Moisture Response Films Versus the Starch Iodine Test for the Detection of Palmar Hyperhidrosis

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Background

Primary hyperhidrosis presents with excessive sweating in specific locations.[1] **Palmar hyperhidrosis** can lead to severe emotional and psychological distress as well as social isolation, and it can have a significant negative impact on the affected individual's quality of life.[5] Many methods for diagnosing hyperhidrosis are currently available. **The Hyperhidrosis Disease Severity Scale (HDSS)**[6] is designed to subjectively evaluate the impact of sweating on everyday life. The scale has 4 grades, with Grade 1 indicating that the sweating is never noticeable and never interferes with daily activities, whereas Grade 4 indicates that the sweating is intolerable and always interferes with daily activities. **The starch iodine test (SIT)**[5,7,8] is currently the gold-standard objective diagnostic test owing to its direct correlation with the Dermatology Life Quality Index after botulinum toxin (BTX) treatment[9] as well as its low cost. The SIT, however, is an inconvenient, messy, and unpredictable method, and insurance companies are reluctant to accept it as a validated method for determining eligibility of patients with hyperhidrosis to receive treatment.

The Hyperhidrosis Disease Severity Scale

My sweating is never noticeable and never interferes with my daily activities	1
My sweating is tolerable but sometimes interferes with my daily activities	2
My sweating is barely tolerable and frequently interferes with my daily activities	3
My sweating is intolerable and always interferes with my daily activities	4

Objective

The Moisture Response Film (MRF) method represents a new approach to the evaluation of volar hyperhidrosis. The test involves placing the paper on a flat surface and planting areas of interest, such as hyperhidrotic palms, onto the paper for about 20 seconds to reliably document a response. Conveniently, the results can be scanned and saved for future reference. We describe here the testing of its clinical application.

Methods

This was a prospective, open-label study. Seventeen patients diagnosed as having bilateral primary palmar hyperhidrosis were enrolled. They included 12 females and 5 males whose age range was 21 to 42 years. Included were generally healthy adult patients with severe primary palmar hyperhidrosis (HDSS 3–4). Each patient was evaluated 4 times. Sessions 2 and 4 were scheduled 1 week after Sessions 1 and 3. Sessions 2 and 3 were 1 month apart. In each pair, the 2 visits were performed one in the morning and the other in the afternoon. At the end of each pair (second and fourth visits), the **participants underwent treatment with injections of 100MIU BTX type A to 1 hand**, in a 1:4 dilution with saline and injected to the palm and fingers in a grid pattern in 1.5-cm intervals. At each of the 4 visits, the participants filled in the HDSS questionnaire separately for each hand before undergoing the SIT and MRF tests to evaluate the sweating pattern (extent and localization) of the palmar hyperhidrosis. **For the MRF evaluation**, the dried and clean hands were placed alternately for 20 seconds on the one-time application MRF film while the examiner outlined the hand with a permanent marker. Each paper was then immediately scanned with a scanning machine or a scanning mobile application and then saved for future use. **For the SIT**, an iodine solution (povidone iodine 10%) was applied to the dry and clean hands and allowed to dry for 2 minutes. After that first step, powdered starch (cornstarch) was brushed onto the surfaces and sides of the palms. Sites with sweating turned a blue–black color. The hands were scanned with the same application as the one used for the MRF evaluation.

Figure 1. Starch iodine test (SIT) vs. moisture response film (MRF) results. Notice hyperhidrosis delineation in following sessions in both the SIT (left) and MRF (right) images.

Results and Discussion

The participants' HDSS scores were compared with the raters' scores for both the MRF and SIT. An additional comparison was done between the two raters' scores of each test (MRF and SIT). For this purpose, a delta score was calculated between each HDSS value and each of the raters' scores for the different tests, as well as between the 2 raters' scores for each test**. The delta between the participants' HDSS values and both the MRF and SIT scores and between the 2 raters' scores for both the MRF and SIT tests was significantly larger than zero.** A pairwise comparison of the scores revealed a significant difference between the raters' SIT scores and between each rater's SIT score and HDSS values. **By contrast, raters' MRF scores were concordant between raters and when compared with the HDSS values**. The limitations of the MRF test include its inability to assess perspiration at the palmar creases and sides of the fingers, and possibly over the axillary areas. In addition, the films have expiration dates. Finally, the cost of the MRF is yet to be announced. The limitations of this study are its relatively small sample size and the evaluation of only one hyperhidrosis site.

Conclusion

Moisture response films are superior to the starch iodine test in both interrater reliability and reliability over time. They comprise a more efficient, convenient, and accurate test than the starch iodine test. The MRF should be considered as a potential new gold standard for the evaluation of hyperhidrosis and treatment response. Further and repeated testing on greater numbers of individuals with hyperhidrosis is required to verify these findings and support that recommendation.

References

1. Fujimoto T. Pathophysiology and treatment of hyperhidrosis. Perspiration Res 2016;51:86–93.
2. Strutton DR, Kowalski JW, Glaser DA, Stang PE. US prevalence of hyperhidrosis and impact on individuals with axillary hyperhidrosis: results from a national survey. J Am Acad Dermatol 2004;51:241–8.
3. Ruan GJ, Sowmyanarayanan Thuppal MD, Sawyer JD, Seadler B, et al. Compensatory hyperhidrosis, and quality of life post sympathectomy for palmar hyperhidrosis. Am Surgeon 2019;85:438–40.
4. Cetindag IB, Boley TM, Webb KN, Hazelrigg SR. Long-term results and quality-of-life measures in the management of hyperhidrosis. Thorac Surg Clin 2008;18:217–22.
5. Maillard H, Lecouflet M. Prise en charge d'une hyperhidrose. InAnnales de Dermatologie et de V´en´er´eologie 2015;142:252–61.
6. Skroza N, Bernardini N, La Torre G, La Viola G. Correlation between dermatology life quality index and minor test and differences in their levels over time in patients with axillary hyperhidrosis treated with botulinum toxin type A. Acta Dermatovenerologica Croatica 2011; 19:10.