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Grammatical approach to describing skin lesions: framework and assessment

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Abstract

Teaching the foundation of dermatology for non-dermatologists has proven difficult, especially in a compact undergraduate medical education system. This has consequently led to insufficient preparation of non-dermatologists, including primary care residents, to identify, describe, and manage skin conditions. We present a grammatical approach for learning and describing skin lesions that will provide an early, expandable framework built from easily digestible components. From results in our own institution, we hope this tool will empower trainees of all expertise and specialties to apply their knowledge at the bedside and aid in communication and collaboration with dermatology consultants when needed.

Twenty-one first-year medical students at the University of Texas at Austin Dell Medical School voluntarily completed our learning module with a pre- and post-survey, which recorded their confidence in verbally describing common skin lesions and formulating differential diagnoses. 85.7% of respondents said the learning tool helped them better organize a description of skin findings. There was a statistically significant increase in confidence after the learning tool for describing skin lesions ($p<0.05$) and formulating a differential diagnosis ($p<0.05$).

These results suggest the grammatical approach improves the confidence of trainees by both describing skin lesions and formulating differential diagnoses based on the lesion's description.

Introduction

Preparing non-dermatologists to evaluate skin conditions has proven difficult in medical education across the world.[1-5] However, in a world with limited specialty access along with increasing utility of teledermatology, it is paramount for non-dermatologists to feel comfortable and capable of treating common dermatological conditions while knowing when to communicate a consultation.[6-8]

The first key aspect to caring for persons with skin lesions is formulating a description. Describing what we see on the skin is much more than an academic exercise; the general practice of narrating physical findings helps us to delineate and process what we see to classify our findings into categories and thus formulate differential diagnoses before treatment is prescribed. This specific analytical process is heavily used by early trainees, as detailed by cognitive load theory, and it is similarly seen in other fields of medicine.[9-11] For example, when we auscultate heart sounds, we describe what we hear, which helps us to formulate possible causes. One can decide that aortic stenosis is likely only after first describing when and where the abnormal sounds take place. Similarly, in evaluating an X-ray, we systematically describe the image first and then consider differential diagnoses. In the same way, first describing what we see on

the skin allows us to be more systematic in enhancing clinician confidence and competence when approaching skin conditions. Especially given how every skin diagnosis has a spectrum of how it presents and only rarely follows the textbook with the "classic picture".

The importance of a unifying nomenclature has been established, as evidenced by the International League of Dermatological Societies (ILDS) revised glossary for the description of cutaneous lesions.[12] According to Nast *et al.*, effective communication is central among dermatologists and those who care for patients with skin diseases. One limitation is how trainees and non-dermatologists should put this excellent knowledge to effective use. Giesey *et al.* recognized this area of need by creating a digital toolkit for internal medicine and family medicine residents, which helped them describe, evaluate, recognize, and manage common dermatological conditions.[13] However, as elucidated by the need for increased dermatological exposure in undergraduate medical education and preparation before residency, we believe a simple, systematic, and expandable framework should be explored early on to equip trainees and clinicians with the ability to describe and analyze skin lesions.[1,10]

We present a grammatical algorithmic learning module that breaks down the process of describing skin lesions into easily digestible components. Additionally, we share results from applying this learning algorithm with first-year medical students. We hope this tool will empower trainees and clinicians to better apply their knowledge at the bedside and aid in communication with consultants. By prioritizing grammatical terms, we hope to alleviate some of the confusion and trepidation that surrounds descriptions of skin abnormalities.

All lesions or eruptions begin with a primary lesion(s). Our algorithm starts with choosing a noun for this. Then, we describe the noun (or nouns) with multiple adjectives, add arrangements, and lastly, distribution. This lets us paint a picture with words of what we are seeing. Only then can we begin the process of formulating reasonable explanations. This will also prove useful when one needs to describe this picture to a consultant and serves to more accurately document in the medical record what the patient's condition looks like.[14] Our hope is to empower the non-dermatologist by using terms that will help communicate and categorize skin disease just as we do with other organ systems. The learning module can be accessed in *Appendix 1*. Figures 1 and 2 demonstrate examples.

