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

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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®)
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-collars (*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!

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