

Evidence to Decision Frameworks: Biological Dressings

Clinical question What biological dressings are effective for supporting healing of pressure injuries?

Recommendation 15.1 Consider applying collagen dressings to nonhealing pressure injuries to improve rate of healing and decrease signs and symptoms of wound inflammation.

Option: Applying a collagen matrix dressing

Comparison: Other wound dressing comparators including basic dressing (saline gauze) or advanced dressing (e.g. hydrocolloid, foam, alginate etc)

Background: Most wound dressing collagen is derived from animal skin. It is proposed that applying collagen topically to a wound bed via a wound dressing facilitates healing. Collagen (a protein produced by fibroblasts) reduces protease activity in inflammatory stages, and promotes angiogenesis, epithelization and granulation.

	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS										
BENEFITS & HARMS OF THE RECOMMENDED PRACTICE	What is the overall certainty of the evidence?	<table border="0"> <tr> <td>No included studies</td> <td>Very low</td> <td>Low</td> <td>Moderate</td> <td>High</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	No included studies	Very low	Low	Moderate	High	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Evidence for improvement in complete healing of pressure injuries</p> <ul style="list-style-type: none"> Collagen dressing not significantly different from hydrocolloid dressing for complete healing in Category/Stage II and III pressure injuries (n=65) at 8 weeks (mean difference 1%, 95% CI to26 to 29%, p=0.893).¹ (Level 1, high quality) At 3 weeks (n=10), 100% of Category/Stage II pressure injuries treated with collagen were healed, compared with 80% treated with a foam dressing (p value not reported).² (Level 1, moderate quality) At 6 months, no significant difference in Category/Stage II to IV pressure injuries (n=80) that were completely healed with collagen matrix versus viscose-rayon (90% versus 70%, p=0.59).³ (Level 1, low quality) <p>Evidence for increase in wound healing rate/reduction in wound surface area</p> <ul style="list-style-type: none"> Pressure injuries (n=33, stage unknown) treated with collagen matrix dressing had significantly greater reduction in surface area compared to hydropolymer dressing (65±13% versus 41±11%, p<0.05).⁴ (Level 1, low quality) Healing rate with collagen dressing not significantly different to hydrocolloid dressing when measured by mm²/day in Category/Stage II and III pressure injuries at 8 weeks (mean difference 0, 95% CI -9 to 8, p=0.942).¹ (Level 1, high quality) <p>Evidence for improvement in protease activity and other markers of inflammation/infection</p> <ul style="list-style-type: none"> Compared with a foam dressing, a collagen dressing was associated with showed a faster and higher reduction in MMP-9 concentration (p<0.04).² (Level 1, moderate quality) Compared with a hydropolymer dressing, elastase activity (p<0.05) and plasmin activity (p<0.05) was significantly lower in pressure injuries (unknown stage) treated with a collagen dressing.⁴ (Level 1, low quality) <p>Adverse outcomes No adverse events were experience over 8 weeks use.¹ (Level 1, high quality)</p> <p>Strength of Evidence: B1 — Level 1 studies of moderate to low quality, plus additional evidence from lower level studies</p>	
	No included studies	Very low	Low	Moderate	High									
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	Is there important uncertainty about how much people value the main outcomes?	<table border="0"> <tr> <td>Important uncertainty or variability</td> <td>Possibly important uncertainty or variability</td> <td>Probably no important uncertainty or variability</td> <td>No important uncertainty or variability</td> <td>No known undesirable outcomes</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Important uncertainty or variability	Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	No known undesirable outcomes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
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How substantial are the desirable anticipated effects?	<table border="0"> <tr> <td>Unclear</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Unclear	Not substantial	Probably not substantial	Probably substantial	Substantial	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
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Do the desirable effects outweigh the undesirable effects?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
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	CRITERIA	JUDGEMENTS	RESEARCH EVIDENCE AND ADDITIONAL CONSIDERATIONS												
RESOURCE USE	How substantial are the resource requirements?	<table border="0"> <tr> <td>Not clear</td> <td>Not substantial</td> <td>Probably not substantial</td> <td>Probably substantial</td> <td>Substantial</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Not clear	Not substantial	Probably not substantial	Probably substantial	Substantial	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>Cost analysis</p> <ul style="list-style-type: none"> Considering dressing materials, ancillary supplies and labor costs, collagen dressing was more expensive than hydrocolloid dressing for 8 weeks for Category/Stage II or III pressure injury (average per patient cost hydrocolloid \$222 versus collagen \$627) (\$US in 2003).¹ <p>Labor</p> <ul style="list-style-type: none"> Collagen dressing required 3.5 times more nursing interventions than hydrocolloid dressing.¹ Category/Stage II to IV pressure injuries required fewer dressings than a viscose rayon dressing (6 to 15 versus 14 to 52).³
Not clear	Not substantial	Probably not substantial	Probably substantial	Substantial	Varies										
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PRIORITY AND ACCEPTABILITY	Is the option acceptable to key stakeholders?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Collagen dressings are derived from animal skin and may not be acceptable to all individuals with pressure injuries (<i>Expert opinion</i>).
	No	Probably No	Uncertain	Probably Yes	Yes	Varies									
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Is the option a priority for key stakeholders?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No evidence available	
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FEASIBILITY	Is the option feasible to implement?	<table border="0"> <tr> <td>No</td> <td>Probably No</td> <td>Uncertain</td> <td>Probably Yes</td> <td>Yes</td> <td>Varies</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	No	Probably No	Uncertain	Probably Yes	Yes	Varies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Collagen dressings may not be universally available. (<i>Expert opinion</i>)
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Balance of consequences	Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings <input type="checkbox"/>	Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings <input type="checkbox"/>	The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i> <input type="checkbox"/>	Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings <input checked="" type="checkbox"/>	Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings <input type="checkbox"/>
Strength of recommendation	Strong negative recommendation: Definitely don't it <input type="checkbox"/>	Weak negative recommendation: Probably don't do it <input type="checkbox"/>	No specific recommendation <input type="checkbox"/>	Weak positive recommendation: Probably do it <input checked="" type="checkbox"/>	Strong positive recommendation: Definitely do it <input type="checkbox"/>
Justification	There is direct evidence from low, moderate and high quality Level 1 studies to suggest that collagen matrix dressings are as effective as other contemporary wound dressings (e.g. hydrocolloid, hydropolymer and foam) in promoting healing. ¹⁻³ In one low quality Level 1 study, ⁴ a collagen matrix dressing out-performed a hydropolymer dressing in achieving reduction in pressure injury surface area and in other studies, indicators of wound inflammation were more favourable in pressure injuries treated with collagen. ^{2,4} Older studies indicated that collagen matrix dressings cost more with respect to product and labor than other types of wound dressings; ¹ however, a cost-benefit analysis is not available. Consideration should be given to resource availability because collagen matrix dressings might be more costly than other contemporary wound dressings ^{1,2} and/or difficult to access. Consideration should also be given to patient preferences (collagen is derived from animal products). ⁵⁻⁷				

