

Influence of Bra Band Tension and Underwire Angles on Breast Motion

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Abstract : Daily activities and exercise may result in large displacements of the breasts, which lead to breast pain and discomfort. Therefore, a proper bra design and fit can help to control excessive breast motion to prevent the over-stretching of the connective tissues. Nevertheless, bra fit problems, such as excessively high tension of the shoulder straps and a tight underband could have substantially negative effects on the wear comfort and health of the wearer. The purpose of this study is to, therefore, examine the effects of bra band tension on breast displacement. Usually, human wear trials are carried out, but there are inconsistencies during testing. Therefore, a soft manikin torso is used to examine breast displacement at walking speeds of 2.30 km/h and 4.08 km/h. The breast displacement itself is determined by using a VICON motion capture system. The 3D geometric changes of the underwire bra band tension and the corresponding control of breast movement are also analyzed by using a 3D handheld scanner along with Rapidform software. The results indicate that an appropriate bra band tension can help to reduce breast displacement and provide a comfortable angle for the underwire. The findings can be used by designers and bra engineers as a reference source to advance bra design and development.

Keywords : bra band, bra features, breast displacement, underwire angle

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