



PRESSURE INJURY PREVENTION

# **EPUAP - NPIAP - PPPIA International Clinical Practice Guidelines 2019**

Considerations on skin and tissue assessment, support surfaces,  
patient handling and pressure injury prevention for clinicians.

# Arjo pressure injury prevention & management solutions

## Prevention and treatment of pressure injuries: clinical practice guideline<sup>1</sup>

The launch of the 2019 guideline represents a truly international perspective of pressure injury prevention and management, reflecting multidisciplinary expertise, key opinion leader insight and cutting edge research from around the world. The most recent 3rd edition presents the latest evidence based recommendations to guide prevention and management practices.

## Skin & Tissue Assessment

### SUB-EPIDERMAL MOISTURE SCANNER



Provizio<sup>®</sup> SEM Scanner



## Support surfaces

### REACTIVE NON- POWERED RANGE



Hybrid & foam range

### ACTIVE AND REACTIVE POWERED RANGE



Powered range

### MICROCLIMATE MANAGEMENT



Negative Air flow &  
Low Air Loss systems

### SEATING CUSHIONS



Foam, Hybrid &  
Alternating systems

## Clinical consultancy partnership

As a leading global provider of solutions which help to prevent avoidable harm for patients at risk of pressure injuries and other complications associated with immobility, we would like to share with you how Arjo's range of products and integrated solutions align to the new recommendations.

Our solutions are designed to help create more secure and efficient healthcare environments from patient handling and mobilisation, to hygiene and pressure injury prevention, we can help you meet the new and continually evolving challenges of today's acute care and long term care settings.

As the scope of the new guidelines is substantial, this document will focus on subject areas related to early identification of risk, the management of pressure, tissue tolerance and immobility – areas closely aligned to our philosophy and expertise.

## Repositioning and mobility

### PATIENT HANDLING



Standing & raising aids

### REPOSITIONING



### EARLY MOBILIZATION



## Pressure injury development: evolving insights

Evolving insights and perspectives on pressure injury development suggest three major contributors to cell damage and tissue necrosis, namely deformation, inflammation and Ischaemia<sup>2</sup>. It is suggested that deformation damage can happen in a matter of minutes with ischaemia taking several hours before it manifests itself<sup>2</sup>. Support surface technologies are considered to play an important protective role and may help in reducing the onset and progression of inflammatory damage, enhance overall tissue tolerance and in delaying the ischaemic response.<sup>3</sup>

## Skin & tissue assessment (STA)

As tissue damage can happen within minutes at a cellular level, Identifying risk factors and assessing the skin and soft tissues are key components of pressure injury prevention, classification, diagnosis and treatment<sup>4</sup>. Assessment should take place as soon as possible after admission and each time there is a change in the individual's clinical condition.<sup>4</sup> In this respect, numerical risk assessment tools (RAT) and a visual and tactile skin inspection by the clinician, to assess for early signs of skin damage, have been the standard of care for many years. Though commonplace, both risk and skin assessment methods are challenged by subjectivity and require a level of clinical expertise that is not always available at the bedside.

Sub-epidermal moisture (SEM) is a biomarker for early tissue damage.<sup>5,9</sup>

Tissue changes may occur beneath the observable skin level days before tissue breakdown and ulceration are visible at the skin surface<sup>5</sup>. These tissue changes that may lead to pressure injury development are caused by inflammation, triggered by prolonged pressure, shear forces, tissue deformation and ischaemia<sup>2</sup>. The inflammation is stimulated over time, varying from minutes to hours and leads to a number of pathological changes. As a result important risk indicators may go undetected delaying the implementation of preventative measures.<sup>1,3</sup>

# Risk Assessment - Provizio<sup>®</sup> SEM Scanner

As an adjunct to Skin and Tissue Assessment an innovative and clinically proven technology<sup>6,7,8</sup> – the Provizio SEM Scanner which provides an assessment of sub-epidermal moisture content, as an early indicator of pressure injury risk is now part of the Arjo portfolio.

The Provizio SEM Scanner is a hand-held, wireless, non-invasive, device with a skin-contact sensor that reads the electrical capacitance of the skin: this biophysical marker changes when sub-epidermal moisture is present.

In comparison to STA, the Provizio SEM Scanner supports clinicians to identify specific anatomical areas – the heels and sacrum at increased risk of pressure injury development on admission and 5 days\* earlier<sup>7</sup> than visual skin assessment regardless of skin tone<sup>8</sup>.

