

After 30 years in wound care, we at Coloplast believe that absorption is the key to better healing. Our Biatain® portfolio brings superior absorption to daily wound care needs, making Biatain the simple choice for faster healing.

# Pressure injuries – prevention and treatment

A Coloplast quick guide



# Table of Contents

Pressure injuries – prevention and treatment.....	3
What is a pressure injury? .....	4
How do pressure injuries arise?.....	5
Who gets pressure injuries? .....	6
Prevalence of pressure injuries .....	7
Risk factors.....	8
The Braden scale for predicting pressure injury risk .....	9
Prevention of pressure injuries.....	10
Prevention protocols by risk level.....	11
International NPUAP-EPUAP	
Pressure injury classification system .....	12
Treatment of pressure injuries.....	15
Dressing selection.....	16
Wound infection.....	18
Case study .....	20
Coloplast solutions for pressure injuries .....	22
Biatain – superior absorption for faster healing .....	25
Other Coloplast products for pressure injuries .....	26
References .....	27

# Pressure injuries – prevention and treatment

Although the quality of pressure injury prevention and treatment has increased considerably over the past years, pressure injuries remain a frequently occurring problem in health care. Especially old people and people that are confined to chair or bed are susceptible to pressure injuries. In recent years, new international guidelines have been published.

This quick guide is intended for educational and informational purposes only. It contains some of the most important advice for prevention and treatment of pressure injuries and will be helpful to health care professionals who are not dealing with pressure injuries every day.

Please note that in this quick guide we have described only very general guidelines. For a full description of the optimal treatment of pressure injuries at the different stages, please refer to your national guidelines and to the ‘Pressure injury treatment – Quick reference guide’ published by the NPUAP-EPUAP in 2009 ([www.epuap.org](http://www.epuap.org)).

For more extensive guidance on prevention of pressure injuries, please refer to ‘Pressure injury prevention – Quick reference guide’ published by the NPUAP-EPUAP in 2010 ([www.epuap.org](http://www.epuap.org)).

Good advice and useful tools for pressure injury prevention are also available at the Braden-homepage ([www.braden.com](http://www.braden.com))

Coloplast A/S, March 2012.

# What is a pressure injury?

International NPUAP-EPUAP pressure injury definition:

A pressure injury (decubitus ulcer) is a localised injury to the skin and/or underlying tissue usually over a bony prominence and is the result of pressure, or pressure in combination with shear.<sup>1</sup>

Pressure injuries are a major cause of morbidity and mortality, especially for persons with impaired sensation, prolonged immobility or advanced age.



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# How do pressure injuries arise?

A pressure injury is defined as a degenerative change caused by biological tissue (skin and underlying tissue) being exposed to pressure and shearing forces. The pressure prevents the blood from circulating properly and causes cell death, tissue necrosis and the development of injuries.

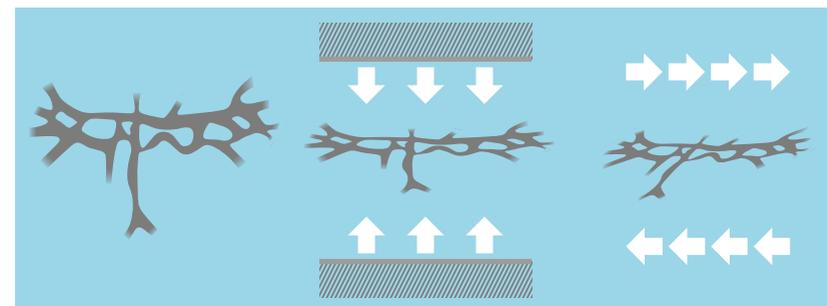


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## The effect of compressive forces and shear forces on tissues and blood supply



