

# A Comparison of Two Scoring Methods in Atopic Dermatitis

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**Background:** Scoring of atopic dermatitis has been a rather controversial issue in recent years, with scoring systems of varying complexity being advocated by different investigators.

**Objective:** It was the aim of this study to compare two of the most commonly used scoring methods in a clinical setting.

**Methods:** Fifty-eight patients diagnosed as having atopic dermatitis were evaluated using the Rajka & Langeland grade and the SCORAD, and the two scoring systems were compared with respect to the presence or absence of clinical and laboratory parameters of atopic dermatitis.

**Results:** The patients were composed of 22 males and 36 females, with an average age of 7.1 years. The average Rajka & Langeland grade was 6.1 (maximum, 9) and the SCORAD, 42.6 (maximum, 103). In both systems, the majority of the patients belonged to the moderate group; however, there was a relatively poor agreement between the two scoring systems in the assessment of overall severity of atopic dermatitis ( $\kappa = 0.267$ ). The SCORAD was better correlated with the clinical and laboratory parameters, such as associated diseases, family history, smoking of the mother, contact with animal and high IgE level.

**Conclusion:** The two scoring systems cannot be used interchangeably. The Rajka & Langeland grade is more ideal for quick, large surveys, and the SCORAD, for drug-effect studies or follow-up of progression of the disease. The SCORAD is the more useful system in relation to other clinical and laboratory aspects of atopic dermatitis.

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**Key Words :** Scoring, Atopic dermatitis, Rajka & Langeland grading, SCORAD

Since assessment methods for atopic dermatitis (AD) are not standardized and therapeutic studies are difficult to interpret, several severity "score" systems have been developed by different authors, none of which has been internationally approved as the gold standard. It was the purpose of this study to compare two of the most commonly used scoring

methods in a clinical setting and to determine the more ideal scoring method.

## MATERIALS & METHODS

We compared the Rajka & Langeland grade<sup>1</sup> and the SCORAD index<sup>2</sup>, with respect to the presence or absence of associated diseases, family history, smoking of the mother, contact with animals, high IgE level ( $>200$  IU/ml) and high eosinophil count ( $>500/\text{mm}^3$ ), in 58 patients diagnosed as having atopic dermatitis at Ewha Womans University Tongdaemun Hospital from May, 1998 to April, 1999. In all patients, the diagnosis of AD was established according to the criteria of Hanifin and Rajka<sup>3</sup>. The patients were scored indepen-

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dently by two dermatologists, and the average of the two scores was taken for each method.

The Rajka & Langeland grade is a score summation of extent (by "rule of nine"), course (via history), and intensity (disturbance of night's sleep by itching), each parameter being calculated as 1, 2, or 3 (maximum score, 9). The score is summarized as mild (3-4), moderate (4.5-7.5), or severe (8-9). SCORAD (maximum score, 103) is a mathematically derived index combining extent (A; maximum, 100), intensity of lesions (B; maximum, 18), and subjective symptoms including pruritus and sleep loss (C; maximum, 20), that is,  $SCORAD = A/5 + 7B/2 + C$ . More recently, the European Task Force on Atopic Dermatitis proposed that on the SCORAD grading scale, *objective items only* should be used, i.e., extent and intensity; the total objective SCORAD score ( $A/5 + 7B/2$ ) has a 0 to 83-point scale<sup>4</sup>. On 2 baseline measurements at a minimum interval of 2 weeks, the mean objective score <15 is defined as mild AD, 15-40 as moderate AD, and higher than 40 as severe AD. Accordingly, we assessed the severity grade of AD in our series us-

ing the two methods. Data were analyzed using SPSS 8.0 for Windows, and the level of statistical significance was determined at  $p < 0.05$ . Agreement between the two scoring systems in the assessment of overall AD severity was calculated by Cohen's kappa. The maximum value of kappa is 1; the closer to 1, the better the agreement.

