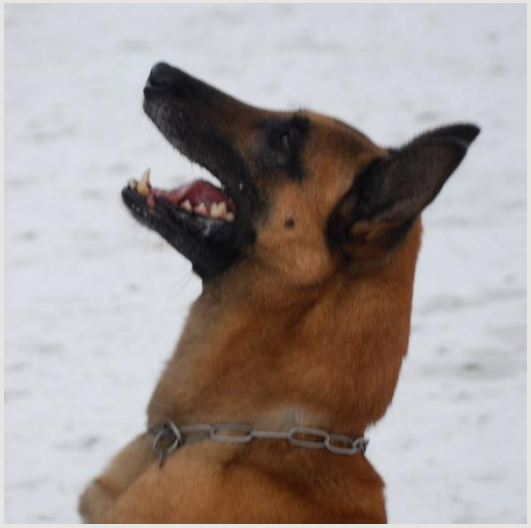
Comparison of stress and learning effects of three different training methods in dogs



E. Schalke, Y. Salgirli,
I. Böhm, S. Ott,
H. Hackbarth

Institute of Animal Welfare and behavior
University of Veterinary Medicine Hanover

Introduction

- Application of aversive stimuli in training is a highly controversial issue
- Particularly the application of electronic training collars
- Court decision in 2006: the use of e-collars is prohibited in Germany

Introduction

- In the last three years in police dog training a debate has emerged
  - Is training without using electronic training collars indeed less stressful for dogs?
  - Particular concern: comparison with the use of pinch collars

Introduction

- In the last three years in police dog training a debate has emerged
  - Are alternative trainings methods as effective, and do they interrupt unwanted behaviors as reliably?
  - Particular concern: comparison with the use of a quitting signal

Introduction

- There are some studies concerning effects of e-collars in the area of dog training (Christiansen *et al.* 2001, Schilder & van der Borg 2004, Schalke *et al.* 2007)
- Studies comparing other training methods with E-collars are non-existent to our knowledge

Aim

- Comparing stress and learning effects of three different forms of punishment in police dog training
  - Two forms of positive punishment (e-collar and pinch collar)
  - One form of negative punishment (conditioned quitting signal)

Aim

- Our interest:

  Finding the most effective and least stressful method for dogs in training situations with high levels of arousal and motivation

Subjects

- 42 Belgian Shepherds (Malinois)
- 33 males and 9 females
- Varying ages (3-10 years old)
- Police dogs from two different police departments
- 22 from North Rhine-Westphalia (M) and 20 from Lower Saxony (H)

Test Persons

- Two researchers were present during the entire experiment
  - One researcher gave all important instructions to the dog handlers and observed the learning effect
  - One researcher filmed the experiment

Test Persons

- Two experienced police dog trainers took part in the study as helpers for the protection work
- They were also responsible for the administration of the electric impulse
- Each helper was responsible for one group during the entire experiment

Training Aids

- Dogtra 600 NCP/2® electronic training collar
- Klickstachelhalsung® pinch collar
- A standard normal collar
- 5 m long leash

Experimental Procedure

- Adaptation training phase
  - Accustoming to the e-collar and the procedure to get saliva
  - Conditioning the quitting signal
    - The training was completed when the dog withdrew itself from its favourite toy immediately after the signal

Experimental Procedure

- Main experiment
  - Three test days for each dog
  - Time interval between test days was one week
  - Within subject design (all three methods were tested and compared on each dog)

Experimental Procedure

- Main experiment
  - Dogs were divided into subgroups using a randomized cross-over design as regards the order of administering the training method

Experimental Procedure

- Main experiment
  - Main test consisted of an obedience session lasting two minutes (80 seconds work and 40 seconds play)
  - After two minutes dog was taken into “heel position”
  - The helper with the protection sleeve provoked the dog to do a mistake

Experimental Procedure

- Main experiment
  - Dogs received punishment according to their group
  - A maximum of three test sessions were conducted per day for each dog to assess the learning effect

