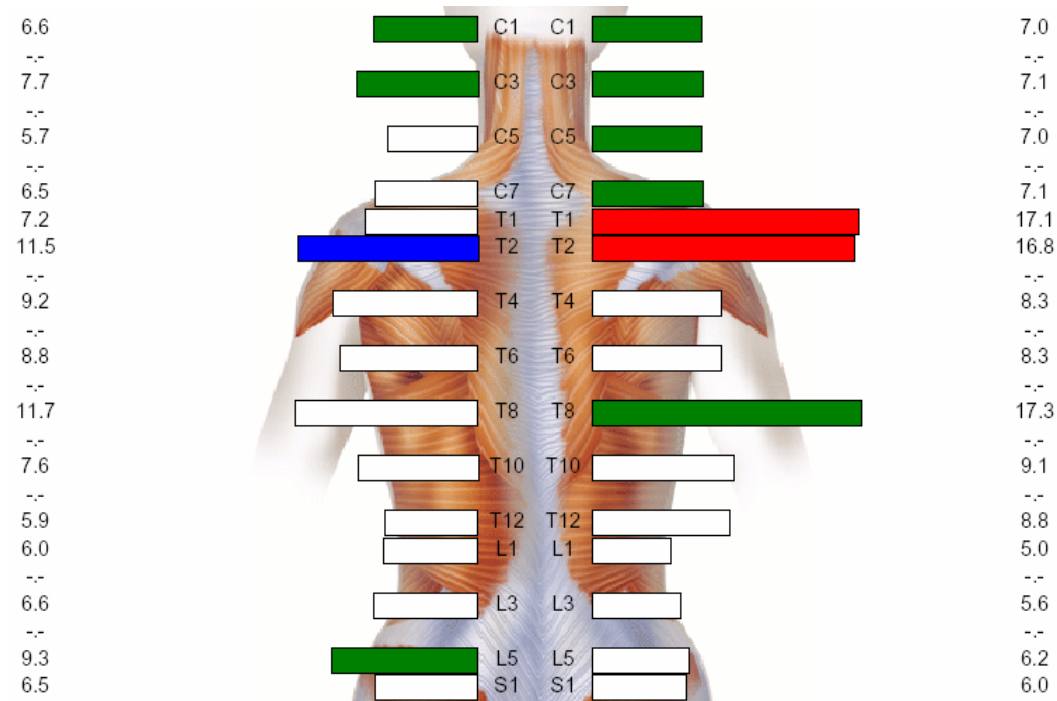
sEMG Scan 2 – One Month Into Care



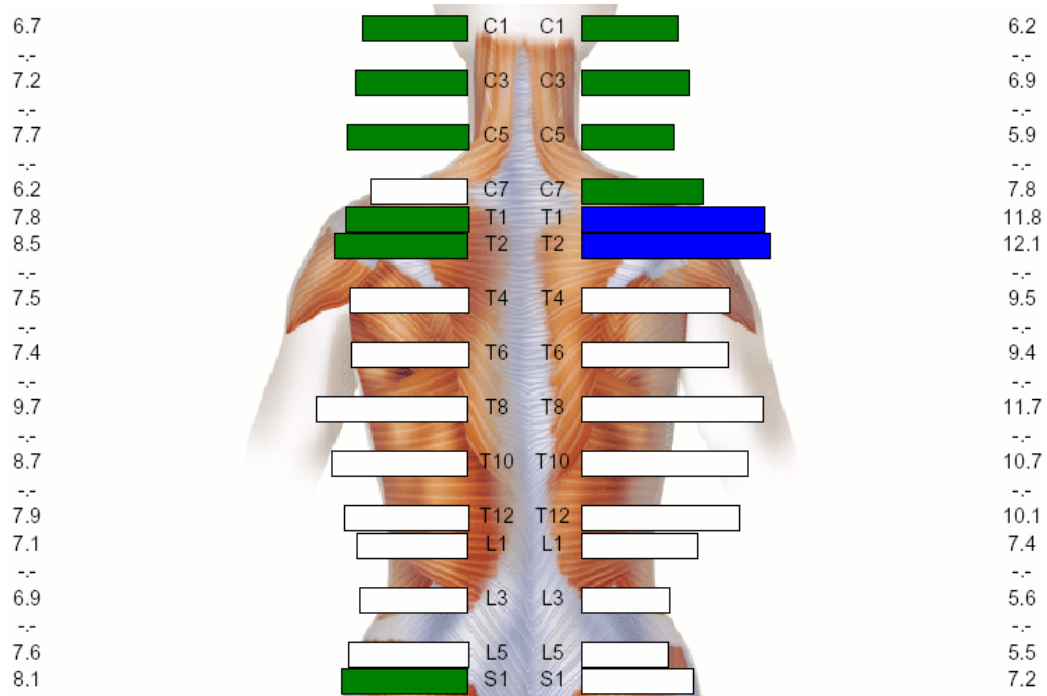
### sEMG Scan 3 – 2 Months Into