The Conservative Scoliosis Treatment
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Side-Shift Exercise and Hitch Exercise

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Abstract. We use side-shift exercise and hitch exercise for the treatment of idiopathic scoliosis. Outcomes of side-shift exercise used for the curves after skeletal maturity or used in combination with part-time brace wearing treatment are better than the natural history. Side-shift exercise and hitch exercise are useful treatment option for idiopathic scoliosis.

Keywords. Idiopathic scoliosis, exercise, side-shift, hitch

Introduction

Since 1986, we adopted side-shift exercise and hitch exercise for the treatment of idiopathic scoliosis. Our indications of physical therapy are:

1. Curves too small for brace treatment (e.g., Cobb angle < 25°)
2. Curves after skeletal maturity that include curves after weaning of the brace (e.g., Risser sign IV or V, post menarche > 2 years)
3. Combined with part-time brace wearing treatment (e.g., Cobb angle > 25°, Risser sign 0 to IV)

We describe methods and outcomes of the treatment.

1. Methods of the Treatment

1.1. Side-Shift Exercise

Side-shift exercise was originally described by Mehta [1]. The exercise consisted of the lateral trunk shift to the concavity of the curve. Lateral tilt at the inferior end vertebra is reduced or reversed, and the curve is corrected in the side-shift position (See Figure 1). Patients are instructed to shift their trunk repetitively to the concavity of the curve and hold the side-shift position for 10 seconds while they are standing and to maintain the side-shifted position while they are sitting.

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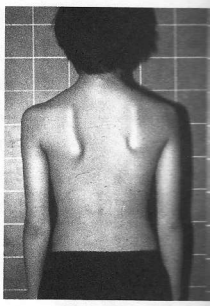


Figure 1. A patient standing
vertebra is reversed and the c

If C7 plumb line lies to
is indicated, and if C7
sacrum, small shift is
subject of the treatment

1.2. Hitch Exercise

For lumbar curve or tho
instructed to lift their he
knee straight, and to h
hitch position, pelvis or
is reduced or reversed, a

(a)

Figure 2. For a lumbar or th
indicated.

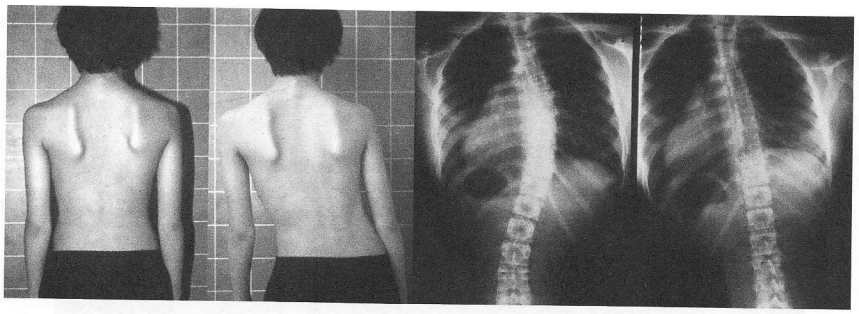
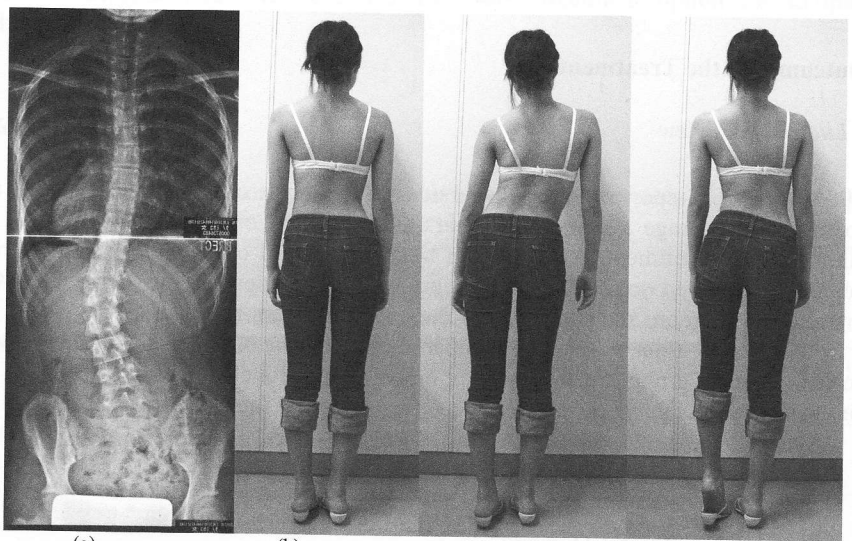


Figure 1. A patient standing in the neutral and side-shift position. Note that lateral tilt at the inferior end vertebra is reversed and the curve is corrected in the side-shift position.

If C7 plumb line lies to the convexity of the curve at the level of the sacrum, large shift is indicated, and if C7 plumb line lies to the concavity of the curve at the level of the sacrum, small shift is indicated. For a double major curve, the larger curve is the subject of the treatment.

