

STANDARDIZING EXERCISE INTERVENTIONS FOR SCOLIOSIS: EXERCISE TYPE, INTENSITY, DURATION AND FREQUENCY OF SESSIONS.

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Exercise interventions for scoliosis

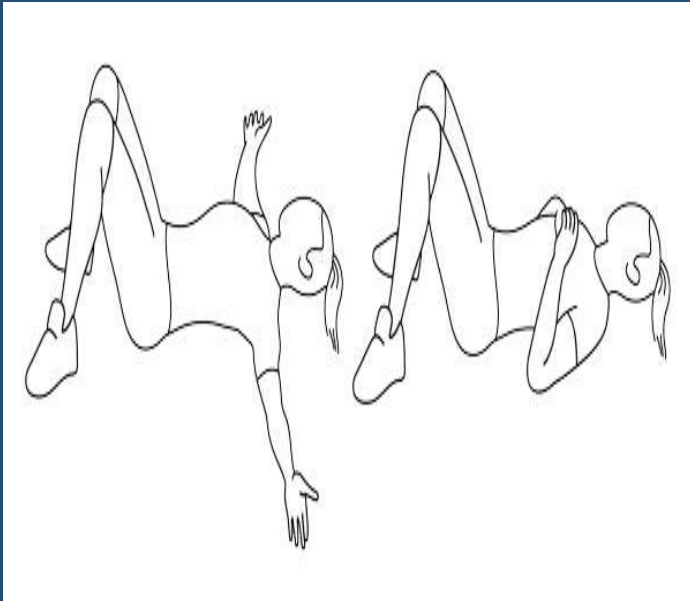
GPTE

- Generalised Physical Therapy interventions

PSSE

- Physiotherapeutic scoliosis-specific interventions

Generalised PT exercises



- Routine generalised PT (GPT) more generic,
- usually consists of low-impact stretching/strengthening activities e.g yoga, pilates, tai chi,
- Can include many different exercise protocols according to the preferences of the therapist e.g McKenzie exercises

What exactly are Physiotherapy Scoliosis Specific Exercises (PSSE)?

- ❖ PSSE`s consist of individually adapted and curve -specific exercises
- ❖ taught to patients in a centre that is often totally dedicated to scoliosis treatment.
- ❖ Patients learn an exercise protocol that is personalized
- ❖ according to medical and physiotherapeutic evaluations of the individual`s scoliosis curves characteristics



GOALS OF PSSE according to SOSORT

skeletally immature patients (Risser sign of 3 or less) with curves between 11° and 30°

1) to stop curve progression at puberty (or reduce it),

2) to prevent or treat respiratory dysfunction,


3) to prevent or treat spinal pain syndromes, and 4) to improve aesthetics via postural correction.

in skeletally mature patients (Risser 4 or 5) with curves 11° to 45°


Further, when patients are prescribed a rigid brace, SOSORT always recommends the associated use of PSSE.

PSSE Principles

- ❖ Based on a specific form of auto-correction,
 - ❖ spinal elongation
 - ❖ Isometric exercise contraction
 - ❖ taught individually to each single patient.
 - ❖ PSSE are also incorporated into activities of daily living
- These are inserted into stabilizing exercises
 - can include neuromotor control,
 - Proprioceptive balance training
 - depending on the specific PSSE school
 - Practised at home
 - Ideally under parental supervision



EXERCISE TYPE : DIFFERENT
APPROACHES (SCHOOLS) TO
EXERCISE INTERVENTIONS IN
SCOLIOSIS





In the Lyon approach, a great emphasis is given to exercises done in the plaster cast prior to bracing and during bracing to encourage equilibrium and muscular strength and endurance while in the cast or brace

1. The Lyon Approach

- The basis of the Lyon method is to avoid spinal extension during exercise and enhance kyphosis of the thoracic region with lordosis of the lumbar spine as well as frontal plane correction, segmental mobilization, core stabilization, proprioception, balance and stabilization



Fig. 3 Scoliosis patient developing self-awareness of postural defects with the help of a video recorder and real-time video feedback



