

Wound Dressings

by Aileen Santos, MD

Occlusive/Moisture Retentive Dressings

Type and Formulations	Composition	Applications	Advantages	Disadvantages	Usage	Common Trade Names*
Films	Transparent sheets of polyurethane or copolyester - Non-absorbent - Semi-permeable - Self-adhesive	Wounds with minimal exudate, including: Superficial burns Ulcers Second intention healing (e.g. donor sites for skin grafts) Protective cover for IV catheter sites	Provides a moist healing environment Promotes autolytic debridement Translucency allows visualization and monitoring of wound Semi-permeability allows for entry of oxygen and prevents accumulation of water vapor Protective barrier against microbes Flexible Self-adhesive	Difficult to use as they fold on themselves easily Requires frequent dressing changes Non-absorbent properties — may lead to excess accumulation of exudates and maceration of wound edges	Can be left in place for up to 7 days but often requires change a few times a week	Tegaderm™ Biocclusive® Blisterfilm™ Carrafil™ Kendall™ Polyskin™ II Mepore Film® OmniDerm® Opsite™
Foam	Composed of polyurethane or silicone center with a semi-occlusive outer layer - Semi-occlusive - Semi-permeable - Highly absorbent	Chronic wounds: Diabetic, venous stasis, sacral ulcers Burns Wounds with moderate-heavy exudate	Absorbent inner layer helps clear exudates while maintaining a moist wound bed Semi-permeable outer layer allows water vapor to escape while preventing bacterial invasion Conforms to wound shape and body contour (good for ulcers above bony prominences) Cushions to prevent trauma Thermal insulation Atraumatic upon removal	Opacity prevents visual monitoring Can be drying to wounds with little to no exudate (avoid in dry wounds) Bulky May macerate surrounding skin Requires secondary dressing	Should be changed as often as the dressing becomes soaked with exudate Daily to once or twice weekly	Allevyn® Aquacel Foam® Biatain® Biopatch® Flexzan® Kendall™ Curafoam™ Kendall™ Hydrasorb® Lyfoam® Mepilex® Polymem®
Hydrogels Sheet Amorphous Gel Impregnated gauze	Hydrophilic polymer usually consists of cross-linked starch polymers comprised of up to 80-90% water base - Semi-transparent	Pressure ulcers Partial and full thickness wounds (including chemical peels, dermabrasion, donor sites) Vascular ulcers Coumadin necrosis Calciphylaxis	Useful for dry wounds (rehydrates and maintains a moist environment) Softens and loosens slough and necrotic wound debris (facilitates autolytic debridement) Cooling effect on the wound (can decrease perceived pain) Does not adhere to wound Permeable to gas and water vapor Promote granulation and epithelialization	Absorptive capacity is limited – not suitable for highly exudative wounds Frequent dressing changes Absorption is slow – not suitable for bleeding wounds Requires secondary dressing Poor bacterial barrier	Change at least every 1 to 3 days – depending on the hydration needs of the wound	2nd Skin® Carrasyn® Clearsite™ Elasto-Gel™ FlexiGel™ Hypergel® Kendall™ Curafil™ Kendall™ Curagel™ Nu-gel™ Tegagel™
Hydrocolloid Sheet Paste Powder	<i>Inner layer:</i> Self-adhesive, gel forming, composed of hydrophilic colloid particles, such as carboxymethylcellulose (CMC), pectin, gelatin, or elastomer Upon contact with exudates, absorbs water and forms gels <i>Outer layer:</i> Usually consists of polyurethane Seals and protects the wound from bacteria, foreign debris and shearing	Wounds with low to moderate exudates Partial and full thickness wounds Granular and necrotic wounds Minor burns Pressure ulcers	Low moisture vapor transmission Provides a moist healing environment Prevents contamination Promotes autolytic debridement, enhances angiogenesis, granulation tissue formation and healing Sheet form is self-adhesive and waterproof (patients can bathe and swim freely) Bulky- provides physical protection to wound	Avoid in infected wounds Sheets are opaque Caution with peri-wound skin as adhesive may cause damage upon removal Gel formed can be thick, yellow, and malodorous - do not mistake for infection Due to debriding abilities, they may initially cause the size of the wound to increase Low absorptive capacity	Does not require secondary dressing Can remain in place for up to 7 days or until drainage is noted beneath dressing Usually needs to be changed daily at the beginning of treatment As the amount of exudate reduces, frequency of dressing changes decreases – every 3-7 days	Duoderm® Comfeel® Cutinova® Hydrocol II® NuDerm® Replicare™ Tegasorb™



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Wound Dressings (cont.)

