

EFFECT OF EXTRACORPOREAL SHOCK WAVE THERAPY ON ELBOW OSTEOARTHRITIS IN DOGS

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Introduction

- Osteoarthritis (OA) is a progressive degenerative process of synovial joints and management is multifaceted
- New modalities to manage OA are regularly promoted, but there is little objective evidence of efficacy
- Extracorporeal shock wave therapy (ESWT) has been used to treat selected musculoskeletal disorders in humans and animals, including OA

Purpose and Hypothesis

- The purpose of the study reported here was to evaluate the efficacy of ESWT in the management of canine elbow OA
- We hypothesized that ESWT would have a positive effect on ground reaction forces and clinical parameters of lameness

Materials and Methods

- 15 skeletally mature dogs with elbow OA, confirmed radiographically, were evaluated
- Diet, exercise, and other treatments were maintained the same throughout the study
- Dogs were randomly assigned to a treated or sham treatment group, in a modified crossover design in which sham treated dogs were allowed to enter the treatment group at the end of the sham period
- Evaluations included subjective gait evaluations at a trot and walk; comfortable range of motion measurements; and determination of ground reaction forces at a trot
- Two baseline analyses were obtained to be certain that the degree of lameness was stable
- If both elbows were arthritic, only the more affected limb was selected for treatment
- ESWT (VersaTron 4Paws, Pulse Veterinary Technologies, LLC, Alpharetta, GA) treatments were administered on days 0 and 14 under sedation
- Joints received 240 pulses/min for a total of 500 pulses using a 5 mm focused probe, with the pulses divided and applied equally to the proximomedial, distomedial, proximolateral, and distolateral joint capsule insertion points
- The energy flux density was 0.13mJ/mm² (E3 level)
- All dogs were evaluated on days 0, 14, and 28
- Data were evaluated using ANOVA with treatment and time as factors
- Significance was set at P<0.05



Results

- Dogs generally tolerated treatment well
- There were mild improvements in outcome parameters in dogs receiving treatment
- ESWT resulted in a 4.5% increase in peak vertical force (79.4±3.21 to 82.8±3.8, as a percent body weight) compared with a decrease of 2.6% (82.7±5.7 to 79.3±3.7, as a percent body weight) in sham treated dogs (P<0.01) (Figs 1 and 2)
- Similar changes were found in vertical impulse (Fig 3)
- Peak braking (Y_{APeak}) and peak propulsion (Y_{BPeak}) were also significantly improved after ESWT (P<0.01) (Figs 4 and 5)
- Mean lameness scores improved marginally at the walk with ESWT (1.9±0.3 to 1.5±0.3) versus no change with sham treatment (1.9±0.3 to 1.9±0.5)(P<0.01)(Fig 6), and remained mainly unchanged at the trot
- Comfortable ROM remained approximately the same in both groups of dogs (P>0.05)

