Skin IQ®
Case study booklet

Clinical overview | Multi-centre observational evaluation | Individual patient case studies

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with people in mind

Managing Microclimate: An important factor in Pressure Injury Prevention and Management

Although high or prolonged pressure is often viewed as the most significant extrinsic factor in pressure ulcer / injury development, there is a growing appreciation of the effects of microclimate in pressure injury formation and healing[1]. Controlling microclimate is a key factor for patients at risk of maceration and skin breakdown[2].

What is Microclimate?

The term Microclimate is used to describe two parameters[3]:

1. Humidity or skin surface moisture at the interface between the body and the support surface
2. Temperature at the skin surface or the soft tissues

The International Pressure Ulcer Prevention and Treatment Guidelines define microclimate in this context as: 'Local tissue temperature and moisture at the body/support surface interface'.[1]

Why is Microclimate Management important in Pressure ulcer/injury Prevention & Management

Elevated temperature and humidity can affect the structure and function of the skin[4] and reduce the tolerance of the skin and tissues to the damaging effects of pressure, shear and friction[5]. It has been suggested that an elevated skin temperature increases the metabolic demand of local tissues, increases the tissues requirement for oxygen and increases the susceptibility of the tissues to the ischaemic effects of pressure and shear[5] whilst also weakening the stratum corneum[6].

Excessive moisture against the skin causes maceration which reduces stiffness, and connective tissue strength and increases the susceptibility to shear forces[7]. Friction at the skin interface with the support surface is also increased promoting adhesion to the sheet or bedclothes and increasing the risk of mechanical damage and superficial pressure injury/ulceration.

Skin IQ Microclimate Management Coverlet.

Managing Microclimate with Skin IQ

Any surface that is in contact with the skin has the potential to affect the microclimate.[1] The overall effect is dependent on the nature of the support surface and the cover.

There are numerous ways to normalise the local skin microclimate, the simplest being to reposition the patient. However this is not always possible and many patients may require additional interventions. The International Pressure Ulcer Prevention and Management Guidelines[1] discuss how managing microclimate can provide an environment conducive to injury prevention and tissue repair. As such the guidelines recommend the need for additional features such as the ability to control moisture and temperature when selecting a support surface.

An effective addition to the support surface is the Skin IQ Microclimate Manager, a powered coverlet designed to fit over an existing active or reactive mattress which adds microclimate control.

Unlike low air loss mattresses and beds, which use positive air flow to regulate the microclimate at the surface – patient interface, Skin IQ Microclimate Manager (MCM) applies a unique Negative Airflow Technology (NAT) to draw temperature and moisture away from the skin and mattress interface. This mattress coverlet is water resistant, and vapour permeable.

Following a number of bench tests and field trials, Skin IQ MCM has proven beneficial in normalising microclimate, reducing odour and promoting an environment conducive to healing [8,9,10,11].

The following booklet provides an overview of the Skin IQ Microclimate Management Coverlet, and presents evaluation and case study data, to demonstrate its practical application and how it performs in the clinical environment.

Clinical Benefits of Skin IQ Microclimate Manager

Skin IQ MCM Moisture Vapour Transfer Rates (MVTR).

- The Skin IQ MCM provides a moisture vapour transfer rate (MVTR) of 130g/m^2/hr[12]
- The Skin IQ 365 reusable MCM provides an MVTR of 171/g/m^2/hr[13]
- The Skin IQ 1000 bariatric version provides an MVTR of 165/g/m^2/hr[14]

Excellent moisture removal may help reduce skin maceration

Bench studies show that Skin IQ MCM removes 3.8 times more moisture at the skin/mattress interface than the same mattress without Skin IQ MCM.[12]

Reduces shear and friction

The Skin IQ MCM surface reduces friction and shear, helping to reduce the risk of pressure ulceration.[15]

Helps control odour

Bench studies show that Skin IQ MCM significantly reduces odour at the skin/mattress interface when compared to the same surface without airflow (Figure 1).[16]

Provides a bacterial and viral barrier and contains bacteriocidal properties

The top layer of Skin IQ MCM is a bacterial and viral barrier,[17] and all layers contain a bacteriocidal agent.[17]

Reduces bacteria growth

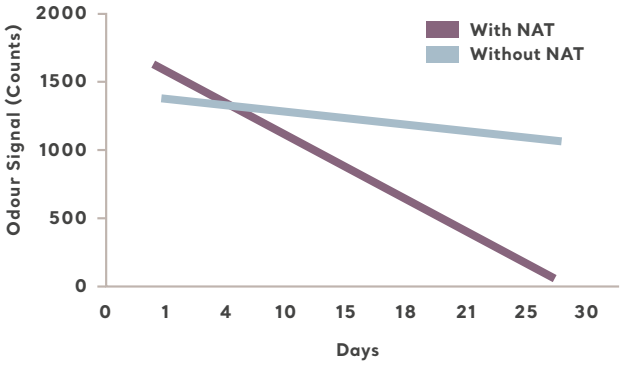
Bench studies show that Skin IQ MCM reduces staphylococcus aureus growth by 3.1 logs over a 24 hr period. A percentage reduction of greater than 99.9%.[18,*]

Doesn't diminish pressure redistribution effectiveness

Pressure mapping testing shows that Skin IQ MCM does not diminish the pressure redistribution properties of the underlying mattress.[5,19,20,21]

NAT helps to reduce or maintain skin temperature whilst preventing excess moisture or humidity build up on the skin's surface. The technology uses a fan to pull moisture vapour that passes through the top layer into the middle layers open construction spacer material with a vacuum effect.

Figure 1: Odour Reduction at 30 Days



*The level of treatment stated indicates theoretical levels only.