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Occlusive/Moisture Retentive Dressings (cont.)						
Type and Formulations	Composition	Applications	Advantages	Disadvantages	Usage	Common Trade Names*
Alginates Sheet Ribbon Rope	Soft non-woven fibers of a cellulose-like polysaccharide derived from the calcium salts of seaweed Covered in calcium/sodium salts Sodium ions in wound exudate are exchanged for calcium ions in dressing to form a hydrophilic gel	Best choice for highly exudative/drainage wounds Pressure/vascular ulcers Surgical incisions Pyoderma gangrenosum Wound dehiscence Sinus tracts Skin graft donor sites Exposed tendons Infected wounds Bleeding wounds	Gel is highly absorbent Absorbs 15-20x their weight in fluid Fewer dressing changes Prevents microbial contamination Autolytic debridement Calcium released from the dressing is thought to have hemostatic properties that promote the clotting cascade	Contraindicated for dry wounds (no hydration qualities) May dry and adhere to the wound base if not changed at least weekly (use hydration to facilitate removal) Yellow-brown color and malodorous smell may be confused with pus Needs secondary dressing Avoid in deep or narrow sinuses — removal may be difficult	Sheet form: beneficial for superficial wounds Ribbon or rope: useful for packing sinuses and cavities Infected wounds: Change daily Clean wounds: May be kept for up to 7 days or until the gel loses its viscosity	Algisite™ Algosteril® Kendall™ Curasorb™ Kalginate® Kaltostat® Melgisorb® SeaSorb® Sorbsan®
Hydrofibers Sheet Ribbon Rope	Composed of sodium carboxymethylcellulose fibers Interacts with exudate to form gel Structurally similar to alginates	Very similar to alginates Highly exudative wounds Bleeding wounds Infected wounds	Comfortable Retains moisture Promotes autolytic debridement Easy to remove Amenable to heavily exudative or infected wounds 3 times as absorbent as alginates Reduces MMP's	Requires secondary dressing	Change at least every 3-7 days or until saturated Irrigate the wound with saline to remove the gel	Aquacel™
Hydroconductive dressings	Utilizes two types of absorbent cross-action structures that facilitate the movement large volumes of exudates, bacteria, MMP's and debris through the dressing	Highly exudative wounds	Move fluid in a horizontal and vertical vector into the dressing Holds up to 30-50x its own weight Debridement component helps to lift and loosen adherent slough tissues (easy removal) Does not shed fibers or break apart Versatile - can be tailored to fit different sizes and shapes	Cost Needs secondary dressing	Change every 1-3 days, as necessary Once exudate is reduced, may be changed less frequently Irrigate with saline for removal	Levafiber™ Drawtex®
Hyaluronic acid Sheets Ribbons Foam Cream	Dermal matrix/scaffold of hyaluronan (upon contact with exudate forms a soft hydrophilic gel) Silicone membrane (when present) provides barrier function	Partial- and full-thickness wounds Venous ulcers Diabetic ulcers Second degree burns Tunneled/undermined wounds Surgical wounds	High capacity to retain water Provides moist environment Biodegradable Accelerates granulation tissue formation and re-epithelialization Painless removal Matrix acts as a scaffold for cellular invasion and capillary growth	Cost	Depends on formulation and level of exudate	Hyalofill® Hyalomatrix® Hyiodine®
Antimicrobial Dressings						
Type and Formulations	Composition	Applications	Advantages	Disadvantages	Usage	Common Trade Names*
Honey Ointment Impregnated tulle Alginate Sheet Hydrogel Hydrocolloid	Manuka honey	Light to moderately exudative wounds, such as: -Diabetic foot ulcers -Venous ulcers -Arterial ulcers -Partial or full thickness pressure ulcer -1st and 2nd degree burns -Traumatic and surgical wounds	Prevents biofilm formation Broad-spectrum antibiotic activity Promotes autolytic debridement Anti-inflammatory High osmolality contributes to the antibacterial effect	Avoid in patients with history of allergy to either honey or bee venom Monitor blood sugar levels in diabetic patients	Depends on preparation	Manuka Fill® Surgihoney™ TheraHoney® Medihoney® Activon® Algivon® Actilite®

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Antimicrobial Dressings (cont.)

