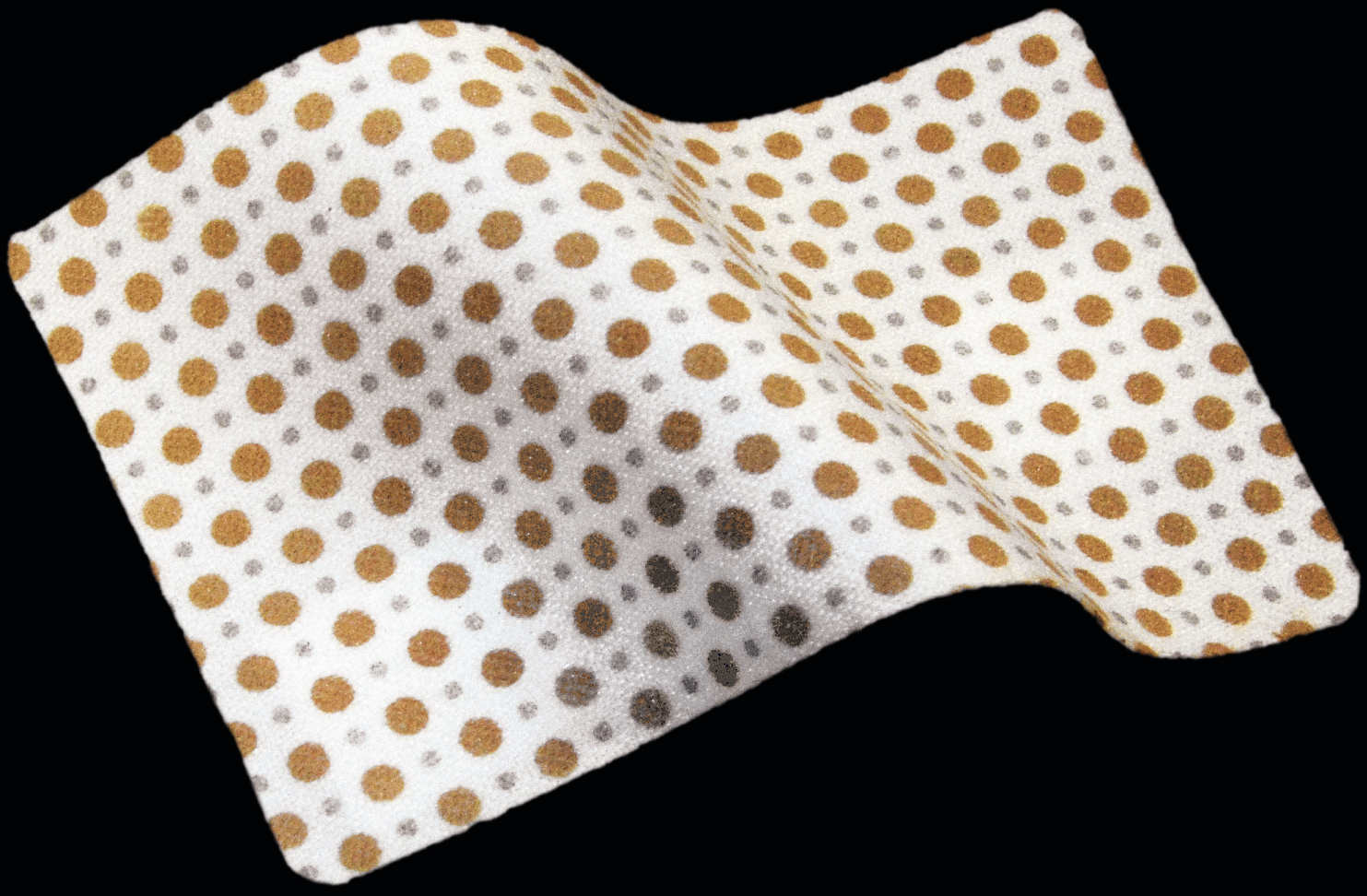
JumpStart®

Antimicrobial Wound Dressings



Arthrex®

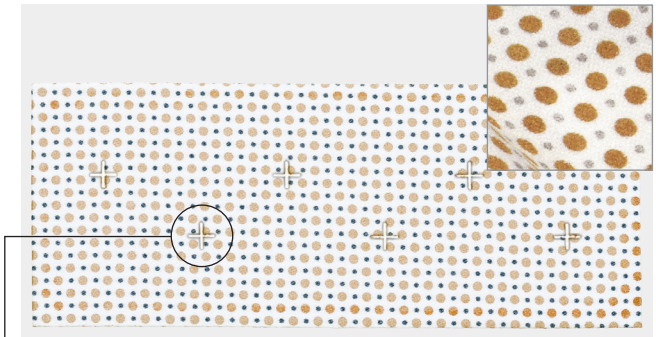
JumpStart® Antimicrobial Wound Dressings

Product Features

JumpStart dressings are provided on an ultra-thin, lightweight, polyester substrate and contain laser-cut fenestrations to allow easy passage of wound exudate into the absorbent layer or a secondary dressing. The flexible design easily contours to the body. JumpStart dressings may be applied directly over sutures, staples, Steri-Strip™ wound closure strips, and liquid skin adhesives. The dot matrix pattern of embedded microcell batteries generates microcurrents on the dressing surface in the presence of a conductive medium, such as sterile saline, water-based gel, or wound exudate.