Fig. 4 Active thoracic mobilization, promoting kyphosis, using the Lyon method



Fig. 5 Active lumbar correction, promoting lordosis, using the

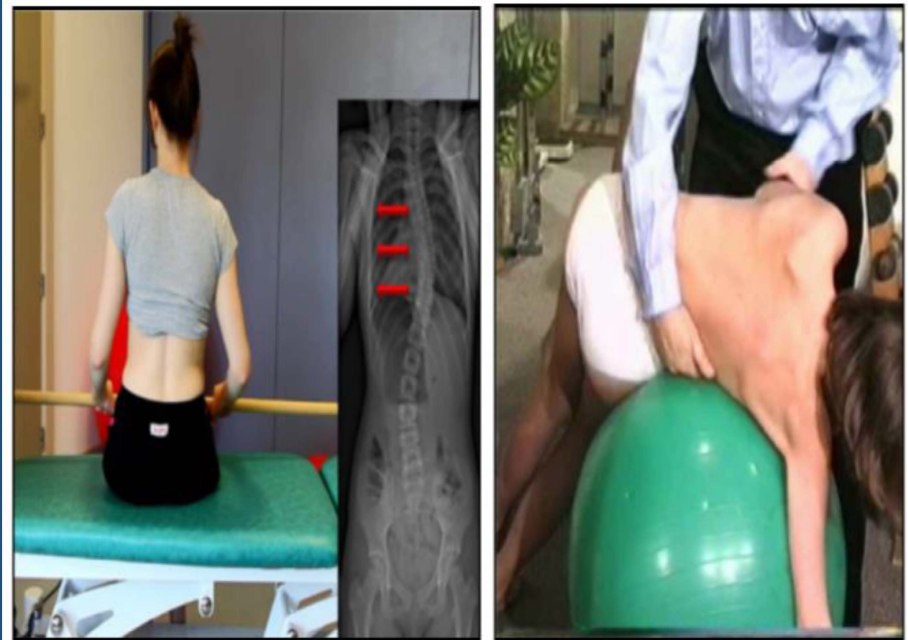


Fig. 6 (a, b): Active thoracic shift exercise with a dowel (a) and a Swiss-ball (b) using the Lyon method

The Schroth Method (Germany)

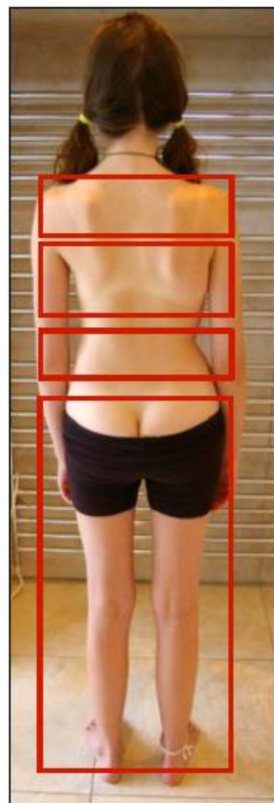
Schroth method was developed by Katharina Schroth in 1920

continuously refined through the treatment of approximately 3,000 scoliosis cases per year.

The Asklepios Katharina Schroth Spinal Deformities Rehabilitation Centre in Germany (Fig. 21) offers a scoliosis-specific intensive inpatient rehabilitation program.

In addition to the treatment offered at the Centre, 2,500 trained and certified Schroth therapists treat patients through the center's residential outpatient treatment program.





