



Universiteit
Leiden
The Netherlands

Targeted treatment in early rheumatoid arthritis

Klarenbeek, N.B.

Citation

Klarenbeek, N. B. (2013, March 21). *Targeted treatment in early rheumatoid arthritis*. Retrieved from <https://hdl.handle.net/1887/20644>

Version: Corrected Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/20644>

Note: To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/20644> holds various files of this Leiden University dissertation.

Author: Klarenbeek, Naomi Bertine

Title: Targeted treatment in early rheumatoid arthritis

Issue Date: 2013-03-21

CHAPTER 11

A comparison between the simplified erosion and narrowing score and the Sharp-van der Heijde score

A post hoc analysis from the BeSt study

N.B. Klarenbeek, M. Güler-Yüksel, D.M.F.M. van der Heijde, P.J.S.M. Kerstens,
C. Mallee, M.L. Westedt, T.W.J. Huizinga, B.A.C. Dijkmans and C.F. Allaart

Ann Rheum Dis 2011; 70: 714-716



The Sharp-van der Heijde method (SHS; range 0-448)¹ is an often used and well-validated method to assess joint damage on x-rays in rheumatoid arthritis (RA). It is a comprehensive method that requires training, making it less feasible for clinical practice. The simplified erosion and narrowing score (SENS, range 0-86)² scores the same joints as SHS, but without grading of damage per joint, making it quicker and easier to learn. Using SENS takes 7 minutes for seven sets of radiographs, compared with 25 minutes for seven sets using SHS.²

In earlier studies, SENS showed good reliability and responsiveness, but these studies either had no restrictions in disease duration or limited patient numbers.²⁻⁴ We aimed to compare the properties of SENS and SHS in a large group of early, intensively treated RA patients with limited joint damage during 5 years of follow-up in the BeSt (Behandel Strategieën [Treatment Strategies]) study. Details of the study have been described earlier⁵.

Annual radiographs of hands and feet in years 0-5 were scored in one session per patient in random time sequence using SHS by two independent readers blinded for patient identity. Per reader, the SENS was derived from the SHS.

In total, 2595 sets of radiographs were present from 498 patients (mean 5.2 sets per patient). Median (IQR)/mean(SD) SHS and SENS at baseline were 3.0 (0.5-9.5)/7.1 (10.2) and 2.0 (0.5-5.5)/3.8 (4.7), respectively. Mean SHS progression in year 1-5, respectively, was 3.4, 1.5, 1.1, 1.5, 1.6; mean SENS progression was 1.7, 0.6, 0.4, 0.5, 0.6.

The reliability of SENS was comparable to SHS with moderate to high between-reader intra-class correlation coefficients (ICCs). Between-reader ICCs for total SHS and SENS varied between 0.74 and 0.93 for both methods. For progression from baseline, between-reader ICCs varied between 0.90 and 0.95 without differences between the methods and was stable over time.

SENS had lower absolute progression scores than SHS, as expected inherent to the scale (figure 1). In most patients, positive SHS change scores were accompanied with positive SENS change scores. However, the figures illustrate that in patients with large SHS progression the amount of SENS progression is highly variable.

Percentages with progression ≥ 1 unit were higher for SHS than for SENS (tables 1 and 2). Sensitivity varied between 69 and 89%, and specificity was high (94-99%). Comparable results were observed for progression $\geq$ the smallest detectable change. In year 1 (delta 0-1) and 5 (delta 4-5), 11% and 27%, respectively, of patients with SHS progression ≥ 1 units had no progression with SENS. This implies that in these patients damage progression occurs in already damaged joints but does not coincide with the development of damage in previously unaffected joints, in line with Bruynestein, et al.⁶ By disregarding grading of damage, the discriminative capacity of SENS is lower. Since differentiation in clinical trials and for example genetics studies, is often based on a minority of patients with joint damage progression, we believe that for research the benefit of time efficiency does not compensate the lower discriminative power of SENS. In daily practice, it may be an acceptable alternative to the SHS.

A limitation might be that we derived SENS from SHS. For comparing reproducibility of SENS and SHS this study design is not ideal. However, this design is appropriate for

TABLE 1 Responsiveness. Progression percentages at different time intervals for progression ≥ 1 unit using SENS and SHS, percentages of discordant observations and sensitivity and specificity using SHS as gold standard.

	% progression ≥ 1 units		% discordance: progression ≥ 1 units		Sensitivity	Specificity
	% ≥ 1 SHS	% ≥ 1 SENS	SHS + SENS -	SHS - SENS +		
Delta 1-0	42% (185/439)	39% (169/439)	11% (20/185)	2% (4/169)	89%	98%
Delta 2-1	34% (139/414)	30% (125/414)	17% (24/139)	8% (10/125)	83%	94%
Delta 3-2	30% (118/398)	22% (88/398)	31% (37/118)	8% (7/88)	69%	98%
Delta 4-3	35% (136/394)	28% (110/394)	22% (30/136)	4% (4/110)	78%	98%
Delta 5-4	32% (113/357)	24% (86/357)	27% (30/113)	4% (3/86)	73%	99%

SENS, simplified erosion and narrowing score; SHS, Sharp-van der Heijde score. Values are percentages (n/n).

