The Anterior (ATSI) and Posterior Trunk Symmetry Index (POTSI) as objective photographic measurement of posture

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Digital photography

For a 2D assessment of body shape is a valuable method to:

- document the body posture
- calculate quantitative parameters

The advantages of body posture assessment using digital photography

1. Objectivation
2. Non-invasive
3. Low cost
4. Reliability
5. Simplicity

Projections for digital photography evaluation
ATSI and POTSI as objective photographic assessment of posture

Tested parameters of posture with front projection

**Frontal plane**

**POTSI Index**

**Posterior Trunk Symmetry Index**

\[ \text{POTSI} = (\text{FAI-C7} + \text{FAI-A} + \text{FAI-T}) + (\text{HDI-S} + \text{HDI-A} + \text{HDI-T}) \]


The medio-lateral length difference at the:

- sternal notch level (FAI-C7)
- axilla level (FAI-A)
- waist level (FAI-T)

are defined as Frontal Asymmetry Index.
ATSI and POTSI as objective photographic assessment of posture
The height difference at the:
- shoulder level (HDI-S)
- axilla level (HDI-A)
- waist level (HDI-T)

are defined as Height Asymmetry Index.
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ATSI Index
Anterior Trunk Symmetry Index
ATSI = \((\text{FAI-SN} + \text{FAI-A} + \text{FAI-T}) + (\text{HDI-S} + \text{HDI-A} + \text{HDI-T})\)

The medio-lateral length difference at the:
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How ATSI parameter on the digital photos may be measured?
Advantages of the use of ATSI and POTSI Indexes

- Possibility to make a photographic measurement with the use of mobile camera with standardized conditions for photographic documentation
- Possibility of the use of a simple digital camera for photographs
- Use a tripod for good stability of digital camera

Advantages of the use of ATSI and POTSI Indexes

- Time for preparing a child for photographic measurements in two projections: front and back is about 3 minutes
- Time for one index calculating (ATSI or POTSI) is about 3 minutes

The mean ATSI value $24.3 \pm 12.7$ (n=421, aged 7-10 y)

The intra-observer error 1.07

The inter-observer error for the three observers 4.06


Advantages of the use of ATSI and POTSI Indexes

- The mean ATSI value 24.3 ± 12.7 (n=421, aged 7-10 y)
- The intra-observer error 1.07
- The inter-observer error for the three observers 6.06

Limitations of the use of ATSI and POTSI Indexes

- Lack of marker points on the body before take a photo (C7 and SN)
- Clinical usefulness of the ATSI parameter is still to be determined by undertaking studies on larger groups of healthy and scoliotic children at different ages.

Difficulties that may influence for photographic assessment:

- Protraction of the shoulders
- Head and gaze directed incorrect
- Straight position of the body
- Hair covering the body contours

Difficulties that may influence for photographic assessment:

- brassiere or swimsuit with limited contact of the body and obscuring the trunk
- incorrect feet setting
- one-leg standing
- limited communication with child
- no leveling of digital camera

Advantages of ATSI and POTSI Indexes

- Objectivization
- Non-invasive
- Low cost
- Reliability
- Simplicity
Advantages of ATSI and POTSI Indexes

- Calculation of quantitative parameters (the actual results) and possibility to show the quantitative results for patient's parents
- Compilation of medio-lateral height differences and length differences between left and right side of the trunk

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Thank you for attention