Journal of Bodywork & Movement Therapies (2015) 19, 232–237

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/jbmt

CASE REPORT

Improvement of clinical and radiographical presentation of Scheuermann disease after Schroth therapy treatment

Tomer Bezalel, MScPT [a], Leonid Kalichman, PT, PhD [b,*]

[a] Maccabi Health Care Services, Posture Clinic, Maccabi Hashalom, Tel Aviv, Israel
[b] Department of Physical Therapy, Recanati School for Community Health Professions, Faculty of Health Sciences at Ben-Gurion University of the Negev, POB 653, Beer-Sheva 84105, Israel

Received 5 November 2013; received in revised form 28 February 2014; accepted 9 April 2014

KEYWORDS
Kyphosis;
Scheuermann;
Schroth method;
Physical therapy;
exercises

Summary *Background:* Scheuermann's disease is the most common cause of hyperkyphosis of the thoracolumbar spine. Few case reports have demonstrated the effectiveness of Schroth therapy in improving the thoracic angle curve in Scheuermann's patients; however, additional verification is needed.
Case description: A 14-year-old female patient presented with Scheuermann's disease. On X-ray, thoracic kyphosis was 55° and lumbar lordosis 55°. The self-rated cosmetic disturbance was graded 10/10 on a verbal numeric scale. The patient received a course of seven weekly Schroth therapy sessions, in addition to daily home exercises tailored specifically for the patient's posture. Five months later, follow-up X-rays revealed thoracic kyphosis of 27° and lumbar lordosis 35°. The patient graded the degree of her cosmetic disturbance as 3/10.
Conclusions: Schroth therapy seems to be able to decrease the thoracic curve angle of Scheuermann's patients; however, efficacy and effectiveness of this method should be investigated in future prospective controlled clinical trials.

Introduction

Scheuermann's disease was first described by Sachs in 1987 as thoracic kyphosis greater than 45° (T3–T12), and at least one vertebra wedged minimum of 5°(Sachs et al., 1987).

Scheuermann's disease, occurring during adolescence, is the most common cause of hyperkyphosis of the thoracic and thoracolumbar spine (Holt et al., 1997). Following idiopathic scoliosis, it is most prevalent in patients with deformities of the spine (Graat et al., 2002; Holt et al., 1997). Scheuermann's disease is characterized by vertebral body wedging, vertebral endplate irregularity, diminished anterior vertebral growth, Schmorl's nodes, narrowing of the intervertebral disk spaces and premature disk degeneration (Fotiadis et al., 2008).

* Corresponding author.
E-mail address: kalichman@hotmail.com (L. Kalichman).

http://dx.doi.org/10.1016/j.jbmt.2014.04.008
1360-8592/

Scheuermann's kyphosis appears during the adolescent growth spurt as a structural kyphotic deformity of the thoracic or thoracolumbar spine. The disease usually occurs between the ages of 10—16, most frequently between 12 and 15 years (Bick and Copel, 1951; Fotiadis et al., 2008; Murray et al., 1993; Wenger and Frick, 1999). According to the literature, controversial evidence exists as to the prevalence of Scheuermann's among males and females. In Sorenson's study (Sorensen, 1964), 58% of the patients were male; 42% were female. Other studies reported the male to female ratio as 1:2 (Bradford et al., 1974; Bradford et al., 1975), 1:1 (Montgomery and Erwin, 1981; Shufflebarger and Clark, 1992; Tribus, 1998) http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3242958/ — CIT0019, 2:1 (Damborg et al., 2011; Fisk et al., 1984; Murray et al., 1993), or 7.3:1 (Scheuermann, 1920).

The choice of treatment for Scheuermann's disease is based on the severity of the deformity, the presence of pain, and age of the patient. Treatment of Scheuermann's disease is primarily non-operative. Adolescents whose kyphosis remains less than 60° are usually treated only by exercise to increase flexibility and then followed periodically by imaging studies until skeletal maturity (Lowe, 1999). There is no standard protocol of follow-up radiographic evaluations for Scheuermann's disease patients. In Israel, the decision is based on clinical evaluation. If during the evaluation, the physician/therapist suspects spinal deformity progression, the patient is referred to X-ray.