A

Shoulder block
S

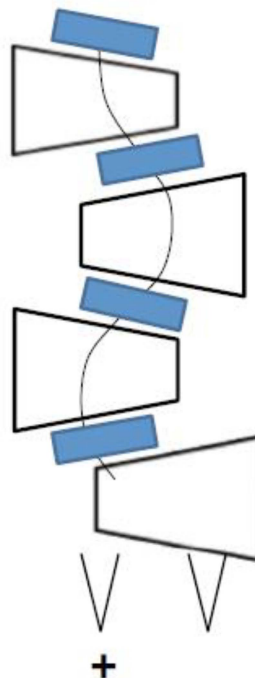
Thoracic block
T

Lumbar block
L

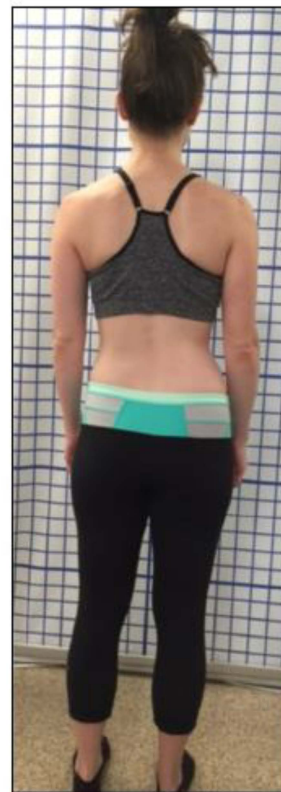
Hip - pelvic
block
H



B



C

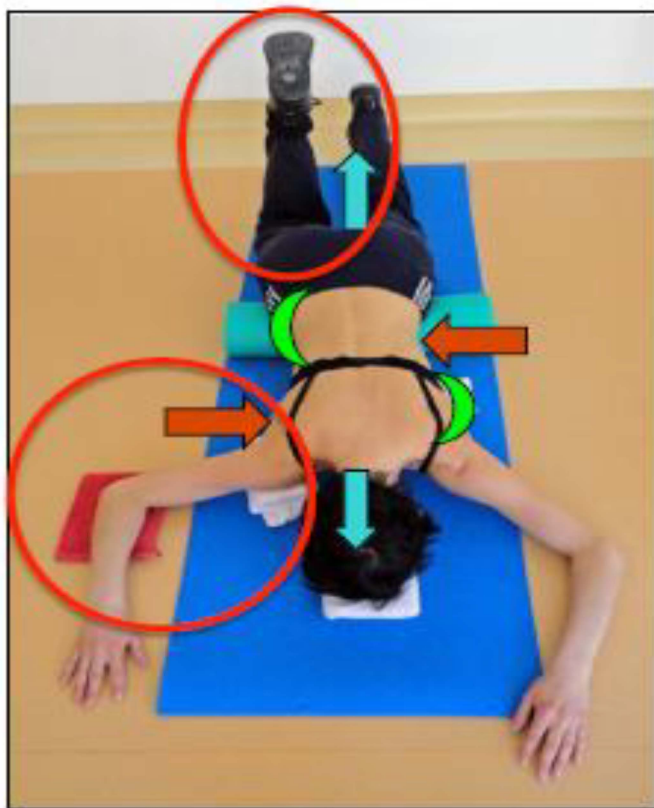


D

Fig. 24 (a, b, c, d): Schroth Body Blocks. The Schroth system of scoliosis curve classification is derived from the Schroth principle of dividing the body into "body blocks" as pictured anatomically (a) and schematically (b). Scoliosis causes the body blocks to become deformed, changing their geometric shape from a rectangle (b) to a trapezium (c). A patient with a major lumbar scoliosis left convex curve has a lumbar block shifted to the left and a hip-pelvic block shifted to the right (d)

3D principles of correction

- In the Schroth method there are five pelvic corrections that are assumed prior to the execution of the main principles of correction.
- These five pelvic corrections ensure that the pelvis is best aligned with the trunk prior to the major corrections.
- The five principles of the Schroth method are: 1) Autoelongation (detorsion);
- 2) Deflection;
- 3) Derotation;
- 4) Rotational breathing; and
- 5) Stabilization.
- During the application of these principals, as with the BSPTS method, the
- patient is taught how to de-collapse the concaved areas of the trunk and how to reduce the prominences.



- Convexities/curves shoulder counter-traction (SCT) (forward - inward)
- Elongation
- Concavities (outward - backward)
- Shoulder traction (ST)
- Corrective pads

Fig. 28 The Schroth prone exercise with activation of the iliopsoas muscle (right hip flexion). Blue arrows represent trunk elongation with caudal and cranial forces. Red arrows represent areas of muscle activation around the convexities towards the midline. Green half-moons represent areas of expansion of the concavities. Red circles represent additional corrective forces: red circles around the right lower extremity and the right upper extremity represent iliopsoas activation and shoulder traction/counter-traction, respectively, resulting in correction of the lumbar and thoracic curves

