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Review Article

Intervention studies on scoliosis – Review of the reviews

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ABSTRACT

Introduction: The treatment of scoliosis is still a matter of debate. Although certain systematic reviews exist, neither the surgical nor the conservative community seems to acknowledge the evidence which has been gained thus far.

Aim: The aim of this review was to highlight the knowledge concerning the conservative and the operative approach in order to provide the clinician with a clear view concerning the current alternatives.

Materials and methods: A PubMed search for outcome papers and reviews concerning the treatment of scoliosis has been performed in order to detect approaches with beneficial outcomes with respect to the Cobb angle, trunk deformity and other signs and symptoms of scoliosis.

Results and discussion: Real outcome papers (beginning of treatment in immature samples, and final results after the end of growth) have been found for brace treatment only. Some papers investigated mid-term effects of exercises, most were retrospective, few prospective and many included patient samples with questionable treatment indications. The papers on surgery do not seem to provide evidence enough to establish a beneficial cost and benefit relationship for the patient.

Conclusions: Physiotherapy in the treatment of scoliosis does not seem to be of evidence enough in the treatment of patients at risk for being progressive. Brace treatment is supported by Level II evidence with studies providing end-growth results and long-term results as well. Surgical treatment cannot be regarded as being evidence based.

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1. Introduction

Scoliosis is a three dimensional deformity of the spine and trunk. This deformation may deteriorate quickly during periods of rapid growth.^{2,25} Although scoliosis may be the expression or symptom of certain diseases, e.g., neuromuscular, congenital, due to certain syndromes or tumors, the majority of patients with scoliosis (80–90%) are called

“idiopathic” because a specific underlying cause has still not been found. The treatment of the so called idiopathic scolioses is determined by the deformity itself. As most of the scolioses progress during growth, the main aim of any intervention is to stop curvature progression.^{2,25}

While children grow until they have fully matured, there are certain periods with more or less growth during childhood and adolescence and curvature progression is more or

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less probable during different phases of growth^{2,25,36,69} (Fig. 1). The “baby growth spurt” ends at the age of 5.5-6 years and is followed by a “flat phase” which lasts until the first signs of maturation. With the first signs of breast development or the appearance of pubic hair, the pubertal

growth spurt starts (P1) and in its ascending phase 2/3 of progression may happen.^{25,69} Shortly after the growth peak (P3), menarche in girls and voice change in boys appear and indicate the onset of the descending phase of growth until its cessation (P5).

Curve progression is dependent on growth rate and growth dynamics

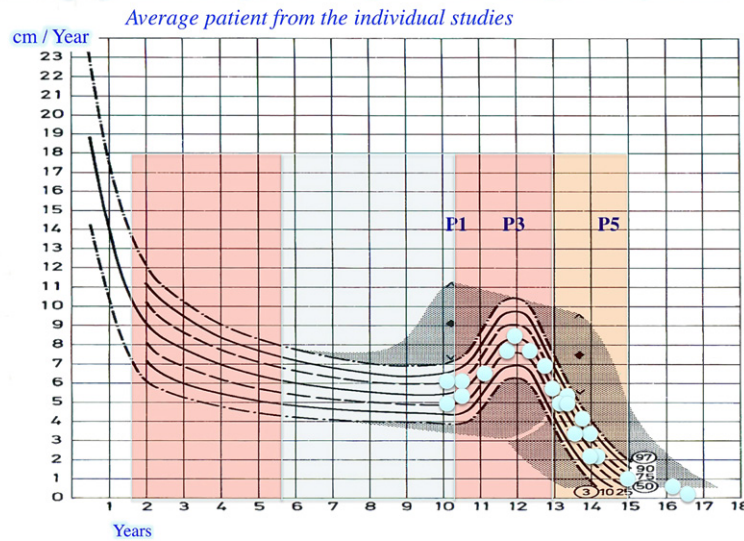
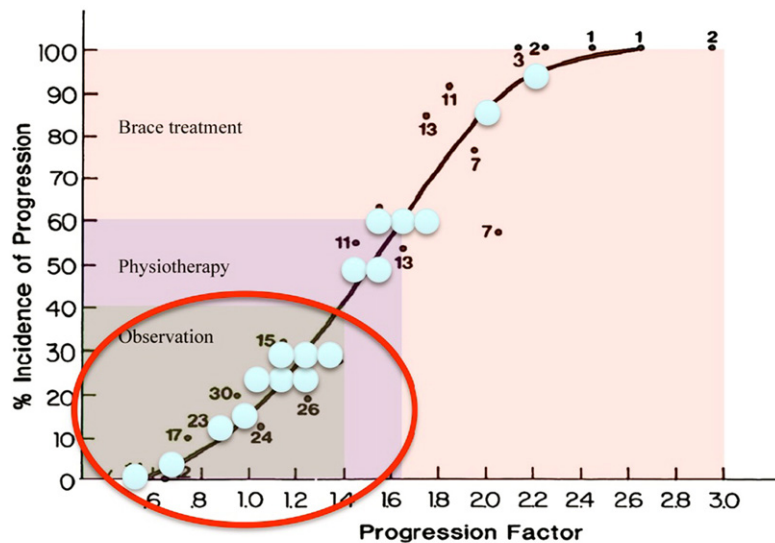


Fig. 1 – Growth rate (body length) as estimated for girls. This figure shows that immature individuals experience two phases of growth with higher velocity. One may be called the baby spurt with descended characteristics (0 to approx. 6 years of age). The other is the pubertal growth spurt (approx. 10-13 years). Between these two phases with higher growth velocity a flat phase of growth with little risk for progression occurs (figure modified from Weiss and Weiss⁷³). With kind permission of Pflaum, Munich.⁶⁹



Graph showing the incidence of progression according to the progression factor, which is calculated by the formula:

$$\frac{\text{Cobb angle} - (3 \times \text{Risser stage})}{\text{Chronological age}} = \text{Progression factor}$$

Fig. 2 – Incidence (risk) of progression can be calculated according to the formula by Lonstein and Carlson.³⁶ According to the indication guidelines (Weiss et al.⁷⁰) we have to distinguish between: indication for observation only – incidence (risk) of progression 40%; indication for physiotherapy – incidence (risk) of progression 40-60%; indication for bracing – incidence (risk) of progression 60% and more. The average patient from the majority of the papers on physical therapy has no indications for treatment, but for observation only (blue spots). With kind permission of Pflaum, Munich.⁶⁹

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