Part 1

Skin IQ Microclimate Manager

Evaluation of the Skin IQ Microclimate Manager in German healthcare facilities

Results of a multi-centre observational evaluation

The following section provides an overview of an evaluation of the Skin IQ Microclimate Manager in German health care facilities. Head nurses of care units in various university hospitals and specialised clinics were offered the Skin IQ to evaluate between January and March 2011.

The decision to use the product was made by experienced nurses from a variety clinical specialisms (Table 1). Patients chosen were expected to have a longer than average length of stay with expected or confirmed problems related to microclimate control.

Individual case reports were written up independently by the evaluators and are presented in this section.

Table 1: Overview of participating institutions and specialities

Institution	Intensive care unit	Neurology	Oncology	Spinal Cord Injury Department	Internal medicine	Surgery	Severe Burns Unit	Micro-biological Testing	Page
Krankenhaus der Barmherzigen Brüder Trier	●	●				●			4
BG-Unfallklinik Frankfurt am Main				●					5
Klinikum Offenbach	●	●				●			6
Westpfalz- Klinikum GmbH		●							7
Universitätsklinikum des Saarlandes								●	8
Südharz-Krankenhaus Nordhausen					●			●	9
St. Georg Klinikum Eisenach gGmbH					●				10
BG-Unfallklinik Ludwigshafen	●	●		●			●		11
Klinik Kipfenberg		●							13
Charité Berlin	●								14
Vitos Pflegezentrum Weilmünster		●							15

Krankenhaus der Barmherzigen Brüder Trier

The Krankenhaus der Barmherzigen Brüder Trier is a general and academic teaching hospital with a 612-bed capacity, 15 medical departments, an A&E unit, several medical centres, a centre for radiology, ultrasound and nuclear medicine and an operations services centre. Die Barmherzigen Brüder Trier e.V. is a network of hospitals, specialist clinics and residential and care facilities.

Author: Johannes Timmer Senior Wound Manager Krankenhaus der Barmherzigen Brüder Trier

The Skin IQ testing period lasted from January to March 2011. Skin IQ was tested on a total of 10 patients. It was used in combination with alternating pressure and foam systems with viscoelastic content. A total of 10 experienced healthcare professionals assessed Skin IQ in accordance with the test criteria provided. The healthcare professionals were interviewed at regular intervals.

Information on the patient group:

Criterion	Test group
Number of patients	10
Indications	Neurological/neurosurgical diagnosis n=7 Surgical diagnosis n=3
Important secondary diagnosis	All 10 patients perspired heavily (moist dermatological microclimate) **Skin disease:** Darier's disease (n=1) **Diarrhoea:** (n=3) Secretions from an open abdominal wound (n=1) 2 patients had pressure ulcers at the beginning of the testing period (1 patient Stage III heel, 1 patient Stage II sacrum)
Age	42–84 years
Weight of the patients	65–93 kg
Gender	Female (n=4), Male (n=6)
Use of Skin IQ in combination with	Alternating pressure foam system with visco-elastic content
Reasons for using Skin IQ	Severe perspiration, moist dermatological microclimate
Total documented test days	152

Results of the Skin IQ testing:

1. The aim of improving the dermatological microclimate was achieved for all patients.
2. Significant reductions in friction and shear forces were reported in the context of motion transfer for all patients.
3. In some cases, there were reports of stress-reducing effects, presumably because of the interruption of the accompanying vegetative symptoms.
4. The above-mentioned Stage 2 pressure ulcer on the buttocks showed an improvement during the testing period, whereas the Stage 3 pressure ulcer on the heel stagnated during the testing period.
5. No new pressure ulcers occurred in any patient during the testing period.
6. The systems were easy to handle.
7. No technical problems occurred at any time.
8. The motor unit proved to be quiet, so no noise pollution was recorded.

Conclusion:

Skin IQ meets the test criteria in full. Skin IQ was very well received by all healthcare professionals and evaluated similarly.

Berufsgenossenschaftliche Unfallklinik, Frankfurt am Main

The optimal care of accident victims is the main focus of the Berufsgenossenschaftliche Unfallklinik in Frankfurt am Main, founded in 1962. 348 beds are available for the care of patients. In addition to medical care, comprehensive treatment includes therapeutic services and support for vocational rehabilitation. Approximately 750 employees look after the well-being of the patients.

Author: Mr Hänsch
Deputy Head of Ward K3 (Spinal Cord Injury Department)
BG-Unfallklinik Frankfurt am Main

Skin IQ was tested in our institution from January to March 2011. During this period, Skin IQ was used in the Department for Spinal Cord Injuries. A questionnaire on the course of treatment completed for each patient, and the healthcare professionals in attendance were surveyed about the product after use.

Information on the patient group:

Criterion	Test group
Number of patients	5
Indications	Paraplegia (n=4), Quadraplegia (n=1)
Important secondary diagnosis	2 patients had pressure ulcers at the beginning of treatment: – 1 patient with 2 pressure ulcers (Sacrum and thorax) Stage II – 1 patient with 1 Stage IV pressure ulcer (lumbar spine region)
Age	52–77 years
Weight of the patients	69–115 kg
Gender	Male (n=5)
Use of Skin IQ in combination with	Standard hospital mattress (n=1), Foam system with viscoelastic content (n=2), Alternating pressure system (n=2)
Reasons for using Skin IQ	Pathological perspiration of the patient partly associated with macerations

Results of the Skin IQ testing:

1. Effective reduction of excessive moisture
2. Patient comfort while lying down
3. Easy operation/start-up and immediate availability
4. Significantly improved wound situation due to drier environment
5. Existing pressure ulcers improved during the course of treatment
6. None of the patients developed new pressure ulcers
7. Significant reduction of shear and friction forces during patient transfers

Feedback from a paraplegic patient after using Skin IQ:

"Skin IQ has a number of advantages for me as a patient: I perspire less, and my existing Stage II pressure ulcer is healing better compared to my previous experience. The top cover is skin-friendly from my point of view, and I can fall asleep more easily and get a better night's sleep because of the reduction in my perspiration. Disadvantages? From my point of view, the system does not have any."