Without load

Compressive forces

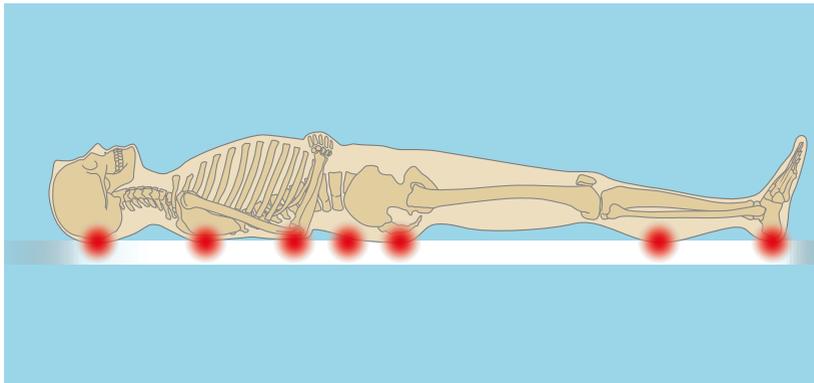
Shear forces

# Who gets pressure injuries?

Despite current interest and advances in medicine, surgery, nursing care and self-care education, pressure injuries remain a major cause of morbidity and mortality. This is particularly true for persons with impaired sensation, prolonged immobility, or advanced age.<sup>2</sup>

People aged over 75 are more prone to developing pressure injuries.<sup>3</sup> However, because people and skin age at different rates, younger patients can also have frail skin. If somebody with frail skin remains in one position for too long without shifting their weight, they are at risk of pressure injuries. Wheelchair users or people confined to a bed (for example, after surgery or an injury), are especially at risk.

The most common places for pressure injuries are over a bony prominence, such as elbows, heels, hips, ankles, shoulders, back and the back of the head.



# Prevalence of pressure injuries

National prevalence studies have been conducted in several countries. Recently, 5947 patients were surveyed in 25 hospitals in five European countries. The pressure injury prevalence (Stage 1–4) was 18.1%, if Stage 1 injuries were excluded it was 10.5%. The sacrum and heels were the most affected locations. Only 9.7% of the patients in need of prevention received fully adequate preventive care.<sup>4</sup> Also, prevalence surveys in U.S., among patients in acute care hospitals, indicated a pressure injury prevalence ranging from 10.1% to 17%.<sup>4</sup>



Vertebrae, NPUAP copyright & used with permission



Ischium, NPUAP copyright & used with permission



Ankle, NPUAP copyright & used with permission



Heel, NPUAP copyright & used with permission

# Risk factors

## The following factors increase the risk for pressure injuries<sup>3,5</sup>

- Being bed or chair bound
- Old age (>75 years)
- Unable to move body or parts of body without help
- Chronic conditions, such as diabetes or vascular disease, which affect blood circulation
- Mental disability from conditions such as Alzheimer's disease
- Fragile skin
- Urinary and bowel incontinence
- Malnourishment

In their international pressure injury prevention guidelines the NPUAP & EPUAP recommend to use a structured approach to risk assessment to identify individuals at risk of developing pressure injuries.<sup>1</sup> One of the most widely used risk assessment tools worldwide is the Braden Scale for Predicting Pressure Sore Risk®, developed by Barbara Braden and Nancy Bergstrom in 1988.<sup>7</sup> Therefore the Braden scale will be used as an example of a risk assessment tool in the following chapters.

# The Braden scale for predicting pressure injury risk

The Braden scale is a clinically validated tool that allows nurses and other healthcare providers to reliably score a person's level of risk for developing pressure injuries by examining six criteria:

- Sensory Perception – ability to respond meaningfully to pressure-related discomfort (1–4)
- Moisture – degree to which skin is exposed to moisture (1–4)
- Activity – degree of physical activity (1–4)
- Mobility – ability to change and control body position (1–4)
- Nutrition – usual food intake pattern (1–4)
- Friction and Shear – amount of assistance needed to move, degree of sliding on beds or chairs (1–3)

The lowest possible total score is 6 and the highest is 23. The lower score, the higher risk of developing pressure injuries. People with scores of 15-18 are at risk of developing pressure injuries if other major risk factors are present. People with scores of 9 and below are at very high risk of developing pressure injuries.<sup>7-9</sup>

The Braden scale should always be used in conjunction with nursing judgment. Each subscale score serves as a flag for assessments that need to be explored further and a guide to the types of interventions that may be required. The lower the subscale scores and total scores, the more 'intense' the nursing interventions should become.<sup>6</sup>

An official copy of the Braden scale can be downloaded from [www.bradenscale.com/images/bradenscale.pdf](http://www.bradenscale.com/images/bradenscale.pdf)

NOTE: these are general guidelines. There may be specific pressure injury screening systems at use in your country or at your work place, which must be followed.

# Prevention of pressure injuries

A person that is bed bound or cannot move due to paralysis, diabetes, circulation problems, incontinence, or mental disabilities, should be frequently checked for pressure injuries. Special attention should be paid to the areas over a bony prominence where pressure injuries often form.

