Japan Scar Workshop (JSW) Scar Scale (JSS) for Assessing Keloids and Hypertrophic Scars

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15.1 Background

The Vancouver scar scale [1], the Manchester scar scale [2], and the Patient and Observer Scar Assessment Scale (POSAS) [3] are all very well-known scar evaluation methods. These tools are based on a number of scar variables, including color, height, and pliability. However, since all were mainly developed to evaluate burn scars, they are difficult to use in clinical practice for keloids and hypertrophic scars. This is because these pathological scars require both differential diagnosis and a way to evaluate their response to therapy. Since the Japan Scar Workshop (JSW) was established in 2006, it has sought to develop a scar assessment scale that meets these clinical needs. The first version of this scar assessment tool was named the JSW scar scale (JSS), and it was reported in 2011 [4]. In 2015, the revised second version was reported (■ Table 15.1 and ■ Figs. 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, and 15.7) [5]. This chapter introduces the JSS and discusses its clinical importance and usefulness in scar research.

15.2 JSW Scar Scale (JSS) 2015

The JSS consists of two tables. One is a scar classification table that is used to determine whether the scar is a normal mature scar, a hypertrophic scar, or a keloid. This grading system helps the user to select the most appropriate treatment method for the scar. The other table in the JSS is an evaluation table that is used to judge the response to treatment and for follow-up. Both tables contain sample images of each subjective keloid/hypertrophic scar item that allow the user to evaluate each item without hesitation (■ Figs. 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, and 15.7). Japanese guidelines for the prevention and treatment of keloids and hypertrophic scars [6] include JSS 2015.

15.3 Classification Table

The classification table consists of two parts: risk factors and the present symptoms. The risk factors consists of six items, each of which has 2–3 categories: (1) human race (African, Other, Caucasian), (2) whether there is a familial tendency (Clearly exists, Does not clearly exist), (3) the number of scars (Multiple, Solitary), (4) the body region the scar is on (Anterior chest/scapular-shoulder/suprapubic, Other), (5) the age at onset (0–30, 31–60, ≥60 years), and (6) the cause(s) (Unknown/minute, Specific type of wounding such as surgery). The present symptoms also consist of six items, each of which has 2–3 categories: (7) scar size

(>20 cm², <20 cm²), (8) whether there is vertical growth (Clearly exists, Does not clearly exist), (9) whether there is horizontal growth (Clearly exists, Does not clearly exist), (10) the shape of the scar (Characteristic shape, Others), (11) whether there is erythema around the scar (Clearly exists, Does not clearly exist), and (12) whether there are subjective symptoms (Always exist, Intermittent, None). Thus, the classification table consists of 12 items in total. The categories in each item are weighted: for example, in Human race, African, Caucasian, and Other races are weighted 2, 0, and 1 points, respectively. The minimum and maximum number of points in the classification table are 0 and 25, respectively. If the classification score is 0–5, the scar is deemed to have mature scar characteristics. If the score is 6–15 or 16–25, the scar is deemed to be a hypertrophic scar and a keloid, respectively.

This grading system is thus used to differentially diagnose keloid and hypertrophic scars. It is necessary to have this system because there are many cases in which the scar bears the growth and histological features of both hypertrophic scars and keloids; as a result, it can be difficult to differentially diagnose these scars in real clinical practice. This reality is not mirrored by the current dogma about pathological scars. Thus, many classical textbooks consider keloids and hypertrophic scars to be completely different types of scar. Clinicians define hypertrophic scars as scars that do not grow beyond the boundaries of the original wound, whereas keloids are defined as scars that spread into the surrounding normal skin. Pathologists have their own definitions; they make a histological distinction between keloids and hypertrophic scars on the basis of thick eosinophilic (hyalinizing) collagen bundles called “keloidal collagen”: these are present in the former scar type but rarer in the latter. However, we have observed many cases that do not fit these dichotomic definitions. For example, scars with hypertrophic growth characteristics can bear considerable keloidal collagen. Indeed, it is possible that hypertrophic scars and keloids are manifestations of the same fibroproliferative skin disorder and just differ in the intensity and duration of inflammation. These inflammatory features may be shaped by genetic, systemic, and local risk factors [7].

