

## Case Study

# IDIOPATHIC THORACO SCOLIOSIS TREATMENT USING A COMBINATION OF DOCUMENTATION BASED CARE (DBC) BACK ACTIVE RECONDITIONING PROGRAMME AND SCHROTH METHODS: A PROSPECTIVE CASE STUDY

Ganesan Kathiresan <sup>1\*</sup>, Tatiana Cornelius <sup>2</sup>.

<sup>1</sup> Senior Physiotherapist, <sup>2</sup> CHEK IV- Corrective High Performance Exercise Kinesiologists. Documentation Based Care (DBC) Kuching, Sarawak, Malaysia.

## ABSTRACT

**Aims and Objectives:** To study the combined effects of using the Document Based Care (DBC) Back active reconditioning programme and Schroth methods to lessen the curvature allied with idiopathic Thoracic scoliosis. **Research Design: Sampling-** An 18 years old female, single case study, **Setting-** DBC Kuching Active rehabilitation centre, Malaysia. **Duration of the study-** 20 weeks, **Outcome measures-** A base line and follow-up outcome measures includes Borg pain scale, Functional Rating Index, Balance test, and Radiographic analysis. **Interventions-** Document Based Care (DBC) Back active reconditioning programme and Schroth methods **Conclusion-** The combination of the Document Based Care (DBC) Back active reconditioning programme and Schroth methods seemed to be effective at reducing a Thoracic dextroscoliosis by about 14° (50%) and Lumbar Levoscoliosis by about 7° (25%), Short form (SF)-36 showed improvement in Quality of life, balance time on the Balance board improved to 52 seconds and Borg pain scale rated 8/10 at the onset of care, dropped to a 1/10 after 20 weeks, in this single case study. The positive outcomes of this practice validate a policy of offering conservative treatment as an alternative to Thoracic scoliosis patients, including those for whom surgery is discussed.

**KEY WORDS:** Thoracic Spine; Lumbar Spine; Posture; Rehabilitation; Scoliosis.

**Address for correspondence:** Mr. Ganesan Kathiresan, DBC Kuching Active Rehabilitation centre, Sarawak, Malaysia. **Email:** gans\_therapist@yahoo.co.in

## Access this Article online

### Quick Response code



International Journal of Physiotherapy and Research

ISSN 2321- 1822

[www.ijmhr.org/ijpr.html](http://www.ijmhr.org/ijpr.html)

Received: 21 August 2013

Accepted: 01 October 2013

Peer Review: 21 August 2013

Published: 11 October 2013

## INTRODUCTION

Scoliosis is a postural deformity described as a lateral curvature of the spine greater than 10°, evaluated by a Cobb angle on anteroposterior (AP) radiographs.<sup>1</sup> Rehabilitation of adolescent idiopathic scoliosis (AIS) involves the careful option of diverse achievable treatments, such as bracing and exercises, according to the patient's requirement. Even if the Italian<sup>2</sup> and international<sup>3</sup> guidelines advocate such treatments to avoid surgery, numerous hesitations have been hoisted regarding the efficacy of both exercises<sup>4</sup> and bracing<sup>5</sup>.

Approach to scoliosis modified due to etiology other than facts: Patients call for conservative (rehabilitation) experts to join in team orthopedic surgeons.<sup>6</sup> Recent literature has shown the pessimistic outcomes of scoliosis on quality of life.<sup>7</sup>

With a consideration of the harmful effects of anomalous mechanical spinal loading<sup>9</sup>, conservative Thoracic scoliosis treatment programs and management plans have been increasingly investigated. Different views exist about the efficacy of conservative Thoracic scoliosis treatment.

Because this difference of opinion corresponds to a great variety of standards applied, it is also not surprising that the results of conservative treatment differ a lot. Thoracic Scoliosis normally does not have such remarkable effects that immediate surgery would be indicated. Moreover, it is clear that functional and physiological impairments of Thoracic scoliosis patients including pain, torso deformity, psychological disturbance and pulmonary dysfunction require therapeutic intervention.<sup>10</sup>

The purpose of the study is to investigate the possible combined effects of using the Document Based Care (DBC) Back active reconditioning programme and Schroth methods to reduce the curvature associated with idiopathic Thoracic scoliosis. These procedures are tested to determine potential effectiveness in a single patient.