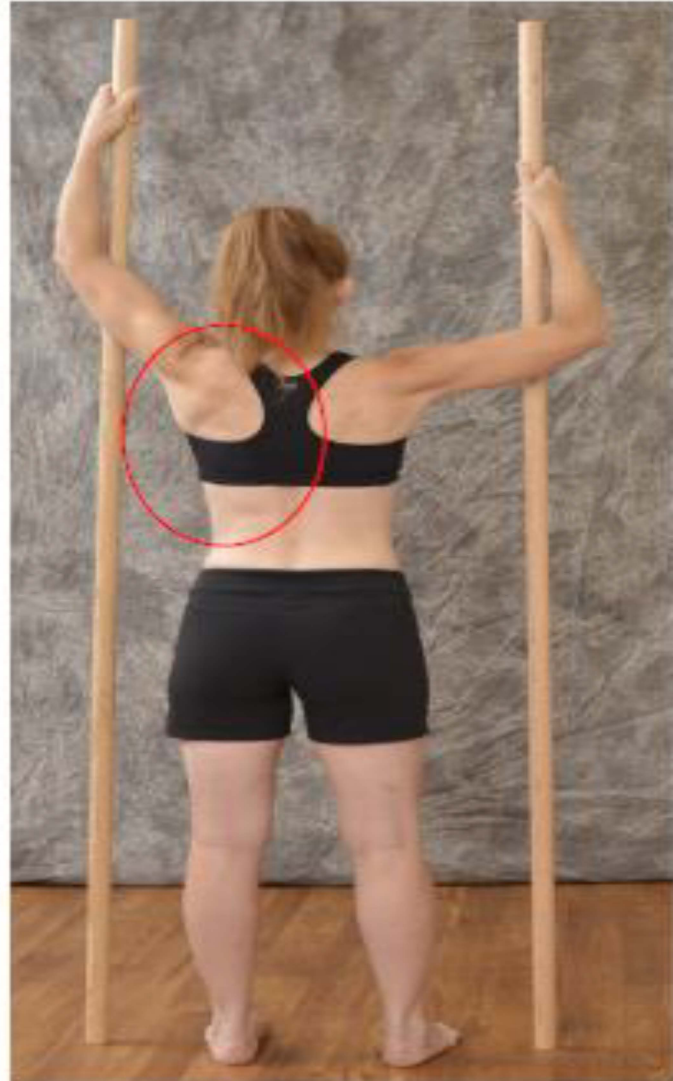


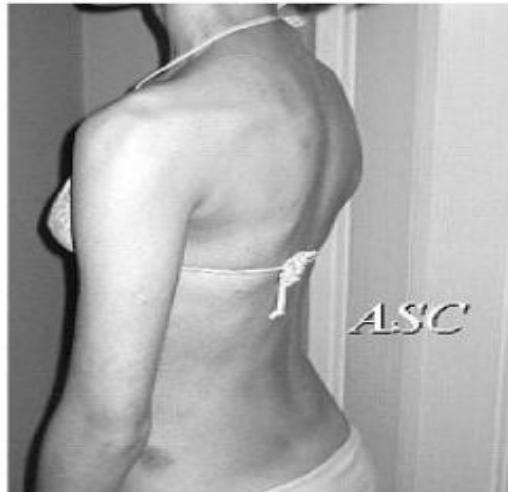
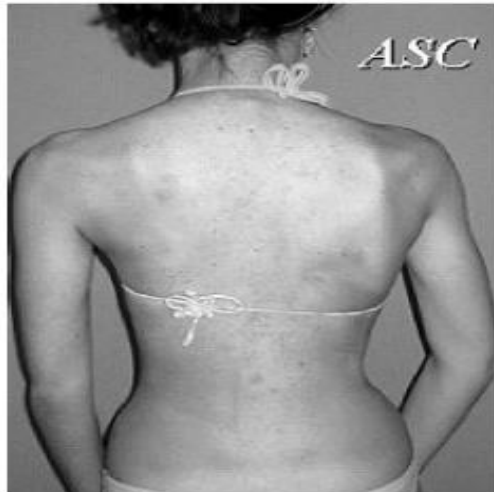
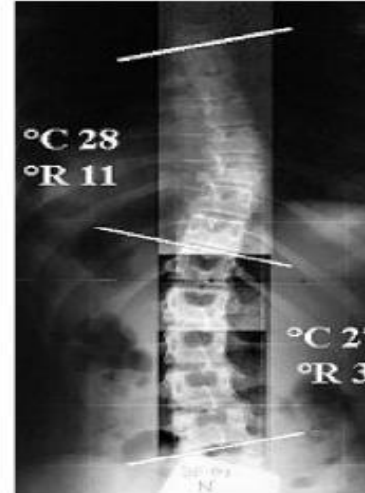
Fig. 29 The Schroth "Sal" exercise where the patient stands on a half foam-roll with two poles and performs active stabilization. The red circle represents the concavity (weak side according to Schroth). During active stabilization, the patient is consciously expanding the left rib cage with right directional breathing, opening the collapsed left lung, while maintaining 3D postural correction





