Postacne Scarring: A Qualitative Global Scarring Grading System

Greg J. Goodman, FACD,* and Jennifer A. Baron, MD†

BACKGROUND There is no global qualitative grading system for assessing the disease load and global severity of disease in a patient with postacne scarring.

OBJECTIVE The purpose of this article is to provide a simple qualitative grading system that would allow better communication between practitioners of a patient's global disease severity and the most appropriate corresponding therapy for that degree of acne scarring.

METHODS Four grades of postacne scarring are described, and appropriate therapeutic interventions are presented for each. Grade assignment is made by lesion morphologies and disease load as indicated by patient perception of severity (i.e., whether or not an individual can easily disguise his or her disease at social distances).

RESULTS A simple qualitative global acne scarring grading system is presented.

LIMITATIONS The determination of disease load in terms of patient perception of severity is intrinsically imperfect due to varying subjectivity among individuals.

CONCLUSION A global acne scarring grading system is presented that is simple to use and may optimize therapeutic intervention. This system would also allow investigators, educators, and proceduralists to compare their cases more accurately and to have a more objective discussion of the efficacy of operative interventions or therapies.

Greg J. Goodman, FACD, and Jennifer A. Baron, MD, have indicated no significant interest with commercial supporters.

A qualitative global acne scar grading system is different from a classification of individual scars. Its aim is to establish an index of severity of an individual's condition that may be readily acknowledged, recorded, and compared over time or at a point in time in a clinic or between different clinics. Individual scar morphology may give an indication of the inducing pathophysiology[1–4] and hint at the required treatment for that scar type[3,4] but does not describe the patient's disease load or global severity. The term disease has been defined as "any abnormal condition of the body or mind that causes discomfort, dysfunction, or distress to the person affected or those in contact with the person." Sometimes the term is used broadly to include injuries, disabilities, syndromes, symptoms, deviant behaviors, and atypical variations of structure and function, while in other contexts these may be considered distinguishable categories.[5] Certainly under this definition postacne scarring is a disease, the unfortunate patient bearing significant distress, discomfort, and often dysfunction.

Global severity scales are not novel in dermatology. Grading systems to determine disease burden have been employed for acne[6] and other dermatologic disease states.[7–9] Some of the concerns expressed when a consensus conference on acne classification held in Washington, DC, in 1990[6] met to attempt agreement on acne classification, not surprisingly perhaps, are mirrored in the issue of classifying postacne scarring. These include the pleomorphic nature of acne lesions, the variability of response to treatment of different lesions, the difficulty of

*Skin and Cancer Foundation of Victoria and Monash University Department of Community Medicine, Victoria, Australia; †Oregon Health & Science University, Portland, Oregon

 • Published by Blackwell Publishing •
ISSN: 1076-0512 • Dermatol Surg 2006;32:1458–1466 • DOI: 10.1111/j.1524-4725.2006.32354.x

TABLE 1. Grades and Examples of Postacne Scarring

Grade	*Level of disease*	*Characteristics*	*Examples of scars*
1	Macular disease	Erythematous, hyper- or hypopigmented flat marks visible to patient or observer irrespective of distance.	Erythematous, hyper- or hypopigmented flat marks
2	Mild disease	Mild atrophy or hypertrophy that may not be obvious at social distances of 50 cm or greater and may be covered adequately by makeup or the normal shadow of shaved beard hair in males or normal body hair if extrafacial.	Mild rolling, small soft papular
3	Moderate disease	Moderate atrophic or hypertrophic scarring that is obvious at social distances of 50 cm or greater and is not covered easily by makeup or the normal shadow of shaved beard hair in males or body hair if extrafacial, but is still able to be flattened by manual stretching of the skin.	More significant rolling, shallow ''box car,'' mild to moderate hypertrophic or papular scars
4	Severe disease	Severe atrophic or hypertrophic scarring that is obvious at social distances of 50 cm or greater and is not covered easily by makeup or the normal shadow of shaved beard hair in males or body hair (if extrafacial) and is not able to be flattened by manual stretching of the skin.	Punched out atrophic (deep ''box car''), ''ice pick'', bridges and tunnels, gross atrophy, dystrophic scars significant hypertrophy or keloid

