Conservative Sharp Debridement:

Sharpening Your Knowledge & Your Skills Workshop

Karen Bruton BScN, RN, WOCN, CETN(C)
Amanda Loney BScN, RN, WOCN, IIWCC, CETN(C)
Canadian Association
For Enterostomal Therapy
Evidence-Based Recommendations
For
Conservative Sharp Wound Debridement
www.caet.ca 1
Outline

- Review the evidence-based recommendations for conservative sharp wound debridement.
- Review different methods to debride a wound
  - Pros and cons to those methods
- Case studies
- Hands on practice
- Break in the middle for coffee/tea
Debridement is removal of foreign material & devitalized or contaminated tissue from the wound bed until surrounding healthy tissue is exposed.

*Dorland’s Illustrated Medical Dictionary. 31st ed, Philadelphia: Saunders. 2007; 481.*
Pathway to Assessment/Treatment of Chronic Wounds

Person with a Pressure Ulcer

Treat the Cause
- Risk factors/conditions
- Pressure reduction/relief
- Nutrition
- Moisture/incontinence
- Friction and shear
- Mobility

Local Wound Care

Inflammation/Infection Control
- Topical antimicrobials
- Antimicrobial dressings
- Systemic antibiotics
- Osteomyelitis

Patient-centred Concerns
- Pain
- Quality of life
- Caregiver/family concerns
- Adherence to plan of care

Debridement
- Devitalized tissue only in non-healable
- Debridement method consistent with wound and needs of patient

Edge of the Wound
- Biologically active dressings
- Skin grafts and substitutes
- Adjunctive therapies
- Surgical flaps

Moisture Balance
- Absorptive dressings
- Fillers
- Occlusive dressings
Rationale for Wound Bed Preparation:

Biochemistry of the wound bed

1. Reduce the inflammatory cytokines, fibronectin, and metalloproteinases produced when a wound is chronically inflamed owing to the presence of necrotic tissue

2. Promote DNA synthesis & growth of keratinocytes that are inhibited by production of these inflammatory products

3. Reduce bacterial bioburden associated with necrotic tissue in the wound bed

Why debridement?

**Necrosis in the wound bed:**
- Stalled in the inflammatory phase of wound healing
- Medium for bacterial growth
- Harbours necrosis, purulent exudate & air in pockets
- Barrier to epidermal resurfacing, contraction & granulation tissue growth
- Increase time for healing
- Biofilm

Evidence-Based Recommendations
For Conservative Sharp Wound Debridement
Recommendation 1
Institutional policies must be in place to enable qualified nurses to perform CSWD

- the registered nurse should ensure that there is explicit employer approval for the practice of CSWD

- Although nursing is a self regulated profession in Canada, institutional policies may act to restrict or enable a nurse to work to his/her full scope of practice

- According to professional standards, the nurse must judge him/herself as having the appropriate knowledge, skill, judgment, and attitude to perform a role or task.
Know your Provincial legislation

- The ability to practice CSWD can vary between care settings depending on Provincial legislations.
  - For example, in some acute care settings, CSWD may require a medical delegation or transfer of function in accordance with Provincial hospital legislation.
  - More than half of the Canadian provincial registered nursing colleges do not have a specific policy or position statement with regards to CSWD.
Get your Framework in Place for CSWD

- Nurse clinicians must have this framework in place by their employers, as well as the specialized knowledge and mentored practice before undertaking CSWD with qualified clients.

- The onus is on the employer to provide a comprehensive policy and procedure for CSWD in order to promote accountability, client safety, and the reduction of avoidable error.
Video of foot being cut off
Recommendation 2
Complete a comprehensive wound assessment prior to initiating CSWD

- A comprehensive wound assessment is defined here as encompassing three elements:
  1. a holistic client assessment
  2. determination of the etiology of the wound/reasons for chronicity
  3. a focused wound assessment using a validated tool such as the Bates-Jensen Wound Assessment Tool (BWAT) or the Pressure Ulcer Assessment tool.
A holistic client assessment:

- experiences of the client
  - perceptions of
    - wound pain
    - quality of life factors
    - adherence to treatment
    - Emotional support systems
- The client’s own goals are important to determine and document.
Thorough Client History
Possible Cause and Co-morbidities

- The following will impact the choice of debridement method for the practitioner:
  - Malignancies
  - Diabetes
  - vascular-compromising diseases.
  - presence/absence of clotting disorders
  - anticoagulant therapy
  - Immune-altering health disorders
Physical Findings

- Ankle Brachial Pressure Index (ABPI)
- Ability to visualize the wound:
  - uncontrolled edema
  - signs and symptoms of infection
  - anatomical structures be noted
- internal sutures:
  - Non-soluble mesh
  - Grafts/ prostheses
  - Debris (hair, staples, nail clippings, old dressings)
Wound Assessment

● leads to a valid determination of goals or alternate end-points
  ● odour or exudate control

● Wound assessment must be completed prior to employing CSWD
Ongoing Wound Assessment

- Is the wound progressing towards the goal of care?
- Is repeated debridement required?
- Using same wound assessment tool each time provides the best measurement of wound status.
  - Volume: Length x width x depth
  - Surface Area: Length x width
    - To be assessed prior to starting treatment.
  - Repeated q1-3wks thereafter.
Percentage of Healing

- A 20-40% reduction in wound surface area over a period of two-four weeks is felt to be a predictor of wound healing for wounds of venous and pressure-related etiologies.
Calculate the % of healing: Surface Area

- Week 1 --> 6.2cm x 5cm = 31
- Week 3 --> 5.8cm x 4.5cm = 26.1

\[
\frac{(\text{week 1 lwx}) - (\text{week 2 lwx})}{(\text{week 1 lwx})} \times 100 = \% \text{ of healing}
\]

\[
\frac{31 - 26.1}{31} = .158 \times 100 = 16\%
\]
Measure Your Wounds

- Wounds need to be measured before and after CSWD
  - Debridement leads to an enlargement in wound size
    - Need to take this into consideration when decisions are made about on-going treatments.
    - Clients/health care providers need to be made aware of this outcome
  - Photo documentation can be of great assistance in providing a visual record of wound status both before and after wound debridement sessions.
Tool to Determine if CSWD is Required and or Adequate?

Saap and Falanga (2002) developed a scoring system/tool

The Debridement Performance Index tool:

- The scoring index determined whether or not an ulcer required debridement at initial assessment
  - Was debridement technique adequate
  - Was enough devitalized tissue was removed

Generalized implementation of this tool could increase the use of CSWD in the wound bed preparation of chronic wounds by determining the need for debridement from the initial point of assessment. The Debridement Performance Index tool could also be used to advance research related to CSWD.
Recommendation 3
Select CSWD when appropriate

- CSWD can result in cost savings:
  - Preparing the wound bed.
  - Removing debris faster in a more cost effective manner.

- In a retrospective study done in Ontario, Canada, there were clear cost savings (approximately $1,516 per case) when CSWD was used by ETNs compared to irrigation.

- Study was part of a best practice scenario to obtain a clean wound bed on foot ulcers.
  - There is a general lack of clinical research trials that compare one method of debridement over another.
Sharp Debridement When Necrotic Tissue Is Not Present?

- There is emerging evidence that supports the use of surgical debridement techniques in stalled, chronic wounds without necrotic tissue.
- outside the scope of nursing? Why?
- nurse's have a role as client advocate in these situations.
Indications and contraindications for each of the debridement options

- Environment
- Resources
- Skill level of the nurse
- Client consent/preference
- Availability of institutional policy
- Speed of removing non viable tissue
- Tissue selectivity
- Presence of wound pain
- Exudate
- Infection
- Anatomical position of wound
- Cost
Wound Etiology and Co-Morbidity/Co-factors

- Non-healable wounds are defined as having:
  - inadequate circulation
  - an untreatable cause, or coexisting medical conditions or medications that prohibit the healing process.
  - inadequate circulation as in the case of arterial disease.
  - Malignant cutaneous wounds

