A Revolutionary Portable Electrospinning Device to Produce Customized Wound Dressing

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The annual incidence of wounds stands at 8 cases per 1000 population-wide, which is higher than that of cancer, diabetes and cardiovascular diseases. Despite the considerable progress that has been made recently, wound healing remains a challenge and the development of novel treatments remains a priority of research.

Wound management contributes to the healing process by protecting wound fluids, preventing/managing infection, controlling mechanical influences, and impacting the collagen maturation process. Wounds and especially chronic wounds have become a major public health issue in the United States and abroad. Patients with chronic wounds, often including the elderly, usually suffer from cardiovascular diseases and other comorbid conditions, and are at additional risk for further complications.

This results in additional health care expenditures; for example, the United States alone spends $25 billion annually on chronic wounds and the demand for wound care is increasing. Current strategies of wound care offer limited relief to almost 8 million patients who suffer from burns or chronic skin ulcers. However, much effort has been made in this field and research is ongoing on the production of dressings that could prove more effective in blood clotting and wound healing.

One of the most significant deficiencies of present dressings is their limitation to wounds with certain diameters, depths, and stages of wound healing. Thus, in confronting large and deep scars, there seems to exist a serious lack of suitable dressing.

Electrospinning as a technical and industrial method that uses a high-voltage electrostatic field to stretch polymer solutions or melts by forming continuous fibers through solvent volatilization or melt solidification is widely used to prepare fiber wound dressings. The

portable SpinCare™ wound dressing system is a handheld electrospinning device for bed-side, on-the-spot wound dressing, creating customized, nanofibrous dressing for all geometries and wound contours. It is perfect for the treatment of skin breaches such as partial and intermediate-thickness wounds, abrasions, superficial burns, donor site wounds, surgical incisions and dermatological lesions or ulcers.

SpinCare™ is a prototype developed by WoundCure project. This project is coordinated and performed by NICAST. This company is a pioneer in the development of implantable medical devices made of electrospun polymer nano fabrics. NICAST's unique and patented electrospun dressing manufacturing technology is the focus of the WoundCure project and the SpinCare system. With an overall budget of € 3 billion and significant contributions made by the EU, the project is operated under the H2020 project.

SpinCare™ wound dressing system.

The system is activated from a distance with no contact between the caregiver and the wound, which renders important advantages in alleviating the infection. The SpinKit™ solution kit includes a disposable solution pre-filled sterile syringe intended for single patient use. The solution has demonstrated an effective and homogenous dressing process, while the nanofibers have a multi-size distribution. Shelf life is 11 months at the moment, but the group are still working to increase it to 24 months.

The pre-clinical and preliminary clinical performance of the SpinCare indicate a number of distinct advantages such as fitting difficult anatomical regions, easy-stick/easy-peel properties, seal/breathe and anti-bacterial characteristics, transparency, and easy wound assessment without removal.

An article in Advances in Wound Care describes the tests performed and concludes that the device can be employed for different formulations and materials. A major bonus is its

customizability to the characteristics of the target wound at the various stages of wound healing.

Today, the SpinCare Device is fully developed, has successfully completed validation and verification and is CE marked. The SpinCare System is easy to use, with a clear, safe and controlled process and safety features. Industrial and mechanical designs are finalized. NICAST continues to invest in generating more clinical data to support the upcoming product launch. In parallel, the company is in the process of moving towards mass production.

The ground-breaking SpinCare dressing is a promising product that brings to the market a tailored bedside-made dressing with phenomenal characteristics contributing to the healing process and possesses multiple applications. The future impact of the SpinCare system throughout healthcare will be immense.