Investigating the performance of maternity/nursing sports bras

Katie Reeves[1], Jon Wheat[1], Hannah Divall[1], Katy E. Griggs[1]
[1]School of Science and Technology, Nottingham Trent University, Nottingham, United Kingdom
Email: katie.reeves2022@my.ntu.ac.uk

Summary

There is a lack of suitable breast support for pregnant and post-partum women. Twenty-eight pregnant or post-partum women participated in a study to investigate the support, comfort and pressure of two maternity/nursing sports bras worn during exercise on a treadmill. Results showed significant differences in bra motion and pressure and highlighted the challenge in balancing comfort and support.

Introduction

The breasts undergo numerous, and continuous, changes during pregnancy and in the post-partum period. Although specific maternity/nursing sports bras exist, pregnant and post-partum women struggle to find suitable sports bras. Only 15% of purchasers of maternity/nursing sports bra found what they wanted and they experienced issues with comfort, support and fit [1]. This study aimed to investigate the performance of two maternity/nursing sports bras (Bra A and Bra B) via biomechanical, pressure and subjective methods.

Methods

Twenty-eight women (four in the second trimester of pregnancy and 24 who had given birth within the last six weeks to 12 months, at the time of data collection) participated in the study. Participants had an average (mean(±SD)) age of 34 years (±3 years), body mass 70.2 kg (±9.2 kg) and height 1.65 m (±0.05 m). All participants were professionally bra fitted with sizes ranging from 28E to 38G. Bra A and B were encapsulation and compression style sports bras, respectively. Both bras were classed as high-impact, and were selected based on research from the user group [1]. Twenty-one retroreflective markers were attached to participants skin and on top of the bras. Bra kinematics (as markers were positioned on the bras) were tracked at 200Hz using a nine camera Qualisys Motion Capture system. Pressure was recorded using Novel Texsens at the front and back of the right side of the underband and on each shoulder strap. Data were recorded whilst participants exercised on a treadmill at 5km/h, 7.5km/h and 9 km/h for one minute per speed in each sports bra (one participant did not complete 9km/h). Subjective data were collected per bra via visual analogue scales for bra comfort, support and pressure, once all speeds were complete.

Results and Discussion

At each treadmill speed and in each bra motion direction there were significant differences in bra displacement of the two bras (Table 1) ($p>0.05$). Encapsulation style bras (Bra A) have been recommended for larger breasted women, sized as D cup and above [2], which all participants in the current study were. Participants perceived Bra A as more supportive and it exhibited less superior-inferior displacement supporting the suitability of this style bra for these women [2]. However, in the anterior-posterior and medio-lateral directions, Bra B exhibited less displacement, thus provided more support. Future research should assess pregnant and post-partum womens' breast biomechanics and the bras' mechanical properties to assist in understanding these findings and in providing sports bra recommendations for this population.

Right and left shoulder strap pressure was significantly greater in Bra A at all treadmill speeds ($p>0.05$). At the front of the underband, pressure was significantly greater in Bra A only at 5km/h ($p>0.05$). The higher pressure of Bra A is likely due to the shortness and minimal adjustability of the shoulder straps [3]. Bra A was perceived to exert higher pressure at all areas, which is likely why Bra B was perceived more comfortable as higher pressure often results in greater discomfort [3]. Bra B was preferred by 54% of participants, which could be due to its higher comfort as comfort is the most important sports bra characteristic for this population [1].

Conclusions

Bra motion and pressure differed significantly between the two bras. More work is warranted to assess pregnant and post-partum womens' breast biomechanics and the bras' mechanical properties. Bra A was perceived more supportive but also exhibited higher pressure, whilst Bra B was perceived more comfortable. Thus, balancing comfort and support is a key factor for future products.

References

[1] Reeves K et al. (2024). *RJTA*.
[2] Scurr J C et al. (2011). *J. Sports Sci*. **29**: 55-61.
[3] Yick K L et al. (2022). *Int J Environ Res Public Health*, **19**.

Table 1: Anterior-posterior (AP), medio-lateral (ML) and superior-inferior (SI) bra displacement (m) at treadmill speeds in Bra A and B.

	5km/h			7.5km/h			9km/h		
	AP	ML	SI	AP	ML	SI	AP	ML	SI
Bra A	0.011 (±0.001)	0.014 (±0.001)	0.007 (±0.000)	0.018 (±0.000)	0.028 (±0.001)	0.025 (±0.001)	0.020 (±0.000)	0.033 (±0.001)	0.030 (±0.002)
Bra B	0.010 (±0.001)	0.011 (±0.001)	0.007 (±0.000)	0.016 (±0.001)	0.022 (±0.004)	0.030 (±0.003)	0.018 (±0.000)	0.026 (±0.000)	0.032 (±0.000)