

Designed to ensure a comfortable, conflict-free night, dual TOG duvets have been around for years. Created specifically to solve the age-old problem of one partner, usually the female, feeling colder than the other, the duvet looks like any other bedding but varies in TOG ratings to cater for different temperature needs. If heat management between men and women varies enough to require a sleeping solution, what is its influence over the way women and men react whilst training?

Vive la difference

The human body is composed of a variety of different tissue types including the so-called 'lean' tissues, such as muscles, and fat. These determine our body composition. The ratio of lean body mass to fat is one of the most obvious physical differences between men and women. The minimum of 5% of bodyfat is considered healthy for males and around 12% for females, however, the average 30-year old woman's body contains 26% of fat whilst a man's 21%. Distribution of fat in the body also differs between men and women. Women store it mainly in the buttocks and thighs, whilst men in the abdominal wall. Women are also generally lighter and shorter. All these variables affect body behaviour at times of physical activity? Research says they do, to a larger extent than most of us imagine...

- as women possess greater subcutaneous fat layer, they also possess more insulation to conserve body heat; with a higher gradient of temperature from the skin to the body core, they are better equipped to maintain a constant body core temperature in cold conditions.
- Because of smaller size women have a larger surface area-to-body mass ratio, hence a greater percentage of the body is in contact with the environment - this means they are more likely to suffer from surface cold injury and have cold hands and feet.
- Females generally sweat less and begin perspiring later into the activity than men - women have fewer functional sweat glands, so body temperature in the female rises two or three degrees higher than in males before the cooling process of perspiration begins - hence acute heat stress is a greater concern of female athletes.
- Long-term, women seem to adjust their perspiration rate more efficiently to the required loss of heat and have a greater cardiovascular component of thermoregulation
- During prolonged activity in normal and hot weather women have less change in body temperature compared to men - they sweat less but tolerate heat as well as men and also cool quicker after physical activity in hot weather.

Thaw's summer collection using Coolmax by DuPont



To simplify the above facts, we can say that women store heat more efficiently and maintain temperature levels for longer periods of time than men. In other words, they work by absorbing and storing outside temperature. The way males work differs considerably, in that men generate their own heat through their larger muscle area. Not as quick to regulate heat, females will, however, show better heat and moisture management in prolonged activity, making them more resilient than men whose short-term performance is better. Due to their size and body composition, women will feel the cold more in some areas such as the hands and feet. It is a well-established fact that a small individual is more at risk of hypothermia.

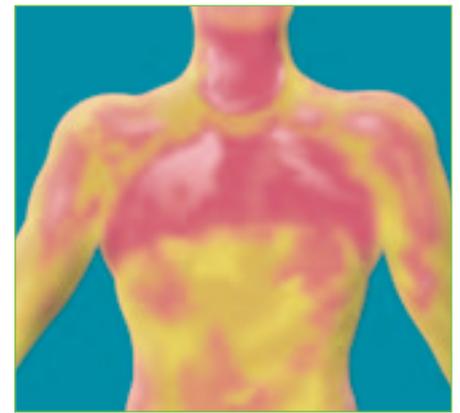
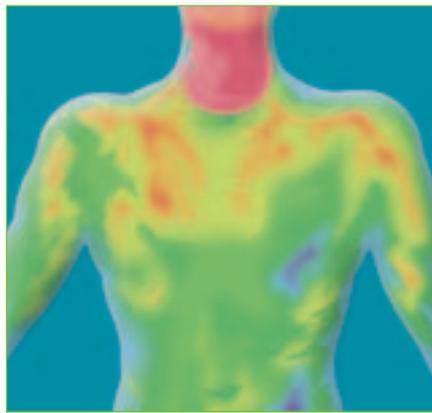
This partly explains the cold feet many women complain of when going to bed or walking into a cool room that men feel quite comfortable in. Yet once the female's thermoregulation kicks in and sufficient heat is produced, it tends to be kept through the night. Many men, in contrast, will feel discomfort tucked up under a thick duvet as their muscles will still be producing significant heat through recent activity. This heat will slowly be lost as the night passes, often causing a morning chill.

Women-specific design

These physiological differences may not be immense but point to a significant difference in female 'design'. With more and more women actively participating in sports and outdoor activities today, much has been done in the areas of fit and fashion. More companies are now appreciating the need to develop women-specific ranges and clothing to meet the complex needs of the female sports person, possibly developing fabrics more suited to women's needs than they realise.

This trend first crystallised with footwear and socks, when companies started developing products specifically shaped for women rather than simply creating a mini version of a man's sock or boot. Once the benefits of this approach were understood, an array of women-friendly companies followed, leading to the birth of businesses that appreciate the necessity of developing collections for women only. One such company, set up by women for women, is the UK outdoor brand Thaw.