Conclusion:

Skin IQ was impressive in treating patients with spinal cord injuries.

Klinikum Offenbach

Klinikum Offenbach, a hospital with the maximum level of care in municipal sponsorship, comprises 18 specialist clinics and institutes as well as inpatient wards, all of which work together in an interdisciplinary manner. With 917 beds, the hospital accepts more than 32,300 inpatients plus approximately 40,000 outpatients per year. Some 300 doctors and nearly 900 employees look after and treat the patients in care and functional units.

Author: Jens Kozak, Head of Department of Anaesthesiological-Operative Intensive Care Unit Sr. Monika Head of the Severe Burns Intensive Care Unit

Skin IQ was tested in our institution from January to March 2011. We used the product for patients with burns and for intensive care patients with various underlying conditions. The course of treatment for each patient was documented by means of a questionnaire and, in addition, the responsible healthcare professionals were surveyed with regard to the product after its application.

Information on the patient group:

Criterion	Test group
Number of patients	6
Indications	Open abdomen, open skull fracture, burn (n = 2), Lyell's syndrome, Subarachnoid haemorrhage
Important secondary diagnosis	1 Patient had a Stage II pressure ulcer on the buttocks 1 Patient had a Stage II pressure ulcer on the sacrum
Age	13–78 years
Weight of the patients	80–85 kg
Gender	Female (n=4), Male (n=2)
Use of Skin IQ in combination with	Standard hospital mattress (n=5), System with constant low pressure bedding (n=1)
Reasons for using Skin IQ	Pathological perspiration of all patients partly associated with moisture-related lesions

Results of the Skin IQ testing:

1. The reduction of excessive moisture led to an improvement of the microclimate for all patients.
2. The system is easy to use.
3. Significant reductions in friction and shear forces were reported in the context of motion transfer for all patients.
4. No technical problems occurred at any time.
5. One patient with a Stage 2 pressure ulcer on the buttock (Lyell's syndrome referral diagnosis and supplied with a standard hospital mattress) exhibited worsening of his pressure ulcer from Stage I to II during the testing period. In addition, the patient developed enteritis and was treated with a TheraPulse ATP for improved pressure distribution and thus wound therapy.
6. No new pressure ulcers occurred in any patient during the testing period.
7. All patients described the comfort level of Skin IQ as comfortable when lying down.

Conclusion:

Skin IQ succeeded in impressing the user with regard to its application for patients with increased skin moisture.

Westpfalz-Klinikum GmbH

The Westpfalzklinikum consists of four locations: Site I Kaiserlautern with 900 beds, Site II Kusel with 240 beds, Site III Kirchheimbolanden with 105 beds and Site IV Rockenhausen with 98 beds.

Westpfalz-Klinikum GmbH
Moderne Medizin
mit menschlichem Gesicht!

Author: Daniela Persch, Head Nurse
Westpfalzklinikum, Kusel site

Skin IQ was tested at Site II in Kusel. In our clinic, we care for patients with insults, ischemia, traumatic and inflammatory diseases etc. The participating department was the Department of Neurological and Neurosurgical Early Rehabilitation with 35 beds. The average hospital stay in our institution is 40–45 days. We tested Skin IQ on a total of 11 patients. The test had already been completed for 7 patients at the time this assessment was prepared. For 3 of the patients, we used another Skin IQ for an additional 30 days after the first 30 days.

Information on the patient group:

Criterion	Test group
Number of patients	7
Indications	Cerebellar infarction, intracerebral Haemorrhages, cerebral mass haemorrhages
Age	41–73 years
Gender	Female (n=4), Male (n=3)
Application of Skin IQ in combination with	Standard hospital mattress (n=7)
Reasons for using Skin IQ	Severe perspiration

Case study:

An impressive case was a 52-year-old patient with a left intracerebral haemorrhage. The patient exhibited a vegetative instability with severe perspiration at the time of admission. We first started using Skin IQ in our institution after this patient had been in residence with these symptoms for 5 weeks. After only a very short time, there was a significant improvement in the side effects associated with perspiration. After a few days, the power supply was unintentionally interrupted during the night shift without being noticed. The night shift reported renewed heavy perspiration in the patient the next morning. During the early shift, the interruption of the power supply was noticed, and it was immediately restored. Additional improvement in the patient's condition was observed immediately upon restoring the power.

Conclusion:

Our entire team (consisting of 36 nurses, 5 physiotherapists, 2 occupational therapists, 2 logopaedists and 4 specialist doctors) gained experience with Skin IQ during the period between January and March 2011. Our evaluation of the benefits of the product is positive, and we continue to use Skin IQ in consultation with our team with the appropriate patients.

Universitätsklinikum des Saarlandes

With 30 specialist clinics and 20 institutes, the UKS occupies a leading position among health centres in south-west Germany. From eye clinics to dental clinics, all major medical disciplines are represented in Homburg.

Author: Petra Schwarz
Divisional Manager, Homburg/Saar

The Skin IQ testing period was from January to March 2011. Skin IQ was tested in Ward M1-03, a ward for allogeneic and autologous stem cell transplantation. In our ward, we care for patients with plasma cell myeloma, leukaemia, non-Hodgkin's lymphoma, GVHD of the skin & intestines etc. Skin IQ was tested on a total of 8 patients. Skin IQ was used in combination with simple foam systems and systems with viscoelastic content. The healthcare professionals were surveyed before and after the test on the product and the course of treatment.