- Clients with impaired clotting mechanisms should not be treated with CSWD

- Clients undergoing anticoagulation therapy should be carefully considered, monitored, and treated by an interdisciplinary team in a safe care environment.
So Do We Debride?
Do Not Debride Burn Blisters

- Flanagan (2001) concludes that it is advisable to leave burn blisters intact, rather than debride or de-roof them. This allows for the gradual re-absorption of burn fluid while maximizing healing, decreasing bacterial colonization, and increasing client comfort.
What about this? How do you clean it up? Ask me questions?
CSWD performed with extreme caution or not at all in such conditions as:

- pyoderma gangrenosum
  - due to a process called pathergy.
    - *Pathergy* is inflammation and ulceration occurring as a result of minor trauma. Sharp wound debridement can result in a dramatic enlargement and worsening of a pyoderma gangrenosum ulcer.
What about this?
Do we Debride this?
If So How?
Black Eschar Heel Ulcers

- Wounds located on the heel and covered with a dry stable eschar should not be considered for debridement of any type.
- If the eschar starts to lift away from the underlying intact skin, it is often necessary to 'trim' the lifting edges.
- If the black eschar develops edema, erythema, fluctuance, or drainage, then the eschar should be debrided.
Location Must be Considered

- Specialist advice is recommended before undertaking CSWD were underlying structures are very close to the skin surface
  - face, hands, and feet
  - Sharp debridement of wounds proximal to a prosthesis or device such as an arterio-venous dialysis shunt should not be undertaken by a nurse due to the risk of severe damage/disruption.
Recommendation 4

- Appropriate pain control methods should be used when performing CSWD
  - Evidence exists to support the use of the topical analgesic EMLA
  - Pain is a symptom associated with real or potential damage resulting from the inflammatory reaction of the tissues
  - the act of pulling or stretching these tissues when securing them for removal can cause pain from innervated, viable tissues beneath the slough/eschar and the surrounding wound
Pain Management

- is a client centered concern, and assessing, addressing, and managing pain should be an integral part of the treatment plan as a primary care objective, in particular when performing CSWD.
Adequate pain management

- may include:
  - pre-intervention analgesia
  - topical anaesthetic which can decrease the incidence of procedural pain experienced by some clients.
- In a review of clinical trials, EMLA (Eutectic Mixture of Local Anaesthetics) was the only topical anaesthetic for which clinical evidence existed to support its efficacy in the treatment of procedural pain associated with sharp debridement of leg ulcers.
Topical Pain Management

- Other topical pain management strategies such as gel-based opioids and lidocaine preparations have not undergone study to the same degree as the EMLA treatment.
- More research is required to support the use of alternative topical pain control measures and the use of accepted pain management techniques in all types of chronic wounds.
Assess Pain Management

- It is strongly recommended that patients/clients be assessed for pain before, during, and after a treatment such as CSWD.
  - Factors which influence a client’s pain experience are related to the type of pain:
    - nociceptive, neuropathic, or mixed
    - the anatomical location of pain
    - the source of pain (procedural, critical colonization, infection, arterial insufficiency, contractures, peripheral neuropathy, etc).
  - Factors such as cognitive difficulties, psychosocial problems, and nutritional deficits can also influence the intensity of the pain.
Setting time limits

- Allows the removal of non-viable tissue in the shortest possible time
  - Thus promoting comfort and quality of life for the client.
- Should be negotiated with the client prior to initiating each debridement session.
  - Limits client and nurse fatigue
  - Optimally set at 15-30 minutes, or less.
Recommendation 5

Specific safety measures and equipment are required to perform CSWD.
CSWD can be safely performed when certain safety measures are in place. These safety measures are as follows:

- the client should be positioned comfortably from both the client's and the nurse's perspective
- the procedure is performed on a stable work surface
- the lighting is adequate to visualize
- the environment is clean
- the nurse has the competence to deal with complications as they arise
- the nurse has good knowledge of the anatomy for the region in which the wound is located as there are clear areas of risk when arteries, veins, and nerves are near the surface
- the nurse has adequate knowledge of infection control
- there is additional personnel available to handle potential complications
- The knowledge of one's professional limits is critical to ensuring client safety
Non-viable matter in a wound

- can mask the wound bed hiding signs of infection
- Exposure of the wound bed by CSWD aids visualization and can help to reduce or prevent infection.
- CSWD, can remove the bacteria-laden slough and necrotic tissue.
- However, if a wound is showing clinical or systemic signs of infection, the risk of spreading infection and the possible requirement of antibiotics should be considered.
Instruments for CSWD

Home

- disposable instruments should be used in the home care setting.
- the care environment is maintained as 'semi-sterile or clean'.