Tracy Harrison, an ex British indoor climbing team member, and Alison Wright, a professional runner who broke the world record for running between Everest Base Camp and Kathmandu, when aged 22, are behind the Thaw concept of 'women seeking adventure'. What both of them found whilst training was that most



clothing they used did not give them enough comfort or provide an adequate fit. By creating a brand that provides functional yet fashionable clothing, the founders are trying to encourage women to run, cycle, walk and climb.

High on Thaw's agenda is keeping women cool. The brand has achieved this by introducing a range of clothes that cater for that need including: vests, tees and smocks. All these products include Coolmax. The feminine touch is reflected in the attention to shape, in the soft detail of the garment styling, and in a colour range that is feminine and soft in tone.

Where to next?

The application of technology and research in active clothing has come a long way since the cotton t-shirt. Most needs for comfort created by training or weather conditions have already been answered. There are fabrics that keep us warm, such as Thermolite or Thermal Pro, those that give us shelter against the wind such as Windstopper, and those like Coolmax or Sympatex designed to keep us dry on the inside. Yet the abundance of textile research, clothing designers, manufacturers and marketing ploys has so far failed to recognise a possible niche - for active clothing meeting the specific needs of the two sexes.

Spending more on research to tweak the basic moisture transportation fibres or thermal fabrics in order to develop more niche markets may sound like an expensive way to do business. Indeed, development in the area has been patchy up to this point. There is, however, one outdoor brand that may have already embarked on a track that could pave the way to a gender revolution in sportswear design and manufacture.

The birth of zone technology

Lowe Alpine prides itself in having rock climbers and alpinists, mountain bikers and skiers, trail runners and canoeists among its staff. Its vision is based on

Thermal images illustrating the body before exercise and the zones that perspire most during exercise.

 Lowe Alpine

innovation and trend-setting and its recent application of the latest technology proves just that. Apart from its rucksacks and mountain equipment, Lowe Alpine has a wide range of outdoor clothing with high performance parameters.

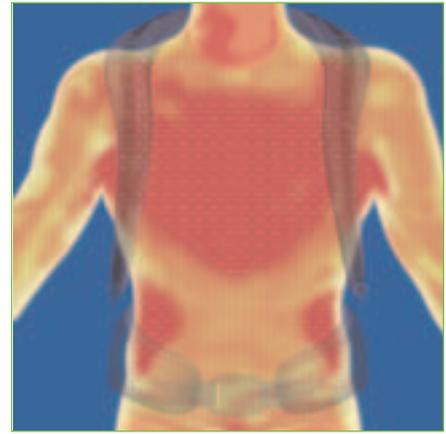
Its Warm Zone technology uses the latest thermal imagery applications to identify the different temperature zones of the human body. Based on thermal images, the company's team of researchers and apparel designers assess areas where insulation is needed the most (elbows, wrists or kidneys) or where insulation can be reduced and breathability increased. The Warm Zone works by engineering varying levels of insulation right into the fabric, giving warmth where it is required, as well as the option to adjust performance. This approach has already won the ISPO Outdoor Award this year. Lowe Alpine also claims to be the only company that offers Zoned technology in both base layer and insulation. It also appears that the company has acknowledged the fact that men and women show different physiological properties. Its Dry Zone garment technology works by recognising body hot-spots and by transferring moisture to other areas and helping it to escape faster. The most productive zones have a more open knit, creating more breathability. Men's and women's garments will, therefore, differ not only in cut but also in the position of zones.

Sex-sensitive fabrics?

What Lowe Alpine has stepped into is a new chapter of apparel design. By taking a closer look at physiology it has already created garments that learn from secrets only recently revealed by science. Thermal diagrams not only tell us the positioning of hot spots in men and women; their size,