Fig. 31 Patients performing Schroth 3D postural corrections in sitting and standing positions. These postural corrections are practiced during activities of daily living in order to change habitual default postures and improve alignment, pain, and curve progression

Scientific Exercise Approach to Scoliosis (Italy)

Italian SEAS Method



Autocorrection according to the SEAS protocol proposed by the ISICO School (intrinsic autocorrection).



EXERCISE INTENSITY, DURATION AND FREQUENCY

School	Inpatient or Outpatient	Treatment frequency	Home program	Country of Origin
SEAS	Outpatient	1 individual session of 90 min for introducing the approach, and the teaching and the video recording of the exercises program every 3 months	Repetition of the exercises in a gym or at home with the assistance of a PT or a parent for 45 min 2-3 time a week + 5 min daily. The patient can choose to not perform the long session (45 min) and perform the program for 20 min daily instead.	Italy
SCHROTH	Inpatient	4-6 daily hours for 30 days in a specialist clinic.	The treatment includes 3-4 exercises at home for 30 minutes daily 5 times per week to maintain the improved postural balance.	Germany
	Outpatient	Two hours for two days per week with Certified Schroth therapists.		
BSPTS	Outpatient	<p>BSPTS offers different frequencies and different modalities to treat patients:</p> <p>INDIVIDUAL local PATIENT'S: 1h session each week. Depending on the quality of the execution of the correction, the PT will space the sessions as needed.</p> <p>INDIVIDUAL foreign PATIENT'S: 2h session; 10 consecutive days. To be complemented by 1 or 2 more weeks 3 to 6 months later depending on the level of knowledge acquired.</p> <p>INTENSIVE COURSE: 20 continuous days in group sessions of 3h/each.</p> <p>REGULAR COURSE: 30 sessions of 1h30 in groups. Spread out after initial 8 sessions over a short period as the patient acquires the capability to perform the exercises properly</p>	For all: home exercises 5 days per week for 45-60 min./day	Spain

		independently.		
DOBOMED	Inpatient or outpatient	5days/wk X 40min over 3 weeks Or 60 min per week continuously Or Repeat stay as above.	??????	Poland
SIDESHIFT	Outpatient	1 individual session of 10 min for the preparation and the teaching of the exercises.	Home exercises daily for 10 min with or without assistance from parents	Japan
FITS	Inpatient Outpatient	A 14-days inpatient program once a year. 1 individual session (45-60 min) with PT 1-4 times per month). with frequency related to the Cobb angle, maturity, risk of progression and distance from clinic.	For all: during exercises with PT the Parent's presence is required. Daily home exercises for 20-30 min.	Poland
LYON	Outpatient	Used during plaster cast or during 24h bracing (1 to 4 months) 2 sessions/week with a PT After 4 months, 1 session/week	Daily exercises at home Sport without limitation	France



SOSORT guidelines

- SOSORT guidelines²³, PSSE are recommended as part of a range of interventions deemed appropriate,
- Depending on the patients' and therapist's willingness to consider more or less aggressive options given the perceived risk of progression determined based on patients age, skeletal maturity and curve severity.

Indications according to current evidence

The level of evidence SSE For AIS is not high.

The existing evidence concerning SSE, which is classified according to the Oxford Centre for Evidence Based Medicine²⁷, can be summarized as follows:

physiotherapeutic scoliosis-specific exercises(PSSE) can be recommended as a first step in the treatment of AIS to avoid and/or limit curve progression (grade B) ^{20;22;23;28-31;}

- Recent systematic reviews ^{28-31;40} have shown the possible effects of PSSE`s on scoliosis primarily in terms of Cobb angle, based on controlled studies, which were mainly observational and partly prospective.
- A Cochrane Review ³⁰ on the effectiveness of scoliosis-specific exercises for patients with idiopathic scoliosis found that, despite a comprehensive search of published and unpublished literature, only two studies met the stringent Cochrane methodological criteria.

