



Vitiligo Area Assessment by Manual Planimetry for Statistical Precision

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Letter to Editor

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Abstract

Vitiligo area severity index (VASI) is formulated as one of the successful tools used in dermatology to calculate the area of vitiligo which is gauged in hand units. Since the patches of vitiligo have irregular outlines with varying sizes in same patient, the accuracy of using hand units is still debated. Various methods have arrived in measuring the area of Vitiligo, but none prove precision for research purpose. Hence we extrapolate the “point-counting method” with the formula to calculate area of an irregular surface thus aiding in area calculation for statistical purpose.

Keywords: VASI; Vitiligo; Repigmentation

Sir,

Vitiligo area severity index (VASI) is formulated as one of the successful tools used in dermatology to calculate the area of Vitiligo which is gauged in hand units. Since, it is measured as the summation of all affected body sites times the hand units in percentage, and is multiplied by the percentage of residual depigmentation, it is subjected to interpersonal variations due to different sizes [1].

Formula¹

$$\text{VASI} = \Sigma (\text{all body sites}) (\text{hand units}) \times (\text{residual depigmentation})$$

Since the patches have irregular outlines with varying sizes in same patient, the accuracy of using Hand units is still debated. Hence newer tools have emerged such as the Vitiligo European Task Force (VETF), particularly to overcome the inter-subject variability [2]. Small patches that has irregular margins are difficult to measure with accuracy. Various planimetric methods have been described in texts, but none of them have a precise utilization in clinical practice.

The self-assessed VASI was studied as an improved tool compared to VASI [3]. But none of these tools has addressed the issue of measuring small patches with irregular margin. Some authors consider drawing an appropriate shape to the patch and using standard measurement. Manual planimetry has long been utilized to measure the surface of wounds [4]. This is the Manual Planimetry method using a graph paper. For the calculation purpose, we define small patches as those involving <1% body surface area which are less than a hand unit. For the calculation, we require a “graph paper” which includes grids of specific measurements. The patches of vitiligo are thus outlined using a marker and impressed over the graph paper which is chosen according to the size of majority of the patches. The impressions thus retrieved will look like the illustration below. Since the grid size gives an appropriate idea of the patch size, the judgements do not vary subjectively or on repetitive measurements unlike the hand units. The patch plotted with grid size of 1cm * 1cm is shown in the illustration upon which the area calculation is composed.

Thus by employing the formula used to calculate the area of an irregular surface, the area of small patches can be calculated with ease. The point counting method has been studied as a semi objective tool in various studies, although no formula was described in the method [5]. This is proposed in this letter as a precise utilization of point counting method for body surface area less than one hand unit.

The area of an irregular surface can be calculated using the mathematical formula,