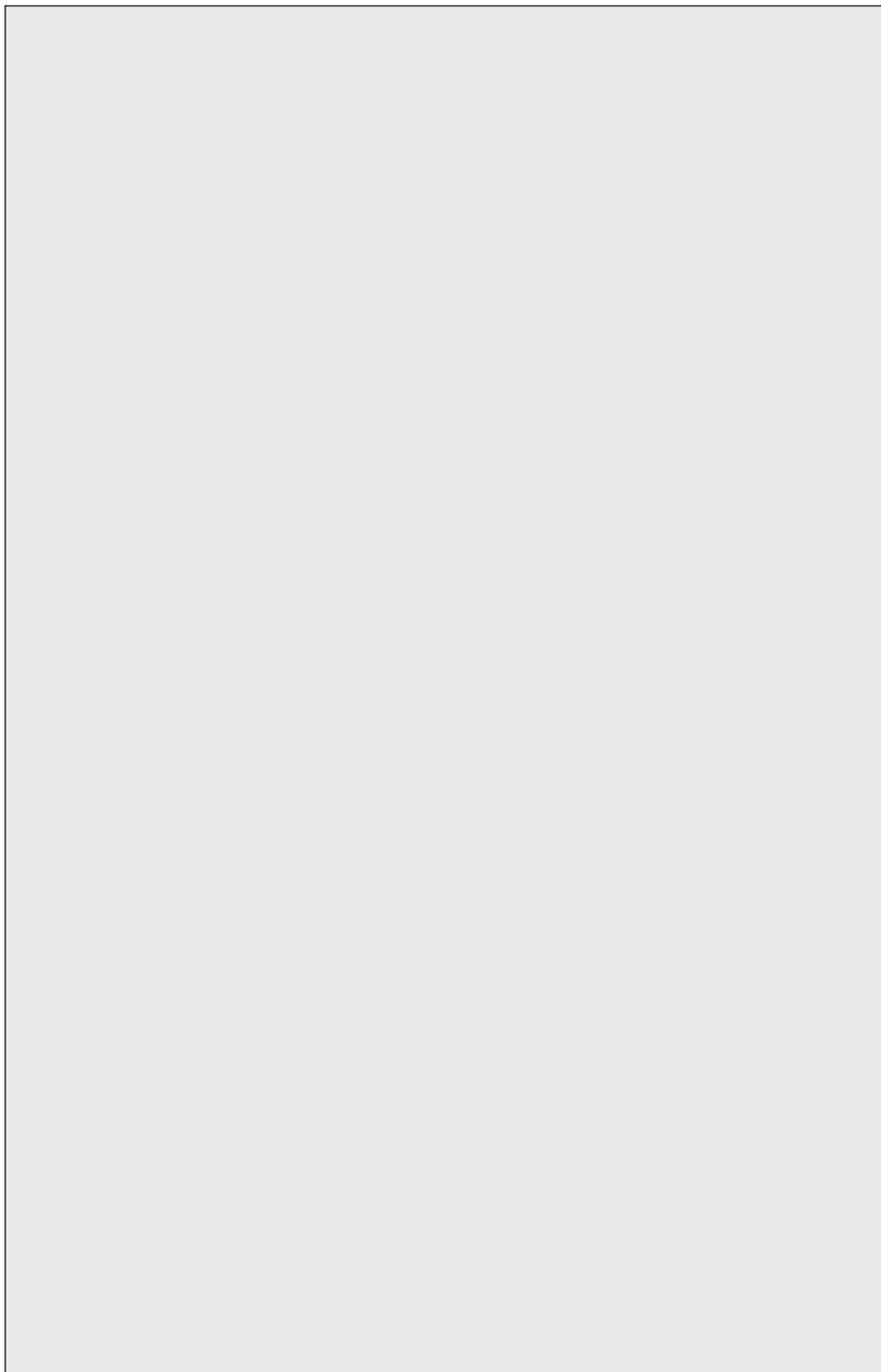
intensity and shape; in theory, they can also point to personal variations between the different individuals. This "sex-sensitive garment technology" may well be opening a new chapter in apparel conceptuality, possibly setting a trend that other brands will follow.

At this point in time, we have the understanding of physiology to take sex-sensitive design forward, an array of performance fabrics to experiment with, the technology that allows us to create a precise map of the human body and powerful, sale driving women to justify further development into the field. More research will be required into fabric production in different weights and proportions to treat the different rates. All fabrics do not fit all.



Thermal images showing body areas that cool down the fastest and areas kept warmer with Warm Zone technology.

 Lowe Alpine



Girl power

As women increase their earning potential so does 'women specific design.' It is seen in every-day life from business suits to mobile phones and cars. The sporting world, for decades dominated by men, is following suit with a larger presence of professional female participants in most sporting disciplines and in leisure sport worldwide.

Recently, the car maker Volvo launched its YCC concept car designed not only to suit female taste but to cater for a range of typically feminine needs. In February Volvo will hold a SportsDesign Forum 'Design Specifically for Women' that will examine the market potential active women create for brands. It will also look at research, industry and design innovations that cater purely for women. The forum will feature some prominent, and not only female, speakers. August Stangl, an Austrian sports enthusiast, is currently working with Therm-ic to produce the perfect ski boot for women - recognising the cold feet problem. Claudia Riegler, the multiple Austrian World Ski Cup champion and ambassador for Rossignol women skies, is developing skiing equipment for women who value technique and control over speed and power. This list also includes Lisa Anderson, a 4-time surfing champion, considered a revolutionary trendsetter in the surfing industry thanks to her development of the first board shorts for women. The naming could go on...

Women-specific outdoor and sporting apparel is heading for an interesting and bright future. Once established, it would undoubtedly also spark off developments in men-specific clothing. Could this be the next big thing after Gore-Tex? Whatever the outcome, few will trace it back to the humble dual tog duvet. 🌐