Project definition: Design of a simulated broken leg including broken femur in the thigh and broken tibia and fibula in the leg.

Problem definition: This model would be used to teach trauma resuscitation. The model would contain simulated bone and silicone muscles with overlying skin. There would be a simulated knee that operates as a hinge for flexion and extension of the leg on the thigh. Overall, from the outside the leg would look like Figure 1 below.

Figure 1 Outside appearance of broken leg

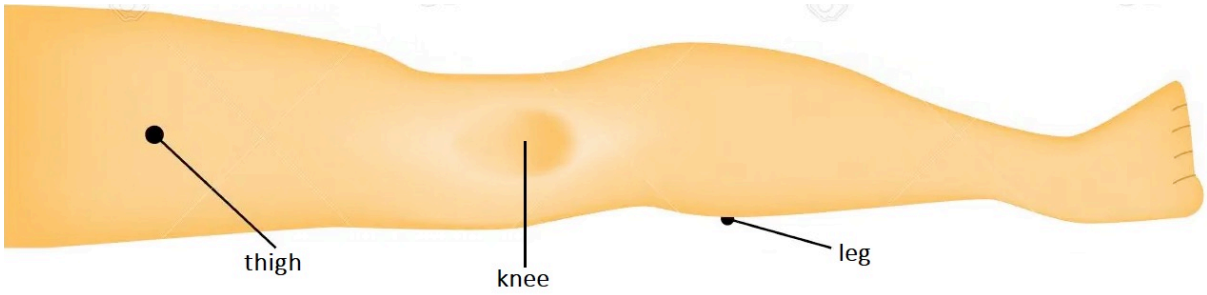
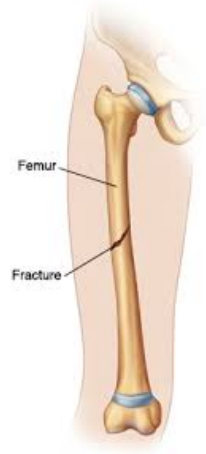
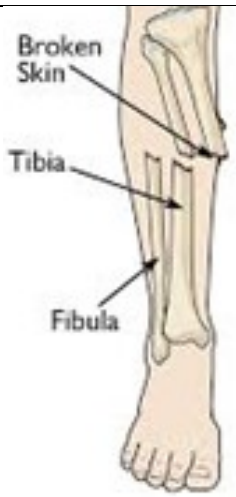
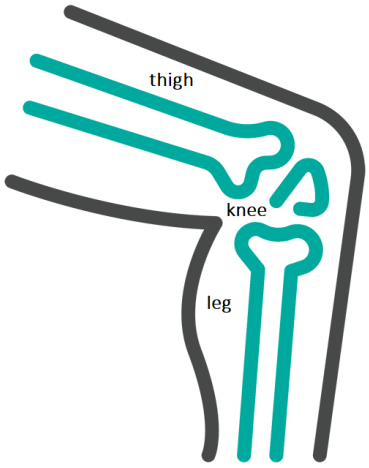


Figure 2 Fractured femur in thigh	Figure 3 Fractured tibia and femur in leg	Figure 4 hinge movement at knee
		

Existing solutions:

There are sophisticated and expensive fracture reduction training models on the market, such as the one for the wrist fractures – Colles fracture[1]. The model for the broken leg does not require anatomical detail of muscles or bone - only the mechanism to pull broken "bones" away from each other (distraction) to restore the normal position[2] – reduction of a fracture.

Main customer demands:

1. Inside: broken "bones" – femur, tibia, femur

2. Inside: silicone muscles – with no anatomical detail. Silicone is heavy. Modifications may be needed to reduce the weight of the leg

3. Overlying silicone skin

4. A hinge that allows for moderate flexion and extension of the leg

5. A silicone foot

Bibliography:

1. Colles fracture reduction training model https://www.youtube.com/watch?v=ZtjlsPVUwsA

2. Closed reduction of fracture https://www.youtube.com/watch?v=cy6f7he2e4w