REALISTIC CANINE BITE SLEEVE
Macon Adams, Shanny Holder, Hilary Walker
April 23rd, 2014

Motivation

Project Definition: The dangerous situation of a canine mis-fire that occurs during military training poses a threat to canine and soldier safety. We are seeking to ultimately improve this situation by creating a bite sleeve that is more realistic to human skin.

Problems:
- Mis-bite on trainers
- Negative safety on the canine as well as the trainer the canine supports

1. Define:
- Material that mimics human skin
- The different material layers of the human arm to mimic human bone and muscle

2. Determine:
- The most suitable design of the bite sleeve
- Methods of improved functionality and the safety of the dog and the handler

3. Create:
- An improved canine bite sleeve that mimics human skin in the following mechanical properties:
  - Shear strength
  - Puncture resistance
  - Plasticity
  - Tensile strength

The sleeve should also optimally protect the canine’s health and trainer’s health from skin punctures, tears and severe bruises.

Current Technology Use of US Army Canine Training (2014)

Most similar to human arm
- Most similar to human arm
- Synthetic materials
- Use of skin

Testing Results

Most similar to human arm
- Medical grade silicone
- Non-toxic and chemically cohesive

Conclusion & Future Work

Final Design

| Left side view of realistic canine bite sleeve | Sleeve covered in Origins medical grade silicone |

CRITERIA

- Safety
  - Chemically cohesive and non-toxic materials
  - No tearing or severe bruising of human skin
- Materials
  - Accuracy of tensile strength, puncture resistance, plasticity, and shear strengths of a human arm
  - Compressibility

Functionality
- Ability to rotate
- Completely encase the arm
- Fabric fitting and sensitive to fit many arm sizes

Conclusions and Future Direction

- Results indicate that the Kevlar, ballistic gel, and polymer foam utilized in the realistic canine bite sleeve exhibited comparable properties to the human arm as well as offered optimum protection for the trainer as well as the canine.

- However, there was no exact method to determine the biting sensation for the canine. Therefore additional testing must be done to compare the properties of the human arm to that of the realistic canine bite sleeve.

- These finding also suggest that an addition which could be investigated would be the use of a blood like additive to increase the realism of the canine bite sleeve and increase the canines desire to attack.

- There should be another iteration or construction of "X" number of sleeves

Sponsorship & Acknowledgements

North Carolina State University College of Textiles
Sponsors: US Army Research Office
Materials Science and Engineering Senior Design Team
Senior Design Faculty Mentors: Drs. Russell Gorga, Dr. Jesse Aur & Jon Rust
Assistant Supervisors: Swapnil Lendig and Dong Nyugen
Men’s Wear Shop

TE/TT Senior Design 2013-2014