



Topic of the Speech:

Body Posture Change of Pregnant Women and Development of Mannequin for Abdomen-supporting Maternity Garments Design

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Professor Rong Zheng obtained Ph.D in ergonomics design at the Hongkong Polytechnic University. A new Chinese bra sizing system (Zheng et al., 2007) developed based on her PhD study was recognized by Time Magazine – Viewpoint in the list of “Best Inventions of 2007”. She is currently Professor in the Shanghai International Fashion Innovation Center at Donghua University since the beginning of 2018. Prior to that she was the former director of the BIFT-Aimer Human Engineering Research Center from 1999 to 2017, and has formerly served as dean and associate dean of School of Fashion Art & Engineering at Beijing Institute of Fashion Technology (BIFT) from 2007 to 2015. She is a Commissioner of the China Fashion Association and Chinese Technical Committee of Standardization of Ergonomics, an expert member of China National Garment Association, and an international specialist in ISO/TC133 Clothing sizing systems - size designation, size measurement methods and digital fittings.

Her research is in the field of human-centered inclusive design using cutting edge technologies, with the focus in the area of anthropometric survey & biomechanical study, sizing systems and creative mannequins for targeted markets, mobility of compression & protective clothing, design of innovative ergonomic /inclusive apparel products, and structures of native and minority costume.

She has published more than 80 journal papers and conference papers, and supervised more than 40 Ph.D and Master students. As a principal investigator, she developed inner-shuttle ergonomics shoes for astronaut in the weightless environment of aircraft and space station for Shenzhou 7, 9, and 11 tasks in collaboration with China Astronaut Research and Training Center, designed the uniform for the China International Search and Rescue (CISAR) team in 2009, and won "reddot award 2018 winner" in German.

-For invited speaker only

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ABSTRACT (NO MORE THAN 500 WORDS:)

The body posture of pregnant women has no great change in early pregnancy. With fetal development, pregnant women's belly becomes large during the second trimester of pregnancy and late pregnancy. In order to maintain body balance during the latter stages of pregnancy, women must lean backward, causing lumbar lordosis that aggravates the lower back ligament, leading to back and waist pains. Abdomen-supporting maternity garments help supporting women's belly weight during pregnancy. The abdomen-support functions of pregnant women's underwear can be designed according to body posture changes during the pregnancy cycle. However, in China there are few brands of abdomen-supporting pants available to pregnant women, and research and development related to such garments is somehow not popular.

The growth of the fetus increases intra-abdominal pressure, and portal venous obstruction causes the upper and lower venous congestion of the rectum, at times resulting in internal or external hemorrhoids. The enlarged uterus pressing against the vessels also may cause dizziness in pregnant women. Therefore, the increasing size of women's belly during the second trimester and late pregnancy creates problems and poses health risks during the later stages of pregnancy. In addition, pregnant women have difficulty to find the right pants. Pants with appropriate abdominal circumference but rather large waist and hip circumference may easily fall, while those with appropriate waist and hip circumference but small abdominal circumference may have an adverse effect on fetal growth and development. As such, there is an urgent need for abdomen-supporting underwear that conforms to ergonomics and has both abdominal and waist supporting functions as well as a high comfort level.

The study conducted a two-year market survey on abdomen-supporting underwear and performed statistical analysis of body shape data of 26 pregnant women. We concluded that body posture of women during pregnancy can be divided into three stages – early pregnancy (8-12 weeks), second trimester (16-24 weeks), and late pregnancy (28-36 weeks) – with each stage having particular maternity garment requirements. Study findings can play a guiding role in structural design of abdomen-supporting underwear and development of dress forms for pregnant women.