

# A controlled prospective study on the efficacy of SEAS.02 exercises in preparation to bracing for idiopathic scoliosis

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## 1. Abstract

The Lyon school has proposed a preparation to brace wearing through an intensive mobilization in order to obtain a better reduction of the braced scoliotic curve. Our aim was to verify this hypothesis. Design: prospective controlled study on idiopathic scoliosis consecutive patients with a brace prescription. Outcome: results after 5 months of brace wearing obtained through radiographs without the brace. Treatment: SEAS Group exercises according to the protocol SEAS.02 (Scientific Exercises Approach to Scoliosis, version 2002); CONT Group various type of exercises. Population. 110 patients (34 females), 13.5±2.4 years, 31.1°±11.1° Cobb (°C), 14.4°±6.0° Bunnell (°B). All parameters improved at follow-up in both groups. SEAS had better results than CONT for °C. Clinical results (variations of at least 5°C and 2°B) were better in SEAS than CONT. This study proves the efficacy of SEAS.02 exercises preparatory for bracing. Bracing demonstrated its short term efficacy.

**Keywords.** Idiopathic scoliosis, Physical exercises, Bracing Controlled study.

## 2. Introduction

It has been hypothesized that exercises can reduce brace side effects: paravertebral hyposthenia, breathing difficulties, reduced coordination[1] [2].

Even if many schools (Milwaukee, Boston, Lyon) have supported the synergy between exercises and braces, there are no researches that demonstrates this hypothesis.

In particular, the Lyon school has proposed a preparation to brace wearing through an intensive mobilization in order to obtain a better reduction of the braced scoliotic curve [2]. Our aim was to verify this hypothesis.

### **3. Materials and Methods**

This is a prospective controlled study on idiopathic scoliosis patients with a brace prescription: all patients corresponding to the inclusion criteria were enrolled consecutively.

The results before treatment and after 5 months of wearing have been obtained through radiographs without the brace and medical evaluation: each patient has been evaluated by the same physician and braces have been made by the same orthopaedic workshops.

#### *3.1. Treatment*

The groups compared have been identified through self-selection by the patients.

The SEAS Group performed exercises according to the protocol SEAS.02 (Scientific Exercises Approach to Scoliosis, version 2002) learning the individually adapted exercises at a structure super-specialized on scoliosis treatment (1.5 hours single sessions every 2-3 months) with prosecution in a facility near home twice a week (40 min) plus 1 exercise daily (5 min).

The CONT Group performed exercises at a local structure according to the protocol preferred by the single treating therapist, usually 2-3 times a week per 45 to 90 minutes.

#### *3.2. Population*

SEAS: 40 patients (33 females), 13.3±2.1 years, 30.6°±10.8° Cobb (°C), 14.4°±6.3° Bunnell (°B). CONT 70 patients (61 females), 13.6±2.6 years, 31.3°±11.3°C, 14.3°±5.9°B.

#### *3.3. Statistical analysis*

T-test for uncoupled data, Mann-Whitney, Fisher's Exact and chi-square with  $\alpha = 0.05$ .

### **4. Results**

At the baseline there were no differences between SEAS and CONT, and all parameters improved at follow-up in both groups.

SEAS had better results than CONT for °C: all curves (-5.7±5.6° vs. -3.4±6.0° - P<0.05), more severe curve (-6.7±4.7° vs. -3.5±6.0° - P<0.05) and lumbar localization (-6.9±5.8° vs. -3.9±6.8° - P<0.05), with a tendency for thoracic (-4.6±5.2° vs. -2.6±5.1° - P=0.06) and thoraco-lumbar (-7.44±5.2° vs. -4.7±6.0° - P=0.09).

SEAS had better results for Aesthetics (Figure 1).

Clinical results (variations of at least 5°C and 2°B) were better in SEAS than CONT (Figure 2): radiographically (°C) 58.0% improved, 1.5% worsened vs. 45.8% and 10.3% respectively (P<0.05), while clinically (°B) 81.5% improved, 2.0% worsened vs. 81.9% and 8.3% respectively (P<0.05).

## SEAS better Aest results

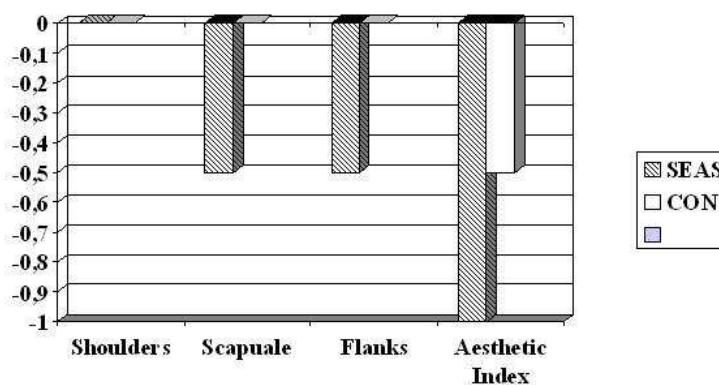
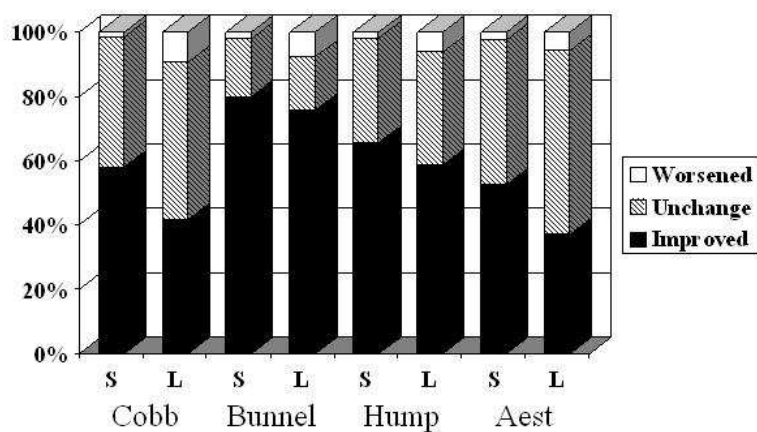


Figure 1

## SEAS better clinical result



**Figure 2**

## **5. Discussion**

This study proves the efficacy of SEAS.02 exercises preparatory for bracing.

Bracing demonstrated its short term efficacy in a highly progressive population, even if completing the treatment is obviously necessary to have final results.

Anyway, study design is adequate to verify the efficacy of preparatory exercises, because radiographs taken without the brace document the real actual results, as well as short term results are those most likely to be influenced by exercises preparatory to bracing.

We could discuss the clinical significance of 3°C reduction when compared to controls, but it should be understood that it correspond to a 10% of the total curve, and that it is twice as much as what could be obtained with inadequate exercises (6°C reduction vs. 3°C).

## **References.**

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