Information on the patient group:

Criterion	Test group
Number of patients	8
Indications	Oncological diagnoses (n=8) (pancreatic tumour, leukaemia, plasma cell myelo-ma, dermatological and intestinal GVHD, non-Hodgkin's lymphoma, T cell lymphoma, seminoma)
Important secondary diagnosis	All 8 patients perspired heavily (moist dermatological microclimate) and had fever
Age	37–73 years
Weight of the patients	63–102 kg
Gender	Female (n=1), Male (n=7)
Use of Skin IQ in combination with	Standard hospital mattress (n=7), Foam system with visco-elastic content (n=1)
Reasons for using Skin IQ	Patients with fever over several days, nocturnal perspiration (B symptoms) Dermatological GVHD (n=1)
Total test days	152

Results of the Skin IQ testing:

1. The aim of improving the dermatological microclimate was achieved for all patients.
2. Significant reductions in friction and shear forces were reported in the context of motion transfer in all patients.
3. In some cases, there were reports of stress-reducing effects, presumably because of the interruption of the accompanying vegetative symptoms.
4. Patients were consistently pleased that their beds were not soaked with perspiration.
5. No pressure ulcers occurred in any of the patients during the testing period.
6. Positive feedback from the patients regarding comfort levels.
7. The 30-day service life is positive for us because of the patients' long hospital stays.
8. Skin IQ is quiet.
9. Good concept as a disposable item.

Südharz-Krankenhaus Nordhausen

With over 800 beds in 26 specialist departments, the Südharz-Krankenhaus Nordhausen, an academic teaching hospital of the Universitätsklinikum Jena, is the largest hospital in Northern Thuringia. More than 1,900 employees provide inpatient care for more than 26,000 patients per year.

Author: Ellen Franke, Head Nurse IMC/SU Südharzkrankenhaus Nordhausen

Skin IQ was tested in the institution from January to March 2011. Skin IQ was used in IST 1, IST 2, palliative care, radiotherapy and IMC/SU. A questionnaire about the course of treatment was completed for each patient, and the healthcare professionals in attendance were surveyed about the product.

Information on the patient group:

Criterion	Test group
Number of patients	7
Indications	Bladder cancer, acute resp. insufficiency, pelvic fracture with unstable lumbar fracture, palliative care (pain management), cerebral metastases, leg angiopathy
Important secondary diagnosis	All 7 patients perspired heavily (moist dermatological microclimate) and had fever to some extent One patient had 2 Stage III pressure ulcers on the heel and sacrum (n=1) One patient had one Stage II pressure ulcer on the sacrum (n=1)
Age	55–80 years
Weight of the patients	69–115 kg
Gender	Female (n=1), Male (n=6)
Application of Skin IQ in combination with	Foam system with viscoelastic content (n=7)
Reasons for using Skin IQ	Heavy perspiration in the patient to some extent associated with fever

Results of the Skin IQ testing:

1. Very simple operation
2. Immediate effectiveness noticeable: faster removal of moisture (patient perspires significantly less)
3. Patient transfer and position changes in bed are easier (lower shear and friction forces)
4. Savings on bed sheets and care times (otherwise frequent change of linen and appropriate body care)
5. Prevention of infection system bacteria-free even after a long period of use
6. Very good prevention of pressure ulcers and intertrigo due to constant dryness
7. Good wound healing tendency for chronic, strong secretion-producing wounds
8. The existing Stage III and II pressure ulcers healed increasingly as part of the treatment. No patient developed new pressure ulcers
9. Subjective well-being of the patient through pleasantly dry environment

Conclusion:

The demand for IST 1, IS 2, palliative care, radiotherapy and IMC/SU in our institution is estimated at approximately 5 units per month. Skin IQ is a medical device which, after intensive testing in several departments, demonstrated impressive advantages. The indication was strictly observed throughout the course of the care.

St. Georg Klinikum Eisenach gGmbH

The St. Georg Klinikum Eisenach is an acute care hospital with nine chief-physician-led medical departments, including a day clinic for psychiatry, psychotherapy and psychosomatics, as well as a centre for physical and rehabilitative medicine. It has a total of 355 beds and 36 therapy spaces.

Author: Mathias Schulz, Chief Nursing Officer St. Georg Klinikum Eisenach gGmbH

Skin IQ was tested in our institution from January to March 2011.

Information on the patient group:

Criterion	Test group
Number of patients	7
Indications	Bladder cancer, acute resp. insufficiency, pelvic fracture with unstable lumbar fracture, palliative care (pain management), cerebral metastases, leg angiopathy
Important secondary diagnosis	All 7 patients perspired heavily (moist dermatological microclimate) and had fever to some extent One patient had 2 Stage III pressure ulcers on the heel and sacrum (n=1) One patient had one Stage II pressure ulcer on the sacrum (n=1)
Age	55–80 years
Weight of the patients	69–115 kg
Gender	Female (n=1), Male (n=6)
Application of Skin IQ in combination with	Foam system with viscoelastic content (n=7)
Reasons for using Skin IQ	Heavy perspiration in the patient to some extent associated with fever

Conclusion:

1. Selective use makes sense (cost/benefit assessment is recommended)
2. There are no concerns from a hygienic perspective
3. Improved quality of life
   - through lowering of skin temperature
   - Neutralisation of moisture-related odours
4. Skin IQ can be used in combination with commercially available pressure-relieving mattress replacement systems
5. Good space-saving storage and timely availability
6. Quick, simple set-up and easy to clean

Vitos Pflegezentrum Weilmünster

Vitos GmbH is an amalgamation of twelve non-profit companies. The sole shareholder is the Landeswohlfahrtsverband [state welfare organisation] in Hesse. The treatment of children, adolescents and adults in psychiatric clinics or clinics for forensic psychiatry is a core task of the Group.

Over 8,800 employees generate annual sales of approx. 480 million euros. They treat over 30,000 patients on a full or partial inpatient basis and over 160,000 outpatients. Vitos is represented in more than 40 locations in Hesse. With 3,154 beds or spaces, the company is Hesse's largest provider of outpatient and full and partial inpatient treatment for people with psychological disorders. There are also facilities for people with mental or emotional disabilities as well as socio-educational youth welfare services with a total of 2,002 spaces and specialist clinics with 325 beds.