## CASE REPORT

### History

An 18-yr-old female presented to our Rehabilitation clinic with a chief complaint of lateral bending and uneven musculature on one side of the spine with low back pain. The subject had been diagnosed by the general physician as thoracic lumbar scoliosis following standing thoracic lumbar radiograph. She was prescribed an oral non steroid anti inflammatory drugs about 6 months and oral steroid about 1 year for pain management. Due to her recurrent low back pain she came to the clinic about 18 months after being treated by the general physician.

### Examination:

#### Outcome Measures:

- Progression of scoliosis was measured by Cobb angle in degrees.<sup>11</sup>
- Quality of life, Psychological issues and disability was measured by SF-36.<sup>12</sup>
- Back pain was measured by Borg pain scale.
- Balance and postural stability was Measured by Balance test using balance board.
- Additionally, a static visual posture examination revealed a marked anterior right hip, a right thoracic translation, a high and anterior right shoulder, and a protruding right scapula.

An initial radiographic examination revealed a Thoracic dextroscoliosis with Cobb angle of 28° (This measurement was taken from a Cobb angle drawn between the superior endplate of the 5<sup>th</sup> thoracic vertebra (T5) and the inferior endplate of the 11<sup>th</sup> thoracic vertebra (T11)) and Lumbar Levoscoliosis with Cobb angle of 29° (This measurement was taken from a Cobb angle drawn between the superior endplate of the 11<sup>th</sup> thoracic vertebra (T11) and the inferior endplate of the 4<sup>th</sup> Lumbar vertebra (L4)) (**Figure 1**).

The SF-36 (Short form - 36) is one of the most extensively used throughout worldwide to measure Health- related quality of life (HRQoL). It is a generic outcome measure based on 36-items selected to represent eight health concepts (physical and social function, Physical and emotional role functioning, mental health, Vitality, pain and general health). SF-36 had been taken initially and after the end of 20 weeks intervention session.<sup>12</sup>

Additionally, at the onset of treatment, the patient rated her pain as an 8/10 on the Borg pain scale. A pain scale rating was taken at once in every a two weeks basis period. The patient wrote down a number from 0-10, with 0 being "no pain" and 10 being "severe pain." The patient was not allowed to see her previous pain scale scores. Finally, prior to intervention, the patient was asked to stand on a Balance Board on 1 foot. Her time was recorded with eyes open. She was timed until her upper body started to lean or her elevated foot touched the floor. She was given 2 practice turns before timing the third. This test was conducted to assess balance and postural stability. Initially, his time registered as 15 seconds.

### Intervention:

#### DBC Back reconditioning Programme:

The aim of reconditioning is to reverse the effects of physical deconditioning, to prevent progression of scoliotic curvature and reduce resulting pain as well as promote anatomical symmetry (in children and adults). Because each individual's curve is unique, and because scoliosis involves the rotation (twisting) of vertebrae in different directions in different areas of the spine as well as the side-to-side, S-shaped or C-shaped curvature, this approach will help both to

“untwist” (or de-rotate) and to straighten the spine by employing our specialized equipment and exercises that elongate shortened muscles and strengthen overstretched, overtaxed muscles. This is achieved by producing adaptive changes in the tissues in a progressive, controlled way, and by improving postural control and co-ordination.

The treatment program is based on the findings and interpretation of the baseline evaluation. The length of the treatment is 20 weeks (a total of 60 sessions). A single treatment session is carried out three times per week. One treatment session lasts, on average, one hour, based on the actual severity of the Thoracoscoliosis. In each device one set of exercises is performed. In each set 30 repetitions is recommended to be perform.

**DBC Treatment Process:**

1st session	Baseline evaluation
2nd session	Individual treatment plan
3rd – 29th sessions	Individual treatment program
30th session	Progress check
31th – 59th sessions	Individual treatment program
60th session	Outcome evaluation
after 20 wk / 6 months etc.	Follow up

**Order of exercises:**

The order of exercises can be individualized. However, from a clinical perspective it is:

- 1<sup>st</sup> warm up
- 2<sup>nd</sup> stretching and relaxation
- 3<sup>rd</sup> Lumbar Thoracic Rotation + relaxation
- 4<sup>th</sup> Lumbar Thoracic Lateral Flexion + relaxation.
- 5<sup>th</sup> Leg press + relaxation.
- 6<sup>th</sup> Multipurpose Lowfriction Unit + relaxation.
- 7<sup>th</sup> Shoulder Blade Adduction+ relaxation.
- 8<sup>th</sup> Wobble board training
- 9<sup>th</sup> Relaxation



