

# Body schema in adolescent idiopathic scoliosis

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		<input type="checkbox"/> Protocol
<b>Registration date</b> 15/05/2015	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan
		<input type="checkbox"/> Results
<b>Last Edited</b> 26/01/2018	<b>Condition category</b> Musculoskeletal Diseases	<input type="checkbox"/> Individual participant data
		<input type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

Adolescent idiopathic scoliosis (AIS) is a spinal deformity involving a bending and twisting of the spine that occurs at or near the onset of puberty. AIS most often appears around the time of a child's 'growth spurt', and tends to affect more girls than boys. It is called idiopathic because there is no identifiable cause, although various theories have been proposed. One such theory is that there is a change in body schema, a concept sometimes used to describe the way the brain interprets the size and spatial position of the body and limbs. Body schema is thought to play an important role in controlling and organising a person's physical actions. Body schema is also considered to be very important in children, because their bodies go through a lot of changes in size and proportion as they grow. If a person's body schema is altered, it is thought that the brain may no longer be able to interpret the precise location of the limbs in space, potentially leading to disorganised actions. In some as yet unknown way it may also contribute to the spinal contortion seen in people with scoliosis. A study of patients with scoliosis has been undertaken to help identify factors known to be related to altered body schema as part of a parallel study (ACTIVATES, NIHR HTA 10/38/03, ISRCTN90480705). The aim of this study is to collect similar information and perform similar tests on young people without scoliosis. It is hoped that this might provide further insight into the factors associated with scoliosis and help identify potential causes.

### Who can participate?

Healthy children aged 10-16.

### What does the study involve?

All participants take part in visual and non-invasive physical tests. Participants are also asked to complete questionnaires.

### What are the possible benefits and risks of participating?

By looking at the differences between young people with and without scoliosis, this study aims to highlight the different factors that are linked to this condition. This may lead to the development of new treatments and has the potential for significant patient benefit.

### Where is the study run from?

1. Tudor Hall School, Banbury (UK)
2. Lutterworth High School, Lutterworth (UK)

3. Marlborough Church of England School, Woodstock (UK)
4. Pattison College, Coventry (UK)
5. King Alfred's Academy, Wantage (UK)
6. The Westwood Academy, Coventry (UK)
7. Lyng Hall School, Coventry (UK)
8. Kingham Hill School, Chipping Norton (UK)

When is the study starting and how long is it expected to run for?

January 2013 to December 2015

Who is funding the study?

National Institute for Health Research (UK)

Who is the main contact?

Mr P Heine

## Contact information

### Type(s)

Public

### Contact name

Mr Peter Heine

### Contact details

University of Warwick  
Warwick Clinical Trials Unit  
Gibbet Hill Road  
Coventry  
United Kingdom  
CV4 7AL

## Additional identifiers

### Protocol serial number

N/A

## Study information

### Scientific Title

Body schema in adolescent idiopathic scoliosis: a case-control study

### Study objectives

Data has already been collected from adolescent idiopathic scoliosis (AIS) patients within the framework of a larger NIHR HTA-funded trial (Active treatment for idiopathic adolescent scoliosis (ACTIVATES): a pilot randomised controlled trial, NIHR HTA 10/38/03, ISRCTN90480705) which received ethical approval from the East of England (Cambridge South) NRES committee (reference number: 12/EE/0331).

The aim of this research proposal is to gather similar information from non-scoliotic adolescents in order to answer the following research questions:

1. Do AIS patients differ from non-scoliotic controls in outcomes related to body schema?
2. If so, is the scale of the difference related to the magnitude of spinal deformity?

### **Ethics approval required**

Old ethics approval format

### **Ethics approval(s)**

Ethics Sub-Committee University of Warwick Biomedical and Scientific Research, 05/01/2014, ref: REGO-2013-590

### **Study design**

Multi-centre observational study using a cross sectional case control design

### **Primary study design**

Observational

### **Study type(s)**

Other

### **Health condition(s) or problem(s) studied**

Adolescent idiopathic scoliosis (AIS).

### **Interventions**

Measurements previously collected from adolescents with AIS will be compared to age and gender matched controls to determine if there are any differences between the two groups, which may indicate alterations in body schema associated with AIS.

