Dressed to the form: An examination of dress form asymmetry and its relation to garment fit

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Keywords: Body asymmetry, dress form, fit, apparel design

Introduction and Objective: Dress forms have been used throughout history to reference the fit of the garment while working on it. Before mass-produced clothing was popular, forms were tailored to the particular wealthy individual (Paglialong, 2013). When clothing was marketed to the masses, the abstracted-form dress form was born to reflect an average (Paglialong, 2013). With the current advancements in 3D body scanning technology, dress forms have seen another evolution towards more realistic forms. Beatrice Forms (n.d), Ditto Form (n.d), and Classy Forms (n.d.) use 3D scans to create custom forms to reflect a single body.

For larger scale production, Alvanon has risen as an industry leader in creating realistic generic forms by using average measurements based on body scans (Alvanon, n.d.) Nonetheless, the dress forms currently used do not fully represent body variations and diversions from the average. Moreover, patternmaking methods focus on developing patterns from one side and using symmetrical halves to create the other side. However, the human body is not perfectly symmetrical (Kim, Jeong, Lee, & Hong, 2010). Therefore, the present study examined the ways a women's romper created with a standard symmetrical dress form would differ from those created with a custom 3D body scanned dress form of the same measurements. The differences that emerged as a result of seven drapes were visually evaluated to determine what draping processes translated into the most realistic, best-fitting garments.

Methods: In order to match the key measurements of a commercial Alvanon size M dress form (bust=32.5", waist= 27.25", hip= 36.25") to a real body, CAESAR body scan database was examined. Once the match was determined, the scan file was horizontally sliced at 1/2" intervals and 62 slices were produced into an Adobe Illustrator file for laser cutting. A full scale, legged custom form was developed using a 1/2" high density foam cut with a Kern laser cutting machine. The slices were layered, glued together, and covered with a high neck unitard. The bust, waist, hip, and centerline of the body were marked. The garment selected for evaluation was a basic romper to capture all major body landmarks, including crotch, which is often one of the more difficult areas to fit accurately. The top reflected a two-dart sloper, while the bottom was created according to the fitted jean-style pants described by Joseph-Armstrong (2013). Once the pieces were draped, they were digitized into EFI Optitex PDS v.19. Seven conditions, i.e., 3 side options (right, left, and both) of the custom dress form x 2 truing options (with and without) of the muslin romper drapes were created for determining the fit differences and best fit. Patterns from the commercial dress form were created by following standard practices to provide a baseline for evaluations. Patterns were draped on: (a) the right side of the commercial form and walked and trued based on standard procedures and methods explained in Joseph-Armstrong (2013), (b) the right side of the custom dress form and trued according to Joseph-Armstrong (2013), (c) the right side of the custom dress form without creating straight side seams and adjusting dart lengths, (d) on the left side of the custom dress form trued according to Joseph-

Armstrong (2013), (e) the left side of the custom dress form without creating straight side seams and adjusting dart lengths, (f) the both sides (i.e., with the left draped on the left side and the right draped on the right of the body) of the custom dress form and trued according to Joseph-Armstrong (2013), and (g) the both sides of the custom dress form without creating straight side seams and adjusting dart lengths.

The patterns were exported from PDS to Adobe Illustrator and were laser-cut out of muslin fabric. The pieces were stitched together using an industrial lockstitch machine with a ½" seam allowance. In order to distinguish the garments, iron-on labels were attached to the upper left back panel on the inside of the garment. In order to evaluate the fit, garments were photographed on the dress forms and fit notes were taken via voice recorder. The photographs were further evaluated and used to determine the best fitting garment. Garments were evaluated by two judges, who came to an agreement on best-fit, based on wrinkle analysis (Liechty, Rasband & Pottberg-Steineckert, 2016).

Results: Although the bust was around 32.5" for both forms, the measurements of each torso quadrant differed between the commercial and custom forms. While the asymmetrical dress form had measurements of 8.25" and 9" on the bust for the front and 7.5" and 8.25" for the back, the commercial dress form had 8.75" on both front halves and 7.5" on both back halves. Based on the seven romper analysis, the left and asymmetrical garments draped to the form and adjusted to standard patternmaking procedures worked the best to create a better-fitted garment to the body. It was expected that the asymmetrical garment (Figure 1a) would have a good fit as it was designed specifically with both halves of the body in mind. The right side of the body was larger and the shoulder was raised a little higher than the left. This means that the asymmetrical garment would cater to the higher shoulder and larger side without creating excess fabric on the lower shoulder and smaller side. As one breast is generally slightly larger than the other, the ability to create asymmetric garments can allow the patternmaker to use darts to fit each side individually, thus creating a better overall fit.

Surprisingly, the left-draped garment (Figure 1b) also fit well when trued and adjusted. The left side of the body was the slightly smaller side. This means that the garments produced from this side would be smaller than the garments produced from the right side. The higher shoulder of the right-based garments created excess fabric on the lower shoulder, but the left-based garments did not create an excess of tension on the higher shoulder.

Conclusions and Implications: If given the option between using a commercial or custom dress form, custom would always be better. Major dress form companies such as Alvanon continuously improve their offering by using 3D scans to make realistic dress forms (Alvanon, n.d). However, commercial dress forms are symmetrical and their measurements do not reflect

(a) Asymmetrical (b) Left-symmetrical

Figure 1. Garments with best fit

body asymmetry. As most body asymmetries cannot be detected by the naked eye (Schell, Johnston, Smith, & Paolone, 1985), these measurement inaccuracies would even out in the end and provide an okay overall fit distribution. The present study was an attempt in determining how the body relates to the dress form and how to create garments that would fit the body accurately without alterations. As body asymmetry is usually examined in connection to bone length and limbs (Halperin, 1931), further anthropometric research should be done to determine the average measurements per torso quadrant to develop a system that produces forms with this asymmetry in mind.

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