



## Enhancing wound healing with growth factors

Stephen C. Adler, MD<sup>a,b,\*</sup>, Kriston J. Kent, MD<sup>c,d</sup>

<sup>a</sup>*Department of Otorhinolaryngology and Bronchoesophagology, Temple University School of Medicine, 3400 North Broad Street, Philadelphia, PA 19140, USA*

<sup>b</sup>*Adler Facial Plastic Surgery, 900 East Ocean Blvd., Suite 338, Stuart, FL 34994, USA*

<sup>c</sup>*Division of Facial Plastic and Reconstructive Surgery, University of Florida School of Medicine, P.O. Box 100264, Gainesville, FL 32610-0264, USA*

<sup>d</sup>*Naples Facial Plastic Surgery, 1660 Medical Blvd., Suite 100, Naples, FL 34110, USA*

The concept and use of surgical glues and tissue adhesives is not new. Surgical glues have been used in Europe and Canada for more than 10 years. During the Vietnam War, quick sealing glue was used to treat battlefield wounds with much success. Modulation and enhancement of wound healing through the use of platelet-rich plasma (PRP) with growth factors continues to raise the interest of the medical community and is a fast-growing, innovative field in medicine. Unlike fibrin glue and other commercial products, PRP contains an abundance of growth factors and bioactive agents that are well known to enhance the healing process and tissue regeneration in bone and soft tissue surgery. Growth factors, such as growth hormone (GH), epidermal growth factor (EGF), fibroblast growth factor (FGF), platelet-derived growth factor (PDGF), and transforming growth factor  $\beta$  (TGF- $\beta$ ) have all been shown to enhance wound healing [1]. New technology used in the preparation of PRP has simplified, revolutionized, and improved the platelet harvesting process while preserving platelet viability with its bioactive properties. Tissue glues are being used in many surgical specialties including facial plastic surgery, cardiovascular surgery, orthopedic surgery, neurosurgery, thoracic surgery, and plastic surgery, among others. In the next decade, the use of tissue adhesives and platelet-rich plasma will revolutionize the art of surgery by enhancing the healing process while replacing sutures in many of the oper-

ations performed in this and other countries. This article presents the principles of wound healing and growth factors, definitions/terminology, differences between PRP with growth factors and fibrin glue, preparation methods of platelet rich plasma with growth factors (PRP), and the clinical benefits in facial plastic surgery in over 3 years of experience.