lesion counting as an index of severity and the inability of photography to discriminate a three dimensional disease. All these concerns are mirrored in the difficulties in grading postacne scarring. The scars of acne are also pleomorphic, they are difficult to count, and they are equally difficult to photograph due to their three-dimensional nature. The consensus conference panel on acne felt that pattern-diagnosis, including a global evaluation of lesions, best takes into account the "total impact of the disease."[6] The concerns of this consensus conference on acne classification about the severity of disease of acne being influenced by the patient's perception is just as pertinent when looking at the patient with postacne scarring as it is with acne. Patients differ considerably in their abilities to withstand the psychological, social, and occupational effects of both acne and its consequent scarring. The panel

Figure 1. Grade 1 macular erythematous marking.

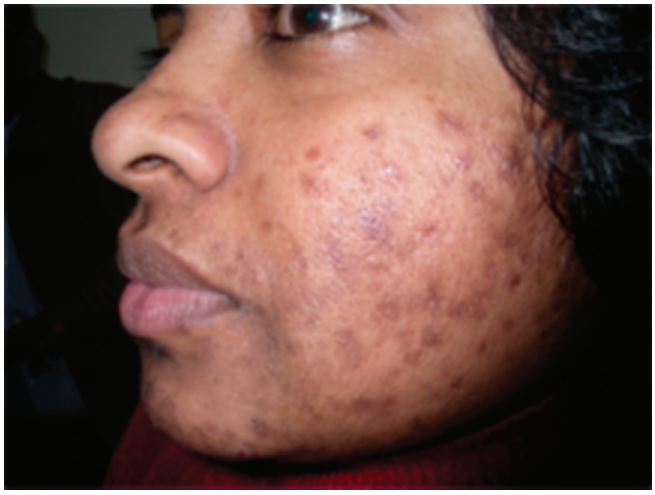

Figure 2. Grade 1 hyperpigmented marking.

felt that the variability of disease expression precluded a strictly quantitative definition of acne. Similar concerns exist for acne scarring and a qualitative approach is presented here. Certainly a panel to attempt consensus with respect to classification of acne scarring to better reflect disease load would be a worthwhile future aim.

A Global Qualitative Acne Scar Assessment

In this classification, four grades of scars will be differentiated and may be further subdivided by focal area of involvement. Elsewhere a quantitative grading system of global severity is being published (Goodman GJ, Baron JA, submitted for publication). This quantitative system describes a global scoring numerical system of acne scarring severity, both atrophic and hypertrophic, the numerical total being tallied from the number and severity of the different types of scars seen by the observer. While this is accurate and allocates a numerical score to the patient, it is somewhat cumbersome for daily use. With this in mind, a somewhat simpler method is presented here of estimated burden of disease suffered by the patient.

Figure 3. Grade 1 hypopigmented marking.

In most patients the pattern and grading will be readily apparent, but in the more severe patients often there will be a mixture of disease patterns. The usual approach adopted here will be to describe the pattern as defaulting to the more severe disease pattern. Examples may include moderate atrophic disease (Grade 3) that will often be accompanied by areas of milder atrophy (Grade 2). This patient will usually be described according to their more severe scar grading (Grade 3) omitting the milder disease. If mention needs to be made of an area with severe scarring in a general setting of milder disease, however, then the focal descriptors of severity will come into play.