Materials and Methods

Our research qualified for exempt status through the Institutional Review Board at the University of Texas at Austin (HRP-UT902). We utilized the Qualtrics interface to collect responses from voluntary first-year medical students at The University of Texas at Austin Dell Medical School. A preliminary

survey was administered, then our learning module and a post-survey followed. The preliminary survey collected demographic information, level of training, and prior dermatology experience. Both the preliminary survey and post-survey measured confidence in verbally describing skin lesions, confidence in formulating a differential diagnosis and provided step-by-step walkthroughs describing skin lesions by noun, adjective, arrangement, and distribution before selecting a final diagnosis. The skin lesions assessed in both the pre- and post-survey included the following: herpes simplex virus, tinea corporis, cutaneous vasculitis, keloid, and basal cell carcinoma.

Results

A total of 21 first-year medical students completed the study. 87.5% of respondents said the learning module helped them better organize a description of skin findings. As detailed in Table 1, there was a statistically significant increase in confidence in describing skin lesions ($p<0.05$), with notable movement of participants to the somewhat and moderately confident groups. Additionally, there was a statistically significant increase in confidence in formulating a list of differential diagnoses ($p<0.05$), with notable movement of participants to the slightly and somewhat confident groups.

Discussion and Conclusions

These results suggest the grammatical approach improves trainees' confidence in describing skin lesions and formulating differential diagnoses based on the lesion's description. There was a larger shift in confidence in describing skin lesions compared to formulating a differential diagnosis. For confidence in describing lesions, the data showed an average increase from 1.6 to 2.8 (Δ+1.2) after the module. For confidence in formulating a list of differential diagnoses, the data showed an average increase from 1.4 to 2.2 (Δ+0.8) after the module.

Limitations in this study included the possible use of outside resources, as the range of time for survey and module completion spanned from 8 minutes to 169 minutes. Our study methodology also opened avenues for potential maturation and cognitive biases. In addition, the sample size was fairly limited and represented a single institution. Future directions could explore the tool's effectiveness in different populations, such as medical students in clerkships and primary care physicians, with a more robust evaluation of impacts on diagnostic accuracy over time and consultation practices. For example, we have found electronic consults often overlook distribution in both descriptions and images, which introduces an opening for optimization.

In summary, instead of relying solely upon rote memorization of classical presentations of skin diseases, we believe that breaking down the process of describing abnormalities of the skin will help improve communication and foster the process of arriving at a category of skin disease and differential. As evidenced by the tool's success in building confidence among first-year medical students, we hope to empower trainees and clinicians to foster the knowledge necessary to describe, identify, treat, and refer skin conditions as needed. Our tool was crafted to provide a framework for systematically approaching and communicating lesions, and it requires both continuing education and practice to hone analytical skills and diagnostic expertise over one's journey. We hope this algorithm, accompanied by the attached figures, with practice, will help to demystify the process and create a renewed interest in the fascinating world of skin disease.

