3D BODY MAPPING FOR BODY SURFACE AREA CALCULATION OF SEVERELY BURNED PATIENTS

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3-Dimensional scanning improves accuracy of body surface area (BSA) calculations for greater variety of patient body types.

3-Dimensional Scanning Overview

Infrared (IR) light is projected from the Structure Scanner onto the patient as a point cloud to provide the user with a pure IR depth image. This depth image is a real-time interpretation of the structured light projection data from the sensor, which is combined with color information from the iPad's camera. A point cloud is filled in to generate a 3D model, from which BSA in meters is extrapolated.
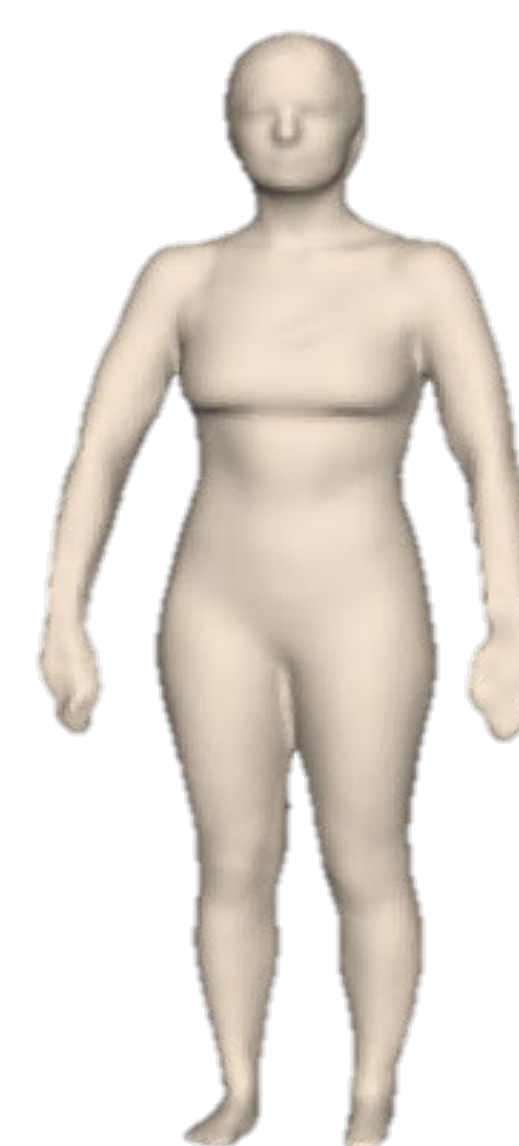

Figure 1: Structure Scanner – iPad attachment.
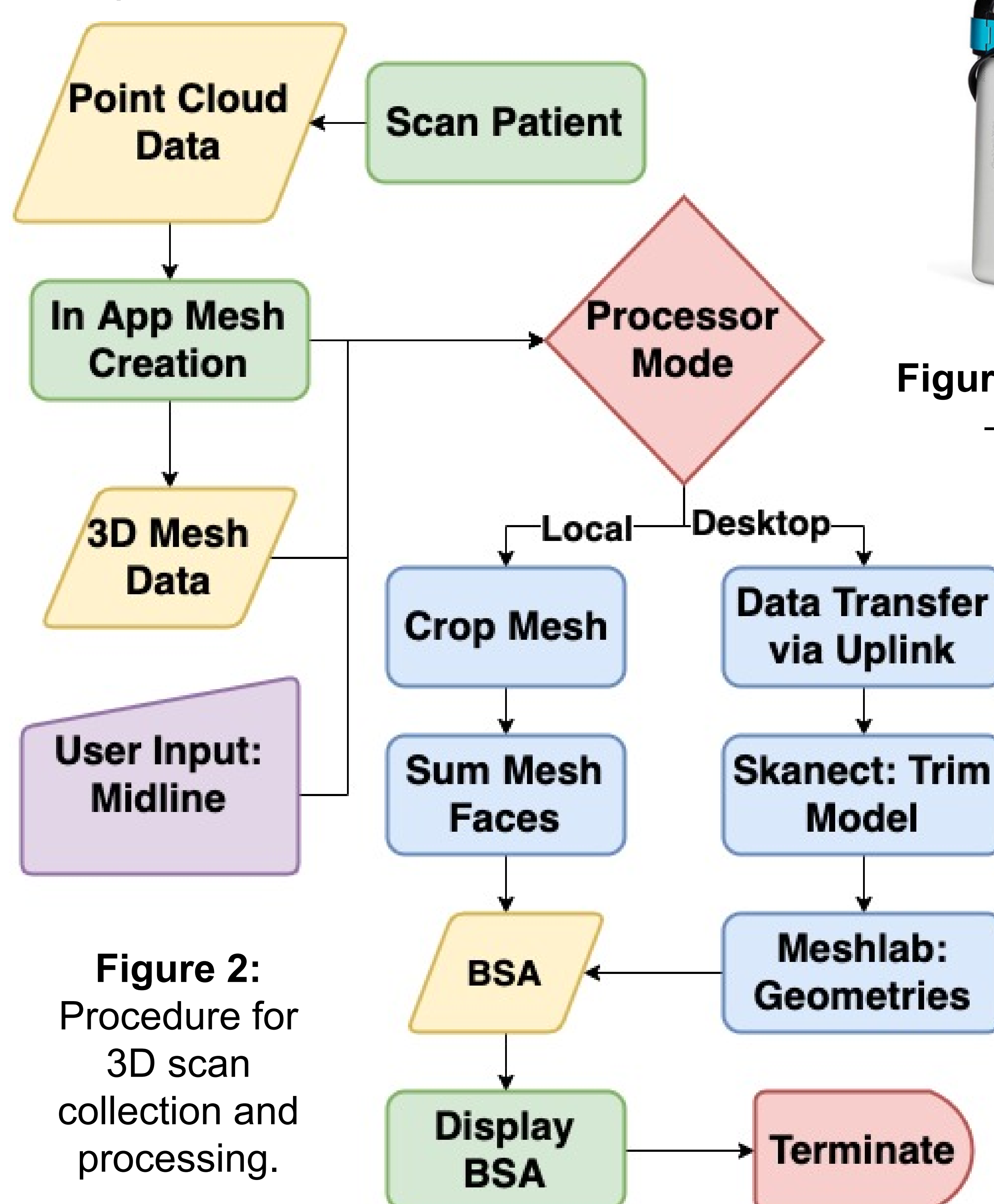
Figure 2: Procedure for 3D scan collection and processing.