Grade 1 Disease

Grade 1 disease is macular disease, and this may be erythematous or hyper- or hypopigmented (Table 1). Erythematous marks

TABLE 2. Global Acne Scarring Classification and Likely Treatment Options

Grade	*Level of disease*	*Likely treatment options*
1	Macular disease	Time, optimized home skin care, light-strength peels, microdermabrasion, vascular or pigmented lasers or intense pulsed light (IPL), excimer lasers.
2	Mild disease	Nonablative lasers, blood transfer, skin needling or rolling or fractionated photothermolysis, fractional resurfacing laser microdermabrasion, dermal fillers.
3	Moderate disease	Ablative and fractional lasers, dermabrasion, medical skin rolling, dermal fillers if focal, subcision and blood transfer. Intralesional corticosteroids steroids or fluorouracil and/or vascular laser if hypertrophic.
4	Severe disease	Punch techniques (float, excision grafting), focal trichloroacetic acid (CROSS technique) with or without resurfacing techniques. Fat transfer, occasionally rhytidectomy if grossly atrophic. Intralesional corticosteroids steroids or fluorouracil and/or vascular laser if hypertrophic.

Figure 4. Grade 2 atrophic postacne scarring in a male patient.

Figure 5. Grade 2 atrophic postacne scarring in a female patient.

Figure 6. Grade 2 papular hypertrophic scarring nose.

are often the transient angiomatous phase of wound healing and would be expected to heal either uneventfully or with the advent of atrophic or hypertrophic scarring (Figure 1). Hyperpigmented marks often represent post inflammatory changes and may settle with time (Figure 2). In contrast, hypopigmented marks often represent end points of scar healing in acne and may not improve with time (Figure 3). A patient with predominantly this type

Figure 7. Grade 3 atrophic postacne scarring in a female patient.

Figure 8. Grade 3 atrophic postacne scarring in a male patient.

Figure 9. Grade 3 hypertrophic (papular) postacne scarring chin.

of scarring may benefit from home treatment to maximize healing (for example, retinoids, topical steroids, or estrogens), from vascular or pigmented lasers and intense pulsed lights, excimer lasers, autologous epidermal grafting or suspension, low-strength peels, or microdermabrasion (Table 2). Although technically these types of macular markings are not necessarily scars, they are usually perceived by the patient as scars, and a variable amount of therapeutic intervention is often required.

Grade 2 Disease

Grade 2 disease comprises mildly atrophic or hypertrophic disease that may not be overly visible from a conversational distance of 50 cm or more (Table 1). It is disguised comfortably by cosmetic makeup or in men the shadow of normal shaved facial skin or body hair if extrafacial. Patients are often more critical than their practitioners, however, and will often wish not to have to continue wearing makeup or be troubled by its appearance in the mirror or under tangential or vertical lighting. Examples of this scarring include mild rolling atrophic-type scars and mild papular scars (Table 1). Rolling scars are gently undulating distensible scarring (Figures 4 and 5) while papular acne scars are small soft papules most often on the nose or cheeks (Figure 6). Treatment may include any of nonablative lasers,[10,11] blood transfer,[12] skin needling or

Figure 10. Grade 4 atrophic postacne scarring.

Figure 11. Grade 4 atrophic postacne scarring in a female patient.

Figure 12. Grade 4 hypertrophic postacne scarring.

rolling,[13] microdermabrasion,[14] and dermal augmentation agents[15] (Table 2) or fine wire diathermy to papular scars.[4]

Grade 3 Disease

Grade 3 disease denotes moderate acne scarring with significant contour abnormality. This scarring is obvious at normal social distance and is not easily covered by makeup or the normal shadow of shaved beard hair or body hair if extrafacial, but is still able to be stretched out and flattened by manual stretching of the skin (Table 1). Examples (Table 1) include rolling distensible scars and undulations, shallow "box car" scars (Figures 7 and 8), and mild to moderate hypertrophic and papular scars (Figure 9). This category may require local treatment such as skin needling,[13] subcision,[16] or blood transfer[12] alone or in combination with each other or with resurfacing procedures for widespread moderate atrophic disease. Tissue augmenting agents, either temporary or long term, may be offered if atrophic disease is more localized. Intralesional corticosteroids or cytotoxic agents[17] or vascular lasers for hypertrophic disease or light cautery or diathermy to papular scars[4] may be treatments of choice for these scar types (Table 2).