Fig 1. Peak Vertical Force

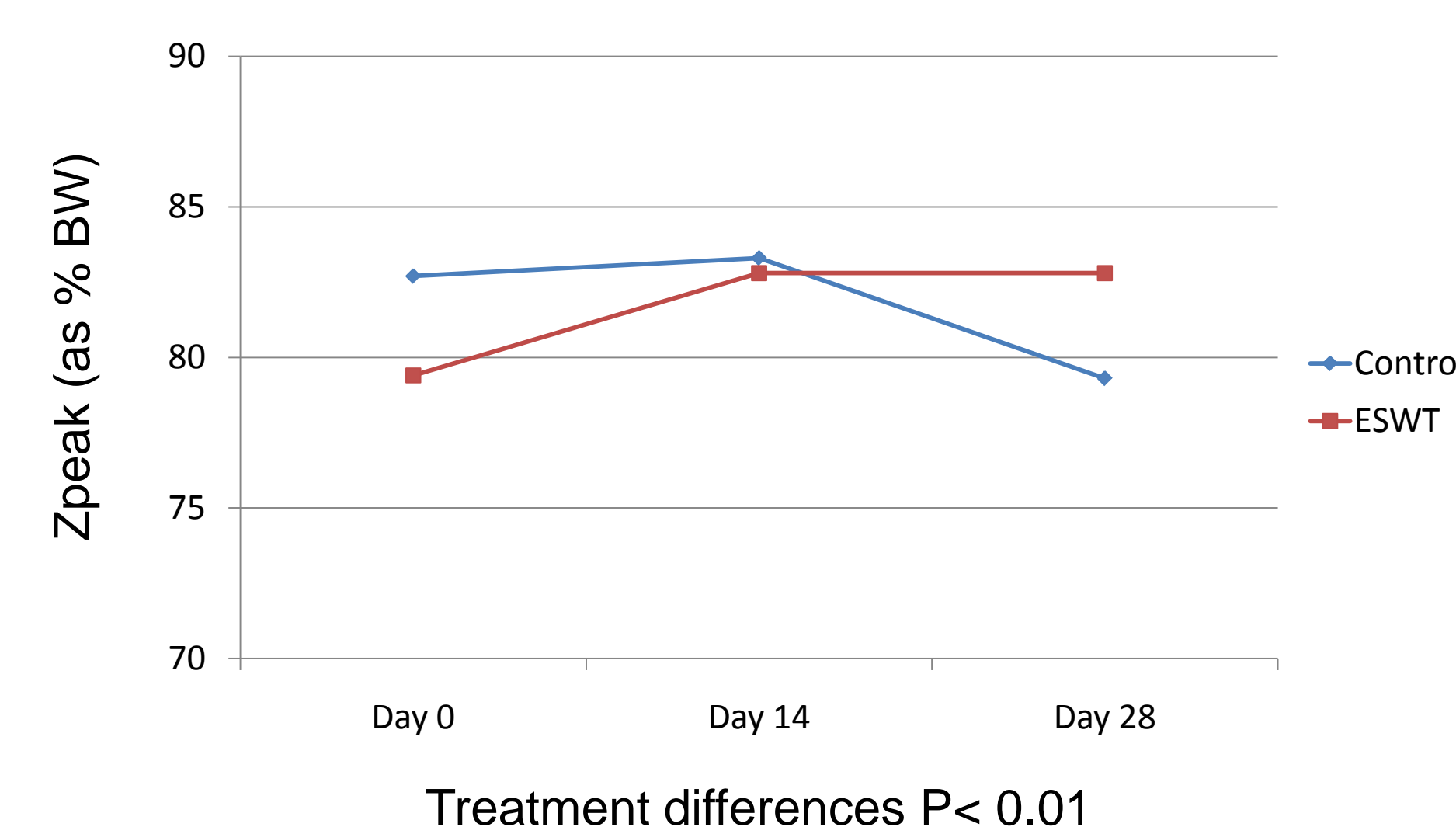


