



UNIVERSITY OF
PORTSMOUTH

BREAST HEALTH NEWS

Research Group in Breast Health
University of Portsmouth
Issue 11 - January 2023

WELCOME TO THE 11TH EDITION OF THE RESEARCH GROUP IN BREAST HEALTH NEWSLETTER

We are pleased to have two new post-doctoral researchers join the group this year, both working with large athletic apparel brands. Jacqui Rix has joined the group exploring breast volume, body composition and breast motion. Jacqui has recently completed her PhD looking at biomechanical changes in acute low back pain patients. Nichola Renwick has joined the group looking at breast movement in water. Nichola has a background in anatomy and biomedical engineering and comes to us from Glasgow where she completed her PhD in clinical biomechanics looking at the biomechanical changes of the foot in a population with diabetic foot disease.



BRA PRESCRIPTIONS FOR THE LIONESSES AS THEY WIN THE 2022 EUROPEAN CHAMPIONSHIPS

One of the most uplifting moments in British football in 2022 was the Lionesses' win over Germany to become Euro 2022 Champions. The final was sealed by an extra-time goal from Chloe Kelly, who immediately whipped off her shirt, showing the world a scientific revolution – her sports bra prescribed by the Research Group in Breast Health. The Lionesses approached us after hearing about our work with the English Institute of Sport, prescribing custom bras for female athletes for events like the 2020 Olympics and this year's Winter Olympics. We know that correct bra fitting for women is largely about education: 'Helping women understand what a sports bra is, how it works, how it should fit, what types are available, what might be better for you and your sport,' says Professor Wakefield-Scurr.

In the lead up to the Championships our work with the Lionesses involved education, individual breast and bra assessments and prescriptions. We established that the Lionesses preferred compression crop tops, so the players had to be encouraged from this comfort zone to find what bra performed best for each of them. 'Sports bras work either by compressing the breast tissue towards the chest wall, or by lifting and holding. Biomechanically, they're two completely different ways of stopping movement,' Melissa Jones, one of the researchers working on this project explains.

Image: Chloe Kelly (with teammate Jill Scott) celebrates scoring England's second goal against Germany during the UEFA Women's Euro 2022 final match at Wembley Stadium on 31 July 2022 in London, England.



'TREASURE YOUR CHEST' RELAUNCH!

If you have read our previous newsletters you will know about our Treasure Your Chest breast education initiative for adolescent girls.



Developed in collaboration with St Mary's University and the University of Chichester our Treasure Your Chest resources, available free of charge, have been downloaded hundreds of times by a variety of schools, clubs, organisations, and parents. Following some exciting developments we launched our new and improved resources in October, including comprehensive slides, discussion topics, interactive tasks and videos. We would love to see as many schools as possible delivering breast education so please share our website with any teachers or schools you know and encourage them to download our resources www.treasureyourchest.org. We also have big plans to expand and further develop our breast education initiative so if you are a company or organisation who would like to partner and support us on our Treasure Your Chest journey please email contact@treasureyourchest.org.

Laura Cavanagh, assistant headteacher, added: 'The session has been brilliant, so informative. It's such a taboo subject, not all students have that supportive network around them, so being empowered with the knowledge themselves is really vital for them.'

