

# The Role of 3D Fit Technology in the Management of Wound with Excessive Exudation and Gap: Our Experience

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## Abstract

Exudates in the wound is necessary for healing, but excess exudation needsto be managed for the wound to heal in an optimal manner. By addressing the underlying cause and by using appropriate wound dressing, the amount of exudate produced can controlled. Underlying systemic or local conditions like malnutrition, cardio-vascular, immunological or infection can impair the normal wound healing processes and lead to chronicity. A prolonged inflammatory response is seen in chronic wounds with increased levels of pro-inflammatory cytokines and excess amounts of exudate with increased protease level, which may inhibit healing by damaging the wound bed and surrounding skin. The chronic wounds treatment especially dressing of wounds imparts financial and physical burden to the health care facilities across the globe. There is always a need for a dressing material, which can address the excess exudate, the dead space, which can minimize the dressing changes andabove allwhich is cost effective. In this article we share our experience of using a dress material with a newer technology called 3D fit technology. The novelty of this study is that, this material has very limited data available from India.

**Keywords:** Exudating Wound; 3D Fit Technology; Wound Gap.

## INTRODUCTION

Exudate helps tocreate a moist wound environment in the wound during early stages

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of healing.<sup>1</sup> They play an important role in wound healing by preventing tissue dehydration and cell death exudates promote the breakdown of dead tissue and helps the interaction between growth factors and their target cells. Exudate levels are highest during the inflammatory phase of wound healing. Although necessary for wound healing, the high levels of exudate during the inflammatory phase need to be controlled otherwise it will slow down the healing process itself.<sup>2</sup> With the management of underlying causes and with appropriate wound dressing, the amount of exudate produced can be maintained in optimum and thus, facilitate the healing.<sup>3</sup> If a wound dressing does not absorb and retain only relevant amounts of exudate,

the wound bed will become wet, and exudate with an increased protease level, may inhibit healing by damaging the wound bed and surrounding skin. The leaking of exudate to surrounding skin will cause maceration, resulting in delayed healing, increased risk of infection, increased friction, and ultimately wound enlargement.

Chronic wound management is substantial economic burden to healthcare systems worldwide and it can significantly reduce the quality of life of the patients, leading to serious complications, amputation, and even death.

## MATERIALS AND METHODS

This study was conducted in the Department of Plastic Surgery at a tertiary care center during the month of December 2021, after getting the departmental ethical committee approval. Informed written consent was taken from the patient. The details of the patient in the study are as follows. A 18-year-old male with no known comorbidities, was admitted with Gustilo Type 3B Tibia fracture of right leg with a raw area over the knee of 4 weeks duration. The wound was deep and had excessive exudation. Initially managed with serial debridement and negative pressure wound therapy. The wound was devoid of infection, but the exudation was high and there was a cavity in the wound also. Then the wound was managed with Biatain R dressing with 3D fit Technology. Three sittings of dressing were done, and the wound assessment was done using wound measurements and visual assessment with the help of multiple independent evaluators.

## RESULT

The wound showed decreased exudation and the cavity decreased in size on visual assessment with 3D Fit Technology dressing and the wound was ready for definitive procedure.

## DISCUSSION

A gap or dead space between the wound bed and the wound dressing, should be avoided as it causes pooling of excessive exudate, causes increased infection and thus impaired healing. The effective management of the gap helps to decrease the risk of infection. One of the methods to deal with wound gap is using appropriate dressing, selection of a suitable dressing can help exudate management, and thus allows wound healing and prevents

maceration of the wound bed and peri-wound skin.<sup>3</sup>

Any patient with chronic wound should be evaluated for any underlying systemic illness which can delay the speed for wound healing. And the wound is evaluated for any factors that can delay the wound healing. Quality, quantity of the exudate, any signs of infection, wound edges surrounding wound skin and probable etiology and any dead space or gap in the wound.

Effective management of excess exudate will facilitate the wound healing. Dressings are the important part of managing excessive exudation and dressing materials should be selected according to their ability to control either or both, volume, and type of exudate. The dressing must absorb excess exudate from the wound to protect the wound and surrounding skin, meantime maintains a moist wound healing environment. An optimal moisture balance will reduce time of healing, reduce exudate related problems like peri-ulcer skin maceration and infection, and reduce dressing change frequency. Other important quality that a dressing should possess include the ability to conform to the shape of the wound bed thus reducing the dead space, easy application and removal, patient comfort, and efficiency when used under compression.<sup>4</sup>

### Biatain 3D Fit Technology

Biatain® Silicone (Coloplast A/S, Humlebaek, Denmark) is a foam dressing used for a wide range of exuding wounds. The recently redesigned Biatain Silicone is a flexible, multi-layered foam dressing with a gentle silicone adhesive layer designed to conform closely to the wound bed to optimize absorption of exudate. The dressing is multi-layered, and the layers are as follows.