The Vitos Pflegezentrum in Weilmünster, which was opened at the end of 2009, is designed for the inpatient care of people with severe and extremely severe neurological damage in rehabilitation phase F according to the framework concept of the National Welfare Association and the associations of the care funds of the state of Hesse. We offer holistic, inpatient care for 21 residents from the age of 18 years, which may also have the capacity for artificial respiration and absorption and a care level of at least 2.

vitos:

Klinik für Neurologie
Weilmünster

Author:
Klaus Günther
Head Nurse

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Nurses

Vitos Pflegezentrum
Weilmünster Gmb

In June 2011, we received two microclimate management systems for evaluation purposes. These were tested on 2 residents over a period of 4 weeks. To begin with, the system was impressive for its ease of use, because it can be placed over any type of mattress like a sheet. Due to the properties of the surface, the shear and frictional forces are significantly reduced, and the positioning and transfer of the residents significantly simplified. The initial concerns that the built-in motor would cause a nuisance to the resident were quickly put to rest in practice. Due to its installation at the foot of the bed and the almost noiseless operation, this presents no problems.

Case descriptions:

Specifically, we would like to use our observations to detail the advantages of this therapy system. Mr S., 56 years old, came to the care centre 1½ years ago with hypoxic brain damage and spastic quadriplegia in a persistent vegetative state. He is trachaeotomised, diabetic and is fed via a PEG tube.

Mr G., 50 years old, came to us 2 months ago with anoxic brain damage following an aneurysm with a shunt installation. He is also trachaeotomised and fed via a PEG tube.

Both residents tended to perspire profusely due to their underlying disease. This meant that their clothing had to be changed several times a day, and also led to various skin irritations. Mr S. has been suffering from a chronic fungal infection in the anal and genital area since his admission, which is also due to excessive perspiration. The use of the Skin IQ has significantly improved this problem.

Conclusions:

Both residents present a significantly drier skin condition, so that the frequency of clothing changes has been greatly reduced. According to our observations, this has also manifested itself as increased well-being, as there was also a decrease in odours due to the removal of excess moisture. Another effect that can be observed is the lowering of the temperature of the skin surface, which brings relief to the residents, especially on very warm days.

In conclusion, we can say that both residents have made a better cared-for and satisfied impression. The use of the Skin IQ returned some quality of life to Mr S. and Mr G., because they can only ever be mobilised in the wheelchair at hourly intervals and therefore spend most of the day in bed. From a nursing point of view, we at Vitos Pflegezentrum Weilmünster can highly recommend the Skin IQ Microclimate Manager, and hope that it will be accepted and recognised by the health insurance companies in the near future.

Berufsgenossenschaftliche Unfallklinik Ludwigshafen

The BG Unfallklinik in Ludwigshafen is a specialist clinic and maximum care facility as well as the 1st Rhineland-Palatinate Emergency Centre with the following specialisations:

- Traumatology/Plastic surgery for the hands/ Trauma surgery
- Cross-sectional surgery/Orthopaedics/Septic surgery
- Neurosurgery
- Spinal Cord Injury Department
- Severe Burns Centre Bed count: 418-bed capacity.

BG Klinik
Berufsgenossenschaftliche Unfallklinik Ludwigshafen

Author: Claudia Stork, Instructor for Nursing Professions, Head of the Internal In-Service Training Unit and Continuing Education / Quality Assurance and Deputy Quality Management Representative
BG Unfallklinik Ludwigshafen

When the modifications to the Updated Experts Standard on Pressure Ulcer Prevention became known in November 2010, a much-discussed criticism was the exclusion of skincare. We were asked to test a new product related to this topic. Skin IQ is described as a system that draws moisture from the skin, thereby significantly improving the microclimate. On the one hand I was sceptical of the promised effect; on the other hand I doubted whether it would be accepted in our clinic. How could I justify the cost of the disposable product? Would the employees cope with it? Did we even have a suitable patient group for it? As our levels of scepticism and curiosity were roughly equal, we agreed to test the product from January to March 2011.

Information on the patient group:

Criterion	Test group
Number of patients	5
Indications	Brain trauma (n=4) Burns (n=1), average
Age	62–85 years
Weight of the patients	68–80 kg
Gender	Female (n=3), Male (n=2)
Use of Skin IQ in combination with	Foam system with viscoelastic content (n=3), Hybrid system (n=1), No information (n=1)
Reasons for using Skin IQ	Severe, illness-related perspiration (n=4) Production of enormous quantities of exudate (n = 1)

Results of Skin IQ testing

- Skin IQ leads to an improvement of the microclimate
- Significant reduction of moisture on the skin and less perspiration-soaked laundry
- Ease of use and handling
- Tolerates more protein than expected
- Application of Skin IQ particularly suitable for skull and brain trauma patients
- Ideal for use with perspiring patients in general
- High level of satisfaction with results on the part of healthcare providers and patients
- Isolated patients in particular found fault with the motor's type of disposal

Overall assessment:

Skin IQ is rated by patients, nurses and doctors as providing a significant improvement in the microclimate and associated reduction in skin hydration. An exception is the feedback from the cross-sectional patient, who, due to his disturbed sensitivity, described a subjectively perceived increase in pressure and creasing. Otherwise, there was a significant overall reduction and saving on laundry. Patients for whom a Low Air Loss System is less suitable because of their perceptual problems (traumatic brain injury patients) can use Skin IQ to be adequately and effectively supported on all other mattresses and support systems in the area of microclimate. Wards which participated in testing recognise the need and would like to provide Skin IQ to additional patients. The number of requests far exceeded the expectations of the previously assumed demand. The problem is more common than previously believed. Until now, however, these patients have not been specifically identified, so the actual need to better care for perspiring patients has certainly been underestimated in many institutions, including ours. None of the patients who were provided with Skin IQ developed any pressure ulcers during the course of treatment. The skin was generally unremarkable, and skin irritation which was primarily caused by moisture, particularly in the area of body folds and cavities, receded completely.