## RESULTS

Among a total of 58 patients with ages ranging from 1 to 30 years (average age, 7.1 years), 22 (37.9%) were male and 36 (62.1%), female. Six patients (10.3%) had associated diseases, 4 of which had asthma and 2 had allergic rhinitis. Family history of atopy was found in 28 (48.3%) of the patients. The most frequently affected family member was the father (9; 32.1%), followed by the mother (8; 28.6%) and sister (4; 14.3%). Both parents were affected in 2 patients. Diseases of affected family members were AD (18; 64.3%), allergic rhinitis (7; 25.0%), and both AD and allergic rhinitis (3; 10.7%). Smoking of the mother during pregnancy was documented in 2 (3.4%) patients, and contact with animals, in 16 (27.6%). Among the animals, dogs comprised the majority (13; 81.3%). The average total serum IgE level (measured in 51 patients) was 660.4 IU/ml (normal; 0-200), and eosinophil count (measured in 49 patients), 441.4/mm<sup>3</sup> (normal; 50-500). The average Rajka & Langeland grade was 6.1, and the SCORAD index, 42.6. In the SCORAD, the extent of areas involved averaged 26.4, the intensity of lesions,

**Table 1.** Score summation using the two methods

	Rajka & Langeland grade	Objective SCORAD
mild	10 (17.2%)	1 (1.7%)
moderate	36 (62.1%)	42 (72.4%)
severe	12 (20.7%)	15 (25.9%)
total	58 (100.0%)	58 (100.0%)

**Table 2.** Comparison of two scoring methods for AD

	Rajka & Langeland grade	SCORAD index (A; B; C)*
Associated disease(+)	7.3 (p=0.046)	58.5 (50.3; 10.5; 11.7) (p=0.008, A; p=0.01, B; p=0.044)
" (-)	5.9	40.8 (23.6; 7.7; 9.1)
Family history(+)	6.3 (p>0.05)	44.7 (26.2; 8.2; 10.7) (C; p=0.039)
" (-)	5.8	40.7 (26.5; 7.8; 8.1)
Smoking of mother(+)	7.0 (p=0.000)	52.3 (40.0; 8.5; 14.5) (C; p=0.000)
" (-)	6.0	42.3 (25.9; 8.0; 9.2)
Contact with animal(+)	6.4 (p>0.05)	43.6 (37.6; 7.6; 9.6) (A; p=0.028)
" (-)	5.9	42.3 (22.1; 8.2; 9.3)
High IgE(+)	6.6 (p>0.05)	49.4 (31.7; 8.9; 11.9) (p=0.029, C; p=0.007)
" (-)	5.9	39.1 (25.9; 7.4; 8.2)
High eosinophil count(+)	6.3 (p>0.05)	44.1 (29.1; 7.9; 10.6) (p>0.05)
" (-)	6.1	42.0 (28.4; 7.8; 8.9)

\* A, extent of areas involved; B, intensity of lesions; C, subjective symptoms.

8.0, and the subjective symptoms, 9.3. The mean objective SCORAD was 33.3.

Score summation using the two different methods of scoring AD are shown in Table 1. Both methods gave the same order of frequency, the majority of the patients belonging to the moderate group, followed by severe and mild groups; however, the objective SCORAD showed a general tendency to shift towards higher severity. The measurement of agreement between the two scoring systems in the assessment of overall AD severity revealed kappa to be 0.267 ( $p=0.006$ ), which means relatively poor agreement.

Comparison of the two scoring systems is summarized in Table 2. When the associated diseases were present, both scoring systems showed significantly higher values, but the SCORAD had a higher level of significance ( $p=0.008$ ). With positive family history, only the subjective symptom scale of the SCORAD was significantly higher, 10.7 versus 8.1 ( $p=0.039$ ). Smoking of the mother lead to significantly higher Rajka grade ( $p=0.000$ ) and the subjective symptom scale of the SCORAD ( $p=0.000$ ). When contact with animals was present, only the extent scale of the SCORAD was significantly higher ( $p=0.028$ ). With high IgE level, the SCORAD was significantly higher ( $p=0.029$ ), especially the subjective symptom scale ( $p=0.007$ ). High eosinophil count did not show any significant difference in either of the scoring systems.