Grade 4 Disease

Grade 4 disease represents the most severe scarring. This scarring

TABLE 3. Global Acne Scarring Classification by Area of Involvement and Major Scar Type

			Number of cosmetic units involved	
Grade	*Grade description*	*Subgroup description*	*A, focal, 1 cosmetic unit*	*B, discrete, 2–3 cosmetic units*
1	Macular disease	Erythematous	1A	1B
		Hyperpigmented	1A	1B
		Hypopigmented	1A	1B
2	Mild disease	Atrophic	2A	2B
		Hypertrophic	2A	2B
3	Moderate disease	Atrophic	3A	3B
		Hypertrophic	3A	3B
4	Severe disease	Atrophic	4A	4B
		Hypertrophic	4A	4B

Figure 13. Grade 4 focal (4A) hypertrophic scar.

Figure 14. Grade 4 focal (4A) hypertrophic and atrophic acne scarring.

is obvious at social distances greater than 50 cm, is not covered easily by makeup or the normal shadow of shaved beard hair in males or body hair if extrafacial, and is not able to be flattened by manual stretching of the skin (Table 1). This type of scarring (Table 1) includes all deep atrophic and nondistensible scars ("ice pick" and deep "box car" scars), bridges and tunnels, dystrophic scars (Figures 10 and 11), and more severe cases of hypertrophic and keloid scars (Figure 12). This spectrum of the disease requires one to be imaginative since this type of scarring does not improve well with standard resurfacing or tissue augmentation techniques. Punch techniques such as punch excision,[18] grafting,[19] and elevation or float techniques[20] and focal trichloroacetic acid[21] may be required for the "ice pick" and deep "box car"–type scars and fat transfer[22,23] for deeply atrophic zones. Intralesional corticosteroids and cytotoxics again are the mainstay for keloid and hypertrophic scars.

Figure 15. Grade 1 focal (1A) postacne marking chest.

Descriptions for Focal Disease Patterns

Sometimes a patient has localized disease or predominant severity in one part of his or her face or body, although this problem is usually a facial one. It may thus be useful to be able to describe this pattern as focal disease as it may be treated differently than more generalized disease. If there was a general predominant scar type with a region having a more severe or different type, a scar grading system should also be able to describe this.

A single cosmetic unit of involvement (focal disease) could be designated "A," and two to three cosmetic units of involvement (discrete disease) may be given a "B" rating (Table 3). It could justifiably be argued that involvement of three or more cosmetic units would normally be viewed as a generalized disease pattern and revert back to the previous description of generalized disease severity.

Hence if a patient had predominant disease in different areas, for example, focal disease (one cosmetic unit) of pigmented macular marks on the forehead but severe atrophy of two regions (e.g., both cheeks) with a background of mild atrophic acne scarring elsewhere, then we could designate this patient as general Grade 2 atrophic scarring with Grade 4B atrophic scarring on cheeks and hyperpigmented Grade 1 disease on the forehead. Although this may be an extreme example it would allow this system to be robust with unusual scarring patterns.

Similarly, extrafacial disease could be dealt with in a similar fashion. If a patient had hypopigmented scarring on the chest and severe keloidal scarring on the back and moderate atrophic scarring on his or her neck, then these could be described exactly as that, that is, hypopigmented Grade 1 scarring on the chest, Grade 4 keloidal scarring on the back, and Grade 3 atrophic scarring on the neck.

Patient examples using this focal classification system are shown in Figures 13 through 15.

Summary

A qualitative global acne scarring system is presented in an effort to facilitate the relatively simple grading of a patient with postacne scarring and allow the rational description of that patient. This description may allow better communication of disease severity between practitioners and give a lead to the most appropriate treatments for that disease severity.