For Exercise No. 3rd



For Exercise No. 4th



For Exercise No. 7th

**The Schroth method:**

The Schroth method of physical therapy is a three-dimensional approach which was developed in the 1920s by Katharina Schroth. The exercises are augmented by a technique called "Rotational angular breathing (RAB) aids derotation", which expands collapsed portions of the rib cage, thus also helping to pull the spine out of its twisting and curving. The overcorrecting laterally-shifted sections beyond the midline helps reverse deformities which achieved by hanging sideways on wall bars.

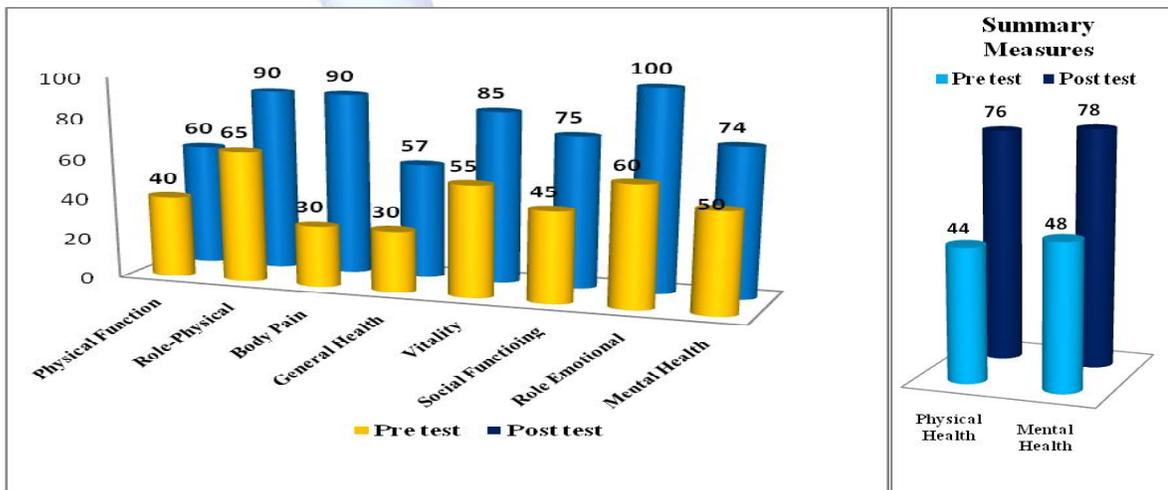
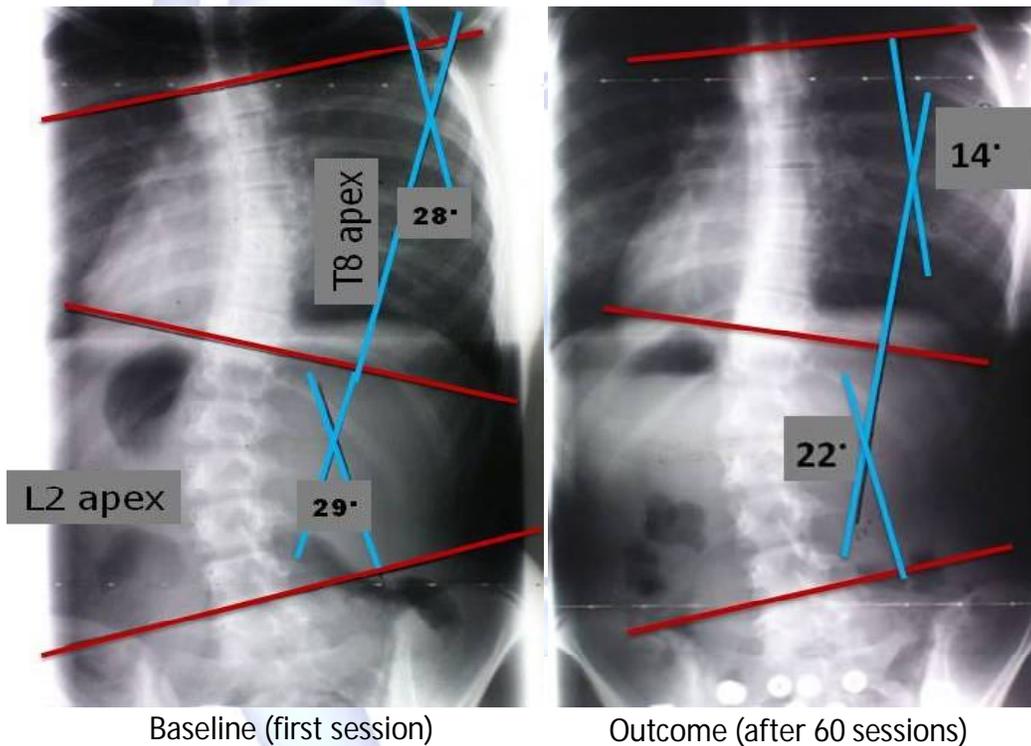
Finally, Isometric stabilization exercises following Corrective Exercises.<sup>13</sup>