Care



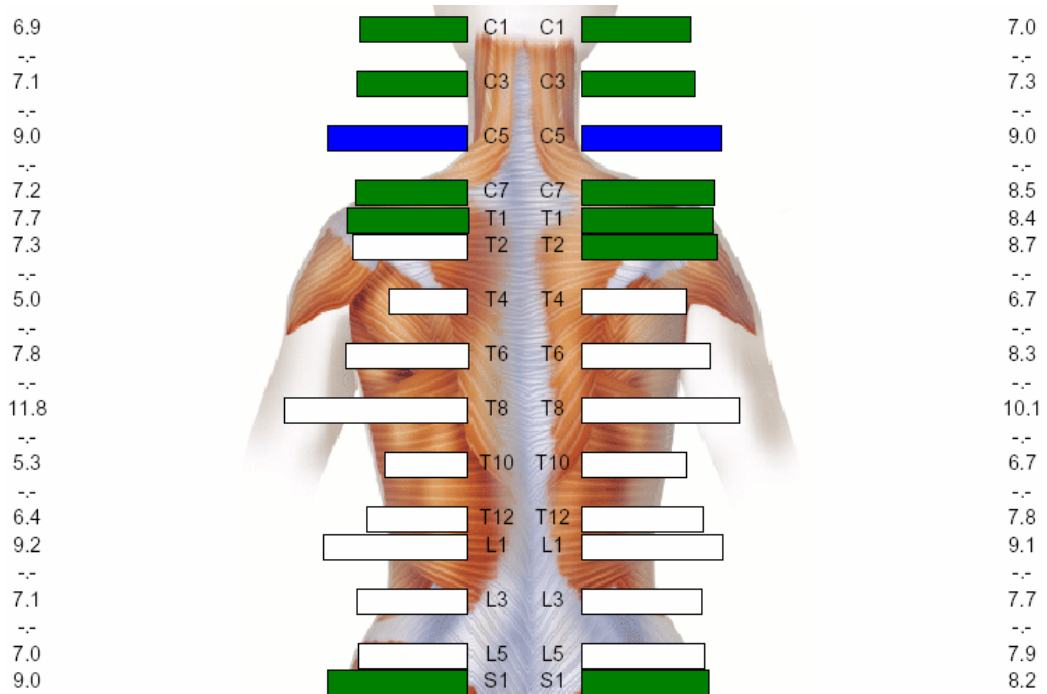
### sEMG Scan 4 – 3 Months Into Care



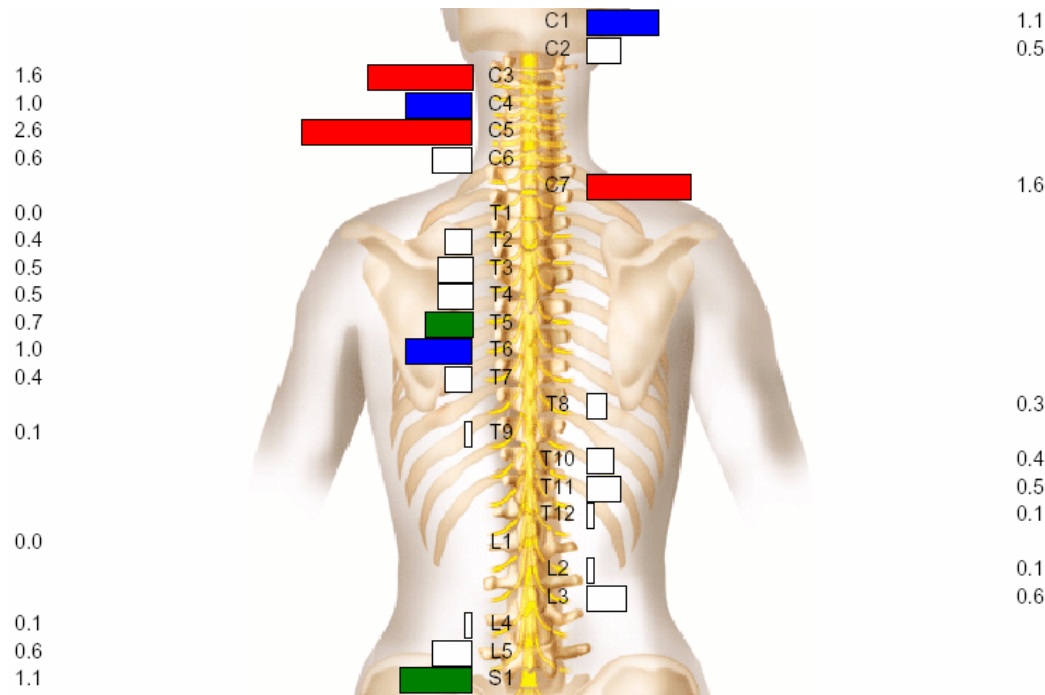