Look for reddened areas that, when pressed, do not turn white, and for blisters, sores, or craters.

In addition, take the following steps<sup>5,9</sup>

- Change the patient's position no less than every 2 hours to relieve pressure, for example, by using a turning schedule
- Use items that can help reduce pressure: pressure-reducing pillows, foam padding, pressure reducing mattresses etc.
- Meals must contain the required amount of calories and proteins
- Provide adequate vitamins and minerals
- Provide and encourage adequate daily fluid intake for hydration
- Daily exercise
- Keep the skin clean and dry
- After urinating or having a bowel movement, clean the area and dry it well. Use creams to help protect the skin
  
- Do NOT massage the area of the injury, as massaging can damage tissue under the skin
- Ring-shaped cushions are NOT recommended. They interfere with blood flow to that area and cause complications

# Prevention protocols by risk level

The cornerstone of pressure injury prevention is identifying and minimizing risk factors with the use of a validated risk assessment tool. If you use the Braden scale there is a protocol that can be referred to for each risk level:<sup>5</sup>

## Preventive measures when 'at risk'/'moderate risk' (15–18/13–14)<sup>3</sup>

- Frequent turning (turning schedule if moderate risk)
- Maximal remobilisation
- Pressure-reduction support surface
- Lateral positioning (if moderate risk)
- Heel protection (offload the heel completely and distribute weight along the calf with slightly flexed knee<sup>1</sup>)
- Manage moisture, nutrition, friction and shear
- Pressure-reduction support surface if bed or chair bound

## Additional preventive measures when 'at high risk' (10–12)<sup>3</sup>

- Increased frequency of turning
- Supplement with small position shifts

## Additional preventive measures when at 'very high risk' (9 or below)<sup>3</sup>

- Use pressure-relieving surface if the patient has intractable pain (severe pain can be worsened by turning)
- Note: low air loss beds do not substitute for turning schedules

'Protocols by at risk level' and suggestion for a turning schedule can be downloaded from [www.bradenscale.com/products.htm](http://www.bradenscale.com/products.htm)

# International NPUAP- EPUAP pressure injury classification system

A pressure injury starts as reddened skin that gets worse over time. It forms a blister, then an open sore and finally a crater.

Pressure injuries are categorised by how severe they are, from Stage I (earliest signs) to Stage IV (worst). Pressure injuries are classified according to the degree of tissue damage observed. In 2009 the EPUAP-NPUAP advisory panel agreed upon four levels of injury:<sup>10</sup>

## Category/Stage I:



Buttocks, Stage I,  
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## Non-blanchable redness of intact skin

Intact skin with non-blanchable erythema of a localised area usually over a bony prominence. Discolouration of the skin, warmth, oedema, hardness or pain may also be present. Darkly pigmented skin may not have visible blanching.

**Further description:** The area may be painful, firm, soft, warmer or cooler as compared to adjacent tissue. Category/Stage I may be difficult to detect in individuals with dark skin tones. May indicate 'at risk' persons.

## Category/Stage II:



Buttocks, Stage II,  
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## Partial thickness skin loss or blister

Partial thickness loss of dermis presenting as a shallow open injury with a red-pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled or sero-sanguinous filled blister.

**Further description:** Presents as a shiny or dry shallow injury without slough or bruising. This category/stage should not be used to describe skin tears, tape burns, incontinence associated dermatitis, maceration or excoriation.

## Category/Stage III:



Ischium, Stage III,  
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## Full thickness skin loss (fat visible)

Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are not exposed. Some slough may be present. May include undermining and tunnelling.

**Further description:** The depth of a Category/Stage III pressure injury varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have (adipose) subcutaneous tissue and Category/Stage III injuries can be shallow. In contrast, areas of significant adiposity can develop extremely deep Category/Stage III pressure injuries. Bone/tendon is not visible or directly palpable.

# Treatment of pressure injuries

## Category/Stage IV:



Sacral Coccyx, Stage IV, NPUAP copyright & used with permission

## Full thickness tissue loss (muscle/bone visible)

Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present. Often include undermining and tunnelling.

**Further description:** The depth of a Category/Stage IV pressure injury varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have (adipose) subcutaneous tissue and these injuries can be shallow. Category/Stage IV injuries can extend into muscle and/or supporting structures (for example, fascia, tendon or joint capsule) making osteomyelitis or osteitis likely to occur. Exposed bone/muscle is visible or directly palpable.

