



The application of marine Omega-3 acellular dermal matrix (ADM) for the management of CLTI – the Asian experience

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Introduction: Being rich in omega 3 polysaturated fatty acid, marine omega-3 acellular dermal matrix (ADM) has positioned an unique vantage point over many cellular and tissue-based products, either bioengineered or mammalian in origin. Apart from being natural, another key benefit is it's enhancement to the host's antimicrobial properties, one that is usually lacking or hampered in chronic wound healing complicated by diabetes mellitus.

Case description: 72 year-old Chinese female presented with bilateral 5th toe gangrene with symptomatic rest pain. Pmhx: T2DM, IHD, ESKD, Parkinson disease, type 2 RF. Arterial duplex of the right lower limb revealed diffused calcification in CFA, SFA and popliteal; and occlusion in both ATA and PTA. Contralaterally, there are multi-foci area of stenosis in popliteal, PTA and peroneal. Bilateral toe-brachial index (TBI) is 0.34 (Right) and 0.29 (left) 0.29 respectively.

Results: Patient underwent bilateral 3-5th ray amputation with POBA of right ATA and recanalization of right PTA; and POBA of left peroneal artery. Revisional Lisfranc amputation of the right foot was performed after the 1st and 2nd toe turning ischemic with abscess collection. Patient also received 6-weeks of culture-directed IV piperacillin/tazobactam. NWPT was used continuously for 11-weeks and discontinued after healthy granulation wound bed was achieved (Fig A). STSG was initially planned but was put on hold till stabilization of contralateral limb. After deliberate consideration, decision was made to apply marine omega-3 acellular dermal matrix (ADM).

A total of 2 applications of marine omega-3 ADM was applied over 10 days (Fig B-D). Following this, the dressing regimen was replaced with hydrofiber-based wound dressing (Fig E). Total wound closure was achieved in 24-days from the initial application of marine omega-3 ADM (Fig F).

Discussion: The use of marine omega-3 acellular dermal matrix (ADM) accelerates wound healing. Faster wound closure decreases perioperative complications, length of hospitalization and ultimately reduced financial burden to the patients.

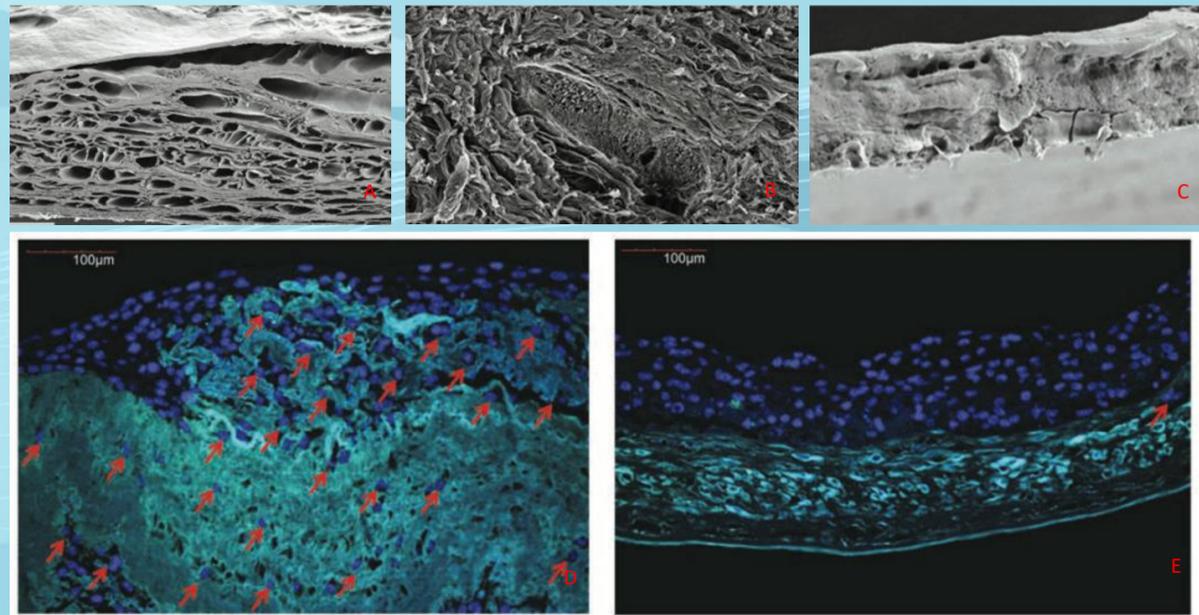


Figure 1 Cross-sectional images under scanning electron microscope (SEM) of Marine omega-3 ADM (A), Normal human skin (B), Human amnion/chorion membrane allograft. Stem cells (stained blue and marked with arrows) migration and proliferation seen within porous architecture of marine omega-3 ADM (D) while stem cells largely resided on the exterior surface of the amniotic membrane (E) Adapted from Winters. Fish skin to heal wounds. Podiatry Management. Dec 2018: 119-123

Features of Marine omega-3 ADM (Kerecis, Iceland)

- Derived from Atlantic cod
- Rich in Omega 3 fatty acid DHA & EPA
- Similar in microstructure with human skin than human amnion/chorion-derived membrane or bovine/porcine derived skin substitute [Fig 1A-C]
- Porous micro-architecture promotes stem cells ingrowth (Fig 1 D)

