

METHODS

Equipment

PC: IBM compatible 500mhz Pentium III with 128 mb memory running under Windows 2000.

Video: SONY solid state B&W camera, 50mm lens/5mm extension, Coreco ULTRA 2 frame grabber.

Software: OPTIMAS v6.5, Microsoft EXCEL 2000, StatSoft STATISTICA 6

Lighting: Illumination is provided by a structured laser light source consisting of parallel lines projected at 45 degrees from the plane of the replica surface.

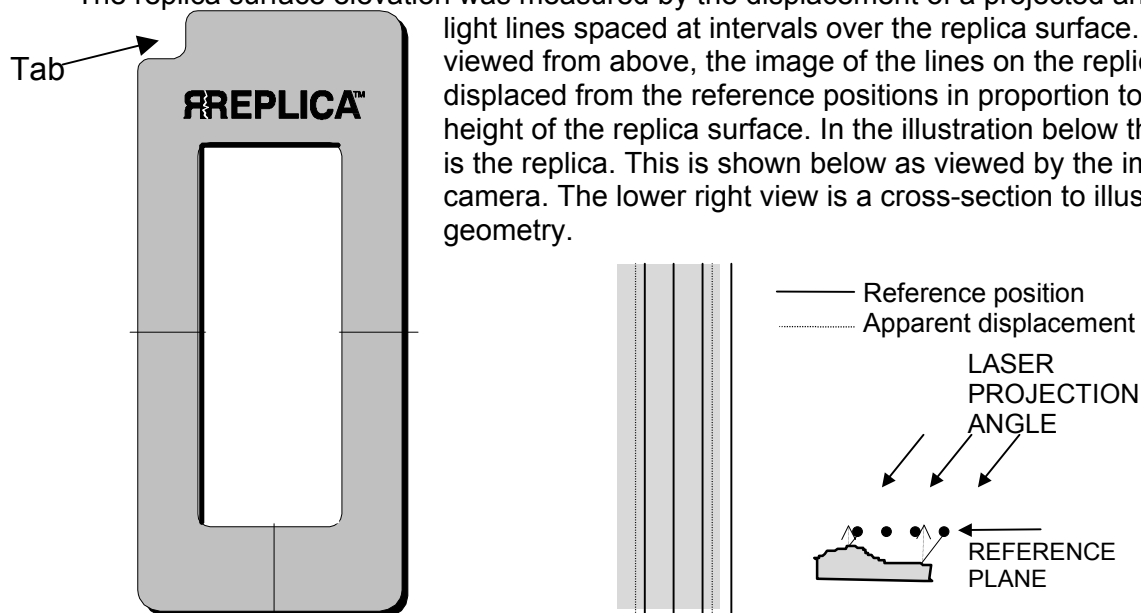
Skin Contour Replica Analysis

Replicas of the thigh surface are obtained with SILFLO silastic resin using a specialized frame to orient and support the replica on the skin. The resulting replica is 2 cm by 5 cm, with the long dimension typically corresponding the subject's body axis, tab pointing toward the head (UP).

The analysis objective is to determine the skin surface 'elevation' or contour as sampled by the replica, and then to analyze the degree of variation of the elevation over the sampled surface.

The replica surface elevation was measured by the displacement of a projected array of laser

light lines spaced at intervals over the replica surface. When viewed from above, the image of the lines on the replica appear displaced from the reference positions in proportion to the contour height of the replica surface. In the illustration below the gray object is the replica. This is shown below as viewed by the image analyzer camera. The lower right view is a cross-section to illustrate the geometry.



For simplicity, only two displaced lines are illustrated. It is a simple proof of geometry that with a 45 degree incident laser light angle, at any point the displacement to the left of the reference position will be equal to the distance between the reference plane and the replica surface at that point.

For the 2cm by 5cm replica, 5 equal spaced laser lines were projected and analyzed. The image analyzer was programmed to determine the location of each displaced projected line at 10 equal spaced locations along the length of the laser line. The displacement (difference between the positions measured for a planar reference and positions measured for the replica sample) was calculated for each of 50 sampling points. The data for each replica constitutes a 'map' of the surface elevation at 50 points on the surface. The data were recorded in a raw data file as the

spacing parameter (SP). The mean, standard deviation, maximum and minimum values of the spacing parameter were recorded in a results file.