## DISCUSSION

There are two aspects of grading the disease activity in AD. The first one is the distinction between patients with mild, moderate or severe disease activity, i.e., categorizing patients for clinical records. The second one concerns the recording of variations of disease activity, e.g., during a clinical trial of a new drug. The Rajka & Langeland method is a simple criteria appropriate for the first aspect, enabling one to assess the severity of AD on the basis of a single consultation, and not taking more than a few minutes<sup>1</sup>. The SCORAD is more ideal for the second aspect; however, it is more elaborate and has higher interobserver variations. In particular, the severity of subjective symptoms is a cause of large variations which may be useful during the follow-up of individual patients but which may cause confusion in multicenter trials for in-

clusion criteria. Thus, the authors of the SCORAD proposed to use objective criteria only to define patients as having mild, moderate or severe AD. The cumulative index SCORAD as initially defined could be used to evaluate patients once the objective criteria for severity have been used for inclusion in clinical studies and could remain the major endpoint study parameter<sup>4</sup>.

A previous study comparing 3 scoring systems, e.g., the SSS (simple scoring system), the SCORAD and the BCSS (basic clinical scoring system), found poor correlation among them in assessing the overall severity of AD, thus concluding that those 3 systems could not be used interchangeably<sup>5</sup>. Our results also show a poor agreement between the two systems in assessing the overall severity of AD. Thus, it appears that each scoring system has its own application in clinical practice and research. When only a rough estimation of the severity of AD is needed, as in long-term follow-up studies on the development of allergic symptoms or for use in large surveys, a more limited scoring system such as the Rajka & Langeland grade, would suffice. Because AD is a chronically relapsing disease, wide variation of the disease state at the time of follow-up is possible. A simple, rapid, and reproducible scoring system such as the Rajka & Langeland grade may be sufficient for this purpose. However, for detection of subtle modifications in the severity of AD, as in drug-effect studies, or for follow-up of the progression of AD, a more elaborate system, such as the SCORAD is more appropriate. The most ideal method must be chosen according to the purpose of the study. One should be aware of significant interobserver variation in the assessment of isolated intensity items such as scales, excoriations, edema/papulation, and erythema, when using the more elaborate systems<sup>5</sup>. Therefore, for research purposes, it is advisable to have these scores assessed by a single observer as much as possible.

Our data showed that the objective symptoms, such as the extent and intensity, of AD are significantly more severe when associated diseases are present, that extent of areas involved are larger when a history of contact with animals is present, and that subjective symptoms of pruritus and sleep loss are more severe with positive family history of AD, smoking of the mother during pregnancy and high IgE level. The overall prognosis of AD has been difficult to gauge from the literature as there is

a lack of long-term follow-up studies based outside the hospital setting. Poor prognostic features include severe widespread disease, a family history of AD, and a personal history of asthma or hayfever<sup>6</sup>. Our results show that the SCORAD correlates well with the natural history of AD, being significantly higher in patients with the above poor prognostic features. Although elevated serum IgE level is considered to be a marker of atopic dermatitis, in recent studies, different investigators did not find any link between serum IgE level and disease activity in AD nor any significant change in IgE level after treatment<sup>7,8</sup>. Our results reveal that serum IgE level may generally be used as a marker of the overall severity of AD at the initial visit, especially the symptom scale; however, follow-up IgE level after treatment of AD should be assessed in the future in our series along with the follow-up SCORAD, to draw any conclusions about their correlation.

Our results show that the SCORAD index is the more readily applicable and useful scoring system in relation to other clinical and laboratory parameters of AD, but further validation is needed. In all studies performed to date on the SCORAD, the most difficult items to score were lichenification and evaluation of the surface extent<sup>2,4,9,10</sup>; thus, training of the scoring dermatologists, preferably using a training atlas, is crucial in obtaining more reliable and reproducible scores.

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