Fig 2. Percent Change in Peak Vertical Force

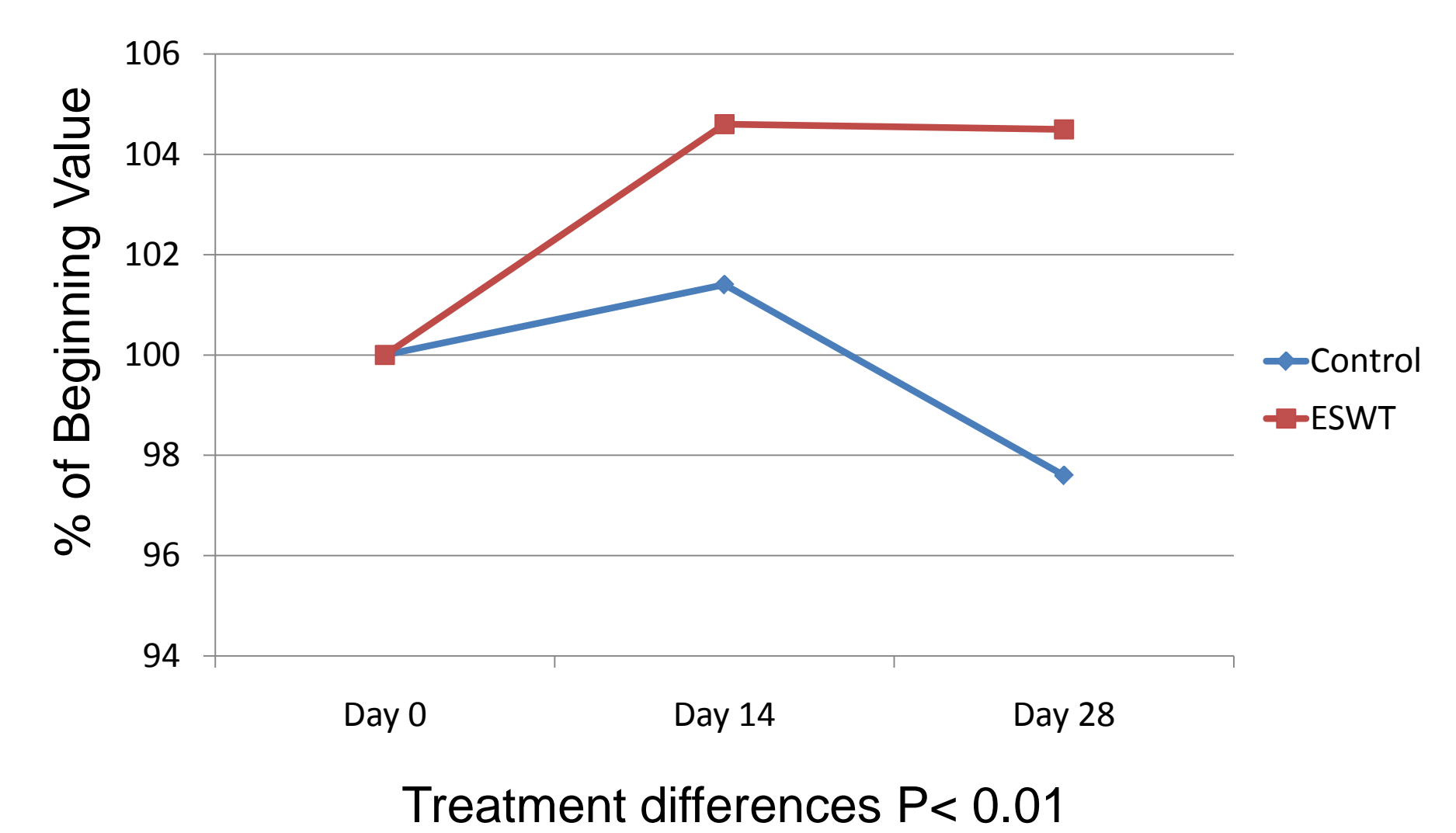


Fig 3. Vertical Impulse

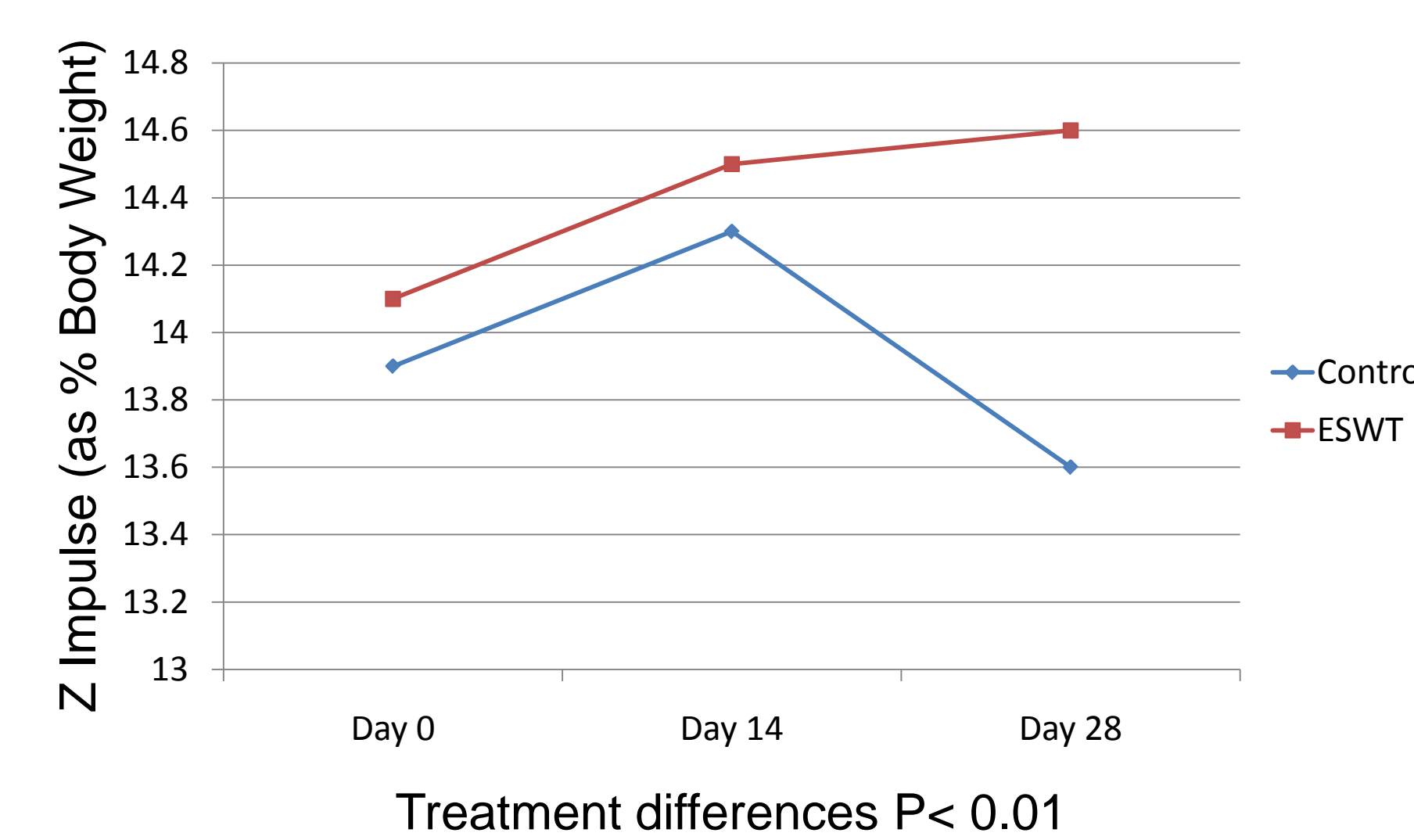