### **Intervention Type**

Other

### **Primary outcome(s)**

Images of the trunk/back in different orientations will be used to test laterality discrimination ability in both control and AIS participants. Laterality discrimination is the ability to identify right from left sides of the body and is measured by accuracy (% correct) and reaction time (seconds) to reach a correct decision. When viewing images of specific body parts in different positions, a correct response requires selection of left or right side, then a mental spatial transformation to confirm the choice. Accurate and timely response is dependent on an intact body representation.

### **Key secondary outcome(s)**

1. Two point discrimination (2PD). If the two points of a compass are simultaneously applied to the skin, they will normally be perceived as separate stimuli. However, below a certain threshold distance (normally measured in millimetres), this ability is lost and instead the two points will be perceived as only one stimulus. As a test of tactile spatial acuity, 2PD depends in part on the integrity of the cortical representation of the body area being tested.
2. Tactile localisation discrimination involves determining the location of stimulation. Patients are shown a picture of the back with marked locations and are then asked to report which point was stimulated. Accuracy of response depends on an intact body schema and changes in localisation ability have been reported as being associated with cortical reorganisation and symptom reduction in chronic pain conditions.
3. Proprioception using a position matching protocol. Participants will be asked to sideflex the trunk in sitting to a point in mid-range and then, once returned to the upright position, to return

to the same position where any differences will be measured.

4. Midline judgement using line bisection tests. A series of horizontal lines will be presented to the participant who will attempt to mark the centre of each one. Differences between the estimated and actual centres, along with direction, will be measured.

5. One legged standing balance. A timed test of how long subjects can maintain one leg standing without having to seek support.

6. Kinaesthetic and Proprioception Assessment Questionnaire (KPAQ). A 12 item self-report measure of proprioceptive and movement awareness (5 point likert scale).

7. Other measurement tools such as the EQ5D, a measure of self-reported function (Paediatric Outcomes Data Collection Instrument, PODCI) and demographic information will also be collected along with height, weight and puberty status.

8. Modified versions of scoliosis specific questionnaires such as the SRS-22 and the Spinal Appearance Questionnaire will be used to gain normative values and to gauge baseline characteristics compared to scoliosis cases.

**Completion date**

31/12/2015

## **Eligibility**

**Key inclusion criteria**

Adolescents (aged 10-16) with no known spinal pathology or neurological conditions

**Participant type(s)**

Healthy volunteer

**Healthy volunteers allowed**

No

**Age group**

Child

**Lower age limit**

10 years

**Upper age limit**

16 years

**Sex**

All

**Key exclusion criteria**

1. Individuals that have suffered significant back pain or other musculoskeletal conditions requiring time off school or sporting activity, or requiring treatment from a health professional in the preceding 12 months

2. Individuals with significant spinal or trunk asymmetry which may indicate the presence of scoliosis

**Date of first enrolment**

15/10/2014

**Date of final enrolment**

15/10/2015

**Locations****Countries of recruitment**

United Kingdom

England

**Study participating centre****Tudor Hall School**

Banbury

United Kingdom

OX16 9UR

**Study participating centre****Lutterworth High School**

Lutterworth

United Kingdom

LE17 4QH

**Study participating centre****Marlborough Church of England School**

Woodstock

United Kingdom

OX20 1LP

**Study participating centre****Pattison College**

Coventry

United Kingdom

CV3 1FQ

**Study participating centre****King Alfred's Academy**

Wantage

United Kingdom

OX12 9BY

**Study participating centre**  
**The Westwood Academy**  
Coventry  
United Kingdom  
CV4 8DY

**Study participating centre**  
**Lyng Hall School**  
Coventry  
United Kingdom  
CV2 3JS

**Study participating centre**  
**Kingham Hill School**  
Kingham  
Chipping Norton  
United Kingdom  
OX7 6TH

## **Sponsor information**

**Organisation**  
University of Warwick

**ROR**  
<https://ror.org/01a77tt86>

## **Funder(s)**

**Funder type**  
Government

**Funder Name**  
National Institute for Health Research

**Alternative Name(s)**  
National Institute for Health Research, NIHR Research, NIHRresearch, NIHR - National Institute for Health Research, NIHR (The National Institute for Health and Care Research), NIHR

**Funding Body Type**

Government organisation

**Funding Body Subtype**

National government

**Location**

United Kingdom

## Results and Publications

**Individual participant data (IPD) sharing plan****IPD sharing plan summary**

Not provided at time of registration

**Study outputs**

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Participant information sheet</a>	Participant information sheet	11/11/2025	11/11/2025	No	Yes