Home and or Clinic

All equipment, including gloves, instruments, solutions, and dressing supplies used during and after CSWD should be sterile.
Razor & Martin (1991) suggest the following instruments:

- gloves, Adson forceps with teeth, no.3 scalpel handle with no. 10 and 15 blades, 2 mosquito clamps, silver nitrate sticks, absorbable gelatin film (surgical or an absorbable fibrinogen-based dressing), gauze sponges, curved iris scissors, normal saline solution, sterile towels.

- Others suggest that a calcium alginate dressing should be on hand for the control of inadvertent minor bleeding.
Evidence for Equipment

- Stronger evidence is required to support the benefits of appropriate equipment.
- However, I think that we can all agree on, the use of appropriate equipment improves comfort, safety, and effectiveness of CSWD.
Recommendation 6
Appropriate procedures must be used when performing CSWD.

Serial sharp debridement
- is the removal of non-viable tissue in thin layers during sequential, prn/daily
- Aids in reduction of microorganisms preventing infection
- Regular removal of biofilm causes susceptibility to antibiotic treatment
- Promotes the inflammatory phase of wound healing
Biofilm or no Biofilm?
Biofilms – on all chronic wounds

- form on wound surfaces
- air-water interface
- located on a (wound) surface, but function together in multi-
  species communities held together by an extracellular slime,
  known as extracellular polymeric substances”.

http://2011.igem.org/Team:Glasgow/Biofilm
Biofilms are a wound management challenge for the following reasons:

- they are resistant to antibiotics
- they are highly resistant to biocides (hydrogen peroxide, acids)
- Barrier to healing
- they invade the host immune system
- They are poorly penetrated by many antibiotics used.
  - When suspected to be present, the physical removal and suppression of biofilm reformation is a necessary part of the wound bed management.
Recommendation 6
Appropriate procedures must be used when performing CSWD. Cont’d

Maintenance & combination debridement
- necrotic tissue is removed as needed
- proactive way to “jump-start” the wound and keep it in a healing mode
- Validated scoring tools: Debridement Performance Index, Wound Bed Score, BWAT – monitor progress
- Combination debridement: complementary methods
- CSWD/Enzymatic  CSWD/Autolytic
- Enzymatic will soften 24-48 hours
Recommendation 7
Treat diabetic foot ulcers with CSWD as part of a multi-modal approach to optimal care

- CAUTON – tread carefully
- Combined modalities such as CSWD, orthotics, nutrition, controlling blood sugar have shown to have good outcomes
- Know your patient, their history and consider a holistic approach in determining a plan of care
Recommendation 8
CSWD can form part of a multi-modal approach to care for chronic venous leg ulcers

- Gold standard – compression therapy
- Serial CSWD
- Autolytic debridement
- Utilizing a curette – yellow adherent slough
Recommendation 9
Client education is required to obtain informed consent prior to performing CSWD.

- Informed consent ESSENTIAL
- Education is a MUST so client can make informed decision for their own care
- Engagement and empowerment to promote autonomy
- Understand rationale, advantages and disadvantages
- Choice of pain management
Recommendation 10
Nurse education & training in CSWD should be obtained through a competency-based educational program

- Competency based education & training in CSWD has been identified as a critical factor in the provision of evidence-based, safe practice.
- Combination of education, training and mentoring is essential prior to practicing CSWD.
- Then it is the responsibility of the nurse to maintain a level of knowledge and skill competency.