### sEMG Scan 5 – 8 Months Into Care



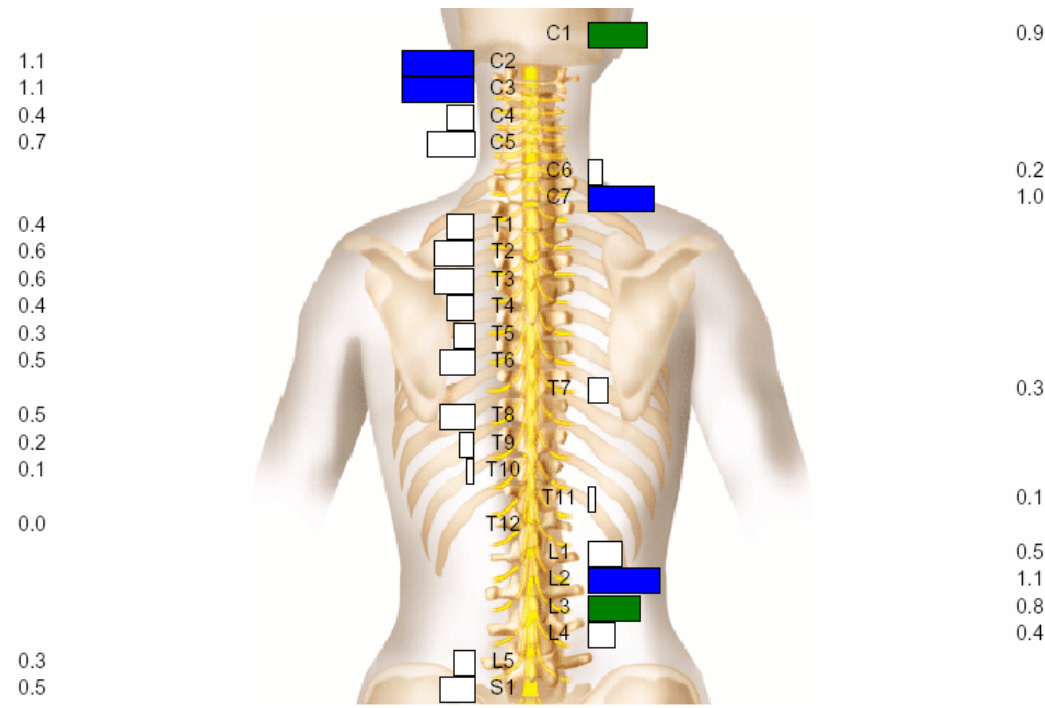
### sEMG Scan 6 – 11 Months Into Care



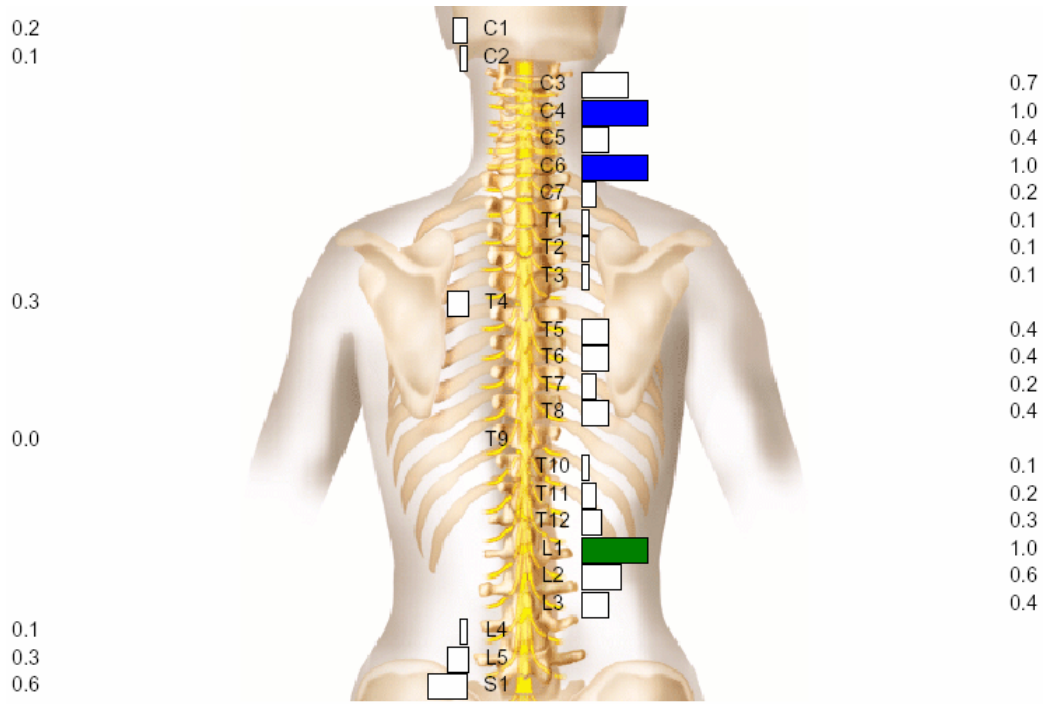
