

# Elastic modulus, permeation time and swelling ratio of a new porcine dermal collagen membrane.

呂炫?,李勝揚

Hsein-Kun Lu;Shan-Yang Lee;Fon-Pih Lin

## Abstract

The goal of a single step therapy has been an important consideration in the development of guided tissue regeneration devices. It would spare the patient from the need for repeated surgery and eliminate many problems associated with a non-resorbable barrier. Animal studies of a collagen membrane extracted from porcine dermis (PDCM), as conditioned by different concentrations of glutaraldehyde (GA), have shown it to be biocompatible and biodegradable (up to 9 wk). This in vitro study further investigated the physical properties of this membrane. A PDCM modified and cross-linked with various concentrations (0.01%, 0.05% and 3.00%) of GA was used. A similar control series was not conditioned. At least 4 specimens for each experimental condition were prepared. The elastic modulus (EM) was measured by a universal testing machine. In the permeability test, Al<sub>2</sub>O<sub>3</sub> particles of different sizes (5-23 microns) were mixed with normal saline to make 5 v/v% suspension and the time needed for collecting 7.5 ml of the filtered suspension from 10 ml suspension was recorded. Swelling ratio ( $\gamma$ ) was also measured according to  $\gamma = 1/V_f$  (volume fraction). Data were analysed using ANOVA and Tukey's LSD test. The EM (40.8 +/- 3.8 gf/mm<sup>2</sup>) for the GA conditioned membranes showed no significant difference but was greater ( $p < 0.05$ ) than that of the control. There was a significant increase (100-300%) in the permeation time with GA concentration (control 0.168 vs. 3% GA 0.100). The results suggest that the physical properties of the GA conditioned PDCM (especially in 3%) may fit the clinical requirements of membrane materials used in guided tissue regeneration techniques.