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<tbody>
<tr>
<td>1.</td>
<td>Be a registered nurse</td>
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<td>2.</td>
<td>Have an accredited education course in wound management</td>
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<td>3.</td>
<td>Attend a minimum of a one-day sharp wound debridement study day that includes extensive anatomy of tissues and underlying structures</td>
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<td>4.</td>
<td>Be assessed by a specialist in wound care qualified in conservative debridement</td>
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<td>5.</td>
<td>Have conducted a series of supervised procedures</td>
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Before and After ??? Of Debridement
What would you do with this?
Before and After CSWD
Case Study
Lateral lower leg (side of calf)

- 6.3 x 1.7 cm depth 1 cm
- Moderate purulent drainage
- Friable
- Caused by pressure
- Blood flow is good
Before and After Conservative Sharp Debridement
Advantages/disadvantages of debridement types and methods

<table>
<thead>
<tr>
<th>Greatest effect</th>
<th>speed</th>
<th>Tissue selectivity</th>
<th>Patient pain</th>
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<tbody>
<tr>
<td>Least effect *</td>
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**Surgical /Sharp**
- Scalpel
- Curette
- Hydrosurgery

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**Autolytic**
- Occlusive drsg.

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**Biologic**
- Larval therapy

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**Enzymatic**
- Collagenase
- Papain

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**Mechanical**
- Forced irrigation
- Wet-to-dry
- Pulsed lavage
- Hydrotherapy

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Adapted from: Falanga et al.39 & Sibbald et al. 44
The Cost of the Debridement of Chronic Wounds: A Canadian Perspective

Cost of Debridement Method
(2010 Canadian $$)

<table>
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<tr>
<th>Method</th>
<th>Base case Time to a clean wound bed (model prediction)</th>
<th>Base case Cost</th>
<th>Cost Time to a clean wound bed ↓ by 1 week</th>
<th>Cost Time to a clean wound bed ↑ by 1 week</th>
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</thead>
<tbody>
<tr>
<td>Surgical sharp</td>
<td>3 weeks</td>
<td>$1,039.09</td>
<td>$948.75</td>
<td>$1,129.43</td>
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<tr>
<td>Conservative sharp</td>
<td>6 weeks</td>
<td>$1,119.60</td>
<td>$1,014.20</td>
<td>$1,224.90</td>
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<tr>
<td>Enzymatic</td>
<td>4 weeks</td>
<td>$1,264.69</td>
<td>$1,151.73</td>
<td>$1,377.64</td>
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<tr>
<td>Autolytic</td>
<td>10 weeks</td>
<td>$1,504.73</td>
<td>$1,379.33</td>
<td>$1,630.12</td>
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<tr>
<td>Mechanical</td>
<td>6 weeks</td>
<td>$1,840.74</td>
<td>$1,603.84</td>
<td>$2,077.64</td>
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<tr>
<td>Biologic</td>
<td>3 weeks</td>
<td>$2,150.89</td>
<td>$1,517.16</td>
<td>$2,784.62</td>
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Advocating for Surgical Sharp Debridement

- Painful wounds under anesthetic
- Complex extensive wounds ie. Necrotizing fasciitis
Case Study

60 year old female
Sedentary life
Type 2 diabetes long standing
Hypertension
Dyslipidemia
Morbidly obese
Good family support
Autolytic Debridement

- Body’s enzymes & moisture re-hydrates, softens & liquefies non-viable tissue
- Selective but slow
- Painless
- should not be used on pts with active infections
- use of occlusive or semi-occlusive dressings which include many advanced wound care products and dressings

NAME SOME?
Autolytic Debridement

- Score eschar with scalpel
- Apply moisture
- Cover with semi-ocularusive
- Change daily

**EXPECT**

↑ odour & exudate
Maggot Debridement Therapy

- **Maggot therapy** is also known as maggot debridement therapy (MDT), larval therapy, larva therapy, larvae therapy, biodebridement or biosurgery.