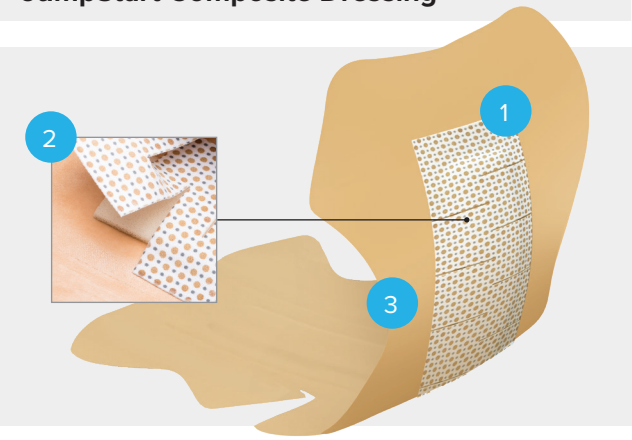
JumpStart Wound Dressings

JumpStart Contact-Layer Dressing



- JumpStart antimicrobial wound contact-layer powered by V.Dox™ technology
- Polyester substrate with embedded microcell batteries made of elemental silver and elemental zinc
- Fenestrations allow wound drainage to pass through dressing to absorbent layer

JumpStart Composite Dressing



1. JumpStart antimicrobial wound contact-layer powered by V.Dox technology
2. Polyester substrate with embedded microcell batteries made of elemental silver and elemental zinc
3. Fenestrations allow wound drainage to pass through dressing to absorbent layer

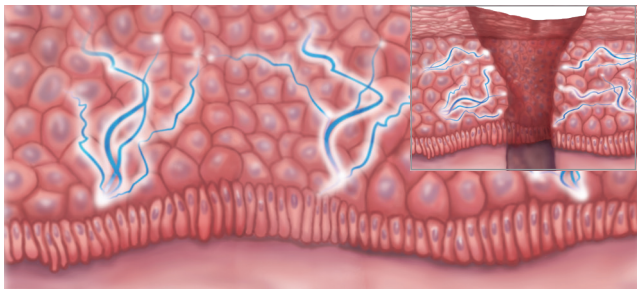
JumpStart®
ANTIMICROBIAL WOUND DRESSING

Energel® Wound Hydrogel Features

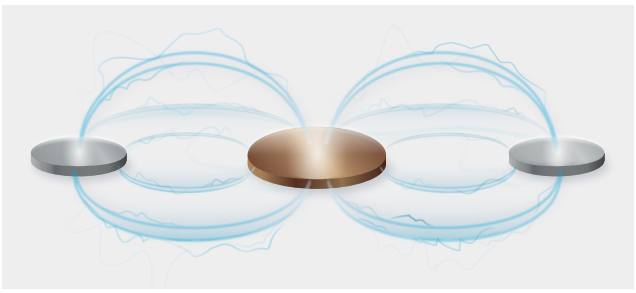
Use Energel wound hydrogel to activate the JumpStart® microcell batteries:

- Sterile, water-soluble gel formulated to maintain a moist wound environment and provide moisture to a dry wound
- Double-packaged sterile for use in the operating room
- Optimally sized for single use (7.5 g)
- Maintains JumpStart dressing's conductivity for up to 7 days

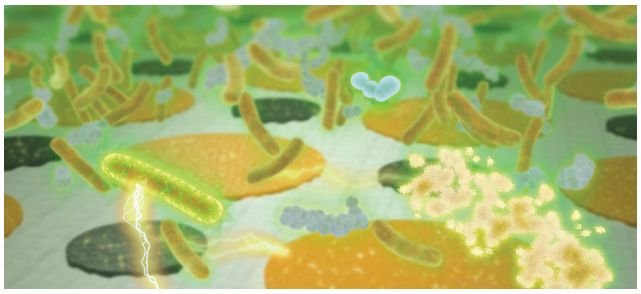
A New Generation in Wound Care Solutions



Inspired by the body.
The skin naturally creates and uses electrical energy to promote healing. Electric fields in the skin create surface energy potential, known as transepithelial potential (TEP). When skin is wounded, a change in electric potential occurs, which drives the cell migration and wound healing processes.



Powered by electricity.
JumpStart® antimicrobial wound dressings—powered by patented V.Dox technology—employ moisture-activated microcell batteries that wirelessly generate microcurrents designed to mimic the skin's electrical energy.