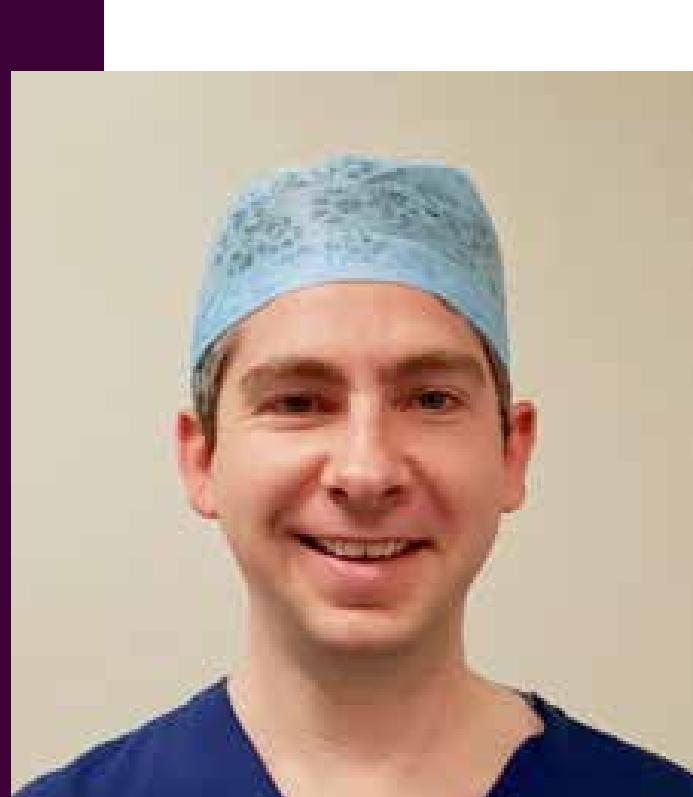
SCAN THE QR CODE OR VISIT
TREASUREYOURCHEST.ORG

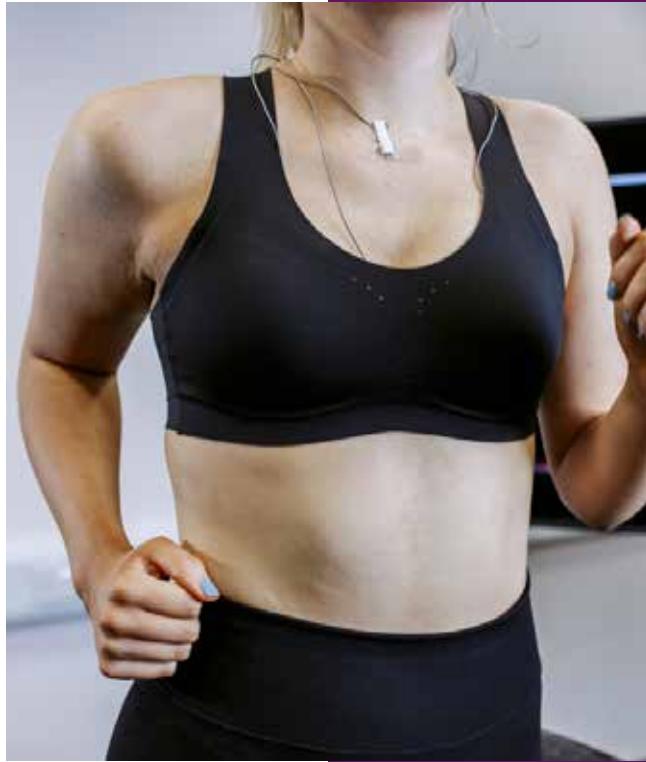
CLINICAL IMPLICATIONS FOR BREAST BIOMECHANICS

Breast cancer affects over 55,000 UK women per year, with 600,000 people estimated to be alive in the UK (3.8 million in the USA) after a diagnosis of breast cancer.

This is predicted to rise to 1.2 million in 2030. Most require surgical removal of the tumour, which is likely to change breast mass, volume, position, shape or tenderness, any of which may alter body or breast mechanics. Understanding biomechanical changes following breast surgery (particularly when resulting in significant asymmetry), will help manage patient expectations post-surgery and provide valuable information for rehabilitation and even pre-habilitation (pre-surgery). This type of information could also inform surgical planning (influencing surgical choice for patients with other biomechanical issues) and inform post-surgery care recommendations (bra choices).

With this in mind, we are delighted to welcome Mr Edward St John (FRCS PhD) to our Research Group. Edward is a Consultant Oncoplastic and Academic Breast Surgeon at Portsmouth Hospitals University, NHS Trust. The Portsmouth Breast Unit is one of the largest breast units in the UK and is one of 15 leading centres in the country on oncoplastic training and techniques. The large dynamic unit is research active, participating in many national and regional trials and has strong academic links with multiple research and innovation projects. By harnessing the surgical expertise of the PHU breast unit and the biomechanical expertise of the Research Group in Breast Health, we believe our projects will produce world leading research, for the benefit of patients.





