# Comparison of a collagen membrane versus a fibrin sealant after a peroneal nerve section and repair: a functional and histological study.

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## Abstract:

BACKGROUND: To date, fibrin sealant is considered to be one of the most effective substitutes to prevent post-operative fibrosis and to limit neuroma formation after nerve suture. Because fibrin sealant presents a number of drawbacks, more suitable techniques should be considered. The aim of this study was to functionally and histologically compare the efficiency of a fibrin sealant to a resorbable semi-permeable porcine type I collagen membrane after a peroneal nerve lesion and repair on rats.

METHODS: Rats were divided into four groups: (1) a SHAM group (n=10) in which surgery was performed without damaging the nerve, (2) a LESION group (n=15) in which the nerve was cut and immediately sutured without additional treatment, (3) a MEMBRANE group (n=30) in which a collagen membrane was wrapped around the lesion site, and (4) a GLUE group (n=30) in which the peroneal nerve was coated by fibrin sealant. Peroneal Functional Index (PFI), kinematic analysis of locomotion, muscular atrophy, axonal regrowth, and irritant ranking score (IRS) were performed during three months post-surgery.

RESULTS: Our results indicate that at the third month post-surgery, no difference in both the functional recovery and the histological measurement was observed between groups. However, no deleterious effect was observed following the use of the collagen membrane. Indeed, the porcine

membrane was well-integrated into the host tissue, with no noticeable foreign body reaction at three months post-surgery.

CONCLUSION: Our preliminary results highlight the fact that the collagen membrane could be used as an alternative to fibrin sealant in peripheral nerve repair surgery. Indeed, animals in which the collagen membrane was used to wrap the lesion site exhibited similar functional and histological results as animals in which a fibrin sealant was used to coat the lesion. The greatest advantage of this membrane is that it could be used as a drug delivery device, regulated by its degradation rate.