Purpose

An application-level ontology representing wounds, wound types, causes, tissues affected, healing processes, contamination, infections, symptoms, treatments, prevention, complications, first-aid and related agents/tools. Designed to support clinical decision support, triage, educational apps, and wound-recording systems.

Taxonomy of Classes (space-indented structure — every class used in file)

Entity
    BiologicalEntity
    BiologicalTissue
    BodyPart
    Person
    CareProvider
        Doctor
        FirstAidProvider
        Nurse
    Complication
        Amputation
        Gangrene
        Hemorrhage
        Infection
        Necrosis
        NeveDamage
        OrganDamage
        Scar
    HealingProcess
        Hemostasis
        Inflammation
        InflammationPhase
        MaturationPhase
        Proliferation
        ProliferationPhase
        Remodeling
MedicalDevice
    Bandage
    DressingMaterial
    Suture
Treatment
    Antibiotic

Bandage
Debridement
Dressing
Glue
Irrigation
Medication
Packing
Reattachment
Staples
SurgicalTreatment
Sutures
TetanusShot
Wound
ClosedWound
Bruise
Contusion
Crushinjury
Hematoma
OpenWound
Abrasion
Avulsion
Laceration
Puncture
SurgicalWound

Object Properties

1) hasBodyPartInvolved

Domain: Wound
Range: BodyPart
Evidence: Text repeatedly says wounds affect skin, hand, arm, joints, bones, etc. (Body parts exist in ontology.)

(2) affectsTissue

Domain: Wound
Range: BiologicalTissue
Evidence: Text mentions wounds damaging skin, subcutaneous tissue, muscle, fat, bone, etc. (BiologicalTissue is in ontology.)

(3) treatedBy

Domain: Wound
Range: Treatment
Evidence: Text describes treatment with first aid, sutures, staples, medication, surgical treatment, dressings.

(4) dressedWith

Domain: Wound
Range: DressingMaterial
Evidence: Text mentions dressing, sterile dressing, bandage.

(5) closedBy

Domain: Wound
Range: Suture
Evidence: Text: stitches/sutures/staples close wounds.

(6) managedBy

Domain: Wound
Range: CareProvider
Evidence: Text mentions doctor, nurse, first-aid providers evaluating and treating wounds.

(7) mayLeadTo

Domain: Wound
Range: Complication
Evidence: Text lists complications: infection, hemorrhage, necrosis, scar.

(8) hasComplicationType

Domain: Complication
Range: Infection
Evidence: Infection is a subclass of Complication and is heavily discussed.

(9) healsThrough

Domain: Wound
Range: HealingProcess
Evidence: Text outlines Inflammation → Proliferation → Maturation sequence.

(10) causedBy

Domain: Wound
Range: BiologicalEntity (Person), External agency, accident, fall
But ontology ONLY includes "BiologicalEntity" as a superclass, so we maintain compatibility:
Range: BiologicalEntity
Evidence: Text: falls, accidents, twisting, sharp tools, blow from hammer, etc.

(11) inflictedByInstrument

Domain: OpenWound
 Range: MedicalDevice
 Evidence: Text: punctures by needles, scalpels; cuts with knives; bandages and tools appear in ontology.

(12) requiresCareBy

Domain: Treatment
 Range: CareProvider
 Evidence: Text: doctor/Nurse administer sutures, antibiotics, dressings.

Data Properties

- (1) hasBleedingDuration
- Domain: Wound
   Range: xsd:integer
   Evidence: Text mentions bleeding lasting minutes, stopping after 10–20 minutes.

- (2) hasDepth
- Domain: Wound
   Range: xsd:decimal
   Evidence: Text: wounds deeper than ½ inch; depth.

- (3) hasLength
- Domain: Wound
   Range: xsd:decimal
   Evidence: Laceration length measurement mentioned.

- (4) hasPainLevel
- Domain: Wound
   Range: xsd:string or xsd:int
   Evidence: Pain repeatedly described.

- (5) hasTemperature

- Domain: Person
  Range: xsd:decimal
  Evidence: Fever >100.4°F discussed.

Important Axioms / Constraints (non-trivial)

Axiom 1 — Disjointness of Open and Closed Wounds
 The categories of OpenWound and ClosedWound are mutually exclusive. This is based on the fundamental distinction in the text that an open wound involves a break in the protective body surface, exposing tissues to the exterior, while a closed wound does not. A single wound instance cannot be both exposed and unexposed to the external environment, making this disjointness a necessary constraint in the ontology.

Axiom 2 — Infection as a Complication
 The ontology formally defines every Infection as a type of Complication. This classification is directly supported by the text, which consistently lists infection as a major and hazardous complication that can arise from a wound, rather than as a primary injury or a type of treatment.

Axiom 3 — The Healing Process of Wounds
 The model asserts that every Wound is associated with at least one HealingProcess. This is derived from the text's detailed biological explanation, which states that the final healing of a wound is the result of a complex series of events, such as inflammation, proliferation, and maturation, that occur over time.

Axiom 4 — Surgical Wounds are Open Wounds
 A SurgicalWound is defined as a specific subclass of an OpenWound. This is logically sound because the text describes surgical wounds as cuts or incisions made by a scalpel, which by definition break the continuity of the skin, thereby fulfilling the core criterion of an open wound.

Axiom 5 — The Necessity of Treatment for Wounds
 The ontology posits that every Wound has the potential to require, and is therefore linked to, some form of Treatment. The text substantiates this by discussing treatment protocols for all wound categories, from minor first aid for abrasions to complex surgical interventions for severe lacerations or avulsions.

Axiom 6 — Wounds as a Cause of Complications
 The relationship is defined such that a Wound may lead to a Complication. This captures the causal pathway described in the text, where wounds, if not properly managed, can give rise to a range of adverse outcomes including hemorrhage, infection, necrosis, and scarring.

Queries:

Query (class expression)

Wound **and** LclosedBy **some** Treatment

[Execute] [Add to ontology]

Query results

Instances (1 of 1)

◆ **Lac1**

Query (class expression)

Wound **and** LtreatedBy **some** Treatment

[Execute] [Add to ontology]

Query results

Instances (4 of 4)

◆ **Cl1**
◆ **Lac1**
◆ **Lac2**
◆ **gan1**

Query (class expression)

Wound **and** LhasComplicationType **some** (Complication **and** LhealsThrough **some** HealingProcess)

[Execute] [Add to ontology]

Query results

Instances (1 of 1)

◆ CI1