## For optimal treatment of pressure injuries there are 4 main concerns:

1. Underlying pathology of the pressure injury must be treated if possible
2. Pressure must be relieved or removed by appropriate measures to prevent further injury
3. Nutrition is important for healing of pressure injuries:
  - Provide sufficient calories
  - Provide adequate protein for positive nitrogen balance
  - Provide and encourage adequate daily fluid intake for hydration
  - Provide adequate vitamins and minerals
4. Wound care must be optimised:
  - If there is black or yellow necrosis in the wound, consider debridement to remove the dead tissue in the wound bed\*
  - Cleanse the pressure injury and surrounding skin and remove debris at each dressing change to avoid contamination
  - Use appropriate moist wound healing dressings

\* Select the debridement method(s) most appropriate to the individual's condition. Potential methods include sharp (surgical) techniques, autolysis (gel, occlusive/semi-occlusive dressing etc.), enzymatic debridement (gel), mechanical debridement, and bio-surgical debridement (maggot therapy).

These are only general guidelines. For a full description of the optimal treatment of pressure injuries at the different stages, please refer to your national guidelines and to the 'Pressure injury treatment – Quick reference guide' published by the NPUAP-EPUAP in 2009. [www.epuap.org/guidelines/Final\\_Quick\\_Treatment.pdf](http://www.epuap.org/guidelines/Final_Quick_Treatment.pdf)

# Dressing selection

Wound dressings are a central component of pressure injury care. Dressing selection should be based on the tissue in the injury bed and the condition of the skin around the injury bed.

Suitable wound dressings for pressure injuries are moist wound healing dressings with good absorption and exudate management properties.

## **Dressings for deep wounds**

Fill deep wounds with dressing materials, e.g. alginate filler. Be careful to document the number of dressings that are used to fill large wounds and ensure that all dressings are removed at the next dressing change.

## **Dressings for infected wounds**

Assess pressure injuries carefully for signs of infection and delays in healing.

An adhesive antimicrobial moist wound healing dressing, e.g. a silver foam, or a silver alginate dressing in combination with an adhesive secondary dressing can help prevent or resolve wound infection.

## **Dressings for sacral pressure injuries**

Pressure injuries in the sacral area of patients that are incontinent have a risk of getting contaminated by urine or faeces and thereby infected. Therefore, it is important to keep the wound and peri-injury area clean and use a semi-occlusive dressing to protect the wound from excretion contamination.

## **Evaluating progress towards healing**

A 2 week period is recommended for evaluating progress toward healing. However, weekly assessments provide an opportunity for the health care professional to detect early complications and the need for changes in the treatment plan.

The treatment needs of a pressure injury change over time. Treatment strategies should be continuously re-evaluated based on the current status of the injury.

# Wound infection

All wounds contain bacteria. Even if the wound is healing normally, a limited amount of bacteria will be present. If the bacteria count rises, the wound may become infected. Bacterial overload in a wound can lead to a serious infection that requires antibiotic treatment.

If the wound is not healing it may be a sign of infection. In the wound, the following symptoms indicate infection:

- Odour
- Increased exudate
- Absent or abnormal granulation tissue
- Increased pain



Pressure injury on ankle, NPUAP copyright & used with permission

If a wound is at risk of infection or has become infected, an adhesive, antimicrobial silver foam dressing can be helpful or alternatively a silver alginate dressing in combination with an adhesive dressing.

Additional clinical symptoms may arise if the infection spreads to the healthy tissue surrounding the wound. Depending on the type of bacteria, the wound exudate may become more pus-like and the peri-injury skin may be tender, red and painful. The patient may also have a fever. If the infection spreads beyond the wound, antibiotics should be used at the discretion of a physician.



Sacrococcygeal pressure injury, NPUAP copyright & used with permission

# Case study

## Treatment of a highly exuding stage III sacral pressure injury with Biatain® Ag

Authors: Jette Kvisgaard and Bjarne Alsbjörn, Department of Plastic Surgery and Burns Unit, Rigshospitalet, Copenhagen University Hospital, Denmark

### Introduction

This report describes four weeks treatment of a patient suffering from a highly exuding critically colonised sacral pressure injury stage III with Biatain Ag.