Data Collection

- Measurement
  - Saliva cortisol and behavioral observation
- Saliva cortisol
  - Secretion of saliva was stimulated with citric acid

  (Vincent & Michell 1992; Beerda *et al.* 1998)

Data Collection

- Saliva cortisol
  - Samples taken from the dog's cheek pouches with a cotton bud (Salivette®)
  - Evaluation took place at the laboratory of the Institute of Pharmacology and Toxicology, University of Veterinary Medicine of Hanover, with enzyme-linked immuno-sorbent assay (ELISA) kits (IBL®)

Data Collection

- Behavioral Observation
  - The entire experiment was filmed (SONY DRC DVD 110E®)
  - Evaluation of the body language by using a special developed ethogram (Feddersen-Petersen & Ohl 1995, Beerda *et al.* 1997, Schilder & van der Borg 2004)

Data Collection

- Behavioral observation
  - Direct behavioral reaction after punishment (one-zero sampling)
  - Entire obedience session
    - Sampling method: focal animal sampling
    - Recording method: instantaneous sampling
    - Session was divided into 8 second intervals

Statistical Analysis

- Performed with SPSS 16.0 Inc. Software
- Kruskal-Wallis:
  - Learning effect between groups and subgroups
  - Body posture between groups
- Paired sample t-test
  - Learning effect between training methods
  - Saliva cortisol between training methods
- Frequency analyses
  - To determine the general body position
  - To detect the direct behavioral effect

Learning Effect

- Electronic training collar
  - 39 of 42 dogs stopped the unwanted behavior = 92,9%
- Pinch collar
  - 32 of 42 dogs stopped the unwanted behavior = 76,2%
- Quitting signal
  - 4 of 42 dogs stopped the unwanted behavior = 7,1%

Learning Effect

- Comparing the learning effect a significant difference was found:
  - E-collar versus quitting signal (paired t-test, $p < 0,01$*)
  - Pinch-collar versus quitting signal (paired t-test, $p < 0,01$*)

Learning Effect

- Comparison of the groups:
  - E-collars: no significant difference between the groups
  - Pinch collar: Group M showed a tendency for a higher learning effect than H (Kruskal-Wallis, p=0,109)
  - Quitting signal: Group H showed a significant higher learning effect (Kruskal-Wallis, p<0,005*)
  - Subgroups: no significant difference

Body Posture

- Particularly submissive behavior was of interest
  - Two submissive behavioral elements
- Obedience session:
  - 3 of 22 dogs of group M showed submissive behavior
  - 8 of 20 dogs of group H showed submissive behavior

Body Posture

- Direct behavioral reactions
  - No significant difference was found (group and subgroup)
- Single behavioral elements:
  - Maximum backward ear position
    - Mostly shown in pinch collar correction (tendency towards significance)

Body Posture

- Single behavioral elements:
  - Lowering of tail
    - Mostly shown in group H (significant difference, $p<0,05$*)
  - Extreme lowering of body posture
    - Mostly shown in pinch collar correction
  - Vocalisation
    - Mostly shown in e-collar correction (significant difference, $p<0,01$*)

Saliva Cortisol

- Basic value
  - Higher than when using the e-collar (p=0,0065*)
  - Higher than when using the pinch collar (p=0,0004*)

Saliva Cortisol

- Training method
  - No significant differences between the methods except for the quitting signal
  - Cortisol level was significantly higher when using the quitting signal than when using the pinch collar or e-collar ($p<0,01$*)

Materials and Methods

- To avoid variability
  - One breed
  - Two groups
  - Similar training situation
  - Always the same helper
  - Standardised procedure

Results

- Learning effect
  - The greatest effect was found for the e-collar, followed by the pinch collar
  - No sufficient learning effect in the quitting signal (negative punishment)

  -> Timing and Intensity

Results

- Body posture
  - The most submissive elements were shown when using the pinch collar (ear and body posture)