## International guideline 2019

### Recommendation 2.6:

Consider using a sub-epidermal moisture/edema, measurement device as an adjunct to routine clinical skin assessment (Strength of Evidence = B2, Strength of recommendation Q) <sup>9</sup>

### Recommendation 2.7:

When assessing darkly pigmented skin, consider assessment of skin temperature and sub-epidermal moisture as important adjunct strategies (Strength of Evidence = B2; Strength of Recommendation h) <sup>10</sup>

Provizio SEM Scanner has been demonstrated as an effective tool supporting the prevention of pressure injury when used as an adjunct to standard of care<sup>6</sup>.



**Provizio SEM Scanner**



# Support surface solutions

With over 60 years of experience, Arjo has become a leading global authority on the design, development and clinical application of therapeutic support surfaces for the prevention and management of pressure related injuries.

As a company we aspire to deliver class leading clinical performance and technological innovation to assist healthcare facilities in reducing avoidable harm. We recognise that each healthcare provider has its own unique blend of clinical and financial objectives to consider when considering and

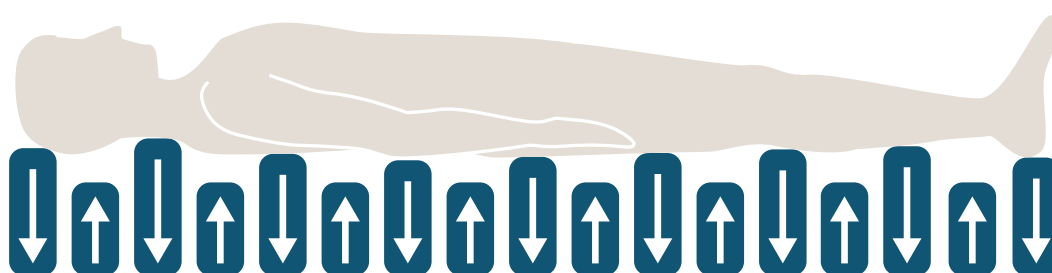
addressing support surface solutions as part of a pressure injury prevention and management strategy.

With an extensive choice of Active (Alternating Pressure) and Reactive (Constant Low Pressure) approaches to pressure redistribution, along with powered microclimate controlled mattresses and cover options, we can help tailor flexible, user-friendly and guideline aligned solutions to help meet a range of requirements.

*“Select a Support Surface that meets the individuals need for pressure redistribution based on the following Factors”<sup>11</sup>*

- Level of Immobility & Inactivity
- Need to influence Microclimate Control & Shear Reduction
- Size & weight of the individual
- Number, Location & Severity of Existing Pressure Injuries
- Risk of Developing New Pressure Injuries

## Active (alternating) support surfaces



### International guideline 2019

*“Assess the relative benefits of using an alternating pressure air mattress or overlay for individuals at risk of pressure injuries”<sup>12</sup>*

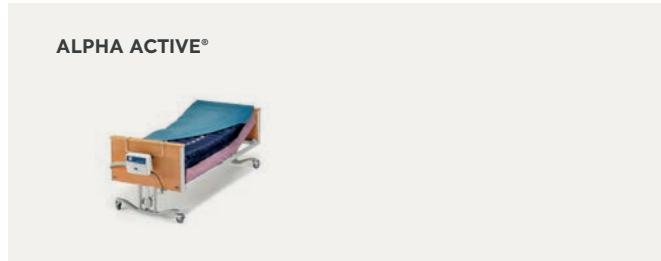
### Considerations:

- An alternating air pressure mattress overlay will require a quality base mattress. Substandard base mattresses may affect performance<sup>13</sup>
- Where possible continue a regular turning and repositioning regimen with frequency based on the needs of the individual<sup>13</sup>

#### Automatic Cell Pressure Adjustment



#### Manual Cell Pressure Adjustment



Arjo Active (alternating) Therapeutic Support Surfaces are designed to closely mimic the natural protective environment of regular spontaneous movement, by redistributing pressure several times each hour, even if the patient doesn't move<sup>14</sup>. A 1 in 2 cell cycle, where alternate cells inflate and deflate balances the application and removal of pressure to give time for tissue reperfusion.