## Thermal Scan 1



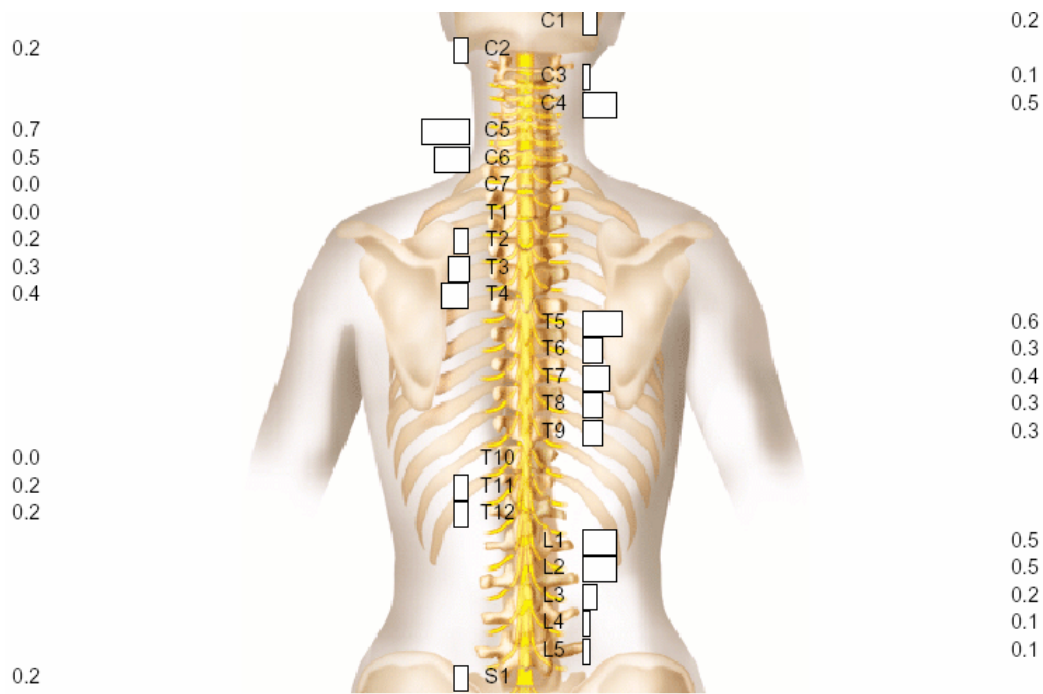
## Thermal Scan 2 – One Month Into Care



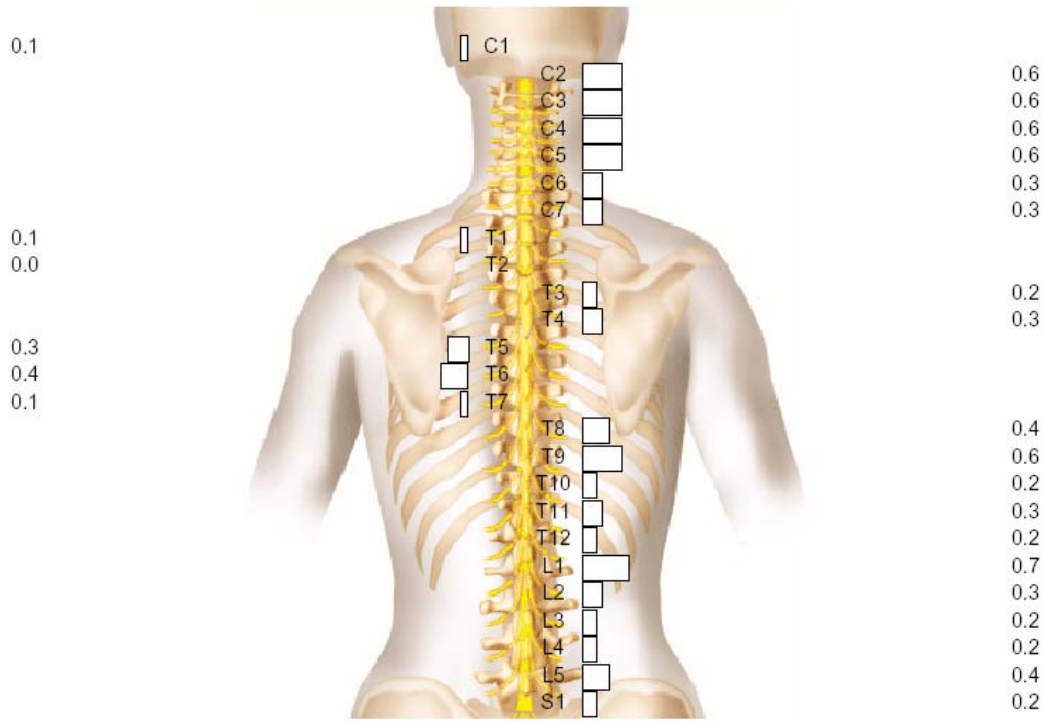
## Thermal Scan 3 – 2 Months Into Care



## Thermal Scan 4 – 3 Months Into Care



## Thermal Scan 5 – 8 Months Into Care



## Thermal Scan 6 – 11 Months Into Care

