

Biomedical Textiles

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What are Biomedical Textiles?

They are textile products for medical and biological use. The materials are used for things such as first aid, clinical, or hygienic purposes.



Woven and knitted materials are used extensively in bandages, vascular grafts and hernia meshes.

Examples of Types of Use:

- Protective and Healthcare: Surgeon's clothes, operating drapes, staff uniforms
- External Body Devices: Bandages, pressure garments, wound dressings
- Implantable Materials: Sutures, vascular grafts, artificial ligaments
- Hygienic Products: sanitary napkins, diapers
- Extracorporeal Devices: artificial liver, kidney, lung ...

Design Factors

Factors when designing a biomedical textile:

Function: needs to readily fulfill the purpose example: cotton swabs require absorbent textile sutures require biodegradable textile

Biocompatibility: reaction of textile to the internal or external body environment example: artificial ligament react with blood cells vs. external bandage contacts outer skin tissue

Cost: raw material, manufacturing process example: cotton swabs vs. vascular grafting

Future Developments

Auxetic fibers -controlled drug delivery in means of a bandage made of polymers such as polypropylene and nylon and used in fabrics that are projected for use in wounds that swell. As the wound swells, the auxetic bandage does as well. The inner "voids" of the bandage would release the healing agent during the healing process and once it begins to heal, the bandage will contract and the healing agent will stop being released.

Shape-memory- are looking to be significant in the future for stents (A stent is a wire mesh tube used to prop open an artery during angioplasty) and sutures. As the name implies these materials store a permanent shape to memory as well as maintain their temporary shape, so that when they are in the compressed temporary form, they can be inserted into the body through a small incision and then upon reaching body temperature would change to the permanent shape

Future Developments (continued)

Electronics- incorporating mini electronic device into textile implants, such as monitors in artificial arteries, stents, and heart valves. Their function would be to act as warning devices that would trigger an electric impulse or a release of drugs to overcome the problem long enough to get to the hospital

Controlled drug delivery- drugs are added onto the biodegradable fabrics that would gradually release as the fabric breaks down