

# Scoring systems in acne vulgaris

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## INTRODUCTION

Acne vulgaris remains one of the most common diseases afflicting humanity and it is the skin disease most commonly treated by physicians.<sup>[1]</sup> It is a disease of the pilosebaceous units, clinically characterized by seborrhea, comedones, papules, pustules, nodules and, in some cases, scarring.<sup>[2]</sup> Although easy to diagnose, the polymorphic nature of acne vulgaris and its varied extent of involvement do not permit simple evaluation of its severity. Because the acne lesions may vary in number during the natural course of the disease, various measurements have been developed, based on clinical examination and photographic documentation, to assess the clinical severity of acne vulgaris.<sup>[3]</sup> Moreover, if the acne treatment regimens produced an all-or-none response, then acne measurements would be unnecessary.<sup>[3]</sup>

### Grading versus lesion counting

Methods of measuring the severity of acne vulgaris include simple grading based on clinical examination, lesion counting, and those that require complicated instruments such as photography, fluorescent photography, polarized light photography, video microscopy and measurement of sebum production. The two commonly used measures are grading and lesion counting [Table 1].

Grading is a subjective method, which involves determining the severity of acne, based on observing the dominant lesions, evaluating the presence or absence of inflammation and estimating the extent of involvement.<sup>[3]</sup> Lesion counting involves recording the

**Table 1: Comparison between grading and lesion counting**

Grading	Lesion counting
Involves observing the dominant lesions, and estimating the extent of involvement	Involves recording the number of each type of acne lesion and determining the overall severity
Subjective method	Objective method
Simple and quick method	Time-consuming method
Less accurate	More accurate
Does not distinguish small differences in therapeutic response	Distinguishes small differences in therapeutic response
Effect of treatment on individual lesions cannot be estimated	Effect of treatment on individual lesions can be estimated
Used in offices and clinical settings	Used in clinical trials

number of each type of acne lesion and determining the overall severity.

Photography has also been used as a method of measuring acne severity. Drawbacks of this approach include the following:

1. Does not allow palpation to ascertain the depth of involvement.<sup>[3]</sup>
2. Small lesions are often not visualized.<sup>[3]</sup>
3. Maintaining constant lighting, distance between the patient and camera and developing procedure is difficult.<sup>[4]</sup>

Fluorescence and polarized light photography have some advantages over normal color photography in estimating the number of comedones and emphasizing erythema. However, the disadvantages include problems such as excessive time involvement and the need for more complicated equipment.

### Individual methods

Although acne vulgaris has plagued humankind since antiquity, the need for grading acne vulgaris was felt when the therapies available for treating acne increased in the 1950s. Probably, the first person to use a scoring system for acne vulgaris was Carmen

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Thomas of Philadelphia. She used lesion counting in her office notes, starting in the 1930s.<sup>[5]</sup> Several systems for grading the severity of acne currently exist.

In 1956, Pillsbury, Shelley and Kligman published the earliest known grading system.<sup>[3]</sup> The grading includes the following:

- Grade 1: Comedones and occasional small cysts confined to the face.
- Grade 2: Comedones with occasional pustules and small cysts confined to the face.
- Grade 3: Many comedones and small and large inflammatory papules and pustules, more extensive but confined to the face.
- Grade 4: Many comedones and deep lesions tending to coalesce and canalize, and involving the face and the upper aspects of the trunk.

In 1958, James and Tisserand in their review of acne therapy, provided an alternative grading scheme<sup>[3]</sup>

- Grade 1: Simple non-inflammatory acne - comedones and a few papules.
- Grade 2: Comedones, papules and a few pustules.
- Grade 3: Larger inflammatory papules, pustules and a few cysts; a more severe form involving the face, neck and upper portions of the trunk.
- Grade 4: More severe, with cysts becoming confluent.

The response to acne therapy could never be precisely assessed by grades of 1 to 4 and such classification systems are overly simple.<sup>[6]</sup> In 1966, Witkowski and Simons<sup>[7]</sup> initiated lesion counts for assessing the severity of acne vulgaris. Lesions were counted on one side of the face as a time-saving measure, after it was established that the number of lesions of the left side was nearly equal to those on the right.

In 1977, Michaelson, Juhlin and Vahlquist<sup>[8]</sup> counted the number of lesions on the face, chest and back. They gave a different score to each lesion type. Comedones were valued at 0.5; papules, at 1.0; pustules, at 2.0; infiltrates, at 3.0; and cysts, at 4.0. By multiplying the number of each type of lesion by its severity index and adding each product, these authors obtained a total score that represented the severity of the disease for each visit. This grading system has been criticized on the grounds that scores ascribed to lesions are non-parametric, whereas absolute counts are a parametric data and it is probably wrong to mix these two types of data.

In 1979, Cook, Centner and Michaels<sup>[9]</sup> evaluated the overall severity of acne on a 0-8 scale anchored to photographic standards that illustrate grades 0, 2, 4, 6 and 8 [Table 2]. In addition to the photographic standards, a nine-point scale for comedones, papules and macules over the face was used in conjunction for more sensitivity.

