

The influence of Suprasorb® C and Suprasorb® P on angiogenesis and matrix metalloproteinases in pressure sores

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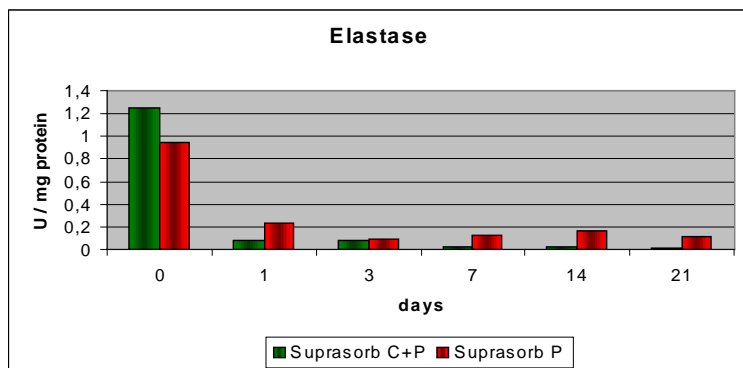
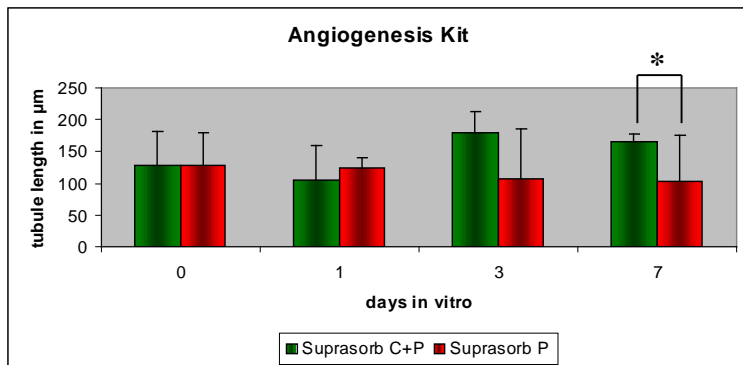
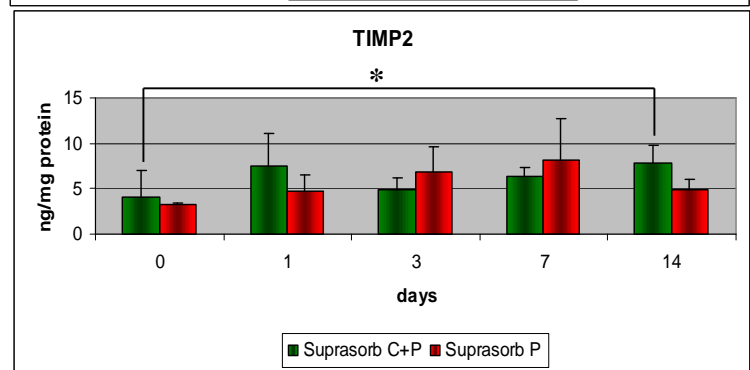
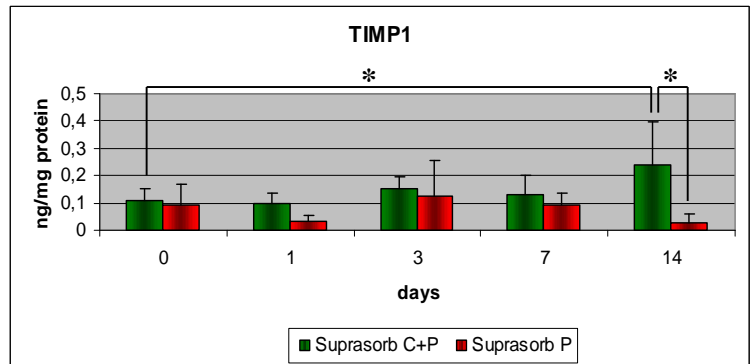
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Aims: Chronic wounds are becoming a growing entity in wound management. Proteases like elastase and plasmin are of great importance in wound healing, especially because of their involvement in angiogenesis. Matrix metalloproteinases (MMP) and their physiological inhibitors, the tissue inhibitors of metalloproteinases (TIMPs), play significant roles in angiogenesis and therefore as well in wound repair. In this study, the concentration and expression of MMP-2, -9, TIMP-1 and -2 and activity of gelatinase, plasmin, and elastase were determined in wound fluid of patients with pressure sores. The influence of wound fluid of patients treated with Suprasorb® C and Suprasorb® P on angiogenesis was also evaluated.

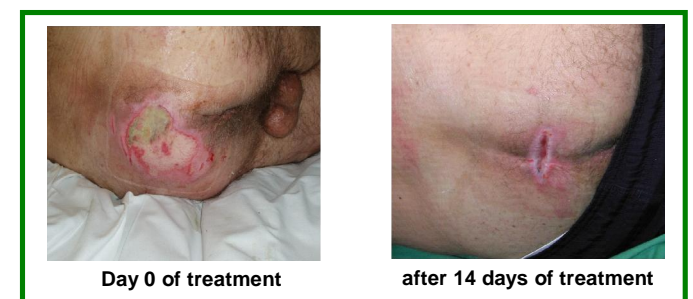
Methods:

In order to determine the influence of Suprasorb® C, a bovine collagen matrix, on wound healing two groups of patients with chronic wounds were set up. 5 patients received wound dressing using Suprasorb® P, a PU foam dressing (group A) whereas in 5 different patients wounds were dressed by the combination of Suprasorb® C and Suprasorb® P (group B). Wound fluid was collected before treatment (day 0), and at day 3, 7, 14, and 21. Wound status and wound size were documented. Wound fluid was collected by application of a non-adherent, absorbent wound dressing which was cut to fit and placed on the wound for 6 hours. The dressing was fixed by an occlusive foil. Wound dressing remained at -80°C after removing from the wound. The concentration of MMP-2, MMP-9, TIMP-1, and TIMP-2 was measured using ELISA-Kits (Oncogene Research Products, Boston, MA). Gelatinase-activity, elastase and plasmin were specified by an activity assay (Chemicon Int.). The influence of wound fluids on angiogenesis was evaluated using an angiogenesis kit (Stem cell Technologies). Significance testing was performed using a repeated measures ANOVA.



Suprasorb P

Suprasorb® P treatment on a hard to heal ulcer. On the left side the patient's left heel after split skin grafting. On the right side a nearly healed ulcer after 21 days of treatment with Suprasorb® P.



Suprasorb C+P

Combined Suprasorb® P and Suprasorb® C treatment on a gluteal pressure sore. On the left side the patient after treatment with antimicrobial dressings. On the right side a nearly healed ulcer after 14 days of treatment with Suprasorb® P and Suprasorb® C.

Results and Conclusion:

Both groups presented a positive wound healing in regular healing time. A significant difference was noticeable regarding gelatinase-activity. The combination of Suprasorb® C and Suprasorb® P (group B) showed a decreasing gelatinase activity over time compared to group A. Wound fluids from patients in group B had a more positive effect on angiogenesis than wound fluids from group A (p<0.05). After day 14 the results become inconclusive. This is due to a lower number of patients in group B beyond the 14th day. In most of the patients treated with Suprasorb® C and Suprasorb® P (group B) wound closure occurred between day 14 and day 21. Therefore faster wound closure was achieved in group B. These results support new achievements in wound therapy.