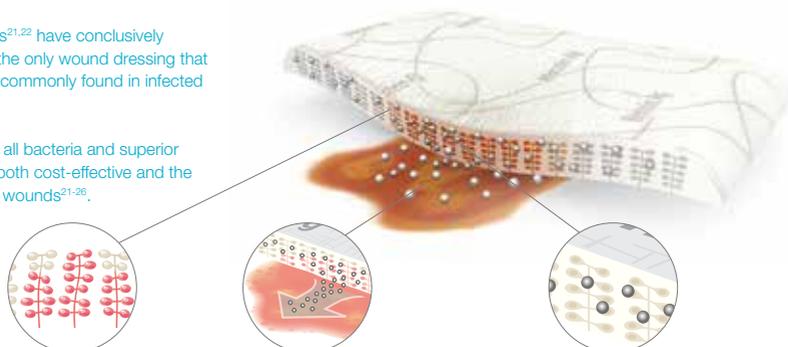
Pressure injuries are associated with fivefold increase in mortality in elderly patients<sup>17</sup>. The prevalence of pressure injuries is 3%-14% among acute care hospital patients<sup>17,18</sup> and up to 25% in long term healthcare facilities<sup>17</sup>. Pressure injuries located in the sacral area are highly at risk of bacterial contamination. Critical bacterial colonisation may worsen the wound and delay healing considerably.

The most important signs of critical colonisation (or local infection) are delayed healing, odour, abnormal or absent granulation tissue, increased exudation, and wound pain<sup>19,20</sup>.

Biatain Ag is a unique 3D polyurethane foam with an antibacterial silver complex homogeneously dispersed throughout the foam. Biatain Ag combines superior absorption and antimicrobial properties in one dressing. Silver release is sustained at an effective rate for up to seven days in the presence of wound exudate<sup>19</sup>. Biatain Ag kills MRSA faster than other silver dressings<sup>20</sup>.

Major independent studies<sup>21,22</sup> have conclusively proved that Biatain Ag is the only wound dressing that is effective on all bacteria commonly found in infected non-healing wounds.

Ensuring the fastest kill of all bacteria and superior absorption, Biatain Ag is both cost-effective and the best dressing for infected wounds<sup>21-26</sup>.



#### Optimal healing environment<sup>23,26</sup>

Unique 3D polymer foam structure ensures superior absorption and high retention even under compression therapy.

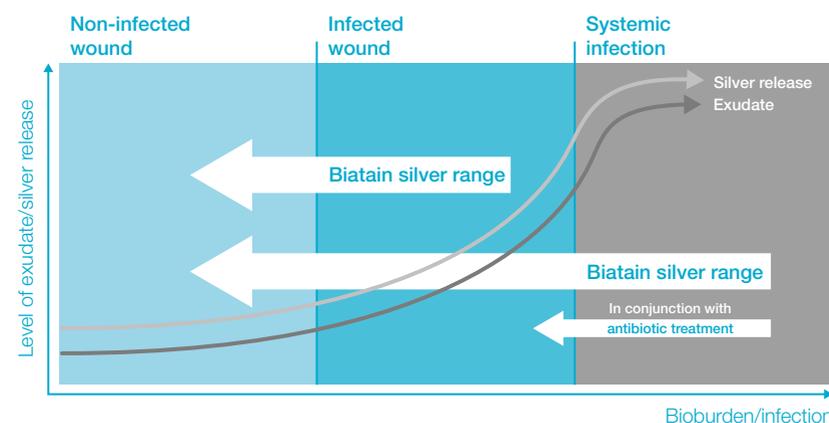
#### Rapid killing of bacteria<sup>21,22,24</sup>

Optimal concentration of silver ensures faster killing of bacteria such as MRSA, VRE, ESBL and Pseudomonas.

#### Designed to prevent wound infection<sup>21-26</sup>

Our patented silver profile provides you with a sustained release of silver at an effective rate during the entire wear time (up to 7 days).

### Faster healing of infected wounds



### Wound Progress

Already after one week the wound bed was considerably cleaner and the odour was eliminated (Figure 2). After 1 month of treatment the wound bed was cleaned and there was no odour. Healthy granulating tissue was present and the healing process was in good progress. (Figure 3).

### Dressing Performance

The dressing demonstrated good absorption capacity and good patient comfort. The nurse found the dressing easy to apply and remove. No infections or adverse events were reported.

### Conclusion

In conclusion, during the one-month treatment period Biatain Ag effectively eliminated signs of local infection and supported healing of this heavily exuding sacral pressure injury. Elimination of odour and a significant increase in healthy granulation tissue was observed already after one week.

