ABSTRACT:
Since the late-1950’s when the first hernia repair materials were introduced, the composition of these meshes has evolved to include not only permanent synthetic polymers, but also biological tissue-derived materials, composite materials, and absorbable synthetic polymers. At least 40 different types of hernia repair materials now exist, and the general surgeon is faced with the difficult task of selecting the proper material for each surgical scenario. Until recently, the literature lacked a complete characterization of these materials and an evaluation of their suitability for hernia repair applications. Thus, we determined the physiomechanical characteristics of thirty-eight (n=38) types of hernia repair materials. In theory, hernia repair materials must possess suture retention and tear resistance strengths of at least 20N and a ball burst strength of at least 50N/cm to support “worst case” hernia repair scenarios. Out of 38 materials evaluated, 14 met all criteria, 18 failed to meet at least one criterion, and 6 failed to meet 2 or more criteria. With this knowledge of the existing designs, novel scaffold materials are being developed. Electrospinning and 3-D printing techniques are being utilized to produce materials with potential applications in hernia repair, as well as breast reconstruction and wound healing.

BIOGRAPHICAL:
Dr. Deeken received her Ph.D. in Biological Engineering from the University of Missouri (Columbia, MO) in 2008. Her doctoral research involved the development of novel bionanocomposite scaffolds for soft tissue repair applications such as hernia repair. In 2009, Dr. Deeken joined the faculty of the Department of Surgery at Washington University School of Medicine where her research included: characterization of hernia repair materials and fixation devices and the development of novel electrospun and 3-D printed scaffolds for hernia repair, breast reconstruction, and wound healing applications. In 2015, Dr. Deeken left academia to pursue a career opportunity as a consultant in the medical device industry.

DATE • TIME • LOCATION:
Tuesday, March 31, 2015, 4:00 PM, 1057 Agricultural Engineering Building