Case studies

Case 1: Neurosurgery

Patient suffered a traumatic brain injury.
Gender: male, **age:** 62 years, **height:** 185 cm, **weight:** 74 kg.
Diagnosis on admission: severe traumatic brain injury after accident
ASA-Classification: IV, risk value (according to Braden): 8 pts
Using Skin IQ on an AtmosAir
Moisture: continuous, very heavy perspiration over the entire body, frequent washing associated with a change of clothing 4–5 times a day
Temperature: normal body temperature, no specific medicines
Mobilisation/repositioning and positioning: Mobilisation was not possible, limited positioning possibilities, position changes at 2–4 hour intervals

Developments and evaluation:

The patient was taken postoperatively from the intensive care unit. He had already suffered previously from heavy perspiration in the normal ward where his skin was constantly wet, and the bedding quickly became drenched with perspiration. Skin IQ was used after consultation with the attending neurosurgeons. The nurses consistently gave a positive evaluation of the application. A reduction in the patient's moisture level was observed after a short time; fewer bedding changes and sponge baths were required. The patient presented with much drier skin and was subsequently transferred back to the neurosurgical ward. The nurses there were impressed with how "dry" the patient's skin was, unlike previously. The doctors were also impressed with the effect. The relief of staff with regard to bedding changes was noticeable. Skin IQ was applied for 6 days in intensive care and 23 days in the normal ward with no errors or failures in use. The performance of Skin IQ surpassed the nurses' expectations and received a very positive rating. Even the relatives noticed the low level of moisture on the body. The motor is barely noticeable; the concern of excessive vibration effects on the bed was not borne out. On the contrary, the patient's new nurses had to be made aware of Skin IQ at first. The test with another traumatic brain injury patient also produced the same positive results.

Case 2: Severe burns

Our observational study focused on the following questions:

- How does Skin IQ perform in the presence of heavy wound secretions?
- Where are the transport limits for liquids with a high protein content?
- How does the high ambient temperature averaging 38°C in the burns ward affect the performance of Skin IQ?
- Does it cause any malfunctions?
- Can Skin IQ also be recommended for patients with combined injuries, e.g. in trauma patients who perspire profusely and produce abundant wound secretions?

Case description:

Gender: female, **age:** 85 years, **height:** approx. 160 cm, **weight:** 68 kg.
Diagnosis on admission: Burns on both legs and buttocks from attempting to ignite a charcoal oven, 3rd degree burns on 28% of the body surface, risk factors: coagulation disorders, heart failure
ASA classification: IV
Pressure injuries: No, risk value at the beginning (according to Braden): 10 Use of Skin IQ on a viscoelastic foam mattress
Heavy wound secretion through burns (use of molleton pads to absorb liquid) temperature regulation disturbance due to burns (hypothermia; 37.1°C achieved through the use of a warm blanket), no special medication
Mobilisation was not possible, limited positioning options, position changes at 2-4 hour intervals
Special conditions: Room temperature constant at approx. 35–38°C; high fluid substitution, heavy wound secretion in the legs and buttocks.

Developments and evaluation by nurses:

Skin IQ was applied with no problems for 5 days, no error messages or failures, removal of the liquid even at high room temperature presented no problems and was clearly visible. The performance of Skin IQ with wound secretions containing high levels of protein, exceeds expectations. Handling in this respect was also described as simple and unproblematic. On the 6th day, an operation was performed on the burn injuries. Large-scale debridement of the legs and buttocks led to the production of extreme amounts of exudate with a high proportion of blood. Skin IQ cannot cope with these amounts of large molecular wound secretions. The patient was transferred to a standard foam stainless steel bed used for these cases. This special type of care enables the unimpeded outflow of large quantities of fluid through the large-pore foam into containers under the bed. Without Skin IQ, the patient would have been transferred to a foam bed earlier. Because of Skin IQ the patient was able to stay on the viscoelastic foam mattress, with its benefits of better pressure distribution, pain reduction, and greater comfort, for a longer period of time.

Klinik Kipfenberg

Klinik Kipfenberg is a neurological specialist clinic at the geographical centre of Bavaria, with a total of 172 beds.

Author: Barbara Polzer
Deputy Head Nurse Klinik Kipfenberg

In our daily nursing routine, we often have to deal with immobile and haemodynamically unstable patients in need of care. Their skin is often irritated and sore due to circulatory problems. Particularly in cross-sectional patients, in the early stages, independence with regard to position changes or the necessary pressure relief is inconceivable. Often our patients undergoing rehabilitation are in poor general condition and are struggling with disease, fever or profuse perspiration. Unfortunately, pressure ulcers are too often a complication in our cross-sectional and early rehabilitation patients.

We therefore tested the new "Skin IQ Microclimate Manager" mattress coverlet, which is designed to alleviate these symptoms. Full of curiosity and with slight scepticism, we allowed ourselves to be introduced to the mattress coverlet. We used Skin IQ with two patients who were perspiring heavily, exhibiting severe redness in some areas of the skin, each suffering from a small pressure ulcer, and repeatedly tending to have a mild fever. All nurses on our cross-sectional ward equipped with 20 beds were instructed in the handling of the coverlet. The ease of use and the low effort had scored in advance for all colleagues. As a result, we feared additional work due to the possibility of more frequent sheet changes. We were quickly able to lay these fears to rest during the testing period.