  -> Association with the dog handler

  - Vocalisations were shown when using e-collars only

  -> Startle response (Broom & Johnson 1993)

Results

- Body posture
  - Comparison of the groups:
    - Dogs in group H held the tail in lower position more often

    --> Way of training

Results

- Saliva cortisol
  - Basic values were higher than values when using the e-collar or the pinch collar

  -> The handler was not allowed to give information to the dog except for the “heel signal”

  -> Uncertainty

Results

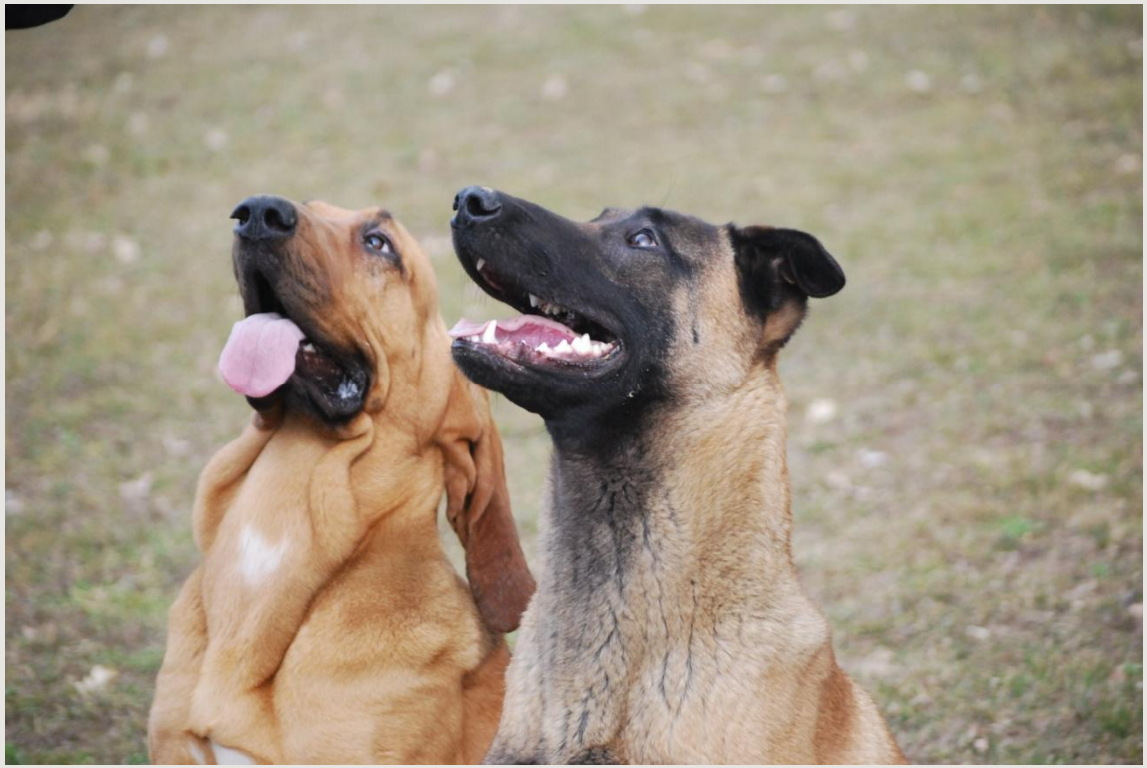
- Saliva cortisol
  - Values when using the quitting signal were higher than values when using the e-collar or the pinch collar
  - -> Intensity cannot be varied
  - -> Frustration is a high stressor for Malinois

Conclusion

- In this study the e-collar induced the highest learning effect and least stress
- Physical stressors could be more intense stressors for the Malinois
- The experience and way of training has a big influence

Conclusion

- We need more research about the administration of punishment
- Particularly the reaction of other breeds concerning this study needs to be examined



THANK YOU FOR YOUR ATTENTION!