

SCIENCE FLASH

Membrane Flex™ shown to exceed many of the performance characteristics of Bio-Gide® in a comparative study of resorbable collagen-based membranes for dental surgery.

RESEARCH QUESTIONS

1. How do Membrane Flex™ and the Bio-Gide® dental membrane compare in terms of conformability and mechanical strength?
2. How does Membrane Flex™ perform *in vitro* and *in vivo* compared to the Bio-Gide® dental membrane?

METHODS

1. Samples of both Membrane Flex™ and Bio-Gide® were micrographed with an SEM, and tested for hydroxyproline content, suture pullout strength, conformability, hydrothermal shrinkage temperature, SDS-PAGE and *in vitro* collagenase digestion.
2. *In vivo* studies were performed using rats and New Zealand white strain rabbits. Rats had samples of each membrane implanted in their upper/mid back region while rabbits had membranes implanted into opposing sides of their maxilla gum tissue. Both sets of animals were then sacrificed at predetermined time points and had their implants analyzed and evaluated using standard histological techniques.

RESULTS

- Both sides of Membrane Flex™ were smooth compared to Bio-Gide®, which had one fibrous and one smooth side. Membrane Flex™ was also slightly denser.
- Both membranes functioned similarly in degradation—*in vitro* and *in vivo*.
- Membrane Flex™:
 - Showed higher pullout strength than Bio-Gide®. (Table I)
 - Had a higher temperature at shrinkage onset than Bio-Gide®. (Table I)
 - Showed lower inflammation and giant cell scores than Bio-Gide® during the first eight weeks after implantation. (Figure 1-2)
 - Was more stable at the intra-oral implantation site than Bio-Gide®. (Figures 3-4)

CONCLUSIONS

- Thanks to its smooth sides, Membrane Flex™ should be simpler to use during implantation since it doesn't require surgeons to identify the correct membrane side.
- Membrane Flex™ has a less varied resorption and new collagen deposition profile and appears to maintain barrier function longer than Bio-Gide® during early guided tissue regeneration (4 weeks).
- Because it elicits a lower inflammation and foreign body giant cell response than Bio-Gide® during the early post-op healing period, using Membrane Flex™ may result in enhanced tissue integration and less scarring.

Performance/Characteristic Parameter	Membrane Flex™	Bio-Gide®
Suture Pullout Strength	953 ± 110g	330 ± 120g
Hydrothermal Shrinkage Temperature (T _s)	56 ± 1°C	45 ± 3°C

Table 1: Results of *In Vitro* Characterization Studies

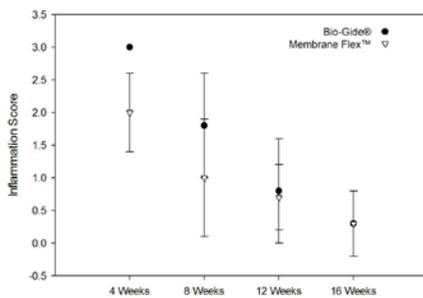


Figure 1: Evaluation of *in vivo* inflammation response to Membrane Flex™ and Bio-Gide® by histological score system. (3: Extensive infiltrate; occupies a large portion of implant and/or surrounding area, 2: Moderate infiltrate; multiple foci within or surrounding the implant or a large amount in a focal area, 1: Minimal infiltrate; occasional foci or one small focal area containing inflammation, 0: None).

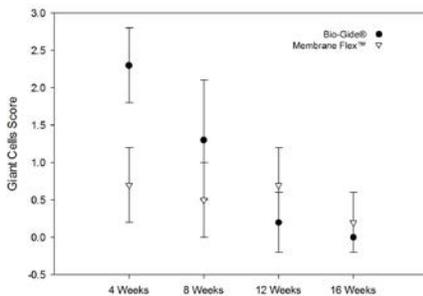


Figure 2: Evaluation of *in vivo* giant cell response to Membrane Flex™ and Bio-Gide® by histological score system. (3: Extensive infiltrate; occupies a large portion of implant and/or surrounding area, 2: Moderate infiltrate; multiple foci within or surrounding the implant or a large amount in a focal area, 1: Minimal infiltrate; occasional foci or one small focal area containing inflammation, 0: None).

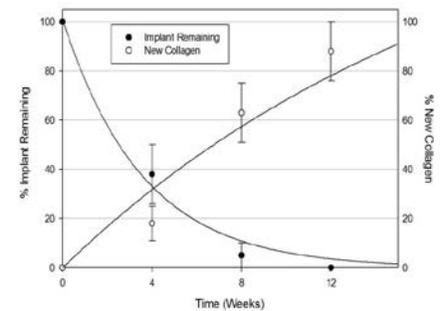


Figure 3: Plot of % implant remaining and % new collagen for Membrane Flex™.

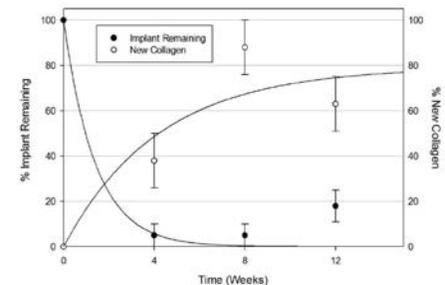


Figure 4: Plot of % implant remaining and % new collagen for Bio-Gide®.

REFERENCE:

Li ST, Yuen D, Martin D, Shishido Lee N. A Comparative Study of a New Porcine Collagen Membrane to Bio-Gide®. Data on file at manufacturer.

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Membrane Flex™ is manufactured by Collagen Matrix, Inc.