Fig 4. Peak Braking Force

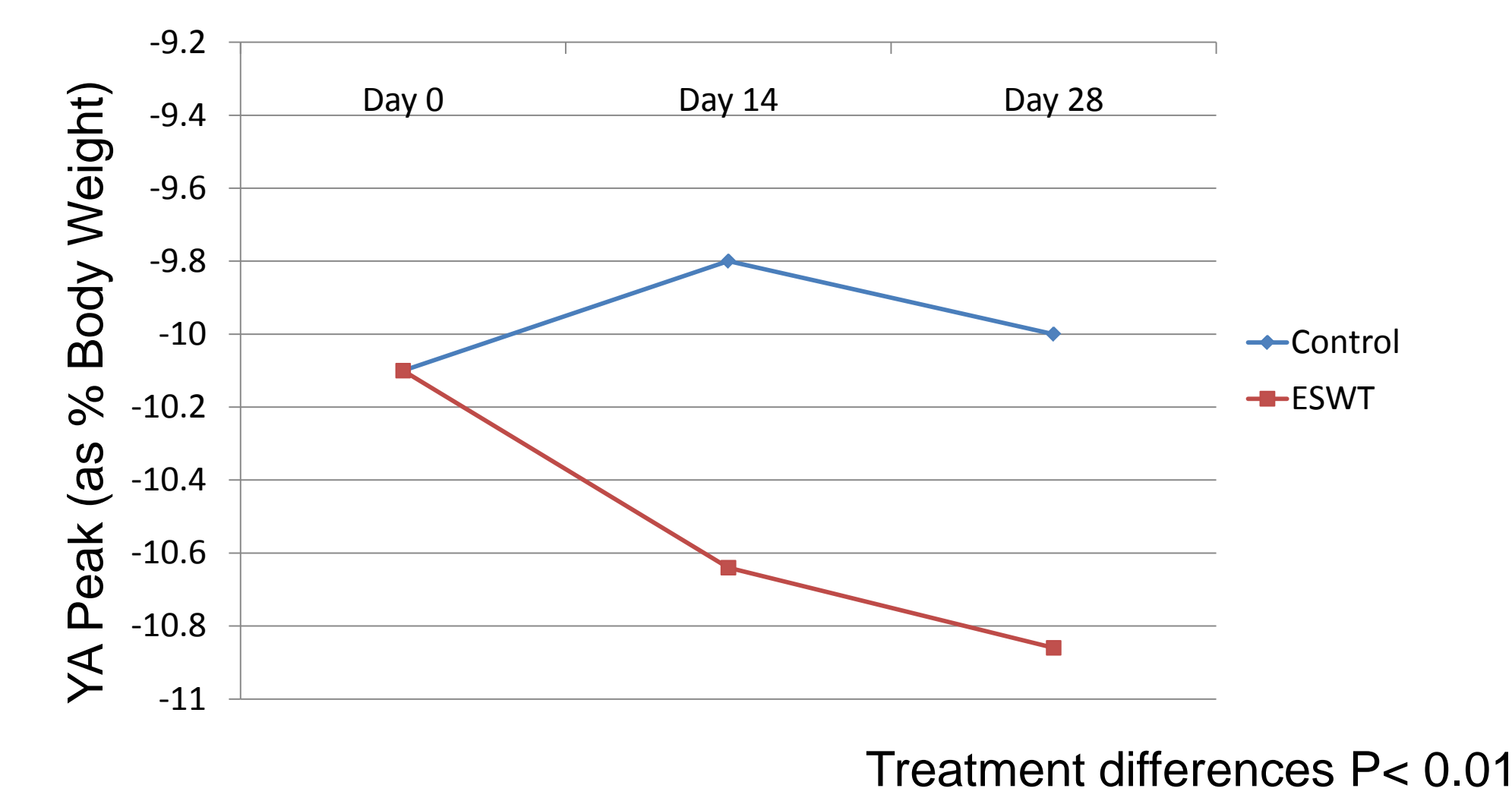


Fig 5. Peak Propulsive Force