### Medical history

The patient is an 88 year old woman with a highly exuding stage III sacral pressure injury. The injury had persisted for 2 months and had previously been treated with standard moist wound healing products. The injury had several signs of local infection; the injury had a significant odour and was heavily exuding. A small undermining was present at the top of the injury and there was approximately 50% unhealthy necrotic tissue in the wound bed. Figure 1 shows the injury at inclusion.



Figure 1. The injury at the start of treatment.



Figure 2. The injury after one week of treatment.

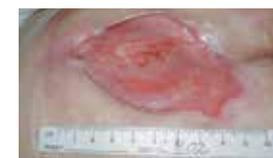


Figure 3. The injury after four weeks of treatment.

# Coloplast solutions for pressure injuries

## Non-infected pressure injuries

Suitable wound dressings for pressure injuries that are not infected are adhesive moist wound healing dressings with superior absorption and exudate management properties



### **Biatain® Silicone** – superior absorption general purposes

- Conforms to the wound bed for superior absorption – even under body pressure
- Soft and flexible dressing silicone adhesive for easy removal with minimal damage or irritation to the skin



### **Biatain Adhesive** – superior absorption for wounds that need extra adhesion

- Unique 3D polyurethane foam that conforms closely to the wound bed for superior absorption – even under body pressure
- Available in sacral shape to ensure close fit to body and skin for prevention of contamination and leakage



### **Biatain® Super** – superior absorption for highly exuding wounds

- Hydrocapillary pad with super absorbent particles lock away exudate from wound bed and surrounding skin

## Deep wounds

Deep wounds can be filled with dressing materials, such as Biatain® Alginate soft filler and covered with an adhesive dressing



### **Biatain® Alginate** – superior absorption for slough and cavity filling

- Highly absorbent alginate dressing for moderately to heavily exuding wounds of any size and shape. Faster wound healing by conforming to any wound shape and by debridement of slough

If the wound is dry or necrotic with a need for enzymatic debridement, you can use a gel such as Purilon® Gel and cover with an adhesive dressing



### **Purilon® Gel** – faster wound healing by effective and gentle debridement

- Fast and effective debridement
- High cohesion – the gel stays in place

**Infected pressure injuries and pressure injuries at risk of infection**



**Biatain® Ag Adhesive**  
– superior absorption for infected wounds that need extra adhesion

- Unique 3D polyurethane foam that conforms closely to the wound bed for superior absorption – also under body pressure
- Continuous broad antimicrobial effect during entire wear time
- Reduction of odour from the wound

**Infected deep wounds**

Infected deep wounds or deep wounds at risk of infection can be filled with antimicrobial dressing materials, and covered with an adhesive dressing. If the infection spreads beyond the wound, antibiotics should be used at the discretion of a physician.



**Superior Absorption™**

# Biatain® – superior absorption for faster healing

Superior absorption for non-infected wounds\*

**Biatain Silicone**

	Item no.
	7.5x7.5 33434
	10x10 33435
	12.5x12.5 33436
	15x15 33437
	17.5x17.5 33438

**Biatain Soft-Hold**

	Item no.
	10x10 3470
	10x20 3472
	15x15 3475

**Biatain Non-Adhesive**

	Item no.
	5x7 6105
	10x10 3410
	10x20 3412
	15x15 3413
	20x20 3416

**Biatain Adhesive**

	Item no.
	7.5x7.5 3462
	12.5x12.5 3420
	18x18 3423
	23x23 3485
	Sacral
	19x20 Heel 3488

Superior absorption for infected wounds

**Biatain Ag Non-Adhesive**

	Item no.
	5x7 5105
	10x10 9622
	15x15 9625
	5x8 Cavity 9628

Superior absorption for painful wounds

**Biatain Ibu Non-Adhesive**

	Item no.
	10x10 34110
	10x20 34112
	15x15 34115
	20x20 34120

**Biatain Ag Adhesive**

	Item no.
	7.5x7.5 9631
	12.5x12.5 9632

# Other Coloplast products for pressure injuries

## Biatain® Alginate

	Item no.
	
5x5	3705
10x10	3710
15x15	3715
40cm/2g	3740

## Biatain® Super

	Item no.
	
10x10	4630
12x20	4645
15x15	4635

## Purilon® Gel

	Item no.
	
8	3906
15	3900

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