Auralis® Alternating Pressure Mattress with Self-Set Technology

#### Auralis Automated Self-Adjusting Pressure

Arjo's most recent Therapeutic Surface - The Auralis offers a solution for patients at very high risk of a pressure injury. Designed for high acuity patients with limited mobility and compromised skin integrity, the Auralis System uses intelligent automated Self-Set Technology to control mattress pressures in both active (alternating) and reactive (constant low pressure) modes. An advanced microprocessor in the Auralis pump regularly assesses the body mass distribution of patients and readjusts cell pressures to suit their individual needs.

#### Nimbus range with wound valve technology

As a further level of tissue protection, products such as the Nimbus Professional and Nimbus 4 mattresses offer the facility to completely and permanently off-load pressure from high risk areas such as the heels, wounds and surgical sites through Wound Valve Technology™.



Nimbus Professional with Wound Valve Technology™

## Support surfaces for individuals with existing pressure injuries

### International guideline 2019

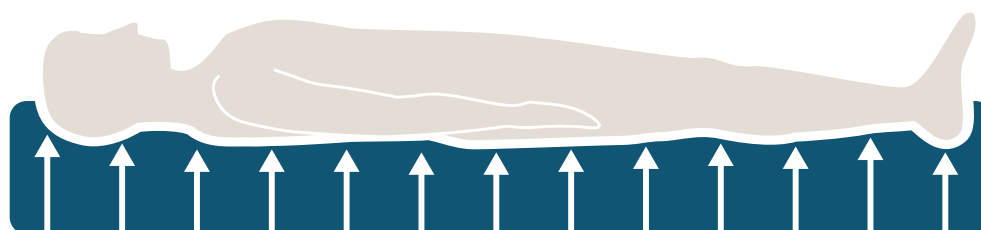
“For individuals with a pressure injury, consider changing to a speciality support surface when the individual:

- Cannot be positioned off the pressure injury
- Has pressure injuries on two or more turning surfaces that limit repositioning options
- Has a pressure injury that fails to heal or that deteriorates
- Is at high risk for additional pressure injuries
- Has undergone flap or graft surgery
- Is uncomfortable
- Bottoms out on the current support surface”<sup>15</sup>

The international guidelines recommend speciality support surfaces to consider for individuals with an existing pressure injury include alternating pressure air mattresses, mattresses

with a low air loss feature and air fluidised beds (Expert Opinion)<sup>15</sup>.

## Reactive (constant low pressure) powered support surfaces



### International guideline 2019

“Consider using a reactive air mattress or overlay for individuals at risk for developing pressure injuries”<sup>16</sup>

Reactive (continuous low pressure) therapeutic surfaces typically reduce the contact pressure at the skin-mattress interface by increasing the surface area over which the individual is supported. Pressures will depend on the type of support surface and how it is adjusted. As the pressures do not change unless the individual makes a movement, these devices are termed ‘reactive’. Reactive surfaces typically include foam, gel, air foam combination products, low air loss and air fluidised systems.

Reactive support surfaces from Arjo aim to reduce the level of continuous pressure exerted against the skin by enabling the body to immerse into and be enveloped by the support surface<sup>17</sup>.

### THERAKAIR VISIO LOW AIR LOSS SYSTEM



### ATMOSAIR HYBRID MATTRESS RANGE



With a choice of non-powered technologies including AtmosAir foam/air hybrids through to powered surfaces such as the Therakair Visio that delivers pulsation and low air loss therapy, the range of Reactive Support Surfaces from Arjo can suit a wide range of clinical applications and environments.

### Dual modality air mattress systems

The Auralis & Citadel C200 mattress systems offer a ‘dual modality’ function to provide a reactive air, constant low pressure mode for pressure injury prevention and management.



## Non-powered reactive surfaces

With foam pressure redistribution mattresses often delivering the first line of defence against pressure injury development, it's important to feel confident in the capabilities of the solution you choose. For this reason, Arjo has a range of high specification foam mattresses and hybrid air/foam pressure redistribution surfaces with self adjusting valves, designed for the prevention and management of pressure injuries.

ATMOSAIR® AIR/FOAM  
HYBRID SYSTEM



PENTAFLEX® HIGH  
SPECIFICATION FOAM



## International guideline 2019

“Use a high specification reactive single layer foam mattress or overlay in preference to a foam mattress without high specification qualities for individuals at risk of developing pressure injuries”<sup>18</sup>

## Specialist off-loading for prevention & management

Wound Valve Technology available with the Nimbus 4 and Nimbus Professional mattress replacement systems, facilitates selective off-loading of vulnerable areas. Other mattresses within the Arjo support surface range include heel zones to assist with pressure injury prevention in the heel area.



