



Exudate Management: What is your dressing telling you?

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Acknowledgement of Country

This presentation is being held on the lands of the Wurundjeri people and I wish to acknowledge them as Traditional Owners.

I would also like to pay my respects to their Elders, past and present, and Aboriginal Elders of other communities who may be listening today.

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DISCLAIMER

Whilst Wound Wise endeavours to cover a wide range of wound care products on the market, it is impossible to discuss and include all products available in Australia, in this session.

Due to affiliations with companies/organizations nationally and internationally there may be perceived or actual conflicts of interest.

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Learning objectives

- 1. Understand the role of exudate in the wound healing process
- 2. Describe how excessive exudate can impact wound healing
- 3. Recognise the visual characteristics and clinical significance of exudate
- 4. Provide rationale for selecting the most suitable wound dressing considering exudate management and wound healing goals

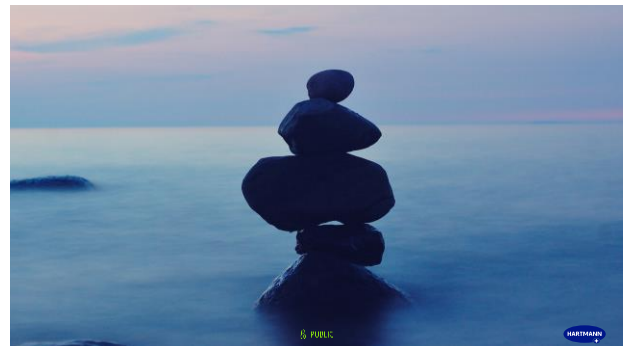
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Do we just manage exudate or try to heal a wound through moist wound healing environment as quickly as possible?



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Wound Exudate defined

"Informal terms for wound exudate include 'wound fluid' or 'wound drainage' (Wound, 2021).

In reference to this consensus document, exudate is best defined as:

"Exuded matter, especially the material composed of serum, fibrin, and white blood cells that escapes into a superficial lesion or area of inflammation". (Wound, 2021)

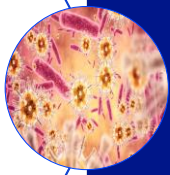
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Importance of Wound Exudate



Exudate supports healing by:

- Providing a moist wound environment
- Allowing for the transfers of immune mediators and growth factors across the wound bed
- Acting as a medium for the migration of tissue-repairing cells across the wound bed
- Supplying essential nutrients needed for cellular metabolism
- Promoting the separation of damaged/non-viable tissue (autolysis)
- **Ultimately enables the wound to heal through moist wound healing which accelerates healing**

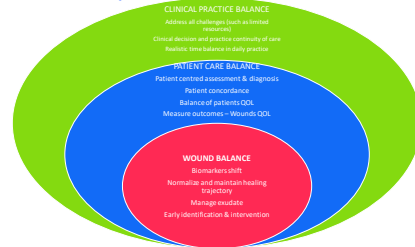
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The Wound Balance concept



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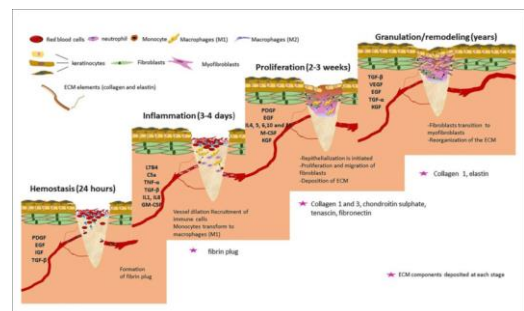
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Role of exudate in wound healing

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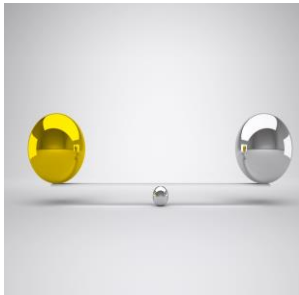
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Biomarkers and Wound Balance

- Biomarkers are objective medical signs used to measure the state of a disease or the effects of treatment
- Useful in clinical practice as they provide a measurable way to track healing and isolate the barriers to healing
- So, wound biomarkers should be considered to assess the journey of wound healing and look at barriers delaying healing, which may enable treatment and clinical decisions to be specific for the patient and their wound



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Biomarkers that affect Wound Balance