Energized by results.
JumpStart dressings reduce the risk of infection by killing a broad spectrum of bacteria without antibiotics while supporting the body's natural healing process.

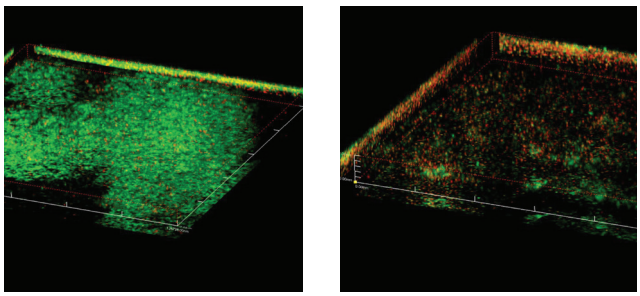
Published studies show JumpStart® dressings reduce the risk of infection[1-5] and promote the healing process[6] to optimize outcomes.

Reduce the risk of infection

- Killed a broad spectrum of pathogens, including multidrug-resistant and biofilm-forming bacteria[1-3]
- Disrupted existing biofilm infection and prevented biofilm from forming in preclinical studies[4]
- Prevented bacterial growth, with sustained antimicrobial impact for up to 7 days[5]
- Demonstrated electricidal antimicrobial impact vs silver dressings[2]

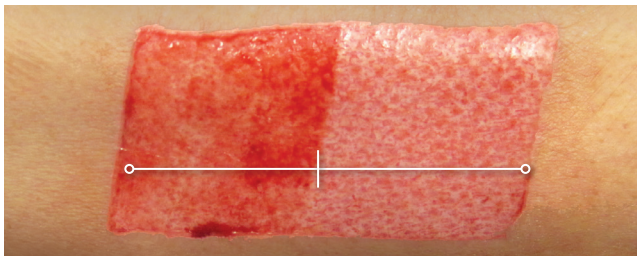
Promote healing

- Improved re-epithelialization with JumpStart dressings vs standard dressings[6]



Live/dead fluorescence staining demonstrated bacterial killing of P aeruginosa within JumpStart antimicrobial wound dressing compared to a standard silver-based dressing at 24 hours. Green = alive, Red = dead

Week 1 Post-op



In a prospective case series,6 skin graft harvest sites (N = 13) demonstrated significantly greater re-epithelialization with JumpStart dressing (71.8%) vs control (46.9%) (P = .015).

Publications Summary

Clinical and Preclinical Publications

Study Area Wound biofilm infection **Design** Preclinical porcine mechanistic study	Barki KG, Das A, Dixith S, et al. Electric field based dressing disrupts mixed-species bacterial biofilm infection and restores functional wound healing. *Ann Surg.* 2019;269(4):756-766. doi:10.1097/SLA.0000000000002504 ■ Tested ability of wireless electroceutical device (WED) to manage bacterial biofilm infection in vivo in porcine chronic wound biofilm infection model inoculated with *Pseudomonas aeruginosa* and *Acinetobacter baumannii* ■ WED disrupted existing biofilm infection and prevented biofilm from forming ■ WED repressed genes responsible for quorum sensing, disrupting bacteria's ability to communicate and form biofilm
Study Area Wound biofilm infection **Design** Preclinical porcine mechanistic study	Cole W. Human acellular dermal matrix paired with silver-zinc coupled electroceutical dressing results in rapid healing of complicated diabetic wounds of mixed etiology: a novel case series. *Wounds.* 2016;28(7):241-247. ■ Electroceutical wound dressing used in combination with human acellular dermal matrix in three complex cases (conventional care was unable to close wounds in up to 2 years) ■ All three cases healed fully within 6 weeks of starting this alternative treatment
Study Area Total knee arthroplasty **Design** Single-center retrospective case series	Chow J. Wireless microcurrent-generating antimicrobial wound dressing in primary total knee arthroplasty: a single-center experience. *Orthop Rev.* 2016;8(2):6296. doi:10.4081/or.2016.6296 ■ Ninety-two patients underwent 100 total knee arthroplasties performed by the same surgeon and were treated with novel microcurrent-generating antimicrobial dressings ■ No major complications, periprosthetic joint infections, or major infectious complications were reported and there were only two readmissions (2%) within 30 days of surgery ■ Knee Society Score function showed statistically significant improvement postoperatively with a mean 6-month score of 75.0 ± 20.3 and a mean change from baseline of 36.3 ± 21.1
Study Area Wireless electrical device in conjunction with negative-pressure wound therapy **Design** Randomized controlled clinical trial	Ghatak PD, Schlanger R, Ganesh K, et al. A wireless electroceutical dressing lowers cost of negative pressure wound therapy. *Adv Wound Care.* 2015;4(5):302-311. doi:10.1089/wound.2014.0615 ■ Thirty chronic wound patients undergoing negative-pressure wound therapy (NPWT) were randomized into two arms (control = NPWT standard of care with thrice-weekly dressing changes; test = wireless electrical device [WED] + NPWT with twice-weekly dressing changes) ■ WED + NPWT effectively decreased required dressing change frequency from thrice to twice weekly without any negative impact on wound healing ■ Cost of care with use of WED + NPWT was significantly lower than NPWT alone (P < .05)

