

DermaMan: Scoring dermatology in your palm

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ABSTRACT

Personal Digital Assistants (PDAs) have become a part of everyday life. DermaMan is a freely available, Java-based, dermatology-specific calculator for handheld devices. It includes modules to compute PASI, MASI, SCORAD, and for calculations related to topical PUVA and Botox® administration.

Key Words: DermaMan, PDA, Software

INTRODUCTION

Personal Digital Assistants (PDA) and applications running on PDAs have been assisting clinicians in several ways for almost three decades.^[1] As processing power and storage become more inexpensive day-by-day, these devices are becoming ubiquitous and soon, these devices will be right next to the hand-lens on a dermatologist's desk. A variety of software solutions are available for PDAs ranging from reference books, calculators, and other utility applications.^[2]

Although several clinical calculators are available, an Internet search failed to unearth any dermatology-specific software except DermTools.^[3] This motivated me to devise a simple application to bring basic dermatology-related calculations to handheld devices. As most handheld devices and mobile phones support Java, Java was chosen as the programming platform to ensure maximum portability.

MODULES

For ease of use, the software was split up into several modules. The individual modules are described below.

PUVAMan

Topical psoralen with ultraviolet A (PUVA) administration

is possible in several ways like Bath water PUVA, Turban PUVA^[4], Shower PUVA^[5] and Foil bath PUVA.^[6] The amount of water used to dilute psoralen varies making it difficult to calculate the amount of psoralen to be added to achieve the desired concentration. This desired concentration may be 0.033–0.33 mg/L for trimethylpsoralen^[7] and 0.5–5 mg/L for 8-methoxypsoralen with a linear correlation of concentration with photosensitivity.^[8] Another source of variability is the varying concentration of psoralen from different manufactures that also makes standardization difficult. PUVAMan calculates the amount of psoralen lotion to be added to a given quantity of water to achieve the desired concentration. 'Bathing time' has been proposed as a major factor,^[9] but has still not been standardized.

PASIMan

Although PASI fails to measure the patient's perception of well being and quality of life, it still remains the standard for psoriasis severity assessment in the majority of clinical studies. The formula for calculation of PASI^[10] is:

$$\text{PASI} = 0.1 (\text{Eh} + \text{Ih} + \text{Dh}) \text{Ah} + 0.2 (\text{Eu} + \text{Iu} + \text{Du}) \text{Au} + 0.3 (\text{Et} + \text{It} + \text{Dt}) \text{At} + 0.4 (\text{El} + \text{Il} + \text{Dl}) \text{Al}$$

where h, u, t, and l stand for sites of affliction (head, upper limb, trunk and lower limb) E, I, and D represent erythema, induration and desquamation, respectively.

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This module makes the computation of PASI effortless and uncomplicated.

SCORAD

This is the most frequently used scoring system developed by the European Task Force on atopic dermatitis for the measurement of its severity.^[11] This composite score can be calculated with this module and standardizes the assessment of atopic dermatitis and helps in the interpretation of therapeutic studies.

MASIMan

MASIMan computes the Melasma area severity index (MASI) which is frequently used for the assessment of melasma.^[12] The sum of the severity grades for darkness (D) and homogeneity (H) is multiplied by the numerical value of the areas (A) involved and by the percentages of the four facial areas (10–30%) as per the formula:^[13]

Forehead 0.3 (D+H) A + right malar 0.3 (D+H) A + left malar 0.3 (D+H) A + chin 0.1 (D+H) A

BOTMan and BOTFace

Botulinum toxin type A (Botox®) is presently used to treat a variety of disorders. However, it is commonly used in dermatology for the treatment of deep frown lines, expression lines on the forehead and crow's feet around the eyes.^[14] Botox® is supplied in a vial of 100 units and needs to be reconstituted with 0.9% sodium chloride (NaCl). The usual volume of 0.9% NaCl added is 2.5 mL to achieve a concentration of 40 U/mL. Higher concentrations make delivery of a specific dose less reliable, while solutions of lower concentrations tend to diffuse more. The Botox® injection is delivered using a sterile syringe of appropriate volume. However, the markings on the syringes may vary according to the manufacturer, making the correlation of units to the markings on the syringe confusing at times. BOTMan is a module to make this calculation easier based on the volume of the diluent used, the volume of the syringe and the markings on the syringe.

To make the injection less painful, only 3–5 injections are delivered with one syringe. BOTFace helps in planning the amount to be drawn into each syringe and has a graphical interface that aids the administration.

DOWNLOADING AND INSTALLING DermaMan

DermaMan is a freeware which can be downloaded from <http://www.gulfdocor.net/derm/dermaman.htm> if you are

accessing from a personal computer (PC) and <http://www.gulfdocor.net/mobile/derm.htm> if you are accessing from your handheld device for over-the-air installation. All modules are packaged as a single JAR^[15] file. Specific instructions for installation depend on your device and are usually available from the manufacturer's user guide. General instructions are available from the webpages mentioned above.

DermaMan will work only on handheld devices and will not work directly on your PC. If you need to run it on your PC, you need to install an emulator, which is a part of 'Sun Java Wireless Toolkit' and is available for free download from the Sun Microsystems® official website (<http://java.sun.com/products/sjwtoolkit/download.html>).

INSTRUCTIONS TO USERS

For PUVAMan and SCORAD, the necessary values can be directly entered into the respective fields. The results of the calculations will be displayed on selecting the 'Compute' menu option.

Other modules have a graphical interface and the values can be interactively fed using the arrow keys. The 'LEFT' and the 'RIGHT' arrows will shift the focus to the previous value and next value while the 'UP' arrow and the 'DOWN' arrow will increase and decrease the value respectively. Pressing the 'FIRE' button^[16] will display the results of computation. The 'FIRE' button is usually located in the center of all the arrow buttons. However, the layout of the arrow keys and the FIRE button may differ according to the device. The 'Exit' menu option is present for all modules.

PROGRAMMING DETAILS AND KNOWN ISSUES

Most calculations involve floating point manipulations for precision which is supported only by CDLC 1.1^[17] specifications. Hence, DermaMan will not run on old mobile phones that support only CDLC 1.0 even if they have the capability to run Java.

Modules with a graphical interface use the 'Canvas' class^[15] for display, which is notoriously nonportable. Hence, it may not work properly in certain new PDAs and mobile phones with different screen orientations. This problem will be addressed in later versions of the software.

CONCLUSION

Mobile devices with processing power are fast becoming

a common part of dermatologists' armamentarium. DermaMan is a freely available, Java-based, dermatology-specific calculator software which can make these devices even more useful for a dermatologist.

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