- MMP's (Matrix metalloproteinases) – mainly MMP-2 and MMP-9
- Elastase from polymorphonuclear granulocytes (PMN elastase)
- Growth factor inactivation/matrix destruction
- Aberrant local inflammation (M1/M2-dominated inflammation and oxidative stress)
- Missing angiogenesis/granulation tissue induction/epithelial cell migration
- Nutrient/oxygen deficiency

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MMP's and Wound Healing

- MMP's are key biomarkers in wound healing
- Inflammatory phase – aid in the removal of bacterial & removal of damaged ECM
- Proliferative phase – aid in degradation of capillary basement membrane for angiogenesis & the migration of epithelial cells
- Maturation phase – aid in contraction of scar ECM & remodeling of scar tissue
- ↑ levels of MMP's in chronic wounds compared with acute wounds & ↓TIMP's (tissue inhibitors of MMP's)



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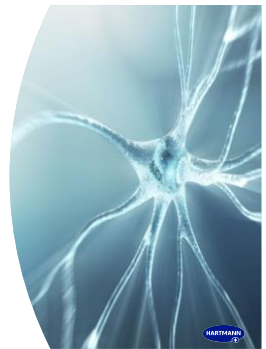
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Acute vs Chronic Wounds

- Wound exudate has been studied and it has been shown that biomarkers are elevated in chronic wounds
- Chronic wound fluid on the surrounding tissue can result in delayed healing
- Aim to identify factors delaying healing early
- Signs of delayed healing can be seen as early as two weeks post wounding

Factors that may delay healing:

- General health status
- Medical conditions
- Medications
- Systemic and local factors
- Risk of infection/bioburden
- Psychological status



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Chronic Wound defined

'Wounds that fail to proceed through the normal phases of wound healing in an orderly and timely manner'

Which means that the wound is 'stuck' in the inflammatory phase



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What are you really seeing in exudate?

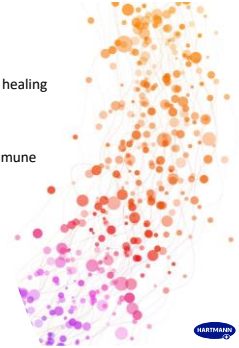
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What is Exudate?

Exudate is produced during the inflammatory phase of healing

Functions of exudate:

- Provides a moist wound healing environment
- Allows for the movement of growth factors and immune mediators to cross the wound bed
- Exudate supplies the nutrients required for cell metabolism
- Aids in promoting autolytic debridement



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Wound Exudate contains

- Water – prevents tissues drying out
- Fibrin – blood clotting
- Glucose – source of cellular energy
- Immune cells – immune defence & growth factor production
- Platelets – blood clotting
- Proteins – aids in transport of other molecules, immune effects
- Growth factors – simulate cellular growth
- Proteases – aid in autolysis and cell migration
- Metabolic waste products – by-products of cellular metabolism
- Microorganisms – are present in various levels
- Debris – proteases in exudate and autolysis of devitalized tissue

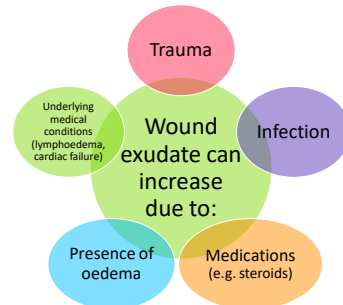
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TYPE	COLOUR	CONSISTENCY	COMMENTS
Serous	Clear, amber, straw coloured	Thin, watery	<ul style="list-style-type: none"> • Normal during inflammatory and proliferative phases • An increase in serous exudate may be a sign of infection • In excessive amounts may be associated with CCF, venous disease, malnutrition or possibly fluid draining from a urinary or lymphatic fistula
Serosanguineous	Clear, pink – light red	Thin, slightly thicker than water	<ul style="list-style-type: none"> • May be considered normal during inflammatory and proliferative phases • Pinkish due to the presence of RBC • May also be found post-operatively or after traumatic dressing removal
sanguineous	Red	Thin, watery	<ul style="list-style-type: none"> • Reddish due to the presence of RBC • May indicate new blood vessel growth or disruption of blood vessels • May be associated with hypergranulation
Seropurulent	Cloudy, creamy, yellow or tan	Thin	<ul style="list-style-type: none"> • Serous exudate containing pus • May also be due to liquefying necrotic tissue • May signal impending infection
Fibrinous	Cloudy	thin, watery	<ul style="list-style-type: none"> • Cloudy due to the presence of fibrin strands • May indicate inflammation with or without infection
Purulent	Opaque, milky, yellow, tan or brown, can be green	Often thick	<ul style="list-style-type: none"> • Mainly pus (Neutrophils, inflammatory cells, bacteria) and may include slough/liquefied necrotic tissue • Indicates infection • Green colour may be due to Pseudomonas, may have an odour
Haemopurulent	Reddish, milky, opaque	Thick	<ul style="list-style-type: none"> • Mixture of blood and pus • Often due to established infection
Haemorrhagic	Red, opaque	Thick	<ul style="list-style-type: none"> • Mostly due to the presence of RBC and indicative of increased capillary friability • May indicate bacterial infection