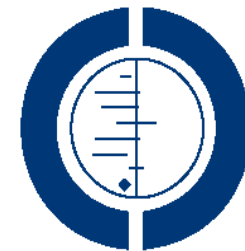
Quantity and quality of the research to date and their limitations

2012

- Of these only one was a randomised controlled trial;
- this trial compared a protocol of exercises, electrostimulation, traction and postural training⁴¹
- to a protocol of electrostimulation, traction and postural training.
- This study provided very low quality evidence in favour of PSSE`s versus the same protocol without exercises.

Exercises for adolescent idiopathic scoliosis (Protocol)

Romano M, Minozzi S, Bettany-Saltikov J, Zaina F, Chockalingam N, Weiss HR, Maier-Hennes A, Negrini S



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This is a reprint of a Cochrane protocol, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2009, Issue 3

<http://www.thecochranelibrary.com>



Exercises for adolescent idiopathic scoliosis (Protocol)
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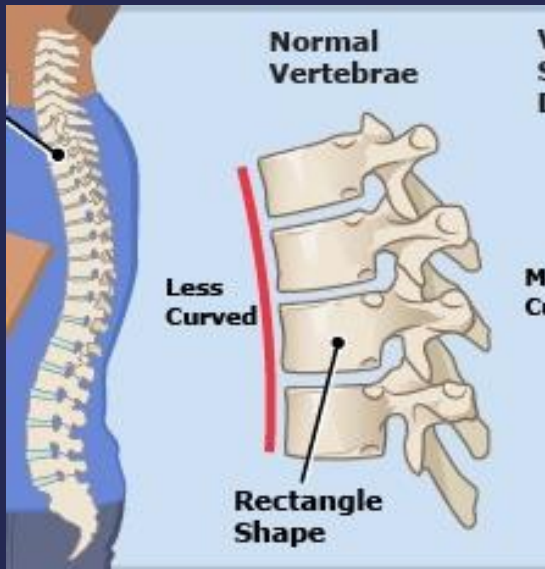
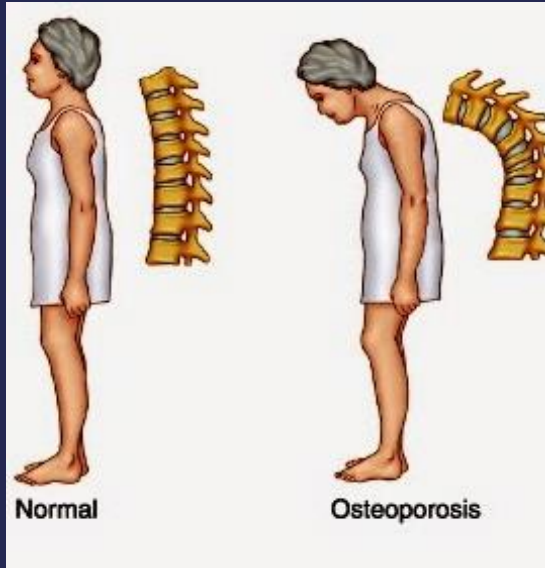
RCT`s

The effect of Schroth exercises added to the standard of care on the quality of life and muscle endurance in at adolescents with idiopathic scoliosis—In an assessor and statistician Sanja Schreiber, Eric C Parent.

Active self-correction and task-oriented exercises reduce spinal deformity and improve quality of life in subjects with mild adolescent idiopathic scoliosis. Results of a randomised controlled trial. *European Spine Journal* June 2014, Volume 23, Issue 6, pp 1204–1214 | Marco Monticone

The efficacy of three-dimensional Schroth exercises in adolescent idiopathic scoliosis: A randomised controlled clinical trial Tuğba Kuru¹, İpek Yeldan², E Elçin Dereli³, Arzu R Özdingler², Fatih Dikici⁴ and İlker Çolak, *Clinical Rehabilitation* 1-10 2015

Active Treatment for Idiopathic Adolescent Scoliosis (ACTIvATeS): a feasibility study *Health Technology Assessment*, No. 19.55 Mark A Williams, Peter J Heine, Esther M Williamson,



The Effect of Schroth
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Kyphotic Curve and
Quality of Life in
Scheuermann's

Patients: A Randomized
Controlled Trial

Tomer Bezalel et al

Asian Spine J. January 24,
2019 [Epub ahead of
print]

<https://doi.org/10.31616/asj.2018.0097>




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PHOTOGRAPHY

