

Visual analog scale in prosthodontics



Visual analog scale (VAS) is a psychometric response scale that can be used in surveys or questionnaires. VAS is a tool used to measure subjective characteristics that cannot be quantified and is an ideal tool to compute perceptions. It is a straight line with categorized endpoints with extreme limits of the response to be measured. Participants report by marking a line at a position within a minute that symbolizes their perception of a particular phenomenon.^[1]

VAS can be horizontal or vertical in direction. Any length considered to be appropriate by the investigator but it is commonly presented as a 100-mm (10 cm) horizontal line on which the participants respond to the questionnaire by indicating a position between two end points of the scale. A horizontal VAS provides more uniform distribution of scores than a vertical VAS. The lines shorter than 100 mm tend to create greater error variance. The illustrative word stops should be placed as right angle to the line not beneath or over the stop. VAS is recorded in millimeters by determining the distance from one end of the scale to the mark scribed by the participant on the line.^[1-3]

VAS is simple, is reliable, and possesses high validity. VAS can be equated to other measures such as Likert scale and Borg scale, and it is proven to be superior to other linear scales used for subjective assessments. VAS evaluations are more reliable at group level than at individual level. Several changes have been made and suggested to improve VAS to make it clinically significant. The manual scoring can be time-consuming and susceptible to measurement errors.

Many modifications have been done to the original VAS scale. In addition, graphic rating scale (GRS), mechanical slider, numeric rating scale (NRS), and computer-based assessments have been used with success.^[1] The GRS divides the VAS into mild, moderate, and severe on the scale. This can be advantageous to the respondents in determining the location of his/her mark on the line in accordance to his/her perception. However, it has limitations where score distribution can get altered by the view of verbal expression stated on the line. The

mechanical slider aids respondents to directly move the scale ruler which can provide active participation of respondents, direct reading by the investigators, and better application. Numeric rating scale (NRS) in which the VAS is regulated with numbers has also been used to measure subjective experiences. The number settings support the individuals who have trouble in understanding the VAS. Computer-based assessments use computers, mobiles, and touch screens where the participants move the slider on the screen. This also provides an added benefit of obtaining results immediately when linked with the statistical software. Electronic methods are time saving and reliable. This also avoids misinterpretation especially in geriatric population.

In dentistry, VAS has been used to evaluate esthetics, complete denture satisfaction, dental anxiety, and postsurgical assessment. In more recent years, VAS has been used to record many constructs in an analysis or used as a response format to generate collective scores on a given situation. VAS does possess limitations. The VAS values cannot be ideally compared to clinical relevance. There exists a difference between patients' quotes and the reported values. Repeated use of the questionnaire on same patients produces fatigue values and the hypothesis can get influenced by the VAS results.

It is used in prosthodontics to analyze several perceptions in both clinical and experimental settings. It is widely used to evaluate patient satisfaction for treatment, denture retention, and psychological attitude.^[4,5] VAS can also be extensively used to support and validate clinical research findings in prosthodontics. An assessment as a supplementary outcome in most of the clinical prosthodontic researches, particularly in randomized clinical trials, aids in better understanding, ranking, and validation of the scale. The posttreatment assessment of patient's satisfaction on the VAS can aid clinicians to reduce perception difference between the clinician and the patient. This can also become an effective communication instrument that can help in recognizing and resolving issues between patients and dentists.

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VAS is useful in many experimental settings to quantify subjective experiences. This makes it a favorable choice for the researcher. The scale has its own limitations of construction, reproduction, instruction, and languages used to explain the patient. Understanding and continuing use can reduce these limitations.^[1,2] In prosthodontics, the investigators have to evaluate on the VAS parameters and should customize the constructs in accordance with the clinical situations. VAS created through an established validity under one context of study cannot be used for all circumstances.

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