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Assessing Wound Exudate



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- Holistic assessment is vital
- Assessment should be done at each dressing change
 - Amount
 - Type, colour, consistency
 - Odour
 - Effectiveness of current wound dressings
- Examine the old dressing
- Ask the patient questions, use positive language

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Wound Exudate Score (Falanga, 2000; WUWHS, 2019)

WOUND EXUDATE SCORE	EXTENT OF CONTROL	EXUDATE AMOUNT	DRESSING REQUIREMENT
1	Full	None/minimal	No absorptive dressings required. If clinically feasible dressing could stay on for up to one week
2	Partial	Moderate amount	Dressing changes required every 2-3 days
3	Uncontrolled	Very exudative wound	Absorptive dressing change required at least daily

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How excess exudate can impact on healing

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Excessive Exudate

- Wounds such as:
- ❖ VLU
 - ❖ Dehiscent surgical wounds
 - ❖ Malignant fungating wound
 - ❖ Burns
 - ❖ Inflammatory ulcers
 - ❖ Donor sites

- 💧 Leakage on the body
- 👕 Soiling of clothes
- ⚠️ Increased risk of infection
- 👤 Pain and discomfort
- 🗑️ Loss of proteins and electrolyte imbalance
- 🔥 Maceration to the periwound skin
- 📏 Increase in wound size

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Insufficient Exudate

- Wounds such as:
- ❖ Ischaemic/arterial ulcers
 - ❖ Neuropathic DFU

- 💧 Delay autolytic debridement
- ⚠️ Trauma to the wound bed on dressing removal, pain
- 🗑️ Dry wound edges which can prevent epithelial contraction
- 📏 No decrease in wound size

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Barriers to healing

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Identifying the Barriers to Healing



- Venous insufficiency
- Uncontrolled diabetes
- Nutritional deficiencies
- Inflammation (medical conditions)
- Carcinogenesis
- Arterial insufficiency

- Excessive protease levels (MMP's)
- Growth factor inactivation/matrix degradation
- Reduced local inflammation
- Nil angiogenesis/granulation epithelialization
- Nutrient/oxygen deficiency
- Ongoing trauma

- Angiogenesis
- Granulation tissue formation
- Epithelialization
- Normalization of inflammation
- Change of the micro-environment towards normal wound healing

SYSTEMIC FACTORS

LOCAL FACTORS

NORMAL WOUND HEALING

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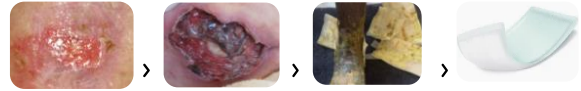
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Choosing the right dressing for exudate levels

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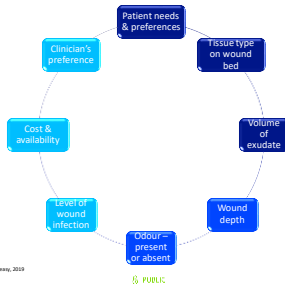
Getting the right Balance in Wound Healing



- Wound bed preparation**
 - Wound bed preparation is essential for providing an optimal environment for wound healing
 - TIME concept
 - Tissue debridement & removal of non-viable tissue
 - Infection control and manage bioburden
 - Moisture balance
 - Epidermal advancement
- Debridement**
 - Debridement is the removal of necrotic & non-viable tissue from the wound bed and essential for optimizing the wound bed tissue for healing
 - Debridement is a key step in promoting a balance in the wound environment.
 - The method of debridement will depend on the skill of the clinician, the patient and the wound.
- Exudate Management**
 - Exudate can have an adverse effect on wound healing when in the wrong amount, wrong place and wrong composition.
 - Protection of the peri-wound skin is essential when levels are heavy
 - Ensure a holistic assessment when assessing exudate in the wound
- Dressing selection**
 - SAP is essential in providing exudate management in mod-heavily exuding wounds
 - SAP dressings have the ability to bind MMP's inside the core of the dressing and reduce bioburden.

