The prevalence of chronic wounds is closely correlated to the aging population and so-called civilizational diseases. Therefore, they are causing morbidity and mortality of millions of patients worldwide, with an unbroken upward trend. As a consequence, chronic wounds induce enormous and rapidly growing costs for our health care systems and society in general. Thus, medically effective and cost-efficient treatment methods are urgently needed. Methods of 'regenerative medicine' might offer innovative scientific solutions, including the use of stem cells, growth factors and new bioactive materials. These tools are experimentally well described but clinically poorly performed. The main reasons for this are both legislative and economic. This review describes state-of-the-art techniques, up-to-date research projects, innovative preclinical and clinical approaches in wound care, and activities to translate these innovative techniques into clinical routine.