References

1. Goodman GJ. Post acne scarring: a review of its pathophysiology and treatment. Dermatol Surg 2000;26:857–71.
2. Goodman GJ. Post-acne scarring: a short review of its pathophysiology. Aust J Derm 2001;42:84–90.
3. Jacob CI, Dover JS, Kaminer MS. Acne scarring: a classification system and review of treatment options. J Am Acad Dermatol 2001;45:109–17.
4. Kadunc BV, Trindade De Almeida AR. Surgical treatment of facial acne scars based on morphologic classification: a Brazilian experience. Dermatol Surg 2003;29:1200–9.
5. Wikipedia [homepage on the Internet]. Herndon (VA): Wikipedia; c2006. Disease; [about 2 screens]. Available from: http://en.wikipedia.org/wiki/Disease
6. Pochi PE, Shalita AR, Strauss JS, et al. Report of the Consensus Conference on Acne Classification. Washington, D.C.,

March 24 and 25, 1990. J Am Acad Dermatol 1991;24:495–500.

7. Carlin CS, Feldman SR, Krueger JG, Menter A, Krueger GG. A 50% reduction in the Psoriasis Area and Severity Index (PASI 50) is a clinically significant endpoint in the assessment of psoriasis. J Am Acad Dermatol 2004;50:859–66.
8. Wilkin J, Dahl M, Detmar M, et al. Standard grading system for rosacea. report of the National Rosacea Society Expert Committee on the classification and staging of rosacea. J Am Acad Dermatol 2004;50: 907–12.
9. Glogau RG. Aesthetic and anatomic analysis of the aging skin. Semin Cutan Med Surg 1996;15:134–8.
10. Tanzi EL, Alster TS. Comparison of a 1450-nm diode laser and a 1320-nm Nd: YAG laser in the treatment of atrophic facial scars: a prospective clinical and histologic study. Dermatol Surg 2004;30:152–7.
11. Patel N, Clement M. Selective nonablative treatment of acne scarring with 585 nm flashlamp pulsed dye laser. Dermatol Surg 2002;28:942–5.
12. Goodman GJ. Blood transfer: the use of autologous blood as a chromophore and tissue augmentation agent. Dermatol Surg 2001;27:857–62.
13. Camirand A, Doucet J. Needle dermabrasion. Aesthetic Plast Surg 1997;21:48–51.
14. Tsai RY, Wang CN, Chan HL. Aluminium oxide crystal microdermabrasion. A new technique for treating facial scarring. Dermatol Surg 1995;21: 539–42.
15. Stegman SJ, Tromovitch TA. Implantation of collagen for depressed scars. J Dermatol Surg Oncol 1980;6:450–3.
16. Orentreich DS, Orentreich N. Subcutaneous incisionless (subcision) surgery for the correction of depressed scars and wrinkles. Dermatol Surg 1995;21: 543–9.
17. Fitzpatrick RE. Treatment of inflamed hypertrophic scars using intralesional 5-FU. Dermatol Surg 1999;25:224–32.
18. Gravelink JM, White VR. Concurrent use of laser skin resurfacing and punch excision in the treatment of facial acne scarring. Dermatol Surg 1998;24:527–30.
19. Johnson W. Treatment of pitted scars: punch transplant technique. J Dermatol Surg Oncol 1986;12:260.
20. Orentreich N, Durr NP. Rehabilitation of acne scarring. Dermatol Clin 1983;1:405–13.
21. Lee JB, Chung WG, Kwahck H, Lee KH. Focal treatment of acne scars with trichloroacetic acid: chemical reconstruction of skin scars method. Dermatol Surg 2002;28:1017–21.
22. Goodman GJ. Autologous fat transfer and dermal grafting for the correction of facial scars. In: Harahap M, editor. Surgical techniques for cutaneous scar revision. New York: Marcel Dekker, 2000:p. 311–349.

Address correspondence and reprint requests to: Greg J Goodman, FACD, Department of Community Medicine, Skin and Cancer Foundation of Victoria and Monash University, 8th Floor, 443 Toorak Road, Toorak 3142, Victoria, Australia, e-mail: greg@greggoodman.com.au.