Type and Formulations	Composition	Applications	Advantages	Disadvantages	Usage	Common Trade Names*
Iodine-containing dressings Gel Sheet Solution Foam	Povidone-iodine: anti-septic impregnated into gauze	Infected wounds	Broad-spectrum antimicrobial: virus, fungi, bacteria Good penetration of biofilms	Caution in patients with iodine allergy, thyroid disease, and/or pregnant or lactating Povidone-iodine can be toxic to keratinocytes – delays wound healing Antimicrobial action may be neutralized by inorganic and organic agents Stinging and local irritation	Depends on level of exudate: Lightly exudative: change every 1-3 days Heavily exudative: change daily Newer dressings: change in color will indicate loss of antiseptic effect	Povidone-iodine: -Iodine® -Betadine® Cadexomer-iodine: -Iodoflex™ -Iodosorb™
	Cadexomer-iodine polymer: compound of dextran beads that slowly releases iodine over time, decreasing cytotoxic effects; gel produced in process absorbs exudate					
Silver Dressings Cream Alginates Collagens Hydrofiber Sheets Films Hydrogels Foams Hydrocolloids	Silver particles impregnated in different types of formulations	Superficially infected wounds	Broad antimicrobial spectrum, including MRSA and VRE Unlikely to induce resistance Variety of products available for different wound situations Active or ionic silver is released at different rates and durations depending on delivery system chosen Infrequent application required Increases levels of MMP	Insufficient evidence to recommend the use of silver containing dressings or topical agents for treatment of infected or contaminated wounds Levels of absorption are not well-defined Skin pigmentation Allergic reactions May delay re-epithelialization process Silver sulfadiazine cream may produce pro-inflammatory pseudo-eschar (delay healing)	Varies by level of saturation and exudate: Lightly exudative wounds can remain in place for up to 7 days	Acticoat™ Actisorb® Silver 220 Contreet® Foam Contreet® Hydrocolloid Aquacel® Ag Algicel® Alginate Silverlon®
	Newer formulations consist of high-density polyethylene mesh impregnated with nanocrystalline silver					

Biologic/Biosynthetic – Skin Substitutes

Type	Composition	Indications	Advantages	Disadvantages	
Epidermal	Autograft	Keratinocytes expanded from skin biopsy	Burns Leg ulcers	Coverage of large area from small skin biopsy Permanent wound coverage Acceptable cosmetic results	3 weeks for graft cultivation Graft fragility, blistering Susceptibility to infection Unstable without dermal substitute Expensive Minimal shelf-life
	Allograft	Allogeneic keratinocytes cultured from neonatal foreskin	Venous leg ulcers Acute and chronic wounds Diabetic ulcers	No biopsy necessary Immediate availability Longer shelf-life	Possibility of disease transmission Expensive Not commercially available
Dermal (acellular)	Allograft	Cadaveric decellularized dermis or neonatal foreskin	Surgical wounds Burns Chronic ulcers	Allows ultra-thin STSG Decreased pain	Allograft procurement Virus screening
	Xenograft	Composed of bovine or porcine collagen plus extracellular matrix components	Donor sites Diabetic ulcers Pressure ulcers Neuropathic ulcers Post-surgical wounds	Immediate availability Reduces pain Long shelf-life Translucent Elastic Allows for ultra-thin STSG Less scarring than STSG alone	Expensive Possible allergic reaction Usually needs multiple applications May have higher infection rates
Dermal (cellular)	Allograft	Neonatal foreskin fibroblast in polyglactin suture	Burns Diabetic foot ulcers Epidermolysis bullosa	Immediate availability	Expensive Multiple applications
Composite	Allograft and xenograft	Engineered neonatal foreskin keratinocytes and fibroblasts plus bovine collagen type I	Venous ulcers Diabetic ulcers Burns	Immediate availability Easy handling Does not require subsequent skin grafting Single application may be sufficient	Limited viability Expensive

VRE – Vancomycin-Resistant Enterococci

MRSA – Methicillin-Resistant Staphylococcus Aureus

MMP – Matrix Metalloproteinases

STSG – Split thickness skin graft

*Trade names remain property of their respective manufacturers.

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