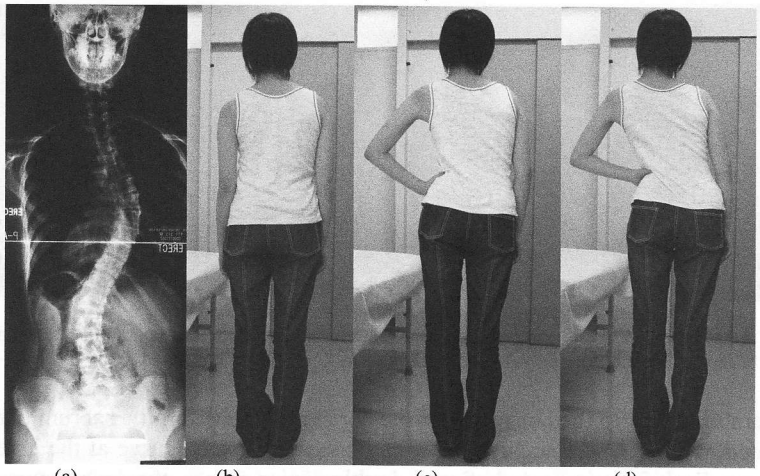
1.2. Hitch Exercise

For lumbar curve or thoracolumbar curve, another option is hitch exercise. Patients are instructed to lift their heel on the convex side of their curve while keeping their hip and knee straight, and to hold the hitched position for 10 seconds (See Figure 2). In the hitch position, pelvis on the convex side is lifted, lateral tilt at the inferior end vertebra is reduced or reversed, and the curve is corrected.



(a) (b) (c) (d)

Figure 2. For a lumbar or thoracolumbar curve (a, b), either side-shift exercise (c) or hitch exercise (d) is indicated.



(a) (b) (c) (d)

Figure 3. For double curve, hitch-shift exercise is indicated. Patients are instructed to lift their heel on the convex side of the lower curve as the hitch exercise, immobilize their lower curve by the hand, and shift their trunk to the concavity of the upper curve.

1.3. Hitch-Shift Exercise

Hitch-shift exercise is an option for a double major curve. Patients are instructed to lift their heel on the convex side of the lower curve as the hitch exercise, immobilize their lower curve by the hand, and shift their trunk to the concavity of the upper curve (See Figure 3).

2. Outcomes of the Treatment

2.1. Literature Review

In 1985, Mehta [1] reported the results of side-shift exercise of 35 patients (33 girls and 2 boys) whose average age was 14.1 years and average Cobb angle was 23.8° at the beginning of the treatment. After a mean treatment period of 1.9 years, their average Cobb angle changed to 24.8°. Of 42 curves in 35 patients, nine curves (21.4%) improved of 5° or more and change of 21 curves (50%) were less than 4°.

In 1999, den Boer et al. [2] compared the results of side-shift exercise with historical control group treated with a brace. They concluded that there was no difference between the efficacy of the brace treatment and the side-shift therapy.

2.2. Our Results

2.2.1. Curves after Skeletal Maturity

Results of a total of 69 patients with idiopathic scoliosis who were treated only by side-shift after their skeletal maturity were analyzed [3]. The average age at the beginning of the treatment was 16.3 years and the average follow-up period was 4.2 years. The

average Cobb angle was 31.5° at the beginning of side-shift and 30.3° at the follow-up. Most of the long-term follow-up studies reported that idiopathic scoliosis progressed even after skeletal maturity. For thoracic and thoracolumbar curves from 30° to 50°, Weinstein SL and Ponseti IV [4] reported 0.25° per year progression with 40.5 years follow-up, and Ascani E et al. [5] reported 0.36° per year progression with 33.5 years follow-up. However, in our results, 33 curves of 30° to 50° showed 0.1° per year decrease during the follow-up period of 4.2 years.

2.2.2. Combined with the Part-Time Brace Treatment

Results of a total of 39 female patients with adolescent idiopathic scoliosis, whose Cobb angle was larger than 25 ° degrees and whose Risser sign was 0-3 at the start of the treatment, were analyzed [6]. The patients followed-up for more than one year and at least until Risser sign of IV, or deteriorated in this period and discontinued the brace treatment were included in an analysis. At the commencement start of the treatment, patients' mean age was 12.8 years and mean Cobb angle was 37.1°. The average Cobb angle changed to 45.4° after the averaged follow-up period of 2.8 years. Of 39 patients, 28 (72%) were classified as unchanged because the change of their Cobb angle was within 10°, and 11 (28%) as progressed because their Cobb angle increased of 10° or more. Comparing these results with natural history of the identical sized curve reported by Bunnell [7], follow-up period was longer in our study, while prevalence of progression more than 10 degrees was lower.

Conclusion

Side-shift exercise and hitch exercise are useful treatment option for idiopathic scoliosis.

References

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