**Re-Evaluation**

On the post-treatment radiographic examination (**Figure 1**) revealed a Thoracic dextroscoliosis with Cobb angle was reduced from 28° to 14° and Lumbar Levoscoliosis with Cobb angle was reduced from 29° to 22°.

The Borg pain scale, rated 8/10 at the onset of care, dropped to a 1/10 after 20 weeks. Her balance time on the Balance board improved to 52 seconds, after again giving her 2 practice turns.

**Figure 1:**



SF-36 showed improvement in Quality of life, Psychological issues and disability such as Physical Health summaries increased from 44 to 76 and Mental Health summaries increased from 48 to 78.

## DISCUSSION

Exercises in scoliosis treatment had been used in three main clinical scenarios:

- (i) the sole use of exercise as the primary treatment of AIS for mild and moderate curves,
- (ii) in conjunction with braces for moderate curves, and
- (iii) during adulthood if the scoliosis curves exceed certain thresholds.

Cailliet et al defines idiopathic scoliosis as an abnormal curvature of the spine of unknown etiology.<sup>14</sup> Idiopathic scoliosis accounts for roughly 80% of all scoliosis cases.<sup>14</sup> Idiopathic scoliosis reports for roughly 80% of all scoliosis cases.<sup>14</sup> There are different number of etiologies for idiopathic scoliosis which includes neuromuscular, hormonal, and genetic.<sup>1,2</sup> Although exact etiology is not determined, physical Therapist ought to focus immediately upon lessening of idiopathic scoliosis curvatures. Moreover, there might be considerable psychosomatic issues concerned with Low back pain<sup>15</sup> and visual postural distortion<sup>16</sup>. During outcome evaluation the subject showed an optimistic result on quality of life<sup>3</sup>, psychological issues<sup>15</sup> and functional disability<sup>17</sup>. In addition, self-reported back pain intensity scale showed that the subject's low back pain had been dropped from severe to low.<sup>1,17</sup>

The subject's balance time and postural stability was significantly improved, it appears that postural corrective exercises and balance board training had gave sufficient postural stimulus to accomplish the balance board test for long duration.<sup>18</sup>

However, future authors may want to consider how improving neuromuscular control of posture affects the curvatures present in scoliosis. A growing body of evidence from independent sources is consistent with the hypothesis that exercise-based approaches can be used effectively to reverse the signs and symptoms of spinal deformity and to prevent progression in children and adults.<sup>19</sup>

## CONCLUSION

The combination of the Document Based Care (DBC) Back active reconditioning programme and Schroth methods seemed to be effective at

reducing a Thoracic dextroscoliosis by about 14° (50%) and Lumbar Levoscoliosis by about 7° (25%), in this single case study. The positive outcomes of this practice validate a policy of offering conservative treatment as an alternative to Thoracic scoliosis patients, including those for whom surgery is discussed. This combination method deserves advance study in larger trials with a long-term follow-up.

**Acknowledgement:** Authors like to thank DBC Kuching staff Mr. Gopalakannan Jayaraman and Ms. Lorraine Sambah for their support and cooperation.