## International guideline 2019

“Support Surfaces are an important element in pressure injury prevention and treatment because they can prevent damaging tissue deformation and provide an environment that enhances perfusion of at risk or injured tissue”<sup>19</sup>

“Ensure the heels are free from the surface of the bed”<sup>20</sup>

## International guideline 2019

“For individuals at risk of heel pressure injuries/and or with category/stage I or II pressure injuries. Elevate the heels using a device specifically designed for heel suspension.”<sup>21</sup>

For individuals with a category/stage III or greater heel pressure injury, elevate the heels using a device specifically designed for heel suspension, offloading the heel completely in such a way as to distribute the weight of the leg along the calf without placing pressure on the Achilles tendon and the popliteal vein”<sup>21</sup>.

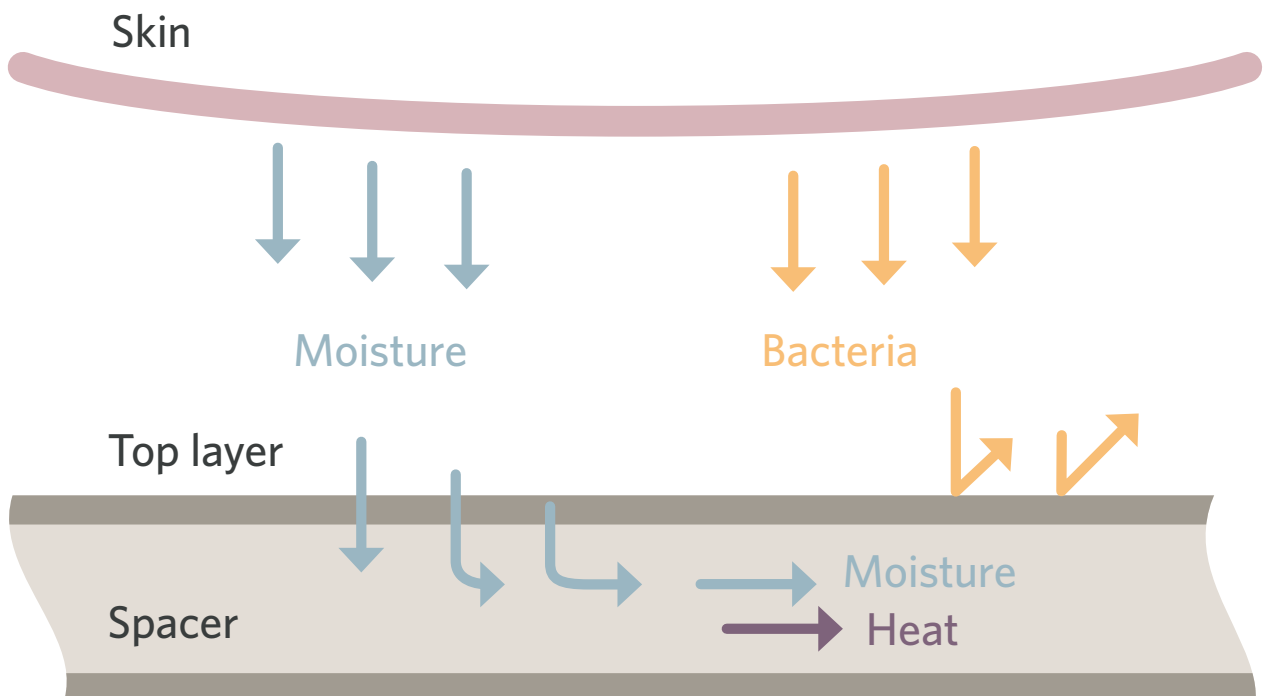
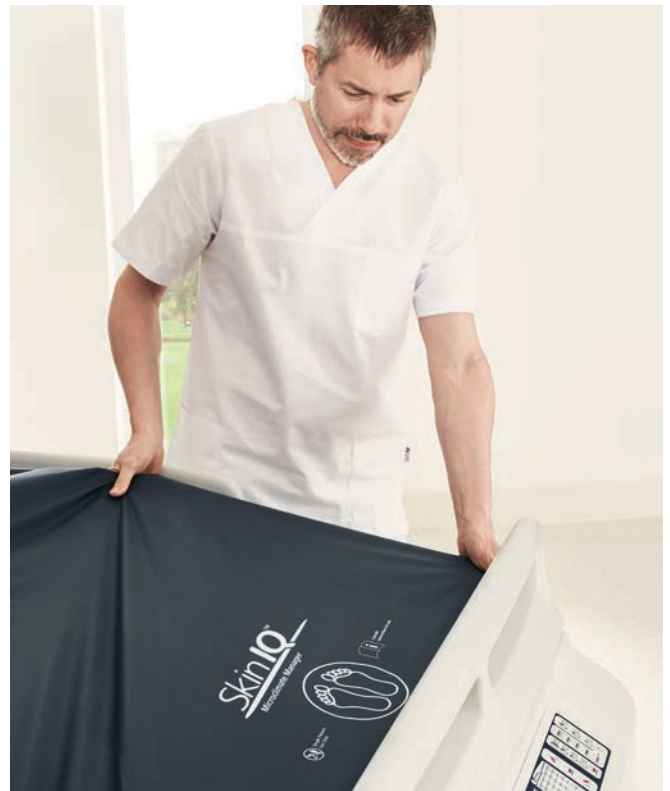
“wherever possible, do not position an individual on an existing pressure injury”<sup>22</sup>