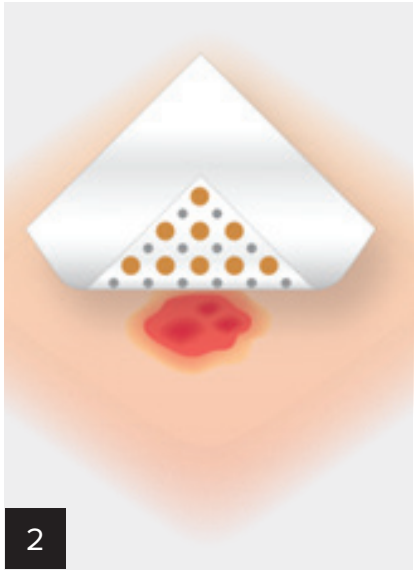
Study Area Acute and chronic wounds **Design** Retrospective dual-center review of wound healing outcomes	Whitcomb E, Monroe N, Hope-Higman J, Campbell P. Demonstration of a microcurrent-generating wound care device for wound healing within a rehabilitation center patient population. *J Am Coll Clin Wound Spec.* 2013;4(2):32-39. doi:10.1016/j.jccw.2013.07.001 ▪ Evaluated differences in wound healing outcomes when treated with microcurrent-generating wound care device (MCD, n = 18) vs standard of care (SOC, n = 20) ▪ Study population of rehabilitation and long-term care patients with acute and chronic wounds of varied etiology ▪ MCD group wounds healed significantly faster (19.78 days) than SOC group wounds (36.25 days) (P = .036) ▪ 83.3% of MCD group wounds healed monotonically vs 50% of SOC group wounds (P = .018)
Study Area Skin graft harvest sites **Design** Prospective single-center clinical study	Blount AL, Foster S, Rapp DA, Wilcox R. The use of bioelectric dressings in skin graft harvest sites: a prospective case series. *J Burn Care Res.* 2012;33(3):354-357. doi:10.1097/BCR.0b013e31823356e4 ▪ Compared acute wound healing after skin grafting (n = 13) ▪ Half of each graft donor site was covered with a standard dressing (control) and half with a bioelectric dressing (test); both were covered with a semi-occlusive dressing ▪ One week post-op: significantly greater epithelialization with bioelectric dressing (71.8%) vs control (46.9%) (P = .015) ▪ Blinded evaluator rated bioelectric dressing side visually superior in 92.3% of wounds
Study Area Reducing skin bacterial load **Design** Basic science—microbiology	Cooke CL, Greene RS, van Eck CF, Uquilas C, Limpisvasti O. Bioelectric silver-zinc dressing equally effective to chlorhexidine in reducing skin bacterial load in healthy volunteers. *Arthroscopy.* 2018;34(10):2886-2891. doi:10.1016/j.arthro.2018.05.046 ▪ Evaluated effectiveness of the silver-zinc bioelectric dressing as compared with skin preparation with 2% chlorhexidine or 4% chlorhexidine in reducing bacterial count on the knee ▪ Three groups of 48 healthy volunteers were included (age range, 23-54 years); 60% male ▪ Application of the silver-zinc bioelectric dressing was equally effective at reducing skin bacterial load when compared with skin preparation with 2% chlorhexidine or 4% chlorhexidine in healthy volunteers ▪ Study findings indicate that use of a bioelectric dressing after knee surgery can match the standard of care of preparing the skin with an antiseptic before surgery