References

1. Graumlich JF, Blough LS, McLaughlin RG, Milbrandt JC, Calderon CL, Agha SA, Scheibel LW. Healing pressure ulcers with collagen or hydrocolloid: A randomized, controlled trial. *J Am Geriatr Soc*, 2003; 51(2): 147-154.
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3. Nisi G, Brandi C, Grimaldi L, Calabrò M, D'Aniello C. Use of a protease-modulating matrix in the treatment of pressure sores. *Chir Ital*, 2005; 57(4): 465-468.
4. Kloeters O, Unglaub F, de Laat E, van Abeelen M, Ulrich D. Prospective and randomised evaluation of the protease-modulating effect of oxidised regenerated cellulose/collagen matrix treatment in pressure sore ulcers. *Int Wound J*, 2016; 13(6): 1231-1236.
5. Wu S, Applewhite AJ, Niezgoda J, Snyder R, Shah JP, Cullen B, Schultz G, Harrison J, Hill R, Howell M, Speyrer M, Utra H, de Leon J, Lee W, Treadwell T. Oxidized regenerated cellulose/collagen dressings: Review of evidence and recommendations. *Adv Skin Wound Care*, 2017; 30: S1-S81.
6. Grothier L. Understanding the use of collagen/oxidised regenerated cellulose dressings. *Wounds Int*, 2015; 6(2): 34-40.
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