## Managing microclimate

Microclimate management can help to complement pressure redistribution for the prevention and management of pressure injuries. There is a growing appreciation of the role of microclimate management in helping to improve tissue tolerance to aid pressure injury prevention and management, particularly in the presence of excessive moisture and elevated temperature at the skin/surface interface<sup>23</sup>.

Any surface that is in contact with the skin has the potential to affect the microclimate. The overall effect is dependent on the nature of the support surface and the cover<sup>24</sup>.

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



Skin IQ MCM mode of action



## Microclimate management

Skin IQ® Advanced Microclimate Management cover designed for compatibility with pressure redistribution mattresses on the market today.

Skin IQ®

### International guideline 2019

“An increasing body of evidence suggests that microclimate between the skin and supporting surface plays a role in the development of Pressure Injuries”<sup>23</sup>

### SKIN IQ MICROCLIMATE MANAGER



### THERAKAIR VISIO



## Seating

### Pressure injury risk is a 24 hour problem

Risk is particularly high when patients are sitting in a chair, given that the pressure exerted over the bony pelvis is naturally elevated<sup>27</sup>. Aside from limiting sit time, pressure redistributing chair cushions are recommended for individuals with reduced mobility.

Arjo provide a range of seat cushions for individuals at risk of, or with existing tissue damage. These range from reactive pressure redistribution to active alternating air cushions.

### International guideline 2019

“Use a pressure redistribution cushion for preventing pressure injuries in people at high risk who are seated in a chair/wheelchair for prolonged periods, particularly if the individual is unable to perform pressure relieving manoeuvres”<sup>25</sup>

“Assess the relative benefits of using an alternating pressure air cushion for supporting pressure injury healing in individuals who are seated in a chair/wheelchair for prolonged periods, particularly if the individual is unable to perform pressure relieving manoeuvres”<sup>26</sup>

### ATMOSAIR® AIR-FILLED (REACTIVE) SEAT CUSHION



### AURALIS® (ACTIVE) ALTERNATING SEAT CUSHION





# Repositioning and mobility

Repositioning is undertaken to reduce the duration and magnitude of pressure over vulnerable areas of the body, and to contribute to the patients comfort, hygiene, dignity and functional ability<sup>28</sup>.

As a global leader in patient handling solutions, Arjo believe frequent repositioning can be made easier and more comfortable for both patient and staff with the use of appropriate patient handling aids. This may include the use of slide sheets and, where necessary patient lifters and standing aids. The variety of sling solutions helps to facilitate both patient repositioning in bed and transfers out of bed.

## International guideline 2019

“Reposition the individual to relieve or redistribute pressure using manual techniques and equipment that reduce friction and shear.”<sup>29</sup>

## Implementation considerations:

“Use moving and handling equipment to reposition the individual.

Appropriate equipment assists in lifting the individual and reduces unintended drag”<sup>30</sup>



## Patient handling

### Standing & Raising aids

For chair bound patients, regular relief of pressure is vital to help protect the skin against tissue damage. In addition to a pressure redistributing cushion, the use of a standing and raising aid such as Sara Plus™ or Sara Stedy™ can facilitate standing to allow regular skin inspection and temporarily relieve the sustained high pressures normally encountered during sitting.



