

Novel implantable composite biomaterial by fibrin glue and amniotic membrane for ocular surface reconstruction.

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Abstract:

Amniotic membrane transplantation (AMT) is considered a substantial treatment option in the management of ocular surface disorders. However, several inherent drawbacks still remain. The present study devised a novel implantable composite biomaterial of fibrin glue-double layer Amniotic membrane (AM) and evaluated the biomechanical properties and effects on corneal surface reconstruction in alkali-burned rabbit model. Biomechanic parameters were calculated by an electronic universal testing machine. Corneal alkali burning was done in the right eyes of thirty rabbits, which were randomized into three groups of ten animals each. The eyes in group 1 underwent fibrin glue-double layer AMT, the eyes in group 2 underwent ordinary single layer AMT, and the eyes in group 3 (control group) did not undergo any surgical procedure. Healing of corneal epithelial defect, extent of corneal vascularization and corneal clarity were assessed and compared at two time points. One month after surgery, animals were killed and the eyes were processed for histopathology. The fibrin glue-double layer AM composites had more ideal biomechanical properties. In fibrin glue-double layer AM group, the rate of epithelial healing, vascularization inhibition and corneal clarity was significantly better than the other two groups. Novel fibrin glue-double layer AMT with corneal alkali burns is more effective and useful for ocular surface reconstruction and has great potential applications.

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