- Involves the introduction of live, disinfected maggots (fly larvae) into the non-healing skin and soft tissue wound(s) of a human or animal for the purpose of cleaning out the necrotic (dead) tissue within a wound (debridement) & disinfection.
Limitations to Maggot Wound Debridement

- Wound beds needs to be:
  - A moist, exudating wound
  - sufficient oxygen supply is a prerequisite.
- Not all wound-types are suitable:
  - Dry
  - open wounds to body cavities
- Maggots have a short shelf life.
- Patients and doctors may find maggots distasteful.
- Dressings designed to keep maggots in while allowing air to get to the maggots.
- Maggots can have a tickling sensation
Maggot Therapy

2 months later
Enzymatic Wound Debridement

Collaginase is an enzyme that breaks down collagen in damaged tissues within the skin and helps the body generate new healthy tissue. Collagen is a type of protein that connects and supports fibers in body tissues such as skin, tendons, muscles, and bone.

Can be used alone or with:
- sharp/CSWD debridement
- serial debridement using an enzymatic agent
- Chronic or non-healing wounds

Expensive - $125-150 for 30gm tube
ENZYMATIC DEBRIDEMENT

ADVANTAGES

- Selective for necrotic tissue
- Generally does not harm healthy tissue
- Widely available/easy to use
- Faster than autolysis
- Less invasive than surgical or mechanical debridement

DISADVANTAGES

- May take several days to weeks for complete debridement
Collagenase Ointment: Guidelines for Use

• Contraindications
  – Local or systemic hypersensitivity

• Precautions
  – Do not use with products that could inactivate collagenase, such as detergents or products containing iodine or heavy metals such as lead, silver or mercury
  – Do not use with acidic solutions or other agents that will move the wound pH outside of the effective range of collagenase (pH 6 to 8)
Mechanical Debridement

- Not evidence based practice
- Wet to dry dressings, remove usually dry
- Against CNA Code of Ethics “do no harm”
- Non-selective tissue removal
Utrasonic Wound Debridement

Hydrotherapy (Mechanical) Debridement

- The titanium alloy probe amplifies the mechanical vibration and transfers the acoustic energy into the tissue, via direct contact. The resulting cavitation, mechanical and hydrodynamic effects produce tissue disruption, fragmentation and emulsion in the wound bed.

http://www.youtube.com/watch?v=EqbUNEcRcaU
Wound Prior to Ultrasound Debridement
2 weeks of Ultrasound wound Debridement
Electrical Stimulation

- Negative current has been shown to solubilize clotted blood.
- Necrotic tissue is made up of coalesced blood elements.
- Negative pole utilized
Subcutaneous Layer

- Insulation
- Nutrition
- Cushioning

Composed of:
- adipose tissue
- Major vessels
- Lymphatics
- Nerves
Fascia

- Shiny white & surrounds skeletal muscle
- Infection (e.g., necrotizing fasciitis) is spread easily along facial planes
- Precaution: Separated fascial planes increase risk of bacterial invasion
Skeletal Muscle

- Purpose is to provide function
- Protects: bones, joints, nerves, and vessels
- Pads bony prominences
- Healthy muscle is dull red, contractile, and vascular
- Necrotic muscle is a darker dull red & avascular
Bone

- hard & white
- Cortical bone covered with periosteum
  - Periosteum is richly vascularized
    - Provides surface for granulation tissue formation
    - If exposed it will dessicate, & turn yellow and will not allow for granulation
  - If exposed, cortical bone must be kept moist or it will become necrotic
Identification of Tissue Types

- Cartilage
  - Connective tissue that covers and cushions the articular surface of bone at a joint.
  - Poor vascularity
Identification of Tissue Types

- Blood Vessels
  - Arteries
  - Arterioles
  - Capillaries
  - Venules
  - Veins

- Understanding Anatomy is crucial to avoid damage
Identification of Tissue Types

- **Tendon**
  - Strong, elastic, fibrous tissues
  - Attach muscles to bones
  - When exposed can be identified by manually moving the adjacent joint
  - Poor vascularity, become infected easily
  - Must be kept moist if exposed
  - Healthy tendons are shiny white and are covered with paratenon
  - Paratenon carry blood, should not be debrided if healthy as the tendon will become necrotic without it.
  - A necrotic tendon will not become viable again
  - Loss of function results from loss of tendon