

# Granulox—The Use of Topical Hemoglobin to Aid Wound Healing: A Literature Review and Case Series From Singapore

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## Abstract

Chronic wounds are an increasing burden on health care globally, and tissue hypoxia is a common issue in such wounds. Granulox (SastoMed GmbH, Georgsmarienhütte, Germany) is designed to provide wound bases with supplemental oxygen through facilitated diffusion and aid the physiological wound-healing process. It is a topical hemoglobin wound spray that is applied after wound cleaning and debridement to ensure continuous oxygen supplementation for up to 72 hours. Compared with other forms of topical oxygen therapy that require portable devices, Granulox is a spray-on application and the patient experience is similar to the use of a conventional dressing. Current clinical evidence suggests that Granulox aids with both wound healing and with symptom relief in chronic wounds, but current literature is limited by small study populations and further larger studies are required.

## Keywords

Granulox, outcome, wound healing, topical, hemoglobin, oxygen

## Introduction

A chronic wound can be defined as a wound that does not heal physiologically and within the usually predicted time frame of the stages of wound healing. The exact time frame for a wound to be considered chronic has not reached a global consensus, but it has been suggested that the lack of ~15% reduction in wound size weekly or ~50% reduction over a month can be used to define a chronic wound.<sup>1</sup> They affect about 1% of the adult population and are usually due to an underlying arterial, venous, neuropathic, or pressure-related pathology.<sup>2</sup> Unlike acute wounds that heal via the physiological processes of hemostasis, inflammation, proliferation, and maturation, chronic wounds tend to have impairment in either one or more of the physiological processes of healing, typically that of the inflammatory stage. Impairment of such responses is usually due to the overlapping of both intrinsic factors, such as tissue hypoxia, immunocompromised states, necrosis, and extrinsic factors, such as infections, moisture balance, exogenous steroids, chemotherapy, or radiation exposure.

Chronic wounds are an increasing burden on health care globally, and this toll is exacted on both health care professionals and financial resources. This increasing burden can be attributed to an aging population and an increasing incidence of “first-world” diseases such as diabetes and obesity.<sup>3</sup> Given the heterogeneity of the current literature regarding management of chronic wounds and its increasing prevalence and cost to our health care systems, the aim of this review is to explore the use of a hemoglobin spray, Granulox (SastoMed GmbH, Georgsmarienhütte, Germany), as an adjunct to the treatment of chronic wounds, to report the results of a literature review assessing the efficacy of the topical

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