The initial results became apparent after a short period of use. The patients were no longer so sweaty, and we were able to control subfebrile temperatures even without medication. Skin IQ regulates body temperature downwards a little, and absorbs perspiration and other body fluids. The mattress coverlet has also proven itself with regard to wound care. The pressure ulcers visibly improved after a few days and regressed to an almost intact skin condition after four weeks. Our patients have reported a pleasant degree of comfort while lying down, primarily because nocturnal perspiration was reduced and thus a much more comfortable night's sleep was possible.

The test of the "Skin IQ Microclimate Manager" mattress coverlet impressed our entire team as well as the two patients. Klinik Kipfenberg's cross-sectional ward will continue to use the mattress pad and is already using it for other patients. It has proven to be a great help in caring for wounds, particularly for pressure ulcer patients.

Conclusion:

Bedridden patients in particular have to struggle with fever, heavy perspiration or pressure ulcers over and over again. Carers are therefore open to new products – to solutions that reduce and improve precisely these patient complaints. We tested the "Skin IQ Microclomate Manager" mattress coverlet, which is specifically intended to prevent these problems. Visible success was evident after just a few weeks of use.

Charité Berlin

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Opinion on a test of Skin IQ

Initial situation:

Patient with morbid obesity with a BMI of 58.7 in an intensive care unit. Pronounced exertional dyspnoea under IV ventilation (weaning) via tracheostoma volume/pressure controlled with partially active mobility and activity. The patient was positioned on a BariAir™ during the acute phase (fulminant sepsis). The patient had a pronounced fungal infection in the anal/genital area at the time of admission. Due to the many deep skin folds in this area, the wound therapy initiated by Wound Management was very problematic.

Measures:

At this stage, our institution's kinaesthetic team began to implement a movement-enhancing training programme using an individualised mobilisation plan. The patient made rapid progress in his partial activity after septicaemia subsided. To further facilitate this with the customised training programme (Aim: to mobilise the patient in this position), a change was made to a BariMaxx™ Active bed with a non powered mattress (AtmosAir™ 9000). The remaining painful, moisture-related skin lesions should have actually been an argument against a bed change. However, as the promotion of physical activity should not be neglected, and the patient's own activity (position change, lateral position) was restricted in the BariAir™ , the bed change was carried out.

Under the guidance of the kinaesthetic instructors, the patient learned to independently change his lateral position and move toward the head of the bed in the BariMaxx™ Active within 2 days, which relieved the nursing staff significantly. The partially active transfer to a sitting position on the edge of the bed was problematic, as the painful moisture-related skin lesions prevented the patient from reaching for and holding this position. We were provided with a Skin IQ™. After a few days of use, the wound managers were also able to observe that the skin lesions on the contact surfaces in the buttocks area could be seen to subside. However, the problem remained in the deep skin folds. After 5 days, the patient was able to maintain the sitting position on the edge of the bed largely free of pain for up to 15 minutes and be mobilised in this position. The patient was on the Skin IQ™ for a total of 20 days.

Conclusion:

It can therefore be assumed that Skin IQ can have a positive effect on wound therapy. Compared with low air loss and alternating pressure systems, Skin IQ in combination with a foam system has a significantly lower negative influence on the promotion of pure passive physical activity and partial activity or activity of the patients. The low height of Skin IQ in combination with a low-to-floor bed and a non powered mattress also allows for safer mobilisation such as sitting on the edge of the bed and getting up for smaller and/or fall-prone patients. The functionality of Skin IQ with obese patients was surprisingly gratifying. This group of patients in particular often suffers from moisture-related skin lesions. The patient experienced no loss of comfort while lying down after the Skin IQ was added. No change in the patient's body perception was observed during the period of use. The easy handling of Skin IQ may be an alternative to the complete bed change procedure which is otherwise required.

Part 2

Skin IQ Microclimate Manager Individual Patient Case Studies & Product Application

Cases: Wound Care, Cancer, Bariatric, Medical and Surgical

PATIENT CASE STUDY:
SKIN IQ MICROCLIMATE MANAGER

Note: As with any case study, the results and outcomes of the patients in these case studies should not be interpreted as a guarantee or warranty of similar results. Individual results may vary depending on the patient's circumstances and condition.

Patient Type: **Wound Care**
Age: **80**
Gender: **Male**

The patient had a non-healing left great toe amputation. The hospital course was further complicated by acute renal failure, pleural effusions, and malnutrition.

Treatment

The patient was placed on a Skin IQ MCM pressure redistribution surface, at admission. Additional materials used with Skin IQ MCM were paper blue pads underneath the patient and a single draw sheet used for positioning patient. Moisture barrier ointment was applied twice daily to the area. Because of multiple discharges to short-term acute care for respiratory failure and GI bleed, Skin IQ MCM was used intermittently for 3 months (A–C).

Outcome:

Skin breakdown (complications resulting from the toe amputation) resolved and patient was discharged.

A. Initial skin breakdown

B. 5 days post Skin IQ MCM

C. 18 days post Skin IQ MCM

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Contributor Title: Medical Director

Contributor Photo:
Facility Name: Baylor Specialty Hospital
Facility Location: Dallas, TX

PATIENT CASE STUDY:
SKIN IQ MICROCLIMATE MANAGER

Note: As with any case study, the results and outcomes of the patients in these case studies should not be interpreted as a guarantee or warranty of similar results. Individual results may vary depending on the patient's circumstances and condition.

Patient Type: **Cancer**
Age: **78**
Gender: **Male**

The patient was admitted for head and neck cancer resection and was on intravenous antibiotics for osteomyelitis of the mandible. The patient also suffered from dysphagia and incontinence.

Treatment

The patient was placed on Skin IQ MCM on a pressure redistribution mattress (PRM) at admission and remained on Skin IQ MCM for 27 days with follow-up at day 30 (A-D). Paper blue pads were used to allow air flow. A single layer draw sheet was placed on top of the Skin IQ MCM to assist when moving the patient. Moisture barrier ointment was also applied twice daily to the area.

