Use of an Ovine Collagen with an Intact Extracellular Matrix (CECM) and negative pressure wound therapy (NPWT) as part of the wound management plan following limb salvage surgical intervention in high risk diabetic foot ulcers.

**Objective:**
Demonstrate use of an Ovine Collagen with an Intact Extracellular Matrix (CECM)® and negative pressure wound therapy (NPWT) as part of the wound management plan following limb salvage surgical intervention in high risk diabetic foot ulcers.

**Background:**
Diabetes is a disease which is becoming more and more prevalent in our society. As a result, more patients are developing complex lower extremity deformities which could lead to ulcerations that often progress to infection. As medical professionals, it is important that we realize the limb threatening diabetic foot ulceration or infection as early as possible so that we can provide patients with the urgent and aggressive wound care necessary for limb salvage. Patients who suffer a limb loss are more likely to suffer contralateral limb loss or even loss of life within the next few years.1,2

**Case Descriptions:**
These four cases involve high risk diabetic patients who were treated with surgical intervention. As a part of post-operative wound management, CECM and NPWT were utilized. CECM was applied to the wound bed, covered with a contact layer dressing,** and then a NPWT dressing was applied. Dressings were changed two to three times a week per instructions for use.

**Conclusion:**
In these cases, the use of CECM and NPWT as part of the wound management plan following limb salvage surgical intervention has assisted in the task of saving these limbs.

### Case Study 1: Left Hallux Amputation

**Patient:** 65 year-old, Diabetic, neuropathy, smoker, chronic DFU on bilateral great toes with osteomyelitis

**Post medical history:**
- Bilateral amputation of hallux, 1 week later the patient developed post-op infection on left foot and went back to OR for debridement and partial 1st metatarsal amputation

<table>
<thead>
<tr>
<th>Initial wound</th>
<th>Wound management post-op:</th>
<th>Wound description:</th>
<th>Wound measurement:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tissue antibiotic ointment,</td>
<td>Bi-granulation tissue with no sign of infection</td>
<td>2 cm x 1.5 cm x 0.2 cm</td>
</tr>
<tr>
<td></td>
<td>anti-infective, saline packing, 2% povidone iodine (PVP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>optic nerve preservation,</td>
<td>Epithelialization starting on plantar surface</td>
<td></td>
</tr>
</tbody>
</table>

**Surgeon:**
Bilateral amputation.

**Wound management post-op: 1st day post-op: in sump dressing as NPWT was initiated.**

**Wound measurement: 11 cm x 0.3 cm x 0.5 cm**

**Case Study 2: Diabetic Foot Ulcer- Wet Gangrene**

**Patient:** 70 year-old female

**Post medical history:**
- Diabetes, peripheral neuropathy, peripheral arterial disease, hypermetabolism, end-stage renal disease and on hemodialysis

<table>
<thead>
<tr>
<th>Initial wound</th>
<th>Wound management:</th>
<th>Wound description:</th>
<th>Wound measurement:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dismantle dressing</td>
<td>Bi-granulation tissue with no sign of infection</td>
<td>13 cm x 10.5 cm x 0.2 cm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Epithelialization starting on plantar surface</td>
<td></td>
</tr>
</tbody>
</table>

**Surgeon:**
Bacterial infection of ulcer.

**Wound management post-op: 1st 2nd day post-op: in NPWT 14th day post-op: in NPWT**

**Wound measurement: 11 cm x 0.3 cm x 0.5 cm**

**Case Study 3: Right Toe Gangrene and Abscess**

**Patient:** 63 year-old female, admitted medical center with right 2nd toe gangrene and abscess

**Post medical history:**
- Diabetes, neuropathy, peripheral arterial disease, coronary artery disease, and underwent partial right 2nd ray amputation (below)

<table>
<thead>
<tr>
<th>Initial wound</th>
<th>Wound management post-op:</th>
<th>Wound description:</th>
<th>Wound measurement:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Antibiotic packing daily and oral antibiotics</td>
<td>Dermal granulation tissue with no signs of infection</td>
<td>2.6 cm x 1.2 cm x 0.2 cm</td>
</tr>
</tbody>
</table>

**Surgeon:**
Debridement.

**Wound management post-op: 5 days post-op: in NPWT, 6th day post-op: in NPWT, 7th day post-op: in NPWT**

**Wound measurement: 1.1 cm x 0.3 cm x 0.2 cm**

**Case Study 4: Non-healing surgical wound after left partial 4th and 5th ray resection**

**Patient:** 50 year-old female presenting to wound care center after partial left 4th and 5th ray resections at another facility, 3 weeks prior

**Post medical history:**
- Diabetes, neuropathy, peripheral arterial disease, heavy smoker

<table>
<thead>
<tr>
<th>Initial wound</th>
<th>Wound management post-op:</th>
<th>Wound description:</th>
<th>Wound measurement:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fistula tract seen in wound bed</td>
<td>Increased granulation tissue, no sign of infection, no drainage, and no inflammation</td>
<td>4.0 cm x 2.2 cm x 0.3 cm</td>
</tr>
</tbody>
</table>

**Surgeon:**
Debridement.

**Wound management post-op: 1st day post-op (after debridement):**

**Wound measurement: 2.0 cm x 1.5 cm x 0.3 cm**

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**Notes:**
1. CECM is an extracellular matrix derived from sheep bladder, containing the extracellular matrix proteins and growth factors.
2. NPWT is a form of negative pressure wound therapy that uses a vacuum to remove fluid, debris, and exudate from the wound bed.
3. DFU refers to Diabetic Foot Ulcer.
4. PVD refers to Peripheral Vascular Disease.
5. DFIB refers to Diabetic Foot Infection.
6. NPWT refers to Negative Pressure Wound Therapy.
7. CECM is an acronym for “Collagen Extracellular Matrix.”
8. NPWT is an acronym for “Negative Pressure Wound Therapy.”

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**References:**