$$A = C + \frac{1}{2} P$$

Where A- area in sq.cm

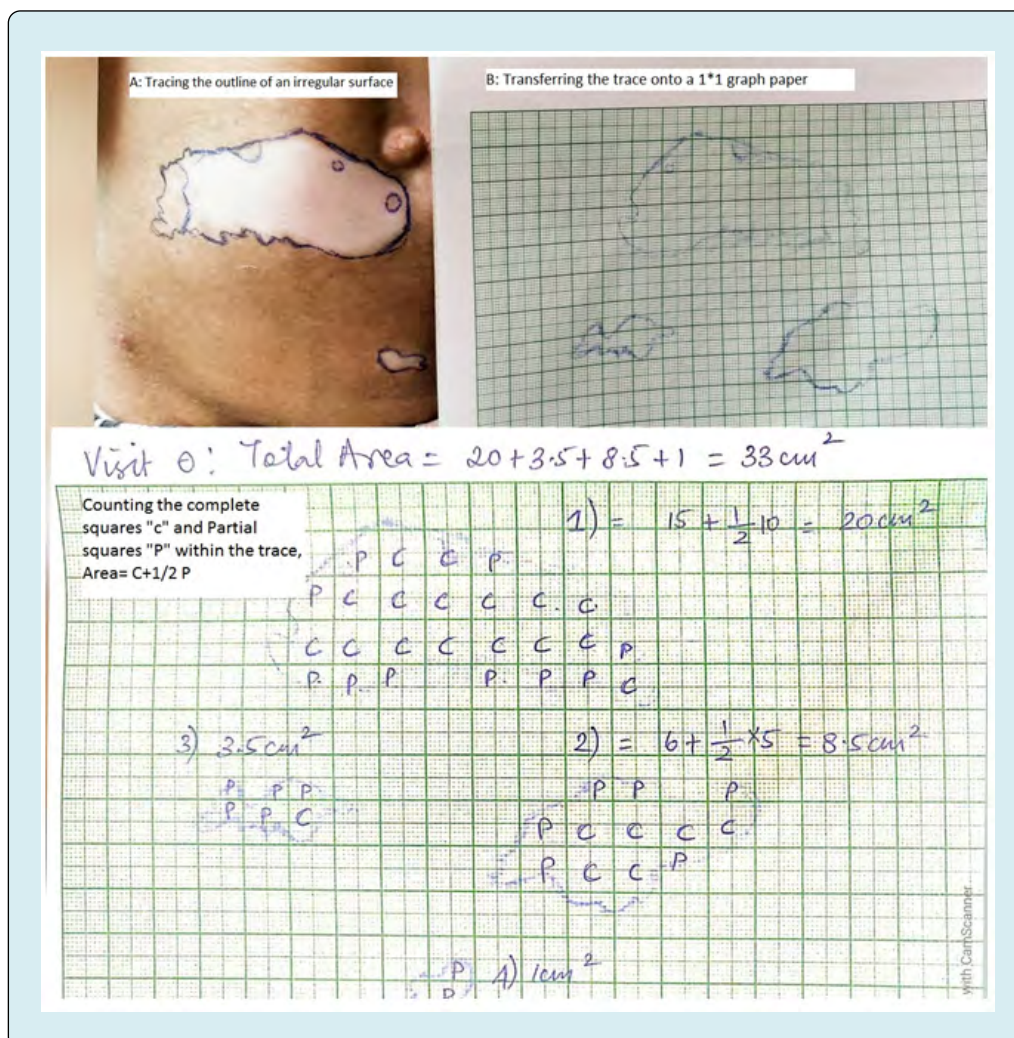
C= Number of squares with complete involvement

P= Number of squares with partial involvement

For smaller patches, grid size shall be chosen appropriately and the formula remains the same.

Grid size area is Length*Breadth, This will be 1 for 1*1 graph paper, 0.25 for 0.5 * 0.5 grids and so on. Thus Area is multiplied by the area of the grid to obtain the final area. For multiple patches, the sum of all the patches can be multiplied with the residual depigmentation to find the VASI of a small area like acral or facial vitiligo.

The formula can also be operated to follow up the patients who are on some form of therapy. Here, the assessment of repigmentation rates can be accomplished by comparing the diagrams at various intervals. The graph book shall be maintained at the vitiligo clinic as a prospective source. Thus, the mathematical derivation for the area of an irregular surface can be applied to VASI to calculate the surface areas less than a hand unit and for evaluating the progression of a given therapy. Hence, we encourage the utilization of this formula in customary practice. Hence we extrapolate the "point-counting method" with the formula to calculate area of an irregular surface thus aiding in area calculation for statistical purpose.



AREA OF IRREGULAR SURFACE CALCULATION:
 AREA= SIZE OF THE GRAPH(C+1/2P)

C → SQUARES WITH COMPLETE INVOLVEMENT
 P → SQUARES WITH PARTIAL INVOLVEMENT

Two Line Graph Paper
 2 cm major lines and 0.25 cm minor lines.

AREA OF IRREGULAR SURFACE
 CALCULATIONS ON A 2*2cm² Grid,

$(2 \times 2) \cdot [C + \frac{1}{2}P]$

$(2 \times 2) (4 + \frac{1}{2}4)$
 = 4×6
 = 24 cm^2

IRREGULAR SURFACE AREA CALCULATIONS:
 FOR 1*1 cm² grid,

$(1 \times 1) [C + \frac{1}{2}P]$

$(1 \times 1) (22 + \frac{1}{2}4)$
 = 24 cm^2

FOR GRID 0.5*0.5 → $0.25(C + \frac{1}{2}P) = 0.25(96) \rightarrow 24 \text{ cm}^2$
 FOR GRID 0.25*0.25 → $\frac{1}{16}(C + \frac{1}{2}P)$ AND SO ON.

Math-Drills.com

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