

The Wrinkle Severity Rating Scale

A Validation Study

Doris J. Day,¹ Curt M. Littler,² Richard W. Swift³ and Scott Gottlieb⁴

1 Department of Dermatology, New York University Medical Center, New York, New York, USA

2 SHARP Rees-Stealy Medical Group Inc., San Diego, California, USA

3 Department of Plastic Surgery, Manhattan Eye, Ear and Throat Hospital, New York, New York, USA

4 Department of Dermatology, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania, USA

Abstract

Background: Patient satisfaction is the most important outcome in facial aesthetic surgery. However, the need for evidence-based evaluation of aesthetic procedures dictates the use of more objective and quantitative measures of treatment outcome.

Objective: The present study was undertaken to validate a new clinical outcome instrument, the Wrinkle Severity Rating Scale.

Methods: Five clinical investigators were presented with 30 photographic images of the lower face and asked to rate nasolabial fold severity on each side using the 5-grade Wrinkle Severity Rating Scale (WSRS). Standardized definitions of the five grades were provided to the investigators in visual (photographic) and descriptive formats. To take into account possible facial asymmetry, nasolabial folds on the left and right sides of the face were rated separately. Assessments were conducted independently and were repeated after ≥ 2 weeks.

Results: Intra-observer (test-retest) agreement was 68.7% (left side) and 72.7% (right side); weighted kappa coefficients for the left and right sides were 0.77 and 0.81, respectively. Mean inter-observer agreement (internal consistency) was 67.7% (left side) and 72.3% (right side); weighted kappa coefficients for the left and right sides were 0.75 (95% CI 0.70–0.79) and 0.78 (95% CI 0.72–0.83), respectively.

Conclusion: The WSRS is a valid and reliable instrument for quantitative assessment of facial skin folds, with good inter- and intra-observer consistency. By allowing objective and reproducible grading of data, the WSRS should prove a useful clinical tool for assessing the effectiveness of soft-tissue augmentation and other facial contouring procedures.

Background

The most important measure of treatment outcome in facial aesthetic surgery, particularly with respect to elective procedures, is patient satisfaction. However, given the variability in patients' perceptions and desires, and the absence of an easily defined or standardized treatment goal, any assessment of postoperative outcome is necessarily subjective.^[1] The recognized need for an evidence-based approach to evaluate the effectiveness of different aesthetic procedures demands that patient-related outcome measures are complemented by more objective and quantitative methodologies.^[2]

The treatment of facial furrows, wrinkles, and folds forms a major component of aesthetic plastic surgery; however, there is no

commonly accepted classification or terminology based on anatomical or dimensional criteria, and quantification of these facial features is difficult.^[3] Objective methods based upon light microscopy or digital imaging of silicone rubber impressions of the skin surface are available for determining the severity of superficial wrinkles,^[4,6] but these techniques have been less widely applied to mimetic wrinkles (facial lines and furrows) and skin folds.^[5] A semi-quantitative method, based on photometric grading, has been developed for the assessment of fine facial wrinkles caused by cutaneous photodamage,^[7] but this instrument is not intended for the assessment of facial furrows or folds.

The introduction of injectable soft-tissue augmentation agents in facial aesthetic surgery has prompted the development of a new, photographically-based outcome instrument, the Wrinkle Severity

Rating Scale (WSRS), designed specifically for measuring nasolabial folds. The objective of the present study was to determine the validity and reliability of the WSRS as a preliminary to its use in the clinical trial setting.

Materials and Methods

Five investigators (three dermatologists, one plastic surgeon, and one ear, nose and throat specialist) involved in the conduct of a proposed clinical trial comparing non-animal stabilized hyaluronic acid with bovine collagen in the treatment of nasolabial folds participated in this prospective validation study. Each investigator was provided with an identical set of 30 photographs displaying frontal views of the lower face and asked to rate the severity of the nasolabial folds in each photograph using the 5-grade WSRS. These photographs were selected to reflect the full range of the WSRS, but were not presented in any particular order. In all cases, nasolabial folds were depicted in the neutral, rather than stretched, state. To take into account possible facial asymmetry, nasolabial folds on the left and right sides of the face were rated separately. Severity assessments were conducted independently and were repeated using the original set of photographs after an interval of ≥ 2 weeks.

Standardized definitions of the five WSRS grades (1–5) were provided in visual (photographic) format for the investigators' guidance; each WSRS grade was represented by a set of three reference photographs (a total of 15 photographs). The investigators were additionally issued with standardized verbal descriptions of the five WSRS grades.

- Grade 1 (absent): no visible nasolabial fold; continuous skin line (figure 1).



Fig. 1. Wrinkle Severity Rating Scale grade 1 (absent): no visible nasolabial fold; continuous skin line.

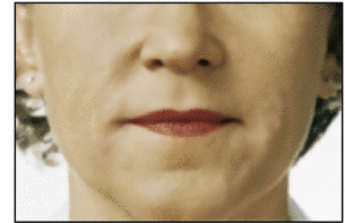


Fig. 2. Wrinkle Severity Rating Scale grade 2 (mild): shallow but visible nasolabial fold with a slight indentation; minor facial feature; implant is expected to produce a slight improvement in appearance (same patient as in figure 3 after treatment with non-animal stabilized hyaluronic acid).

- Grade 2 (mild): shallow but visible nasolabial fold with a slight indentation; minor facial feature; implant is expected to produce a slight improvement in appearance (figure 2).
- Grade 3 (moderate): moderately deep nasolabial fold; clear facial feature visible at normal appearance but not when stretched; excellent correction is expected from injectable implant (figure 3).
- Grade 4 (severe): very long and deep nasolabial fold; prominent facial feature; < 2 mm visible fold when stretched; significant improvement is expected from injectable implant (figure 4).
- Grade 5 (extreme): extremely deep and long nasolabial fold, detrimental to facial appearance; 2–4mm visible V-shaped fold when stretched; unlikely to have satisfactory correction with injectable implant alone (figure 5).



Fig. 3. Wrinkle Severity Rating Scale grade 3 (moderate): moderately deep nasolabial folds; clear facial feature visible at normal appearance but not when stretched; excellent correction is expected with injectable implant.