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PRS GLOBAL OPEN VIEWPOINT

Staying on the Cutting Edge

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Plastic Surgery is definitively the single most diverse surgical field in medicine today. Our scope of practice involves anything from the correction of pediatric cleft lip and palate deformities to free autologous tissue reconstruction and anything in-between. We are not defined by any certain organ system, rather we are characterized by a set of principles that guide us through the solution of complex problems. Our multifaceted approach to complicated issues is what sets our specialty apart. Given the vast exploratory and innovative nature of our specialty, the ebb and flow of staying ahead is challenging. As Plastic Surgeons, we should continue to perpetuate and broaden our field into new territories. Namely, we have the capability, capacity, and expertise to broaden our reach into the field of biomaterials for wound healing.

Chronic wounds in the United States represent an immense problem, affecting an estimated 6.5 million people in this country.[1] The economic impact of this issue amplifies the need for a more definitive and cost-effective approach to wound healing, as it has been estimated that more than $25 billion per year is spent on the treatment of chronic wounds alone.[2] Surgical debridement is often the backbone for the treatment of chronic wounds, but can we do more? The successful treatment of chronic wounds requires an understanding of the biology and physiology of the issue, so that a more tailored and efficacious approach can be executed.

We have the ability to change the biology of wounds and accelerate the wound healing process in a cost-effective manner, and thus, we, as plastic surgeons, should utilize this ability.[3,4] Extracellular matrix (ECM) is the largest component of the dermal skin layer, and its synthesis plays an integral role in wound healing. In more acute wounds, the provisional matrix contains proteins that provide a scaffolding to guide cells into the injury and aids in the synthesis of a new extracellular matrix. Chronic wounds, in contrast, are often characterized by increased levels of inflammatory cells that are associated with elevated levels of proteases. These proteases were found to degrade the constituents of the ECM, such as its growth factors and receptors, leading to delayed wound healing. Re-establishing a functional ECM in chronic wounds can change the biology of these wounds to facilitate healing. Multiple regenerative ECM materials have been developed as a solution to this problem. More recently, extracellular vesicles derived from mesenchymal stem cells have been investigated as new tools for regenerative medicine, with studies thus far noting accelerated wound healing, decreased scar formation, and the ability to promote angiogenesis.[5]

The usefulness of integrating a more biological approach in the treatment of chronic wounds has sparked new and exciting research in the field of regenerative medicine, and, as Plastic Surgeons, we have a duty to explore and incorporate this element of healing into our armamentarium. Reaching into the field of biomaterials will continue to keep our specialty at the forefront of innovation and help optimize the care our patients need.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

REFERENCES

1. Sen CK, Gordillo GM, Roy S, et al. Human skin wounds: A major and snowballing threat to public health and the economy. *Wound Repair Regen.* 2009;17:763–771.
2. Services UDoHaH. Guidance to surveyors for long term care facilities. *Guidance to Surveyors for Long Term Care Facilities on World Wide.* Centers for Medicare and Medicaid Services; 2004. Available at https://doi.org/www.cms.hhs.gov//.
3. Schultz GS. Extracellular matrix: review of its roles in acute and chronic wounds. 2005. Available at http://www.worldwidewounds.com/2005/august/Schultz/Extrace-Matric-Acute-Chronic-Wounds.html. Accessed December 5, 2020.
4. Sasse KC, Ackerman EM, Brandt JR. Complex wounds treated with MatriStem xenograft material: Case series and cost analysis. *OA Surg.* 2013;1:3.
5. Hong P, Yang H, Wu Y, et al. The functions and clinical application potential of exosomes derived from adipose mesenchymal stem cells: a comprehensive review. *Stem Cell Res Ther.* 2019;10:242.

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Received for publication December 29, 2020; accepted January 21, 2021.

Plast Reconstr Surg Glob Open 2021;9:e3475; doi: 10.1097/GOX.0000000000003475; Published online 24 March 2021.