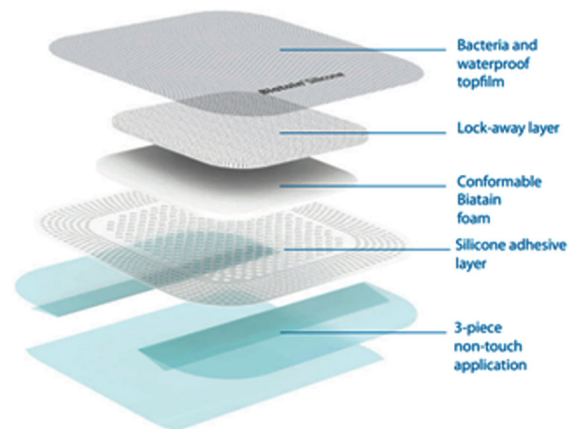
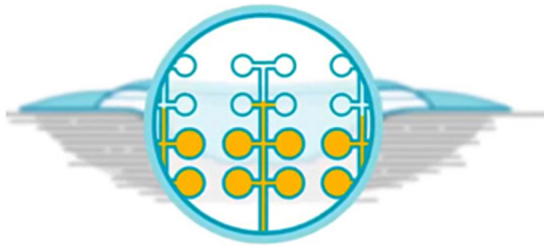
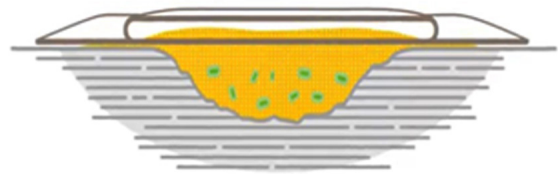


Fig. 1: Layers of The Biatain with 3D Fit Technology (Source: Biatain)

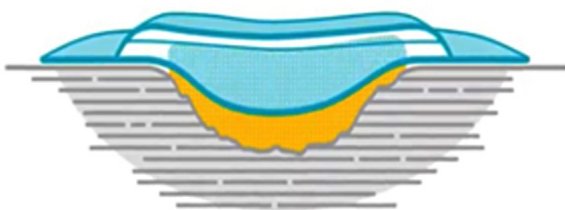
The proposed mechanism by which the material acts can be illustrated as follows.



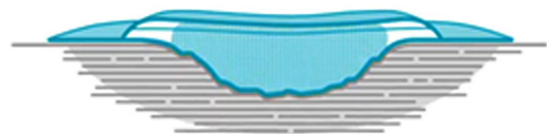
**Fig. 2:** Microcapillaries doing Vertical Absorption of Exudate (Source: Biatain)



**Fig. 3:** Excess exudate in the gap between dressing and wound bed marked in yellow color (Source: Biatain)

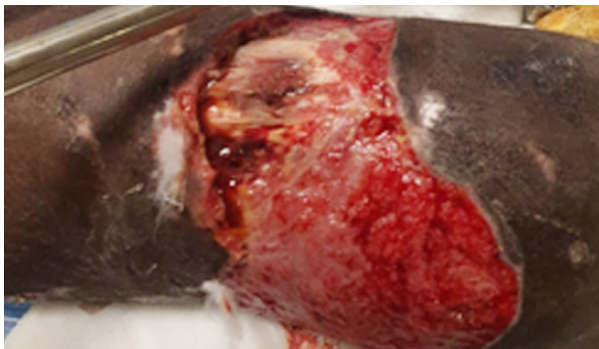


**Fig. 4:** The exudate is absorbed and the silicone layer starting to enlarge in size (Source: Biatain)

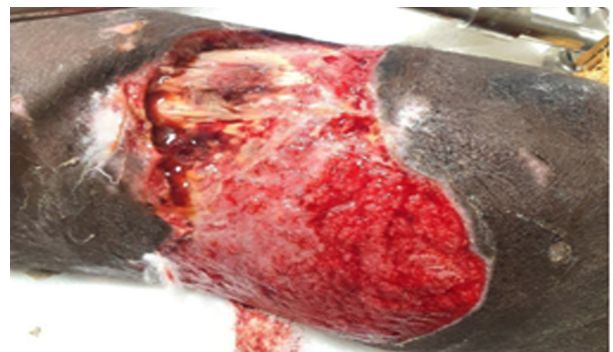


**Fig. 5:** The Dressing is fully conformed to the wound bed with no dead space (Source: Biatain)

### Clinical Photographs



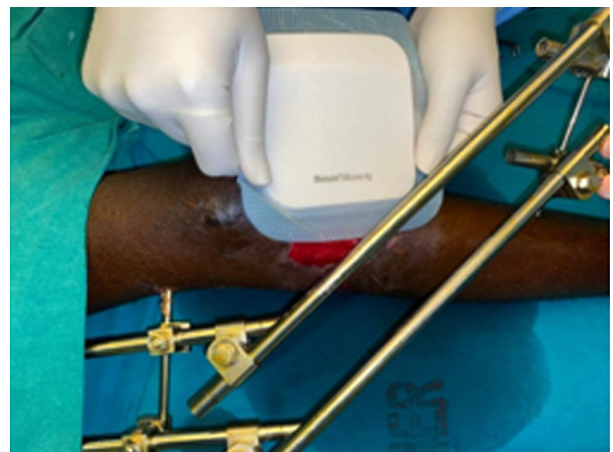
**Fig. 6:** Wound At Presentation



**Fig. 7:** Wound at Presentation



**Fig. 8:** Wound After Negative pressure wound Therapy



**Fig. 9:** Silicone Ag dressing with 3D Fit Technology Being Applied



Fig. 10: Wound After 3D Fit Technology Application

## CONCLUSION

The 3D fit technology is an effective method of managing the wounds with excessive exudation. The conforming silicone layer of the dressing effectively conformed to the wound gap and prevented the leakage of exudate into the surrounding skin. The 3D fit technology can be used as a primary dressing alone or can be used in combination with other dressings. The application and removal of the dressing is easy and patient friendly. No side effects were noted during the study. The cost of this dressing material can be a limiting factor, but one plus point is less dressing change frequency needed. The limitation of the

study is that the study was done on a single subject and the wound depth was less than 2 cm and we only used 3 sittings and the wound was managed with local flap. So, the authors suggest a study with multiple participants, multiple sittings of dressing and with a control group to validate the result.

**Competing interest:** None

**Declarations:** Author's contributions:

**All authors made contributions to the article**  
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