Healthy children have a significantly increased skin score assessed with the modified Rodnan skin score

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Objectives. The modified Rodnan skin score (MRSS) is used as a primary outcome measure in most therapeutic trials in systemic sclerosis (SSc) in adults. Before we can apply this outcome measure in trials in juvenile patients with SSc, we need to evaluate this assessment method in children without sclerodermatous skin changes, to establish values for the normal paediatric population.

Methods. To determine the MRSS in healthy paediatric population, patients of the paediatric rheumatology out-patient clinic with mechanical pain or with juvenile idiopathic arthritis at the age of 16 yr or under were assessed between 1 January and 31 March 2004. Patients with any sign of connective tissue disease or skin disorders, such as psoriasis or ectopic dermatitis, were excluded. The MRSS was determined at a standardized location and with a standardized pinching method.

Results. Two hundred and seventeen patients, including 100 females, were assessed. The mean age of the patients was 10.5 yr (2.9–16), the mean body mass index (BMI) was 18.3 (9.3–35.7), and the mean MRSS was 13.92 (range 4–25). The MRSS score showed a difference between males and females at every Tanner stage. There was a linear correlation between MRSS and body mass index independently of age and Tanner stage.

Conclusion. The mean MRSS in healthy children is 13.92 units and this range would be expected in a patient with a diffuse form of SSc. The MRSS score in children correlates with the body mass index and the Tanner stage, so it should be corrected to these parameters, according to this pilot study.

Key words: Modified Rodnan skin score, Children, Juvenile systemic sclerosis, Systemic sclerosis.
FIG. 1. Correlation of the mean body mass index (BMI) with the mean modified Rodnan skin score and age.

FIG. 2. Correlation of the mean body mass index (BMI) with the sex of the healthy controls and the mean Modified Rodnan skin score (MRSS) with the sex of healthy controls. On the y-axis is the value of BMI/MRSS; the number at the top of the column shows mean BMI or MRSS. The P value under the columns shows the difference between the female and male groups.

FIG. 3. Correlation of the Tanner stage with the mean modified Rodnan skin score for males and females. The P values under the columns show the difference between the female and male groups.
Discussion

In healthy children—those without sclerodermatous skin changes—the mean MRSS is 13.92 and this range would be expected in a patient with mild diffuse involvement of SSc. There was a significant difference in the mean MRSS score in males and females, which would reflect the lower amount of subcutaneous fat in males. The MRSS score seems to correlate to the Tanner stage. None of the single-area MRSS scores was higher than 2. In the involved areas we would also expect scores of 3, so the current application of MRSS in children would differentiate between severe sclerodermatous changes, MRSS score 3 and areas with less or no involvement. Children without SSc achieve MRSS scores of 1 and 2 because of the ‘Natural thickening of the skin’, explained by the increased subcutaneous fat tissue compared to adults [7]. The natural subcutaneous thickening of the skin seems to change with sexual maturation. This is reflected in the tendency for changes to occur with changing Tanner stage, which reflects sexual maturation; especially in the male children this seems to lead to more pronounced changes. The MRSS seems to correlate to BMI; the less impressive correlation after the age of 13 could be explained, by the smaller group of patients, who present the mean value.

In an adult-limited SSc cohort, the mean MRSS score was 6.6 ± 4.0 units and in the diffuse SSc cohort it was 19.1 ± 8.6 units [8]; in another adult cohort with diffuse SSc with a disease course shorter than 3 yr, the mean initial MRSS score was around 23 [4]. In our healthy children the mean score was 13.92, which would be a significantly increased MRSS even for an adult with SSc.

Currently, the MRSS for paediatric patients fulfils only part of the filter criteria for the Outcome Measures in Rheumatology (OMERACT) [9], such as face validity and accuracy; for the other criteria it needs more validation.

The MRSS score in children correlates with the BMI, so if MRSS is used in a paediatric trial the score should be corrected for the BMI for the same sex and age [10] and for the Tanner score, according to this pilot study. It would be reasonable to apply MRSS in a multinational approach in a cross-sectional juvenile SSc cohort to establish the validity of the MRSS after a training session for the participants to decrease the intraobserver variation.

The authors have declared no conflicts of interest.

References