Sara® Plus



Sara® Stedy

### International guideline 2019

“Do not leave moving and handling equipment under the individual after use, unless the equipment is specifically designed for this purpose”<sup>30</sup>

“Consider using textiles with low friction coefficients for individuals with or at risk of pressure injuries”<sup>31</sup>

### Maxi Transfer Sheet

The dual purpose Maxi Transfer Sheet, is an example of a product which has been designed to remain under the patient after use. Combining the benefits of a transfer sling and the functionality of bed linen, its soft breathable fabric construction<sup>32</sup>, enables it to remain in place under the patient after use.



Maxi Transfer Sheet

## Repositioning

### International guideline 2019

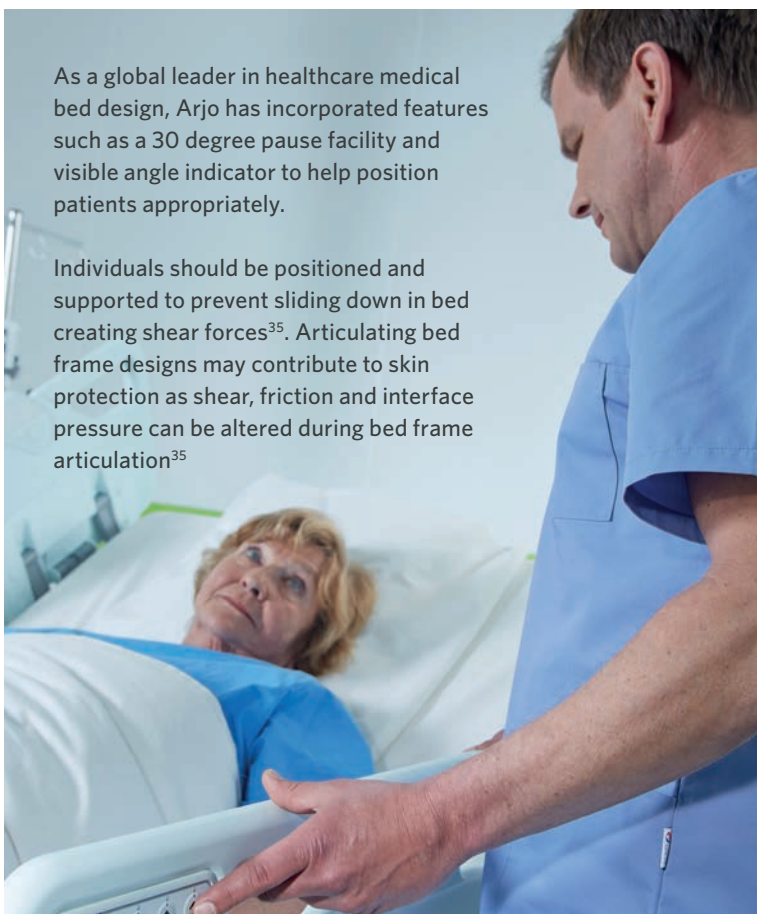
“Keep the head of the bed as flat as possible”<sup>33</sup>

“Maintaining a flat position should be evaluated with consideration to the individuals clinical needs. When elevating the head of the bed maintain elevations at 30° or lower to minimise soft tissue deformation.”<sup>34</sup>



As a global leader in healthcare medical bed design, Arjo has incorporated features such as a 30 degree pause facility and visible angle indicator to help position patients appropriately.

Individuals should be positioned and supported to prevent sliding down in bed creating shear forces<sup>35</sup>. Articulating bed frame designs may contribute to skin protection as shear, friction and interface pressure can be altered during bed frame articulation<sup>35</sup>



## Early Mobilisation

### International guideline 2019

“Implement an early mobilisation program that increases activity and mobility as rapidly as tolerated”<sup>36</sup>

“Ambulation schedules may offset the clinical deterioration often seen in patients subjected to prolonged bed rest”<sup>37</sup>



Arjo Walker®

Bed rest not only places patients at an increased risk of pressure injuries and venous thromboembolism events, but also reduces pulmonary function and significantly increases

muscle loss and decreases muscle strength. Mobilisation early in the patients pathway is encouraged in the new international guidelines to help prevent many of these issues<sup>37</sup>.



