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TRACE2 (TRUNK AESTHETIC CLINICAL EVALUATION, VERSION 2). THE NEW RASCH-COMPATIBLE SCALE TO ENHANCE AESTHETIC EVALUATION IN CLINICAL PRACTICE AND RESEARCH

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Background

The SOSORT Consensus identified aesthetic improvement as a primary goal of rehabilitation treatment for adolescents with idiopathic scoliosis (AIS); severe aesthetic compromise is also considered an indication for surgery. The Trunk Aesthetic Clinical Evaluation (TRACE) is an easy-to-use clinical tool for assessing symmetry as a proxy of the aesthetic of patients with IS during everyday practice. However, Rasch analysis, a gold-standard psychometric approach for instrument development, indicated suboptimal reliability, most likely attributable to the limited number of items.

Study Design

Mixed-methods with Delphi consensus and cross-sectional Rasch validation.

Objective (s)

To develop a new version of TRACE by increasing the number of items using the Rasch model framework, thereby improving the sensitivity and specificity of the rating scale.

Methods

Phase 1 involved experts from a tertiary scoliosis centre who participated in a Delphi process to generate and refine candidate items. Round 1 produced an extensive item pool. Round 2 retained items that met a 4-point cut-off on a 5-point Likert scale for appropriateness, utility, and assessability, yielding the first consensus on the TRACE2 draft. Inter-rater reliability was evaluated using standardised patient photographs (n=20), informing a second consensus and a revised draft, which was subsequently tested on a larger photographic sample (n=250). Rasch analysis guided item reduction, scale construction, and evaluation using an iterative process across two stages to derive the final TRACE2. With the Rasch analysis, we assessed category functioning, item fit, unidimensionality, differential item functioning, and measure reliability.

Results

The Delphi rounds included 5 MDs and 16 PTs (14 females), and 10 MDs and 26 PTs (21 females) experts, yielding 30 and 18 items, respectively. The TRACE2 draft was iteratively reduced through Rasch analysis from 18 to 17 items, with 13 items retained in the final version of the questionnaire. The two stages of Rasch analysis included data from 298 and 283 consecutive patients, evaluated by 2 and 19 MDs, respectively. At the first stage, we removed four items (two for multidimensionality and two for a marked misfit). The subsequent Rasch model demonstrated a satisfactory overall fit and fair reliability, enabling a 3-level distinction in deformity. Item difficulty covered 3.33 logits (−1.28 to 2.05), whereas person ability spanned 6.22 logits (−3.93 to 2.29), indicating suboptimal item–person targeting (mean person measure: −0.84 logits). The threshold structure suggested limited discrimination among non-extreme individuals with low deformities.

Conclusion(s)

TRACE2 is Rasch-consistent and can be used to analyse and compare trunk appearance across different conditions and patient populations. While TRACE2 includes 13 items instead of the previous 4, its implementation takes only a few seconds.

Clinical significance

Even if based on clinical observation, the new TRACE2 can significantly contribute to everyday clinical practice by providing an objective evaluation of trunk asymmetry in patients with scoliosis.