A Schroth three-dimensional exercise therapy program was developed in Germany in the 1920s, by Katharina Schroth. She divided the trunk into three "blocks" (cervical, thoracic and lumbar body segments) which can be shifted against one another. Special exercises were designed to correct the relative position of the three blocks in the sagittal plane together with self-elongation of the vertebral column, proprietary corrective breathing techniques and re-education of the neuromuscular system in order to improve postural perception (Lehnert-Schroth, 1992; Otman et al., 2005; Weiss, 2011). The method is based on sensorimotor and kinesthetic principles. The initial force involved in every Schroth exercise is spinal self-elongation. The patient learns to strengthen the musculature surrounding the spine when they are in place associated with the newly formed posture. Using sensorimotor feedback mechanisms, the patients learn an individual correction routine. Mirror monitoring allows synchronizing the corrective movement and the postural perception with visual input. By viewing himself in a mirror, the patient is able to see how the kyphotic posture changes into a more favorable one, and how the skeletal imbalance and musculature gradually transform into an upright position. Corrective breathing is a major component of the Schroth method (Weiss, 1991). The focus is on changing the patient's breathing pattern in order to decrease the risk of spinal deformity curve progression and to promote a more balanced posture. In addition, motivation and cooperation are essential components in the Schroth method. Patients receive a detailed explanation of the method in general and of each exercise specifically, to promote cooperation and improve motivation.

The Schroth method corrects the kyphotic posture, with the help of proprioceptive and exteroceptive stimulation and mirror control in the sagittal plane, using specific corrective breathing patterns. These exercises are specifically tailored to each patient. Treatment objectives were passive and active reduction of the kyphotic hump, and stretching hamstring and pectoral muscles. During therapy, patients utilize corrective active trunk muscle forces and learn to maintain an erect posture. Then, the corrected posture is maintained throughout daily living activities and eventually results in a more erect trunk.

Our clinical experience, in addition to a few case reports in the literature (Weiss et al., 2002a, 2002b), suggest that Schroth therapy may be effective in preventing deterioration and decreasing the thoracic angle curve in Scheuermann's patients. Additional verification is needed to implement this method in an evidence-based clinical practice model.

Case presentation

Initial evaluation

A 14-year-old female patient presented with hyperkyphosis and was diagnosed in November 2011 as suffering from Scheuermann's disease by two orthopedic surgeons. One surgeon identified the Cobb angle at 55° and advised Schroth therapy. The second surgeon identified the Cobb angle at 60° and advised treatment by the Milwaukee brace. The patient and her parents chose Schroth therapy.

The patient's general health was normal, no developmental problems in childhood, and no back or neck pain. She was eight months onset of post-menarch, height was 1.580 m and she had not participated in any sport or physical activity prior to treatment. Her familial history of spinal deformities was positive; her sister was treated with braces for Adolescent Idiopathic Scoliosis. No other proximate family members suffered from spinal deformations.

In January 2012, the patient was examined by a physical therapist (T.B.) with more than 5 years' experience in the daily treatment of spinal deformities and trained in the Schroth method.

Radiographic evaluation of thoracic kyphosis was observed on a lateral view digital image of the spine in a standing position. Digital image software offers several tools for improving image quality i.e. zoom, increased contrast, silhouette enhancement, and a negative image effect. In a recent study, the Cobb method demonstrated high reliability (interclass correlation coefficient = 0.96, CI 0.92, 0.97), clinical advantages and suitability to assess the scoliotic curvature in the frontal plane (Tanure et al., 2010).

The thoracic kyphosis measured by the physical therapist at T3—T12 was 55°(normal kyphosis is between 26° and 46°); the lumbar lordosis at L1—L5 was 55° (normal lumbar lordosis is between 32° and 56°) (Fig. 1a). T7 and T8 vertebrae were anteriorly wedged at >5° (Fig. 2a). The C7 vertebral body vertical axis (posterior part of the vertebral body) was situated 7.92 cm from the sacral promontory. The scapula rested high on the rib cage with an anterior inclination (35° from the vertical line).

Clinically, the patient had bilateral mild pes planus. Sagittal plane observation showed lumbar hyperlordosis,