

## ARE SPORTS BRASSIERES TOO TIGHT FOR ACTIVE FEMALES?

K-A Bowles and JR Steele  
Biomechanics Research Laboratory  
Department of Biomedical Science  
University of Wollongong, Australia  
[www.uow.edu.au/health/mrc/brl](http://www.uow.edu.au/health/mrc/brl)

### INTRODUCTION

As the female breast contains limited anatomical support, external support, usually in the form of a brassiere, is worn to decrease excessive breast motion and associated breast pain. Although limited research has been conducted in this area, previous studies have shown that sports brassieres are more effective in limiting breast motion and breast pain, compared to standard fashion brassieres (Mason *et al.*, 1999). However, a recent study of young Australian females indicated that only 27% of respondents usually wore a sports brassiere for breast support during exercise. The most popular form of breast support during exercise was the less supportive fashion brassiere. Although cost and fashion-related factors influenced sports brassiere use, 11% of respondents stated that they did not wear sports brassieres during exercise, as they were "too tight around the chest,..". It has been postulated that tighter sports brassieres may impede athletic performance by restricting respiratory function during exercise. As this notion is only speculative, the aim of this study was to investigate if sports brassieres were "tighter,, than fashion brassieres and if brassiere design impeded respiratory function during exercise.

### METHODS

Ten smaller breasted (A cup) and 10 larger breasted ( $\geq$  C cup) healthy active females ( $23.5 \pm 2.5$  yrs) were selected for this study, based on professionally fitted brassiere size. After adequate familiarisation sessions the subjects exercised on a treadmill at 70% of their maximal oxygen consumption under three randomly assigned experimental conditions: bare breasted, wearing a fashion brassiere (Berlei "Touched,,) and wearing a sports brassiere (Berlei "UltraSport,,). To assess brassiere "tightness,, two custom-designed novel<sup>gmbh</sup> compliance-sensor pressure strips were attached to the subject's torso, located directly under the elastic strap of the brassiere gore, during each brassiere condition (see Figure 1). Respiratory volumes were also collected during each trial using standard spirometry techniques. Once each subject had reached a steady state heart rate force, area and pressure data were sampled (50 Hz) for 15 seconds from each sensor strip ( $10 \times 1 \text{ cm}^2$  sensors). After completing each trial the subjects were asked to rank their perceived "comfort,, of the brassiere using a visual analogue scale. A repeated ANOVA design with one within factor (brassiere design) and one between factor (breast size) was then used to determine if either brassiere design or breast size significantly ( $p \leq 0.05$ ) affected the respiratory, pressure and comfort data.



**Figure 1:** Novel sensors attached to a subject's torso

### RESULTS AND DISCUSSION

Preliminary results indicate that, for smaller breasted women, sports brassieres imparted significantly more maximal force on the torso of the subjects, in turn, increasing the maximal pressure, and the pressure time integrals. However, this trend was not evident in the larger breasted females, or the respiratory volumes data. This difference in pressure data between the two subject groups may be explained by differences in brassiere construction for the two sizes, despite using the same brassiere make and line for both the A and C+ cupped subjects. Although there was no significant difference between the perceived comfort of the two brassieres, when the subjects were asked which of the two brassieres they would prefer to exercise in, most responded the "sports brassiere,,.

### SUMMARY

As the causes of breast pain and the consequences of excessive breast motion are not known, brassiere designers need to address structural issues within sports brassiere design that deter active females from wearing them. Although results of the present study indicate that sports brassieres can place more pressure on the torso of some females, there is no evidence to support the notion that "tighter,, sports brassieres impede respiratory function during exercise.

### REFERENCES

Mason, BR, Page K-A, & Fallon, K. (1999). *Journal of Science and Medicine in Sport*, 2 (2), 134-144.

### ACKNOWLEDGEMENTS

Thanks to Berlei Australia, the New South Wales Sporting Injuries Committee, and novel<sup>gmbh</sup>.