



**BIOMECHANICAL ANALYSIS OF A PROTOTYPE SPORTS BRA**

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**ABSTRACT**

*A Latin Square Experimental Design was used to compare a prototype sports bra previously developed for large-busted women, with two other sports bras through a controlled laboratory wear study. Vertical breast displacement data were gathered by videotaping the first three running strides of six large busted active females recruited from local fitness centers. Multiple regression results found that the garment treatment significantly related to the breast displacement experienced by subjects during each test session [F (2,213) = 16.393; p < .0001]. Approximately 13% of the variability in breast displacement was predicted by garment, indicated by the Squared Multiple Correlation Coefficient. ANOVA results found significant subject, garment, and subject-by-garment effects. Subjects wearing garments A and B had a lower level of vertical breast displacement of .031” as compared to subjects wearing garment C with .045” of displacement.*

*Keywords: biomechanical research, sports bras, brassieres, vertical breast displacement, breast discomfort, female exercise, and human motion.*

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**Introduction**

Greater emphasis is being placed on physical fitness, a positive self-image, personal enjoyment, and weight loss. The Surgeon General asks the American people to promote exercise and states that physical activity joins the front ranks of essential health objectives, such as sound nutrition, use of seat belts, and prevention of adverse health effects of tobacco use (U.S. Department of Health and Human Services, 1996). In a September 17, 1998 news release, the American Council on Exercise (ACE) reported a majority of women

experience breast discomfort while exercising, causing some to avoid exercise all together. Physical activity causes the breasts to bounce. As the activity increases, so does the bounce and the larger the breasts, the greater the vulnerability. Breast discomfort reported by physically active women is thought to be due to excessive breast displacement (Himmelsbach, J., Valiant, G., Lawson, L., & Eden, K., 1992). Despite the increase of women athletes and the accelerated need to limit breast movement, little scientific research has been conducted in the area of breast motion (Page & Steele, 1999). Better understanding of