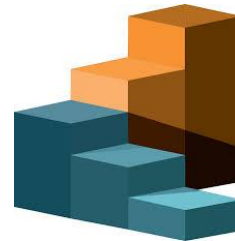
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Factors affecting Dressing Selection



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Step-up and Step-down Approach to Biofilm

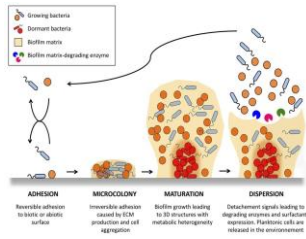


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Biofilm

Definition: "Biofilms are aggregate microorganisms that have unique characteristics and enhanced tolerance to treatment and the host defences. Wound biofilms are associated with impaired wound healing and signs and symptoms of chronic inflammation." (Wu, 2022, pg 47).

- Very little is known about biofilms. How biofilms develop in acute and chronic wounds is unknown
- Wound biofilms can be embedded into slough, debris, necrotic and other tissues, along with the dressing
- Often multiple organisms in the biofilm
- Biofilms cannot be observed with the naked eye, they are microscopic
- Biofilms have an increased tolerance to antimicrobial treatments
- Thorough wound bed cleansing and optimising the wound environment is essential as the biofilm can be deeper in the tissues



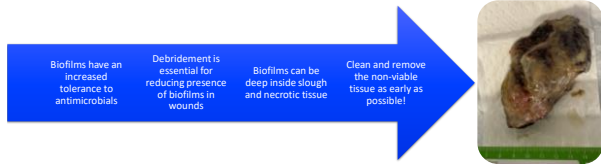
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Biofilm – Criteria indicative of potential Biofilm in a Wound

Failure of appropriate antibiotic treatment	Recalcitrance to appropriate antimicrobial treatment	Recurrent of delayed healing on cessation of antibiotic treatment
Delayed healing despite optimal wound management and health support	Low-level chronic inflammation	Increased exudate/moisture
Low-level erythema	Poor granulation/friable hypergranulation	Secondary signs of infection

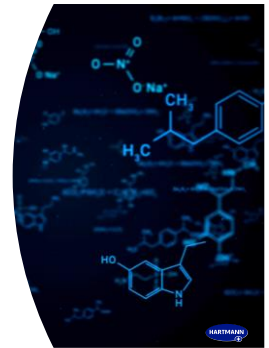
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So, what does this mean for treating wounds?



Super Absorbent Polymers (SAP)

- Superabsorbent dressings
- Absorb and retain fluids
- Reduce the risk of leakage
- Aim to minimize maceration
- SAP dressings lock in exudate while maintaining their structure



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MOISTURE MANAGEMENT STRATEGIES

TOO WET	TOO DRY	OPTIMAL LEVEL
<ul style="list-style-type: none"> • Use a thicker and more absorbent dressing • Consider a SAP dressing • Increase the frequency of dressing changes • Consider negative pressure therapy/wound drainage devices 	<ul style="list-style-type: none"> • Choose a dressing that donates moisture • Use a thinner, less absorbent dressing • Decrease the frequency of dressing change 	<ul style="list-style-type: none"> • Continue with current dressing • No change of frequency needed

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MOISTURE MANAGEMENT STRATEGIES



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Moisture Balance

- Exudate contains bacteria and wound debris which will slow wound healing.
- Too much exudate can lead to further breakdown of wound bed and edges.
- Dry wound bed may need moisture added to encourage new tissue growth.