THE GRAND OPENING OF OUR SPECIALIST SPORTS BRA TESTING LABORATORY

In 2014, we established the world's first sports bra testing service; designed to help industry develop better breast support garments through biomechanical testing. Over the past nine years, the bra testing unit has partnered with many global sports apparel brands, lingerie brands, manufacturers and start-up companies to test hundreds of different sports bras. As the bra testing unit has grown, so has the need for a specialist laboratory space designed specifically for sports bra testing. This year saw the grand opening of our new sports bra testing laboratory. Brogan Jones, who leads the bra testing unit, is delighted to be running this laboratory and said 'having our own specialist lab for sports bra testing means we have everything we need to collect robust, scientific data and help more companies develop better products'. The new laboratory is also an ideal space for external partners to visit and see the scientific testing in action, film content for marketing purposes, or capture educational pieces on sports bras and breast biomechanics. The laboratory contains specialist motion capture technology in the form of electromagnetic sensors and high definition, high speed cameras to measure the biomechanics of the breast. There is also a bra fitting suite and exercise equipment to simulate different exercise activities within the lab environment.

EXPLORING BREAST MOVEMENT IN WATER

Breast movement in water is different to on land, we have advanced our methods to investigate this further.

Breasts contain limited internal support and therefore, if not properly supported, sporting activity can cause excessive breast movement.

This breast movement is associated with a number of negative consequences including breast pain, breast tissue damage, changes in full body mechanics and embarrassment, all of which may deter women from taking part in physical activity. Previous research has shown that when exercising in water, women reported less breast discomfort and less breast pain compared to exercising on land (McGhee et al., 2007). Interestingly, there was no reduction in breast movement in water despite the reduced feelings of breast pain. This is an interesting phenomenon which is yet to be investigated further.

Through developing new methodologies using our electromagnetic sensor system, our research group is investigating changes in breast movement in water. These findings will be pertinent for sports like swimming or those that include a swim such as Triathlon, where breast support is required across a variety of different exercise modalities.



We will continue to advance our research on breast movement in water through developing new methodologies and data analysis techniques.

Reference

McGhee, D. E., Power, B. M. & Steele, J. R. 2007. Does deep water running reduce exercise-induced breast discomfort? British journal of sports medicine, 41, 879-883.

BREAST HEALTH EDUCATION FOR FEMALE POLICE OFFICERS

There is a need to better understand the impact of bra choices and operational equipment for female police officers.

Breast health (a term used to refer collectively to breast pain, breast size, bra fit issues and appropriate breast support) can significantly impact a female's occupational performance, health and overall wellbeing. As the number of female police officers increases, there is an increased importance to understand issues relating to female-specific health and well-being. Police activity is physically demanding, with officers routinely required to perform strenuous physical activities, such as running and self-defence techniques. It is well established in the breast health literature that a high support sports bra is a necessary item of equipment to reduce breast movement and breast pain during running. However, high support sports bras have historically been designed for short duration wear during high-intensity activity. The suitability of sports bras for long-term wear, as found in operational police duties or for prolonged use and interaction with body armour, is currently unknown. Problematically, only 17% of female police officers are reported to wear a sports bra when on duty, with the predominant bra type (71%) being underwired. Concerningly, poorly fitted underwired bra support can lead to pain, discomfort, and even soft tissue damage due to rubbing and chafing. Clearly, there is a need to better understand the impact of bra type choices among female police officers.

In addition, many police duties are undertaken whilst wearing personal protective equipment such as body armour. To date, the design and development of contemporary body armour has solely focused on male users, with limited consideration of the fit and functional requirements of females. Reportedly, 67% of female officers found wearing body armour either uncomfortable or very uncomfortable with a bra, regardless of the type worn. Research into a more effective bra and body armour combination is needed. Further, larger-breasted police officers (UK D cup size and above) more frequently report discomfort or rubbing. This finding agrees with previous studies that have reported breast pain and bra discomfort to be higher in larger-breasted women.

Alarmingly, compressing a larger breast mass can lead to increased vulnerable regions around the armpit and chest cavity when wearing soft armour, causing a major safety concern in larger-breasted female officers.

Following on from her present work with the British Army, Dr Jenny Burbage from the RGBH has recently won a funding bid to work on a project with the College of Policing. Next year Jenny, and a collaborator from the University of Lincoln, will lead a project providing breast health education to female police officers and investigating the interaction of different bra types with operational equipment (e.g. body armour and tactical vests). Watch this space!



Contact us

E breastresearch@port.ac.uk
Twitter: [@UOP_RGBH](#)
Instagram: [@UOP_RGBH](#)
Website: port.ac.uk/breastresearch