

Analyze the Properties of Different Surgical Sutures

Authors : Doaa H. Elgohary, Tamer F. Khalifa, Mona M. Salem, M. A. Saad, Ehab Haider Sherazy

Abstract : Textiles have conquered new areas over the past three decades, including agriculture, transportation, filtration, military, and medicine. The use of textiles in the medical field has increased significantly in recent years and covers almost everything. Medical textiles represent a huge market as they are widely used not only in hospitals, hygiene, and healthcare but also in hotels and other environments where hygiene is required. However, not all fibers are suitable for the manufacture of medical textile products. Some special properties are required for the manufactured materials, e.g. Strength, elasticity, spinnability, etc. In addition to the usual properties of medical fibers, non-toxicity, sterilizability, biocompatibility, biodegradability, good absorbability, softness, and freedom from additives, etc., desirable properties include impurities. Stitching is one of the most common practices in the medical field. as it is a biomaterial device, either natural or synthetic, used to connect blood vessels and connect tissues. In addition to being very strong, suture material should easily dissolve in bodily fluids and lose strength as the tissue gains strength. In this work, a study to select the most used materials for sutures, it was found that silk, VICRYL and polypropylene were the most used materials in varying numbers. The research involved the analysis of 36 samples from three different materials (mostly commonly used), the tests were carried out on 36 imported samples for four different companies. Each company supplied three different materials (silk, VICRYL and polypropylene) with three different gauges (4, 3.5 and 3 metric). The results of the study were tabulated, presented, and discussed. Practical statistical science serves to support the practical analysis of experimental work products and the various relationships between variables to achieve the best sampling performance with the functional purpose generated for it. Analysis of the imported sutures shows that VICRYL sutures had the highest tensile strength, toughness, knot tensile strength and knot toughness, followed by polypropylene and silk. As yarn counts, weight and diameter increase, its tensile strength and toughness increase while its elongation and knot tension decrease. The multifilament yarn construction (silk and VICRYL) scores higher compared to the monofilament construction (polypropylene), resulting in increases in tenacity, toughness, knot tensile strength and knot toughness.

Keywords : biodegradable yarns, braided sutures, irritation, knot tying, medical textiles, surgical sutures, wound healing

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