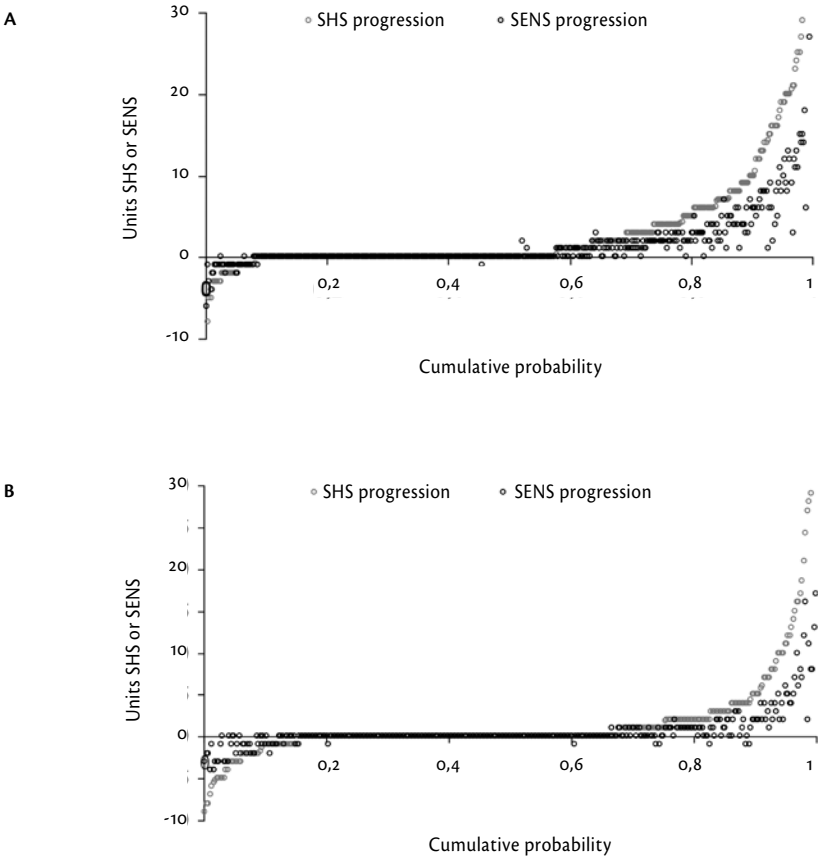


FIGURE 1 Cumulative probability plots showing Sharp-van der Heijde score (SHS) progression with corresponding simplified erosion and narrowing score (SENS) progression of reader 1 in year 1 (delta 0-1) (A) and year 5 (delta 4-5) (B). Reader 2 showed comparable results (data not shown).

TABLE 2 Responsiveness: progression percentages at different time intervals for progression ≥ the smallest detectable change using SENS and SHS, percentages of discordant observations and sensitivity and specificity using SHS as gold standard.

	SDC (% of maximum score)*		% progression ≥ SDC		% discordance: progression ≥SDC		Sensitivity	Specificity
	SHS	SENS	SHS	SENS	SHS + SENS -	SHS - SENS +		
delta 1-0	5.9 (2.5)	2.8 (4.4)	20% (86/439)	20% (86/439)	14% (12/86)	14% (12/86)	86%	97%
delta 2-1	5.5 (2.3)	2.4 (3.8)	9% (37/414)	10% (40/414)	16% (6/37)	23% (9/40)	84%	98%
delta 3-2	4.4 (1.8)	2.1 (3.2)	11% (44/398)	7% (29/398)	39% (17/44)	7% (2/29)	61%	99%
delta 4-3	5.4 (2.3)	2.5 (3.9)	10% (40/394)	8% (32/394)	30% (12/40)	13% (4/32)	70%	99%
delta 5-4	6.3 (2.7)	2.5 (4.0)	9% (31/357)	8% (29/357)	19% (6/31)	14% (4/29)	81%	99%

SDC, smallest detectable change; SENS, simplified erosion and narrowing score; SHS, Sharp-van der Heijde score. Values are percentages (n/n), except for SDC.
*SDC (values in parentheses are percentage of maximum score of SHS and SENS in the study, that is 236 and 64 for SHS and SENS, respectively)

comparing responsiveness of SENS and SHS, which was the main focus of our analysis. Furthermore, earlier research showed that the concordance between SENS scored separately versus SENS derived from SHS was high (93.8% complete agreement)³. In summary, SENS is a valuable tool in clinical practice due to its time efficiency. However, we do not recommend SENS for research, because it is less sensitive, and by disregarding grading of damage per joint the discriminative power will be lower.

REFERENCES

1

van der Heijde DM, van Riel PL, Nuver-Zwart IH, et al. Effects of hydroxychloroquine and sulphasalazine on progression of joint damage in rheumatoid arthritis. *Lancet* 1989;1:1036-8.

2

van der Heijde DM, Dankert T, Nieman F, et al. Reliability and sensitivity to change of a simplification of the Sharp/van der Heijde radiological assessment in rheumatoid arthritis. *Rheumatology (Oxford)* 1999;38:941-7.

3

Guillemin F, Billot L, Boini S, et al. Reproducibility and sensitivity to change of 5 methods for scoring hand radiographic damage in patients with rheumatoid arthritis. *J Rheumatol* 2005;32:778-86.

4

Dias EM, Lukas C, Landewe R, et al. Reliability and sensitivity to change of the Simple Erosion Narrowing Score compared with the Sharp-van der Heijde method for scoring radiographs in rheumatoid arthritis. *Ann Rheum Dis* 2008;67:375-9.

5

Goekoop-Ruiterman YP, de Vries-Bouwstra JK, Allaart CF, et al. Clinical and radiographic outcomes of four different treatment strategies in patients with early rheumatoid arthritis (the BeSt study): a randomized, controlled trial. *Arthritis Rheum* 2005;52:3381-90.

6

Bruynesteyn K, van der Heijde DM, Boers M, et al. Contribution of progression of erosive damage in previously eroded joints in early rheumatoid arthritis trials: COBRA trial as an example. *Arthritis Rheum* 2002;47:532-6.