ELECTROSPINNING® COMPANY

Your Next Generation Dental Membrane

Could electrospun membranes be used in dentistry for guided bone regeneration (GBR) and/or guided tissue regeneration (GTR)?

Could this lessen the destructive effects of periodontal diseases?

Firstly, what are the key facets that surgeons and product designers are looking for? These include:

- Cell occlusivity.
- Closure membrane.
- Resorbable functional barrier.
- Retains integrity to support long-term healing.
- Minimal inflammation.
- Appropriately sized.
- Easy to handle.
- Good suture retention strength or easily tucked.
- Conformity to wound site.

Is Electrospinning Technology the solution? Well, nothing is usually that straightforward, but here's what we do know:

Materials

The electrospinning process is suitable for thermoplastic polymers and elastomers. A wide range of degradable and non-degradable polymers used in medical devices can be electrospun including Polycaprolactone (PCL), Polyethylene, Terephthalate (PET) and Polyurethanes (PU). These polymers can be spun individually or blended to control degradation, mechanical properties and physical properties including handling.

Architecture

A membrane with different layers of architecture can be beneficial. The bone-facing side could have a more open porous architecture to facilitate both growth and angiogenesis. And the top soft-tissue layer could be denser with low pore sizes to make it occlusive to epithelial cells but allow adhesion and tissue growth to heal the soft tissue.

Hybrids

Hybrids could help facilitate the healing process. Matching degradation and healing of tissue can be tricky. Electrospinning facilitates incorporation of biomolecules such as collagen, hyaluronic acid and growth factors which all improve healing. The bone-facing layer could be incorporated with materials like hydroxyaptetite to promote osteogenesis.

Coating

Why not coat an existing membrane with a thin layer of electrospun material? The technology allows coating of existing products to further improve membrane performance.

Scale

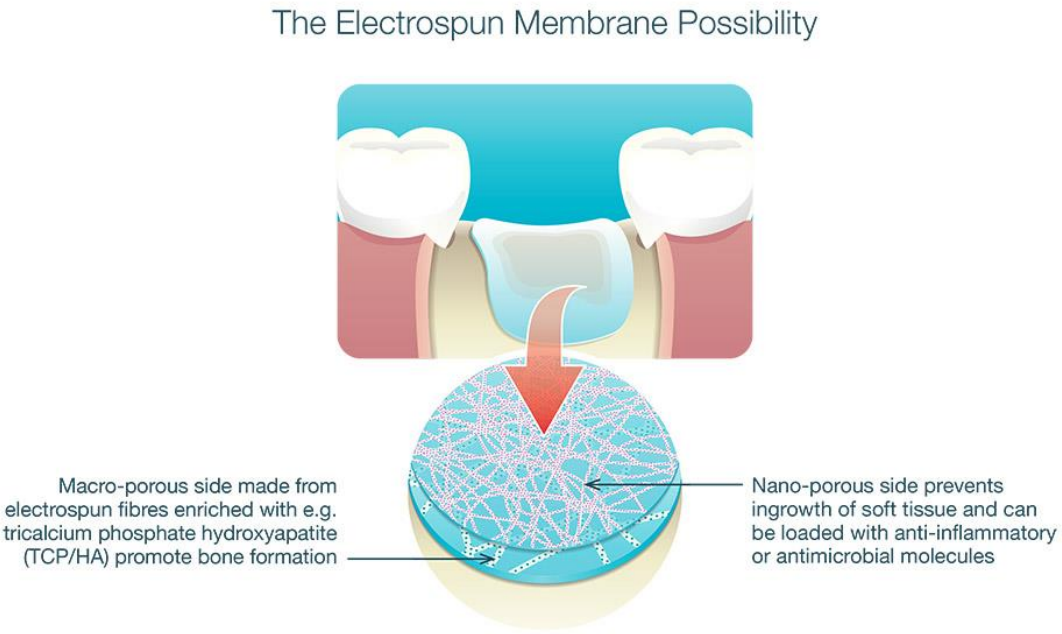
Thanks to the innovation in electrospinning technology, large batches of synthetic membranes can be manufactured at a scale hard to match by decellularised porcine pericardium (I.e., Bio-Gide, Geistlich). In addition, the industrial scale manufacturing limits batch variation and is unaffected by ethical reservations using porcine tissue. Finally, due to the scale of manufacturing, membranes can be more affordable and accessible to a larger number of patients.

Anti-infective

Real story:

Afyx Rievelin® an oral electrospun patch has a drug-delivery layer which possesses a unique structure made of nanoscale and microscale fibres with high porosity and surface area, which facilitates patch adhesion to the mucosal lining. The adhesiveness of the layer only manifest when in contact with a moist surface, minimizing the risk of drug exposure elsewhere when handling the patch.

The drug is incorporated into the fibres during manufacturing, and it is released after application to the site in need. This results in a prolonged interaction with the tissues and a sustained release, which enhances drug bioavailability. The product demonstrated human safety in clinical trials.



So, are you convinced? Whether you are developing a new membrane or looking to improve an existing one, it might be worth talking to us.