In 1984, Burke, Cunliffe and Gibson<sup>[10]</sup> presented the Leeds technique. They described two scoring systems. The first is an overall assessment of acne severity for use in routine clinic and the second, a counting system for detailed work in therapeutic trials. A scale of 0 (no acne) to 10 (the most severe) was used for grading. The groups 0 to 2 were divided into subgroups, by 0.25 divisions. Grades 0.25 to 1.5 represented patients with physiological acne or “acne minor” and those with grades of 1.5 or more have clinical acne or “acne major.”

In 1996, Lucky *et al.*,<sup>[11]</sup> assessed the reliability of acne lesion counting. Acne counts were recorded on a template divided into five facial segments: Right and left sides of the forehead, right and left cheeks and chin. The nose and the area around it were excluded. Counts of each lesion type were recorded within each segment of the template. Total lesion count, along with total inflammatory lesions and comedonal counts, were then calculated. They concluded that reliability of acne lesion counting was excellent when performed by the same trained rater over time.

In 1997, Doshi, Zaheer and Stiller<sup>[12]</sup> devised a global acne grading system (GAGS). This system divides the face, chest and back into six areas (forehead, each cheek, nose, chin and chest and back) and assigns a factor to each area on the basis of size [Table 3].

In 2008, Hayashi *et al.*,<sup>[13]</sup> used standard photographs and lesion counting to classify acne into four groups. They classified acne based on the number of inflammatory eruptions on half of the face as 0-5, “mild”; 6-20, “moderate”; 21-50, “severe”; and more than 50, “very severe.” Other grading systems used for grading acne vulgaris are summarized in the Table 4.

Acne vulgaris was graded by Indian authors,<sup>[14]</sup> using a simple grading system, which classifies acne vulgaris into four grades as follows.

- Grade 1: Comedones, occasional papules.
- Grade 2: Papules, comedones, few pustules.

**Table 2: Acne grading method by Cook *et al.*,<sup>[9]</sup> using photographic standards**

Grade	Description
0	Up to 3 small scattered comedones and/or small papules are allowed.
2	Very few pustules or 3 dozen papules and/or comedones; lesions are hardly visible from 2.5m away.
4	There are red lesions and inflammation to a significant degree; worthy of treatment.
6	Loaded with comedones, numerous pustules; lesions are easily recognized at 2.5m.
8	Conglobata, sinus or cystic type acne; covering most of the face.

**Table 3: The global acne grading system<sup>[12]</sup>**

Location	Factor
Forehead	2
Right cheek	2
Left cheek	2
Nose	1
Chin	1
Chest and upper back	3

Note: Each type of lesion is given a value depending on severity: no lesions = 0, comedones = 1, papules = 2, pustules = 3 and nodules = 4. The score for each area (Local score) is calculated using the formula: Local score = Factor × Grade (0-4). The global score is the sum of local scores, and acne severity was graded using the global score. A score of 1-18 is considered mild; 19-30, moderate; 31-38, severe; and >39, very severe

**Table 4: Other acne grading systems**

Acne grading system	Method	Anatomical area studied	Special equipment needed
Frank numerical grading system <sup>[15]</sup>	Grading from either 0-4 or 0-10 for each lesion, based on severity	Face, chest and back	None
Plewig and Kligman <sup>[16]</sup>	Comedonal and inflammatory acne were separately graded based on the number of lesions and type	Right side of the face, excluding other side, chest and back	None
Christiansen <i>et al.</i> <sup>[17]</sup>	Lesion counting done in a test area and graded with a six point scale 4 to -1	The area containing the most lesions was used as the test area	Cardboard ring having an inner diameter of 5 cm used for counting
Samuelson <sup>[18]</sup>	Requires both the patient and physician to assess the severity based on a set of reference photographs on a nine grade scale	Face, chest and back	Photography
Lucchina <i>et al.</i> <sup>[19]</sup>	Severity of comedonal acne assessed based on a four point scale using fluorescent photography	Excludes chest and back	Fluorescent photography
Phillips <i>et al.</i> <sup>[20]</sup>	Polarized light photography to assess the severity of inflammatory acne		Polarized light photography
Allen and Smith <sup>[21]</sup>	A photonumeric method-both grading using photographic standards and lesion counting done	Excludes chest and back	Photography

- Grade 3: Predominant pustules, nodules, abscesses.
- Grade 4: Mainly cysts, abscesses, widespread scarring.

## CONCLUSION

Assessment of the severity of acne vulgaris continues to be a challenge for dermatologists. No grading system has been accepted universally. An ideal grading system would

1. Be accurate and reproducible.
2. Capable of documentation for future verification.
3. Be simple to use by the clinician over serial office visits.
4. Be less time consuming.
5. Be less expensive and simple.
6. Reflect subjective criteria, i.e., psychosocial factors.

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