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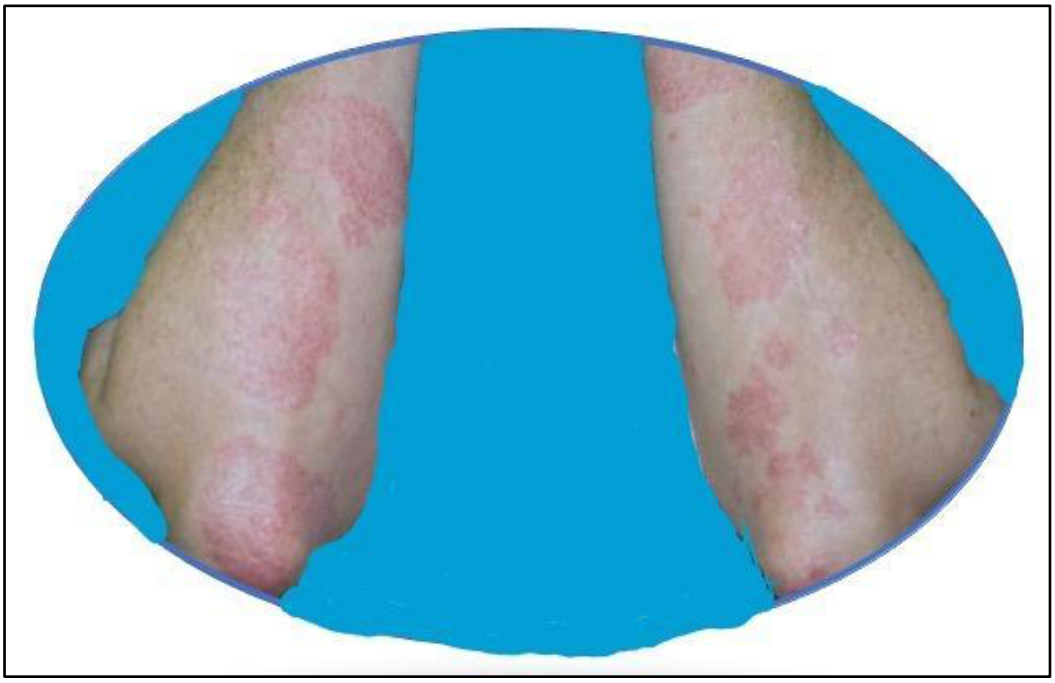
Figure 1. Rash on the arms. The patient presents with multiple scattered, pink, thin, scaly, circular, well-demarcated plaques that are symmetric and distributed over the bilateral extensor forearms. This is a diagnosis of plaque psoriasis.



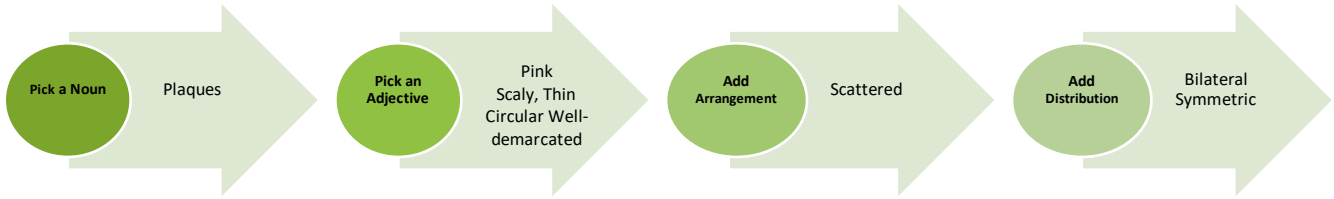


Figure 2. Lesion on the lower lip. The patient presents with grouped vesicles with surrounding erythema localized to the left lateral lower lip. Lesions are unilateral. This is a diagnosis of herpes simplex virus.

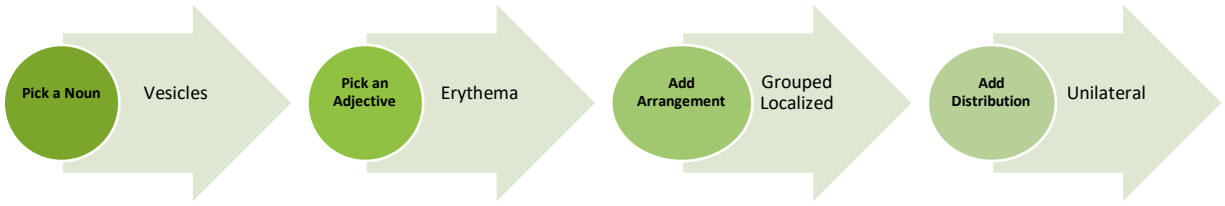


Table 1. Mean confidence for participants pre- and post-survey on a 5-point Likert Scale.

	First-year medical students (n=21)		
	Pre-survey participant confidence	**Post-survey participant confidence**	**P-value**
Q: How confident do you feel verbally describing the appearance of skin lesions?	1.6	2.8	<0.05
Q: How confident do you feel formulating a differential diagnosis for a skin lesion?	1.4	2.2	<0.05
5-Point Likert Scale Measures: 1: not at all confident; 2: slightly confident; 3: somewhat confident; 4: moderately confident; 5: very confident.			

Online Supplementary Material:

Appendix 1. *Learning materials offered to survey participants.*