Ruslana Ovsienko
Kyiv National University of Technologies and Design
(Kyiv)
Scientific supervisor – PhD Maria Chernets

MEDICAL KNITTING

Medical textiles which are materials with high-added value textile structures and products are widely used in mass care and patient treatment in medical institutions. It is a new field of combination of textile technology and medical science. The earliest medical textile materials are natural fibers, such as cotton and ramie. And with the advancement in technology, synthetic fiber is taking on a higher percentage in medical textiles. Now, biodegradable fibers are being developed and applied in healthcare [1].

One of the important components in medicine is medical bandages or dressings. They are used to insulate and prevent trauma, attach the drugs to the wound and absorb liquids. It is essential for wound dressings to have the properties of good hygroscopicity, good breathability and great sense of comfort when it comes in contact with the skin. The knitted medical dressings show greater extensibility, elasticity, fitness and flexibility. For two dimensional structures, weft plain stitch and rib stitch are greatly applied in medical dressings for simple knitting technology, great flexibility and low viscidity. Besides these, some three dimensional structures, including weft multiply composites, weft knitted spacer fabrics and warp knitted spacer fabrics, are greatly used in the field of medical dressings. They often have absorbent layers for good ability to control heat and moisture transfer. And the materials applied in medical dressings refer to cotton, viscose filament, alginate fiber, chitosan. Yarns and filaments take great portion for little loss of short fiber during the procedure [2].

Medical dressings based on weft plain stitch show great strength. Alginate is non-toxic and aids in homeostasis as a part of the wound healing process. Medical dressings of alginate fiber cotton blended yarn are a contact dressing. The alginate

fiber insides will form one gel layer after absorbing the effusion and the gel can separate the wound from the dressings. Cotton fibers provide enough strength to maintain the shape and they are suitable to clad the wound. Viscose is also applied in medical dressings. It is often combined with non-woven materials with higher hygroscopicity to separate the wound from short fibers of non-woven materials.

Ordinary weft rib stitch has great elasticity and extensibility when stretching along the transverse direction. And it is difficult to generate edge-roll. While jacquard stitch, which is a combination of mesh stitch and rib stitch, has properties like clear patterns, stable and thick structures, as well as lower extensibility and raveling property. And the different sizes of mesh can obtain better breathability and moisture permeability. Jacquard stitch mixes the advantages of the structures above and greatly satisfies the requirements of medical dressings [2].

Knitting technology is one of the future developments of high-tech medical textiles research and application, especially cell scaffolds in tissue engineering disciplines. The knitted medical textiles are a popular trend in technical textiles, with high added value and high technology content. A large number of structures and materials are continuously being developed to meet the requirements for medical applications. However, there are still challenging issues for those devices that are implanted in human body, since some textiles have shown tendencies to cause rejection reaction and device failure after long-term use. With increase in aging population, large number of injuries and a demand for higher quality of life, a wide range of knitted medical textiles and materials are required to fulfill some vital requirements in medical areas.

To conclude, knitted fabrics form a small part of the medical textiles, but are widely applied in high-tech medical textiles, containing artificial blood vessels, hernia patches, cardiac support devices, knitted medical expandable metallic stents and tendon scaffolds. The knitted textiles are popular for their loose structure, greater flexibility, higher porosity, more flexible structure and better forming technology.

REFERENCES

1. Medical fabric and technologies [Electronic resourse].-Electronic data. Mode of access: https://www.atextechnologies.com/medical-textile-what-we-do/medical-fabric-and-technologies/knitting-surgical-mesh/ – Title of the screen

2. Application of knitting structure textiles in medical areas [Electronic resourse].-Electronic data. Mode of access: https://www.researchgate.net/publication/321207804_Application_of_Knitting_Structure_Textiles_in_Medical_Areas – Title of the screen