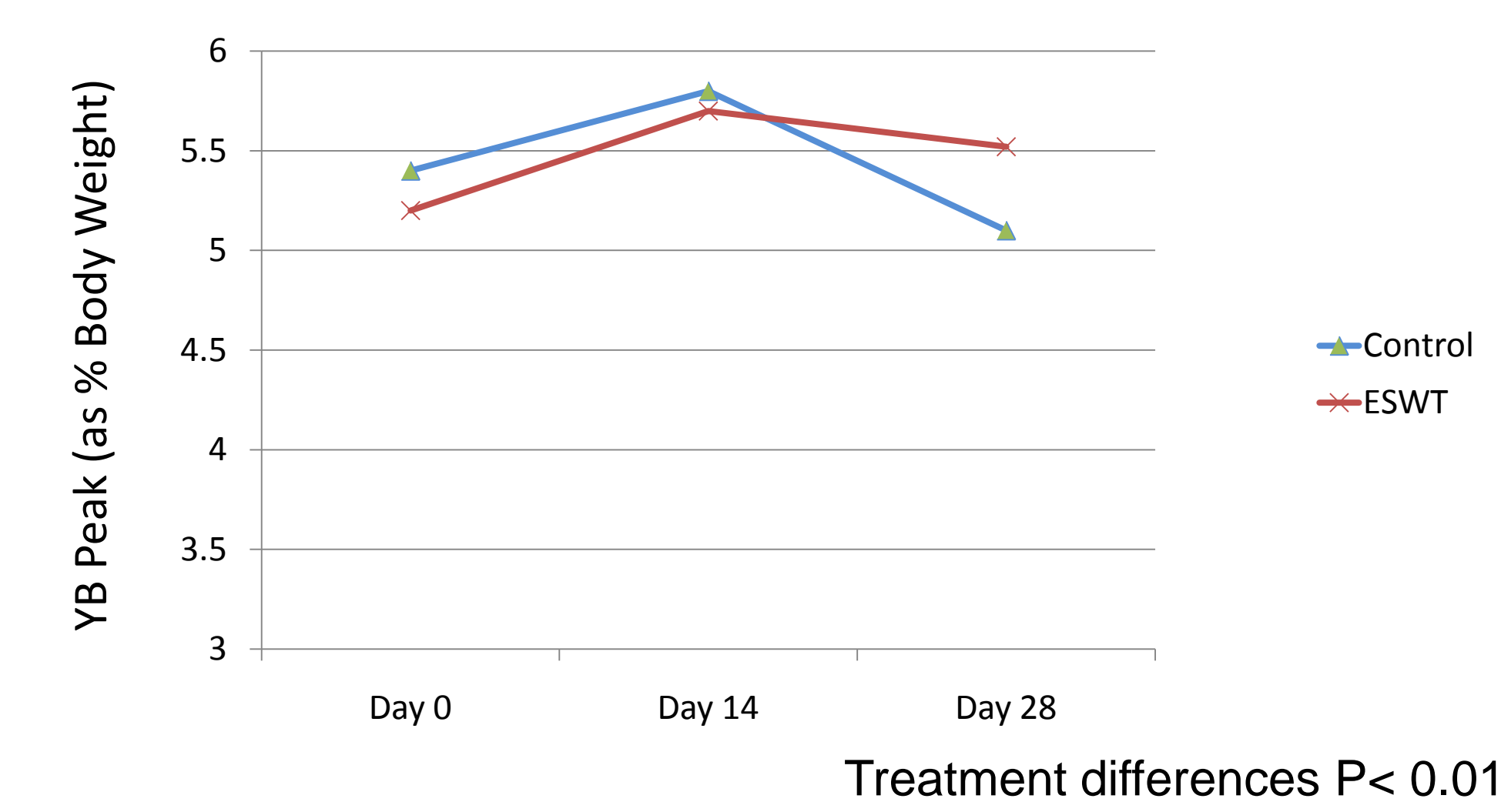
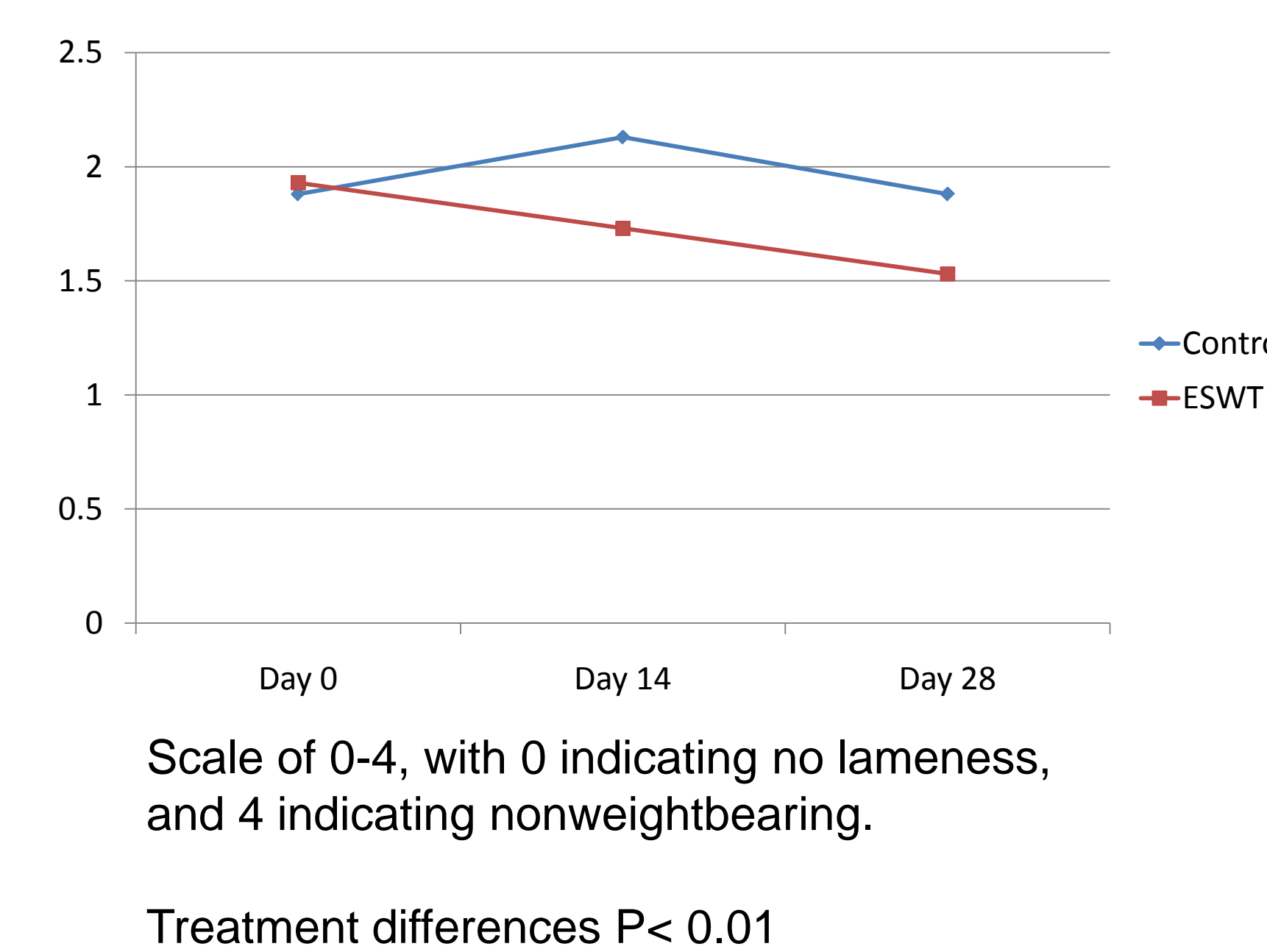