Scientific Publications

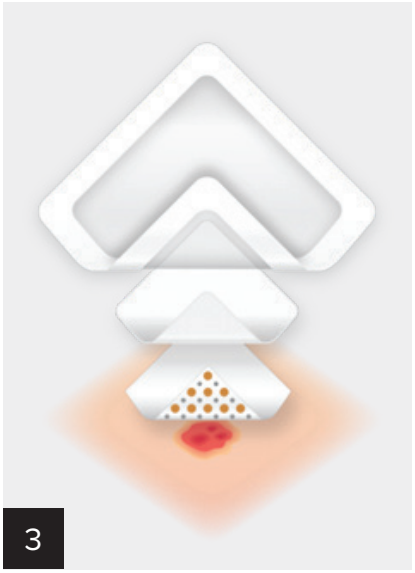
Study Area Anti-biofilm properties **Design** In vitro	Banerjee J, Das Ghatak P, Roy S, et al. Silver-zinc redox-coupled electroceutical wound dressing disrupts bacterial biofilm. *PLoS One.* 2015;10(3):e0119531. doi:10.1371/journal.pone.0119531 ▪ Tested the ability of a wireless electroceutical device (WED) to inhibit *Pseudomonas aeruginosa* biofilm ▪ WED impaired biofilm formation and significantly impaired extracellular polymeric substance formation compared to two different controls (placebo dressing and silver dressing) (P < .05) ▪ WED impaired biofilm structures and caused significant cell death compared to controls (P < .05) ▪ Silver alone was unable to disrupt *P aeruginosa* biofilm
Study Area Anti-biofilm properties **Design** In vitro	Kim H, Izadjoo MJ. Antibiofilm efficacy evaluation of a bioelectric dressing in mono- and multi-species biofilms. *J Wound Care.* 2015;24(Suppl 2):S10-S14. doi:10.12968/jowc.2015.24.Sup2.S10 ▪ Tested a bioelectric dressing's effectiveness against 10 clinical wound pathogens in monospecies and multispecies biofilm settings ▪ Bioelectric dressing was effective against monospecies and multispecies biofilm-forming bacteria; demonstrated 100- to 1000-fold reductions in bacterial numbers compared to three controls
Study Area Re-epithelialization **Design** In vitro	Banerjee J, Das Ghatak P, Roy S, et al. Improvement of human keratinocyte migration by a redox active bioelectric dressing. *PLoS One*. 2014;9(3):e89239. doi:10.1371/journal.pone.0089239 ▪ Human keratinocytes exposed to bioelectric dressing (BED) demonstrated significantly accelerated cell migration. This effect was not observed with three controls (placebo, silver alone, zinc alone) ▪ Cells exposed to BED's electric fields demonstrated increased signaling and production of H_2O_2 (required for cell migration)
Study Area Antibacterial properties **Design** In vitro	Kim H, Makin I, Skiba J, et al. Antibacterial efficacy testing of a bioelectric wound dressing against clinical wound pathogens. *Open Microbiol J.* 2014;8:15-21. doi:10.2174/1874285801408010015 ▪ Examined in vitro antibacterial efficacy of bioelectric dressing against 13 wound pathogens ▪ The bioelectric dressing demonstrated bactericidal activity against antibiotic-sensitive multidrug-resistant strains and multiple antibiotic-resistant strains of wound pathogens, and bacteriostatic activity against *Enterococcus* species

Single-Layer Dressing Application

Moisten dotted side of dressing with sterile saline, water, or water-based hydrogel.

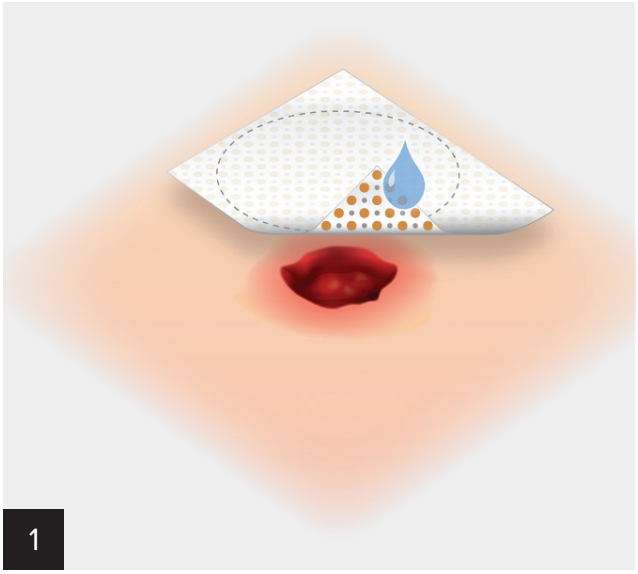


Apply, dots down, onto wound surface.



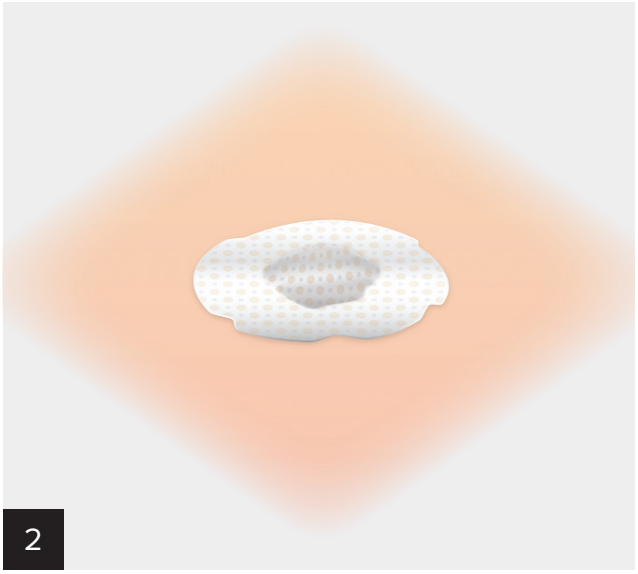
Cover with secondary dressing(s) appropriate for drainage levels.