ABSORB OR HYDRATE

ProteoNet® Promotes healing

Zetuvit® Plus Silicone Border Absorbs moderate to high exudate

Zetuvit® Plus Absorbs high to very high exudate

HydroClean® Donates moisture and absorbs exudate

Wound Exudate Pathway

ASSESSMENT	Dry	Low	Moderate	High
<p>Under no exudate on dressing after 1 week</p> <p>Is debridement indicated?</p>	<p>1-2 dressing changes a week</p> <p>Exudate contained within dressing</p> <p>No peri-wound maceration</p>	<p>2-3 dressing changes a week</p> <p>No air/bubble through</p> <p>Minimal peri-wound maceration</p> <p>Oedema may be present</p>	<p>3-7 dressing changes a week</p> <p>Probable peri-wound maceration/irritation</p> <p>Consider through non-dressing and bandages</p> <p>Possible presence of oedema</p>	<p>5-7 dressing changes a week</p> <p>Consider and manage causes for high levels of exudate: infection, inflammation, unmanaged oedema</p> <p>Are dressing changes frequent enough?</p> <p>If compression used, check correct application</p>
<p>ProteoNet® - Protect the wound</p> <p>HydroClean® - Wound bed preparation</p>	<p>ProteoNet® - Protect the wound</p> <p>HydroClean® - Donates moisture</p>	<p>Zetuvit® Plus Silicone border to protect the peri-wound and fragile skin</p> <p>Absorb exudate with Zetuvit® Plus</p> <p>HydroClean® - Moisture balance</p>	<p>Manage bio-burden with HydroClean</p> <p>Absorb exudate with Zetuvit® Plus</p>	<p>Manage bio-burden with HydroClean</p> <p>Absorb exudate with Zetuvit® Plus</p>
<p>STEP DOWN</p>	<p>Assess exudate levels and stop up or step down absorptivity levels</p>	<p>STEP UP</p>	<p>STEP UP</p>	<p>STEP UP</p>

Wounds UK (2021) Exudate Explained, 2021. Available to download from: www.wounds-uk.com. PUBLIC HARTMANN

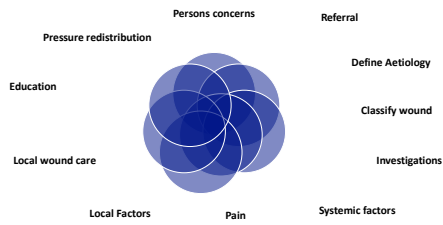
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Protecting the Peri-wound Skin

- ✓ Excess moisture and proteolytic enzymes (MMP's) delay healing and cause maceration
- ✓ Maceration can result in pain, discomfort and can risk an increase in wound size
- ✓ Aim to reduce the risk of trauma to the periwound skin when removing dressings - consider using silicone contact layers or barrier creams/wipe
- ✓ The presence of exudate will impact on exudate in heightened levels. This can be managed with compression therapy and lymphatic drainage.

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Person Centred Approach



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Quality of Life



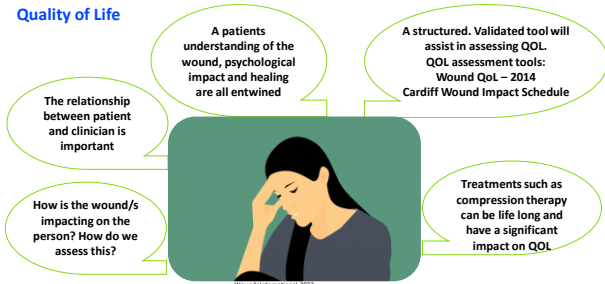
Kopp & Santamarie, 2017

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Quality of Life



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Case Studies



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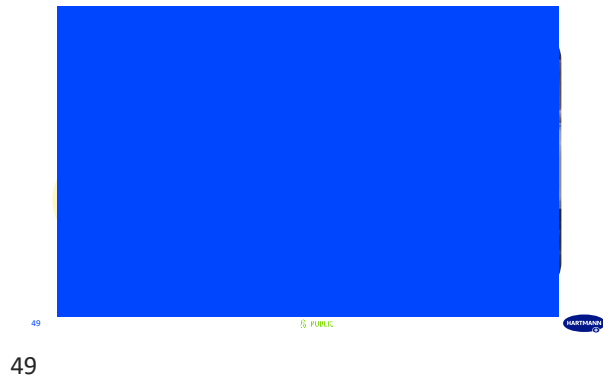


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So, what is your dressing REALLY telling you???



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