Outcome:

Skin breakdown resolved and patient was discharged.

A. Initial skin breakdown

B. 6 days post Skin IQ MCM

C. 27 days post Skin IQ MCM

D. Follow-up at day 30

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PATIENT CASE STUDY:
SKIN IQ MICROCLIMATE MANAGER

Note: As with any case study, the results and outcomes of the patients in these case studies should not be interpreted as a guarantee or warranty of similar results. Individual results may vary depending on the patient's circumstances and condition.

Patient Type: **Bariatric**
Age: **48**
Gender: **Female**

The patient had a spontaneous rupture of an abscess located on left buttock (A) and was treated with gentamicin soaks at a previous hospital.

Treatment

The patient was placed on Skin IQ MCM on a pressure redistribution surface at admission and remained on Skin IQ MCM for 30 days. Additional materials used with Skin IQ MCM were paper blue pads underneath the patient and a single draw sheet used for positioning patient. Moisture barrier ointment was also applied twice daily to the area. Ruptured abscess was treated with negative pressure wound therapy. Improved skin condition was noticed around peri-wound area by 20 days of use (B–D).

Outcome:

Skin breakdown resolved and patient was discharged.

A. Ruptured abscess with skin breakdown

B. Peri-wound condition – 7 days post Skin IQ

C. Peri-wound condition – 18 days post Skin IQ

D. Peri-wound condition – 20 days post Skin IQ

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PATIENT CASE STUDY:
SKIN IQ MICROCLIMATE MANAGER

Note: As with any case study, the results and outcomes of the patients in these case studies should not be interpreted as a guarantee or warranty of similar results. Individual results may vary depending on the patient's circumstances and condition.

Patient Type: **Medical**
Age: **64**
Gender: **Female**

The patient developed chronic yeast infection to sacrum and buttock areas (A). The patient maintained a Prealbum (PAB) <5 throughout hospitalization.

Treatment

The patient was placed on Skin IQ MCM, which was installed on a pressure redistribution surface, at admission and remained on Skin IQ MCM for approximately 16 days (B–C). Additional materials used with Skin IQ MCM were paper blue pads underneath the patient and a single draw sheet used for positioning patient. Moisture barrier ointment was also applied to the area. A physician on call transferred patient onto a low air loss (LAL) surface unaware of Skin IQ MCM. Patient remained on LAL surface without Skin IQ MCM for less than a week (D), during which the patient's skin integrity worsened. Patient was placed back on Skin IQ MCM for approximately 7 days. Skin integrity was improving.

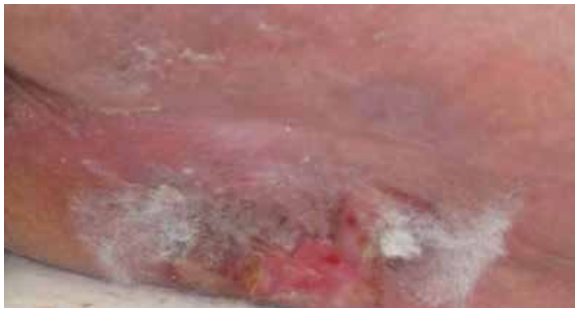
Outcome:

Patient expired after gastrointestinal (GI) bleed within 30 days of admission.

A. Initial skin breakdown

B. 6 days post Skin IQ MCMIQ

C. 27 days post Skin IQ MCM



D. Follow-up at day 30 (after transfer to low air loss)

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PATIENT CASE STUDY:
SKIN IQ MICROCLIMATE MANAGER

Note: As with any case study, the results and outcomes of the patients in these case studies should not be interpreted as a guarantee or warranty of similar results. Individual results may vary depending on the patient's circumstances and condition.

Patient Type: **Surgical**
Age: **73**
Gender: **Female**

The patient underwent revascularization with multiple washouts for hematoma. The patient also had a Candida rash to perirectal, sacral and posterior buttock areas (A).

Treatment

The patient was placed on Skin IQ MCM on a pressure redistribution surface 1-2 weeks after admission and remained on Skin IQ MCM for 2-3 weeks (B-D). Additional materials used with Skin IQ MCM were paper blue pads underneath the patient and a single draw sheet used for positioning patient. Moisture barrier ointment containing an anti-fungal agent was applied to the area pre and post Skin IQ MCM implementation.

Outcome:

Skin breakdown resolved and patient was discharged. The patient's initial prealbumin (PAB) of < 5 improved to 7.5 by time of discharge.

A. Initial skin breakdown

B. 7 days post Skin IQ

C. 14 days post Skin IQ

D. 17 days post Skin IQ

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Summary

Microclimate management represents one element of a pressure injury prevention program.

Elevated temperature and excessive moisture can have a damaging effect on the skin and underlying soft tissues increasing the risk of injury from pressure, shear and / or frictional forces.

Patients with suspected or confirmed microclimate management requirements may benefit from the use of Skin IQ as part of a pressure injury prevention and management solution. A full holistic assessment of the patient should be considered before implementing microclimate control measures to ensure product functionality is matched with individual therapy goals.

Skin IQ is an adjunctive therapeutic mattress coverlet which adds microclimate control to a pressure redistributing surface and can be used with patients presenting with complex skin care issues, including full thickness tissue injury.

We hope that you have found this clinical resource of value. If you would like more information, please visit our website www.arjo.com or contact your local Arjo representative.

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At Arjo, we are committed to improving the everyday lives of people affected by reduced mobility and age-related health challenges. With products and solutions that ensure ergonomic patient handling, personal hygiene, disinfection, diagnostics, and the effective prevention of pressure injury and venous thromboembolism, we help professionals across care environments to continually raise the standard of safe and dignified care. Everything we do, we do with people in mind.

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