Deep-Wound Dressing Application



Hydrate dotted side of dressing with sterile saline, water, or water-based hydrogel.

Note: If desired, trim to size and shape prior to moistening (include 1 cm to 2 cm overlap of wound edge).

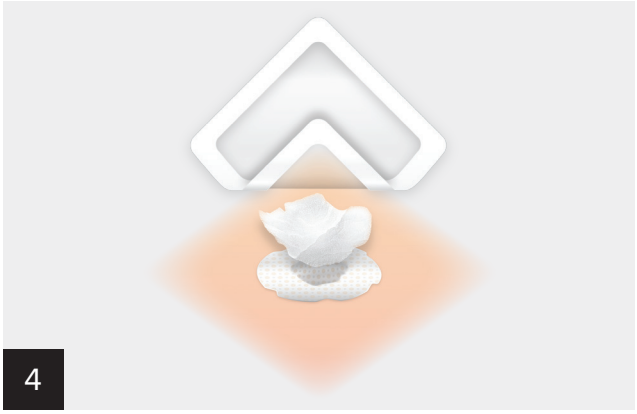


Apply, dots down,onto wound surface.

Note: Completely line deep wound and extend 1 cm to 2 cm beyond wound edges.

Fill "dead space" with gauze.

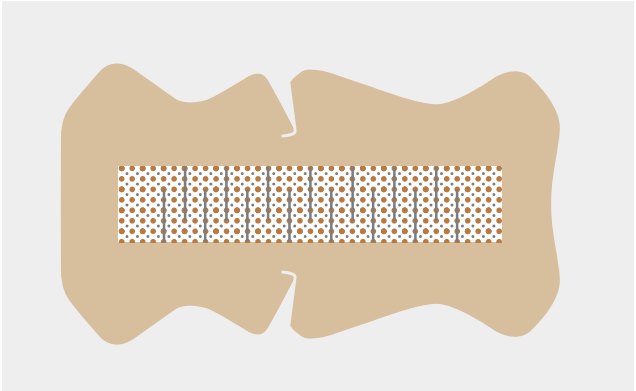
Note: If desired, moisten gauze to keep JumpStart® moist.



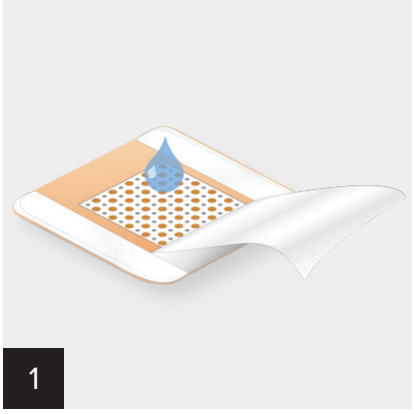
Cover with secondary dressing(s) appropriate for drainage levels.

Knee Dressing Application

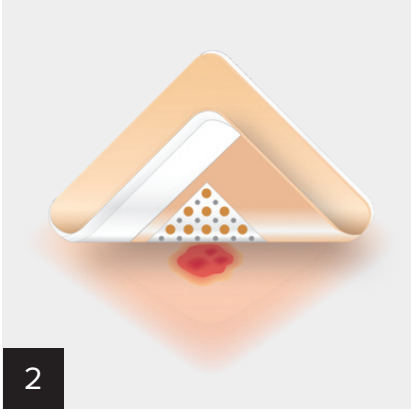
1. **Orient** the dressing to anatomy.
2. **Remove** center liner and **moisten** pad.
3. **Apply**, dots down, onto wound surface, with knee in slight flexion (~30°).
4. **Remove** both shin liners and **secure** to skin.
5. **Remove** both thigh liners, overlap, and **secure** to skin.



Composite Dressing Application



Remove center liner and **moisten** dotted pad with sterile saline, water, or water-based hydrogel.



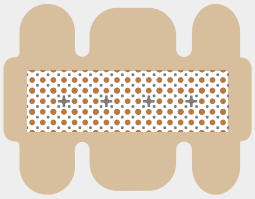
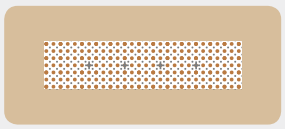
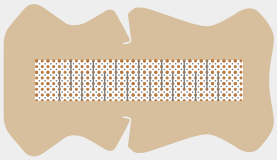
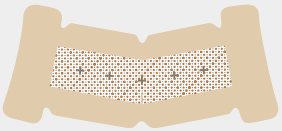
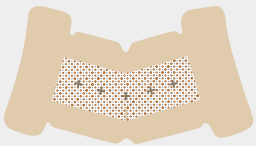
Apply, dots down, onto wound surface.

Note: If dressing a joint, apply while joint is in slight flexion.

