

# **Comparative evaluation of absorbable hemostats: Advantages of fibrin-based sheets.**

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## **Abstract:**

Bioactive hemostats and wound dressings consist of either inherently active materials or act as delivery vehicles which contain such materials. Fibrin is a natural hemostat and scaffold, guiding the direction of wound contraction and closure. In order to improve the ease of application of liquid fibrin glue, we have made a freeze-dried form of polymerized fibrin that supports hemostasis and wound healing. The bleeding from the middle ear artery of rabbits was found to be arrested instantaneously on application of fibrin sheets, even when the animal was heparinized systemically. As the fibrin sheet was found to be fragile, gelatin was incorporated to the sheet and thus the mechanical stability was improved without compromising the hemostatic effect. The efficacy of the fabricated fibrin and fibrin-gelatin sheets to seal traumatized rat liver was compared with commercially available hemostats, Abgel (cross-linked gelatin) and Surgicel (cross-linked cellulose). Tissue compatibility of all the hemostats was studied by analyzing the liver tissue 15 days after application. While the hemostatic effect was best with fibrin and fibrin-gelatin sheets, both Surgicel and Abgel were not capable of arresting the bleeding quickly. Gross analysis of tissue on the 15th day of application, visibly, Abgel was not only degraded but resulted in severe adhesions of internal organs and histologically capsule formation around the implant was evident. Though Surgicel was also seen as cream soft material on the site of application that joined two pieces of liver, there was no adhesion of other internal organs and histologically, immune reaction and foreign-body-type giant cells were present in large amounts. Fibrin was not found grossly on application site whereas fibrin-gelatin was seen as a small white spot. Granulation tissue formation and cell migration into the

fibrin-based sheets were evident, and therefore, fibrin-based sheets are not only efficient hemostats but showed optimum degradation and wound healing. © 2004 Elsevier Ltd. All rights reserved.