Figure 3: Original captured scan (top), midline scan cropping (bottom).


Figure 4: Verification of Structure Scanner (Bottom) was compared with the gold standard Styku Scanner (Top). Average Structure mean bias was 0.0520.

Clinical Significance

Current methods of BSA calculation include equations developed from isolated, standard-physique subjects that are outdated and inaccurate. Improper fluid resuscitation occurs with misinformed BSA, resulting in treatment complications. 3D scanning introduces a standard and accurate method of BSA calculations for diverse patient physiques.

Clinical Testing & Results

A 3D-scanning study of 25 burn patients was approved by the University of California - Davis Institutional Review Board and is currently open to enrollment.
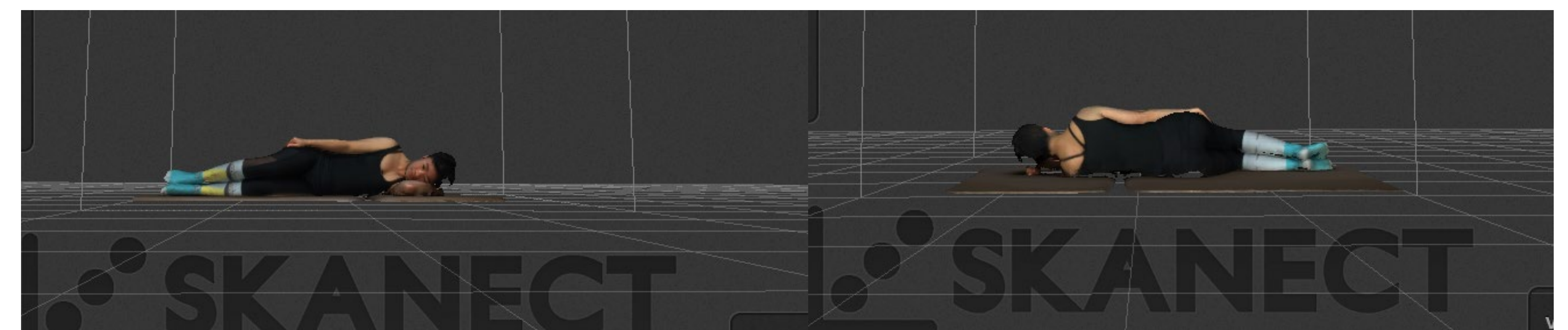
Figure 5: Burn ICU healthy volunteer scans in lateral recumbent position to be used in burn patient scanning.

Figure 6: Repeat scans of two healthy volunteers at UCDMC. Precision was assessed with coefficient of variance (%CV). Left: Mean BSA = 2.399, SD = 0.182, %CV = 7.953; Right: Mean BSA = 1.679, SD = .123 %CV = 7.329.

Future Work

1. Introduce scans to machine learning algorithms to identify burns with color data and output burned surface area.
2. Utilize machine learning to automate scan processing.
3. Expand 3D-scanned BSA research into pediatric populations.

Acknowledgments