Because the reference for the spacing parameter is a PLANAR SURFACE, there is a contribution of the overall curved shape of the replica to the spacing parameter as determined above. To minimize the contribution of the general curvature of the replica, the spacing data is fit to a hypothetical curved cylindrical surface and the **differences** between the hypothetical reference surface and the observed map elevations computed. The standard deviation of these differences called the Standard Deviation of the Residuals (RE-SD) is a measure of the **unevenness of the contour surface independent of the general curvature**. This value is recorded in the results file and constitutes the main reported datum for the replica. The RE-SD unit of measure is microns. Other data recorded in the results file are RSQ, the square of the correlation coefficient between the fitted and actual data, R-MAX and R-Min, the maximum and minimum deviations from the fitted surface, and NLARGE, the number of points falling more than a standard deviation above or below the fitted cylindrical surface. Tabulated below is a summary of the parameters and their interpretation.

SP-MEAN	Average measured spacing shift= average distance below the reference plane.
SP-SD*	Standard deviation of spacing shift= variation of the surface including overall shape contribution, smaller=smoother.
SP-MAX	Maximum distance from the reference plane.
SP-MIN	Minimum distance from the reference plane.
RSQ*	Square of the correlation coefficient between the fitted surface and the measured points, goodness of fit, larger=smoother.
RE-SD*	Standard deviation of the residuals, smaller=smoother.
RE-MAX	Maximum distance from the fitted surface.
RE-MIN	Minimum distance from the fitted surface.
NLARGE*	Count of points further than one standard deviation from the fitted surface, smaller=smoother.

* Only starred parameters are diagnostic of the unevenness of the contour. Other parameters are for checking internal data consistency.

ANALYSIS PRICING

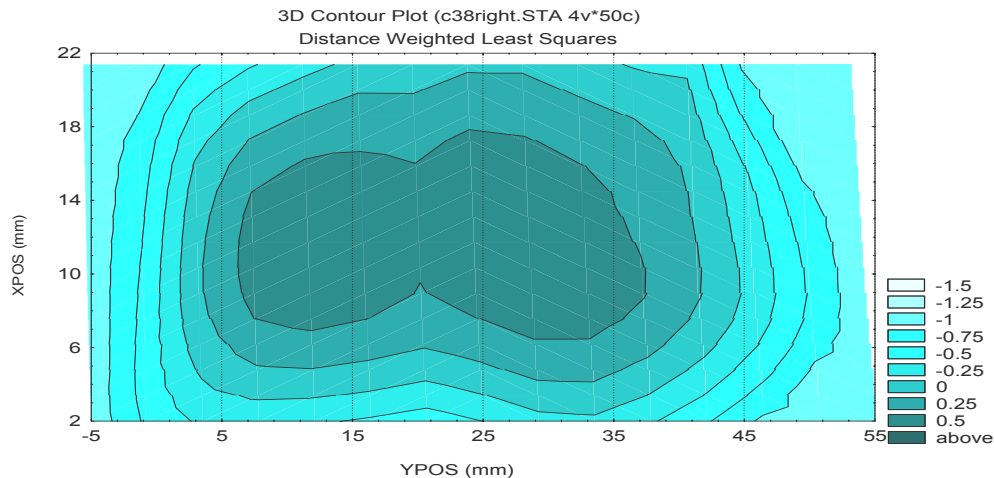
DATA ONLY: Option A-\$8.00 per replica

Option A -- Listing of data for each replica. (on request we supply IBM format diskette with data in a text file).

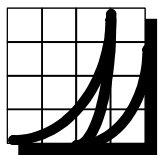
Option B – The replica image used in the analysis is not a “viewable” image. It is not saved. We will produce a catalog of contour maps (see illustration below) in a viewable format with a printout. There is an additional charge of \$200 + \$2.00 per replica for this service.

REPORT/Simple Statistics: \$500 for one grouping variable plus \$200 for each additional grouping analyzed.

Also available: PC compatible CD-ROM with all contour images, data tables and reports archived. OPTION B price + \$200.



© 2003 bioNET Incorporated, a service organization affiliated with CuDerm Corporation.



bioNET Incorporated

P.O. BOX 797686 DALLAS, TX 75379

Tel:(972)248-8095 Fax:(972)248-1094

OUR 12th YEAR SERVING SKIN MEASUREMENT NEEDS!

Home Page on the Web: www.cuderm.com/bionet/bindex.htm