

Fibrin and Cyanoacrylate Adhesives for General Surgeries: A Review

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Abstract

Over 7 million traumatic lacerations occur in the United States each year; between 26 and 90 million surgical incisions require closure each year as well. Traditionally wounds have been closed with sutures; however, tissue adhesives have seen augmented use in the clinical setting due to their rapid and painless application, reduced cost, and their lack of removal surgery. Whereas sutures mechanically hold a wound together, tissue adhesives chemically bond the wounded tissues. Fibrin adhesives mimic the coagulation cascade in order to promote wound closure. Cyanoacrylates polymerize and the resulting film closes the wounded tissue edges together. Tissue adhesives lack comparable tensile strength to sutures and cosmesis studies have not conclusively determined whether tissue adhesives restore physical appearance better than sutures. Overall, the advantages of tissue adhesives make them clinically significant and improving tensile strength and cosmesis outcomes will further increase tissue adhesive usage.

1. Introduction

Over 7 million traumatic lacerations occur in the United States each year [1]; between 26 and 90 million surgical incisions require closure each year as well [2]. Suture materials are required in order to keep wounds together until the wound is sufficiently healed [3]. Traditionally, wounds have been closed with sutures [4]; and currently tissue reconstruction and wound closures rely on sutures and staples in surgical procedures [5].

1.1. Wound Healing

Skin serves as a protective barrier against outside bacteria and other infectious agents, and when it is wounded, the skin must be rapidly and efficiently mended [6,7]. When tissue is injured it causes the disruption of blood vessels and the extravasation of blood constituents [7]. The three phases of wound healing are: inflammation, tissue formation, and tissue remodeling (Fig. 1) [7].