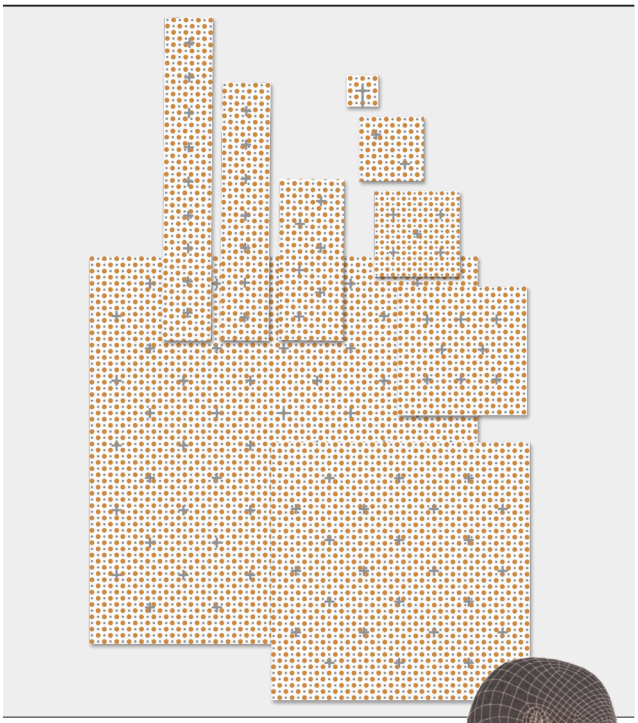
Remove remaining liners and **smooth** adhesive over skin.

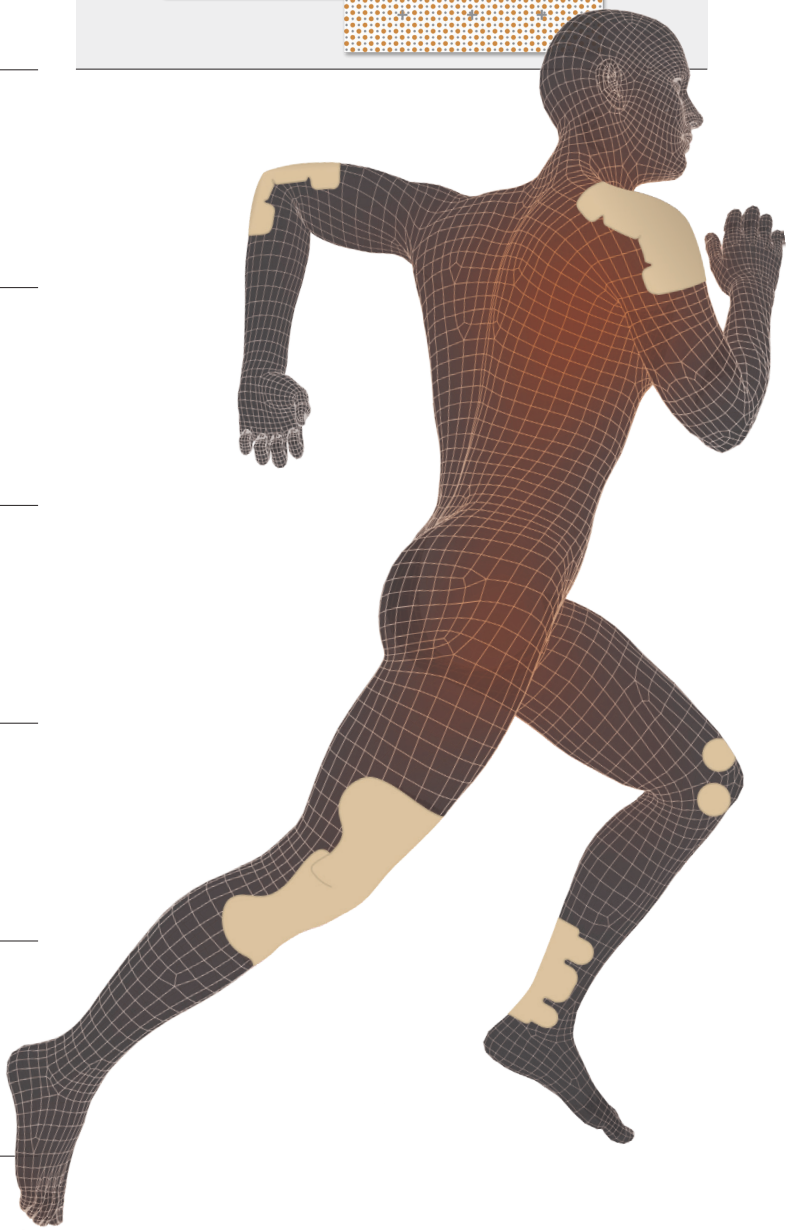
Address All Your Wound Dressing Needs

JumpStart® Composite Dressing Types

Product Image	Product Description	Item Number
	Foot, ankle, and shoulder dressing	ABS-**4051**
	Direct anterior hip arthroplasty dressing	ABS-**4052**
	Hip and knee arthroplasty dressing	ABS-**4050**
	Partial- and full-thickness dressing	ABS-**4053**
	Total shoulder arthroplasty dressing	ABS-**4057**
	Medial/lateral elbow dressing	ABS-**4058**
	2.5-inch diameter scope-site dressing	ABS-**4054**
	4-inch diameter scope-site dressing	ABS-**4056**