Maxi Move® Passive Lifter



Sara Combilizer® Patient Positioning and Mobilisation aid



# Clinical consultancy partnership



## Guideline implementation

Pressure injuries occur, not because of a single event, but due to failures within the continuum of care. System wide strategies are recommended to ensure preventative measures are successful:

1. Assess and maximise the availability and quality of equipment and standards of use as part of quality improvement to reduce the incidence of pressure injuries<sup>38</sup>
2. At an organisational level develop and implement a structured, tailored & multifaceted quality improvement programme to reduce incidence of pressure injuries<sup>39</sup>
3. Regularly monitor, analyse and evaluate performance against quality indicators for pressure injury prevention and treatment<sup>40</sup>

## Arjo outcome programme

Arjo outcomes programmes and audit solutions provide healthcare facilities with a pressure injury monitoring and improvement service utilising appropriate quality indicators and a suite of dedicated monitoring tools.

Contact your Arjo representative to learn more or visit us at:  
[www.arjo.com/en-au/solutions/pressure-injury-prevention](http://www.arjo.com/en-au/solutions/pressure-injury-prevention)

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**Please note:** This document is not designed as a comprehensive overview of guideline recommendations. Always refer to the full guideline document or quick reference guide when planning care or making any clinical decisions.

**Please also note** that the international guidelines do not provide any endorsements of a specific product. This guide has been developed to provide the reader with an overview of products and solutions available from Arjo which may help you in your quest to prevent or manage pressure injuries.

## References

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10. Section 5: Skin and Tissue Assessment. Recommendation 2.7 Assessing darkly pigmented skin and soft tissue. Page 79
11. Section 10: Support Surfaces. Recommendation 7.1 Support Surface Selection and Use. Page 156
12. Section 10: Support Surfaces. Recommendation 7.7 Alternating Support Surfaces. Page 165
13. Section 10: Support Surfaces. Implementation considerations for Recommendation 7.7 Alternating Support Surfaces. Page 166
14. Phillips L, Goossens R, Takahashi M et al. Defining active pressure redistribution. Wounds International. 2012; 3(3): Page 52–56
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16. Section 10: Support Surfaces: Recommendation 7.5 Reactive Air Pressure Mattresses. Page 163
17. Section 10: Support Surfaces Introduction. Page 155
18. Section 10: Support Surfaces. Recommendation 7.4 Single Layer Specification Foam Mattress. Page 160
19. Section 10: Support Surface Selection and Use. Page 156
20. Section 9: Heel Pressure Injuries. Recommendation 6.2 Positioning to Prevent and Treat Pressure Injuries. Implementation Considerations. Page 147
21. Section 9: Heel Pressure Injuries. Recommendation 6.3 Positioning to Prevent and Treat Pressure Injuries. Page 150
22. Section 10: Support Surfaces. Implementation Considerations for Recommendation 7.9: Mattress and Bed Support Surfaces for Individuals with Existing Pressure Injuries. Page 169
23. Section 2: The Aetiology of Pressure Injuries. Ongoing Research: Current and Future Perspectives. Page 22
24. Section 10: Support Surfaces - Selecting a Support Surface in All Care Settings. Page 157
25. Section 10: Support Surfaces. Recommendation 7.12 Seating Support Surfaces for Individuals with or at Risk of Pressure Injuries. Page 173
26. Section 10: Support Surfaces. Recommendation 7.13 Seating Support Surfaces for Individuals with or at Risk of Pressure Injuries. Page 173
27. Section 10: Support Surfaces. Seating Support Surfaces for Individuals with or at Risk of Pressure Injuries. Page 172
28. Section 8: Repositioning and Early Mobilisation. Evidence discussion Page 116
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30. Section 8: Repositioning and Early Mobilisation. Recommendation 5.6 Repositioning Techniques. Page 121
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38. Section 24: Implementing Best Practice in Clinical Settings. Recommendation 20.4 Attitudes and Cohesion. Page 325
39. Section 24: Implementing Best Practice in Clinical Settings. Recommendation 20.5 Quality Improvement Initiatives. Page 326
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At Arjo, we believe that empowering movement within healthcare environments is essential to quality care. Our products and solutions are designed to promote a safe and dignified experience through patient handling, medical beds, personal hygiene, disinfection, diagnostics, and the prevention of pressure injuries and venous thromboembolism. With over 6000 people worldwide and 60 years caring for patients and healthcare professionals, we are committed to driving healthier outcomes for people facing mobility challenges.

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