**Conflict of interest:** None

## REFERENCES

1. Mark W Morningstar, DC, Megan N Strauchman, DO, Greg Gilmour, DC. Idiopathic Scoliosis Treatment Using the Pettibon Corrective Procedures: A Case Report Journal of Chiropractic Medicine (Accepted for publication)
2. Negrini S, Aulisa L, Ferraro C, Fraschini P, Masiero S, Simonazzi P et al. Italian guidelines on rehabilitation treatment of adolescents with scoliosis or other spinal deformities. *Eura Medicophys*. 2005, 41:183-201.
3. Weiss HR, Negrini S, Rigo M, Kotwicki T, Hawes MC, Grivas TB et al. Indications for conservative management of scoliosis (guidelines). *Scoliosis*. 2006, 1:5.
4. Negrini S, Antonini G, Carabalona R, Minozzi S. Physical exercises as a treatment for adolescent idiopathic scoliosis. A systematic review. *Pediatr Rehabil*. 2003, 6:227-35.
5. Shindle MK, Khanna AJ, Bhatnagar R, Sponseller PD. Adolescent idiopathic scoliosis: modern management guidelines. *J Surg Orthop Adv*. 2006; 15:43-52.
5. Grivas TB, Wade MH, Negrini S, O'Brien JP, Maruyama T, Hawes MC et al. SOSORT consensus paper: school screening for scoliosis. *Scoliosis*. 2007;2:17.
6. Scoliosis [Internet] [place unknown] c1999-2008. Available from [www.scoliosisjournal.com](http://www.scoliosisjournal.com).

7. Weiss HR. Scoliosis: a journal dedicated to multidisciplinary research on prevention, control, and treatment of scoliosis and other spinal deformities. *Scoliosis*. 2006; 1:1.
6. Negrini S, Fusco C, Minozzi S, Atanasio S, Zaina F, Romano M. Exercises reduce the progression rate of adolescent idiopathic scoliosis: results of a comprehensive systematic review of the literature. *Disabil Rehabil*. 2008; 30(10):772-85
7. Schwab F, Dubey A, Pagala M, Gamez L, Farcy JP. Adult scoliosis: a health assessment analysis by SF-36. *Spine*. 2003; 28:602-606.
9. Harrison DE, Cailliet R, Harrison DD, Troyanovich SJ, Harrison SO. A review of biomechanics of the central nervous system- part III: spinal cord stresses from postural loads and their neurologic effects. *J Manipulative Physiol Ther* 1999; 22:399-410
10. Weiss H R. Rehabilitation of adolescent patients with scoliosis—what do we know? A review of the literature. *Pediatric Rehabilitation*. 2003; 6(3), 183–194.
11. Gocen S, Havitcioglu H. Effect of rotation on frontal plane deformity idiopathic scoliosis. *Orthopedics* 2001;24:265-268
12. Asher M, Min Lai S, Burton D, Manna B. The reliability and concurrent validity of the scoliosis research society-22 patient questionnaire for idiopathic scoliosis. *Spine (Phila Pa 1976)*. 2003; 28(1):63-9.
13. Weiss HR. The method of Katharina Schroth-history, principles and current development. *Scoliosis* 2011, 6:17
14. Cailliet R. *Scoliosis Diagnosis and Management*. 1975 FA Davis Co. pg 41-48
15. Simo T, Carlo D, Marc H, Michel H. The Role of Physical Exercise and Inactivity in Pain Recurrence and Absenteeism from Work after Active Outpatient Rehabilitation for Recurrent or Chronic Low Back Pain. *Spine*. 2000; 25(14):1809–1816.
16. Schwab F, Dubey A, Pagala M, Gamez L, Farcy JP. Adult scoliosis: a health assessment analysis by SF-36. *Spine* 2003; 28:602-606.
17. Markku K, Simo T, Olavi A, Osmo H. The Efficacy of Active Rehabilitation in Chronic Low Back Pain. *Spine* .1999; 24:1034–1042
18. Tjernstrom F, Fransson PA, Hafstrom A, Magnusson M. Adaptation of postural control to perturbations – a process that initiates long-term motor memory. *Gait Posture* 2002; 15:75-82
19. Martha C. Hawes. The use of exercises in the treatment of scoliosis: an evidence-based critical review of the literature. *Developmental Neurorehabilitation*. 2003; 6(3-4):171-182.
20. *Back Manual*: DBC International Ltd.; 2009.

#### How to cite this article:

Ganesan Kathiresan, Tatiana Cornelius. Idiopathic Thoraco scoliosis Treatment using a combination of Documentation Based Care (DBC) Back active reconditioning programme and Schroth methods: A prospective case study. *Int J Physiother Res* 2013;04:148-153.