JumpStart Contact-Layer Dressing Sizes





Post-Application Care and Dressing Changes

- JumpStart® dressing may be left in place for up to 7 days
- Earlier and/or more frequent dressing changes may be required, depending on the amount of exudate present and the condition of the wound and/or the surrounding skin. Inspect the wound site periodically
- To remove JumpStart dressing, gently pull back. If it adheres to the wound surface, do not force it off; moisten or soak the dressing with sterile saline or water until it can be removed without tissue disruption

JumpStart wound dressings with V.Dox™ technology are versatile and usable as an adjunct to multiple advanced wound care therapies such as:

- Directly over sutures, Steri-Strip bandages, staples, liquid skin adhesives
- In case studies, JumpStart dressings have been used with bioengineered skin substitutes and negative-pressure wound therapy[1,2]
- With multilayered compression therapy

Ordering Information

JumpStart Contact-Layer Dressing

Product Description	Qty/Box	Item Number
1 in × 1 in fenestrated	10	ABS-**4001**
1.5 in × 8 in	10	ABS-**4005**
1.5 in × 10 in	10	ABS-**4006**
2 in × 2 in	10	ABS-**4002**
2 in × 5 in	10	ABS-**4025**
3 in × 3 in	10	ABS-**4003**
4 in × 4 in	10	ABS-**4004**
8 in × 8 in	1	ABS-**4008**
12 in × 12 in	1	ABS-**4012**

JumpStart Composite Dressing

Product Description		Qty/Box	Item Number
Adhesive Size	Dressing Size		
2.5 in	1.0 in	10	ABS-**4054**
4.0 in	2.0 in	10	ABS-**4056**
4.4 in × 9.6 in	1.5 in × 6.5 in	5	ABS-**4057**
4.2 in × 7.5 in	1.4 in × 4.5 in	5	ABS-**4058**
4 in × 4 in	2 in × 2 in	5	ABS-**4053**
5 in × 6 in	1.5 in × 5 in	5	ABS-**4051**
4.5 in × 10 in	1.5 in × 7 in	5	ABS-**4052**
6 in × 11.5 in	2 in × 9 in	5	ABS-**4050**

To order, please call **(800) 934-4404**. Contact your local Arthrex Technology Consultant for additional information.

References

1. Kim H, Makin I, Skiba J, Ho A, Housler G, Stojadinovic A, Izadjoo M. Antibacterial efficacy testing of a bioelectric wound dressing against clinical wound pathogens. *Open Microbiol J.* 2014;8:15-21. doi:10.2174/1874285801408010015
2. Banerjee J, Das Ghatak P, Roy S, et al. Silver-zinc redox-coupled electroceutical wound dressing disrupts bacterial biofilm. *PLoS One.* 2015;10(3):e0119531. doi:10.1371/journal.pone.0119531
3. Kim H, Izadjoo MJ. Antibiofilm efficacy evaluation of a bioelectric dressing in mono- and multi-species biofilms. *J Wound Care*. 2015;24(Suppl 2):S10-S14. doi:10.12968/jowc.2015.24.Sup2.S10
4. Barki KG, Das A, Dixith S, et al. Electric field based dressing disrupts mixed-species bacterial biofilm infection and restores functional wound healing. *Ann Surg*. 2019;269(4):756-766. doi:10.1097/SLA.0000000000002504
5. Vomaris Wound Care, Inc., Data on file. Report #SLM090512CMC01F.
6. Blount AL, Foster S, Rapp DA, Wilcox R. The use of bioelectric dressings in skin graft harvest sites: a prospective case series. *J Burn Care Res.* 2012:33(3):354-357. doi:10.1097/BCR.0b013e31823356e4

Notes

Arthrex®

This description of technique is provided as an educational tool and clinical aid to assist properly licensed medical professionals in the usage of specific Arthrex products. As part of this professional usage, the medical professional must use their professional judgment in making any final determinations in product usage and technique. In doing so, the medical professional should rely on their own training and experience, and should conduct a thorough review of pertinent medical literature and the product's directions for use. Postoperative management is patient-specific and dependent on the treating professional's assessment. Individual results will vary and not all patients will experience the same postoperative activity level or outcomes.

Arthrex manufacturer, authorized representative, and importer information (Arthrex eIFUs)

US patent information

arthrex.com