15.4 Evaluation Table

The evaluation table consists of six items: (1) Induration, (2) Elevation, (3) Redness of the scar, (4) Erythema around the scar, (5) Spontaneous and pressing pain, and (6) Itch. Each item has four intensity categories, namely, None, Weak, Mild, and Strong. These categories are weighted 0, 1, 2, and 3, respectively. There are sample

Table 15.1 JSW Scar Scale (JSS) 2015 (Classification and Evaluation of Keloids and Hypertrophic Scars)

Classification (for grading and selection of appropriate treatment methods)			Evaluation (for judging treatment results and for following-up)			
Risk factors			1. Induration			
1. Human race	Africans	2	0: None	1: Weak	2: Mild	3: Strong
	Others	1				
	Caucasians	0	2. Elevation (■ Fig. 15.5)			
2. Familial tendency	Clearly exists	1	0: None	1: Weak	2: Mild	3: Strong
	Not clearly	0				
3. Number	Multiple	2	3. Redness of scars (■ Fig. 15.6)			
	Solitary	0	0: None	1: Weak	2: Mild	3: Strong
4. Region	Anterior chest, scapular-shoulder, suprapubic	2				
	Others	0	4. Erythema around scars (■ Fig. 15.7)			
5. Age at onset	0–30 y/o	2	0: None	1: Weak	2: Mild	3: Strong
	31–60 y/o	1				
	60 y/o	0	5. Spontaneous and pressing pain			
6. Causes	Unknown or minute	3	0: None	1: Weak	2: Mild	3: Strong
	Specific wound type such as surgery	0				
Present symptoms			6. Itch			
7. Size (cm ²)	Over 20 cm ²	1	0: None	1: Weak	2: Mild	3: Strong
	Under 20 cm ²	0				
8. Vertical growth (elevation) (■ Fig. 15.1)	Clearly exists	2	Total 0–18			
	Not clearly	0	Remarks			
9. Horizontal growth (■ Fig. 15.2)	Clearly exists	3	Weak: symptoms exist in less than 1/3 of the area, or are intermittently			
	Not clearly	0	Strong: symptoms exist in the entire region, or are continuous			
10. Shape (■ Fig. 15.3)	Characteristic shape	3	Mild: between weak and strong			
	Others	0				
11. Erythema around scars (■ Fig. 15.4)	Clearly present	2				
	Not present	0				
12. Subjective symptoms	Always exist	2				
	Intermittent	1				
	None	0				
Total 0–25						
Remarks						
0–5	Character like matured scars (intractability, low risk)					
6–1	Character like hypertrophic scars (intractability, middle risk)					
16–25	Character like keloids (intractability, high risk)

■ Fig. 15.1 Vertical growth (elevation)

images of each category in each item that helps the user judge the items. The minimum and maximum total points in the evaluation table are thus 0 and 18, respectively. When the symptoms improve, the total score decreases.

also used in a study in Taiwan [9]. However, in our experience, different regions of the world vary in terms of the severity of keloids and hypertrophic scars: in particular, keloids appear to be singularly severe in Africa and East-South Asia, while being rare in western countries. Therefore, in the future, the JSS2015 should be modified to cover other regions of the world.

15.5 Clinical Suitability and Usefulness of the JSS

We evaluated the clinical suitability of the classification table of JSS2015 with 50 consecutive scar patients in our clinic. The scores of the patients were evenly distributed between 0 and 25 points (■ Fig. 15.8). This distribution closely reflects our subjective experiences in our scar clinic and those of other Japanese plastic surgeons. As a result, the JSS became a standard classification and evaluation tool for keloid and hypertrophic scars in Japan. The JSS has since been used to evaluate scar severity in several clinical research projects [8–10]. It was

15.6 Conclusion

The Japan Scar Workshop (JSW) developed the JSW scar scale (JSS) to evaluate keloids and hypertrophic scars. The JSS consists of two tables; one is a scar classification table that is used to determine whether the scar is a normal mature scar, a hypertrophic scar, or a keloid, and the other table is an evaluation table that is used to judge the response to treatment and for follow-up. The JSS became a standard classification and evaluation tool for keloid and hypertrophic scars in Japan. In the future, the JSS5 should be modified to cover other regions of the world.

■ Fig. 15.2 Horizontal growth

■ Fig. 15.3 Shape

■ Fig. 15.4 Erythema around scars

■ Fig. 15.5 Elevation

■ Fig. 15.6 Redness of scars

■ Fig. 15.7 Erythema around scars

Fig. 15.8 Clinical suitability of the classification table of JSS2015 in consecutive scar patients. We evaluated the clinical suitability of the classification table of JSS2015 by applying it to 50 consecutive scar patients in our clinic. The scores of the patients were evenly distributed between 0 and 25 points. This reflects our general clinical experience

Take-Home Messages

- The Vancouver scar scale, the Manchester scar scale, and the Patient and Observer Scar Assessment Scale (POSAS) were mainly developed to evaluate burn scars.
- The Japan Scar Workshop (JSW) developed the JSW scar scale (JSS) to evaluate keloids and hypertrophic scars.
- The JSS consists of two tables; one is a scar classification table that is used to determine whether the scar is a normal mature scar, a hypertrophic scar, or a keloid, and the other table is an evaluation table that is used to judge the response to treatment and for follow-up.
- The JSS contains sample images of each subjective keloid/hypertrophic scar item that allow the user to evaluate each item without hesitation.

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