Fig 6. Lameness Score at a Walk



Discussion

- ESWT is a relatively new modality in small animal practice to treat OA
- Elbow OA is particularly challenging to manage, and the cases in this series were moderately lame with end-stage OA, with most dogs already receiving standard therapy
- The magnitude of improvement in mean peak vertical, peak braking, peak propulsive forces, and lameness scores in this study are similar to what might be expected with NSAIDs or other treatments
- In addition to group means, note should also be made of the percent of dogs that have a positive response to treatment
- More dogs had a favorable response to ESWT treatment as compared with sham treatment (Table 1), and the increase in weightbearing was approximately 10% (Fig 7)
- Furthermore, dogs receiving sham treatment first followed by ESWT consistently improved after ESWT, with the exception of 1 dog (Fig 8)

Table 1. Peak Vertical Force Responders vs Nonresponders

	Day 14	Day 28
Control Responders	2/8	3/8
Control Nonresponders	6/8	5/8
ESWT Responders	8/15	9/15
ESWT Nonresponders	7/15	6/15

Responders had > 5% increase in Peak Vertical Force

Fig 7. Percent Change in Peak Vertical Force of Responders

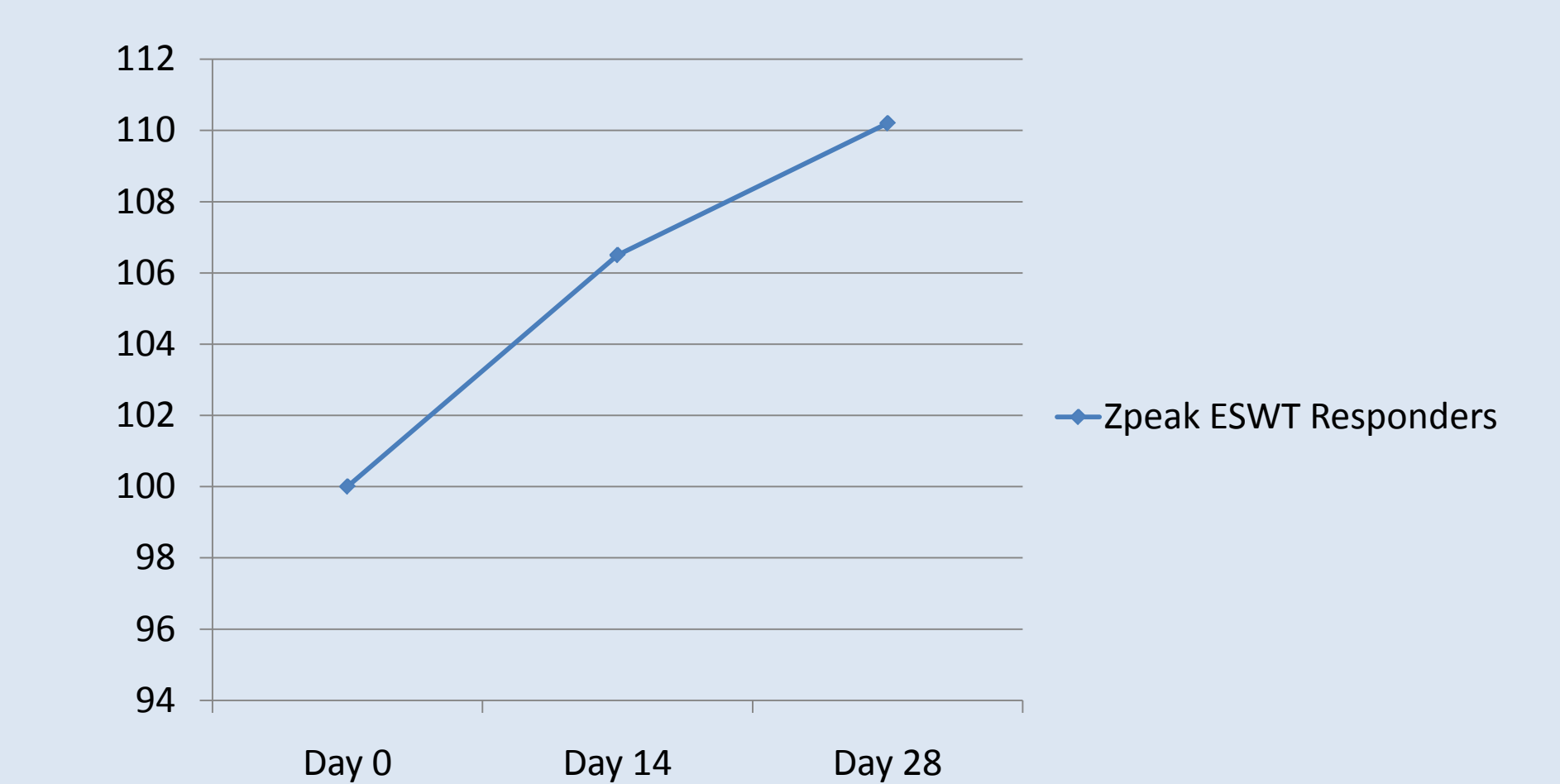
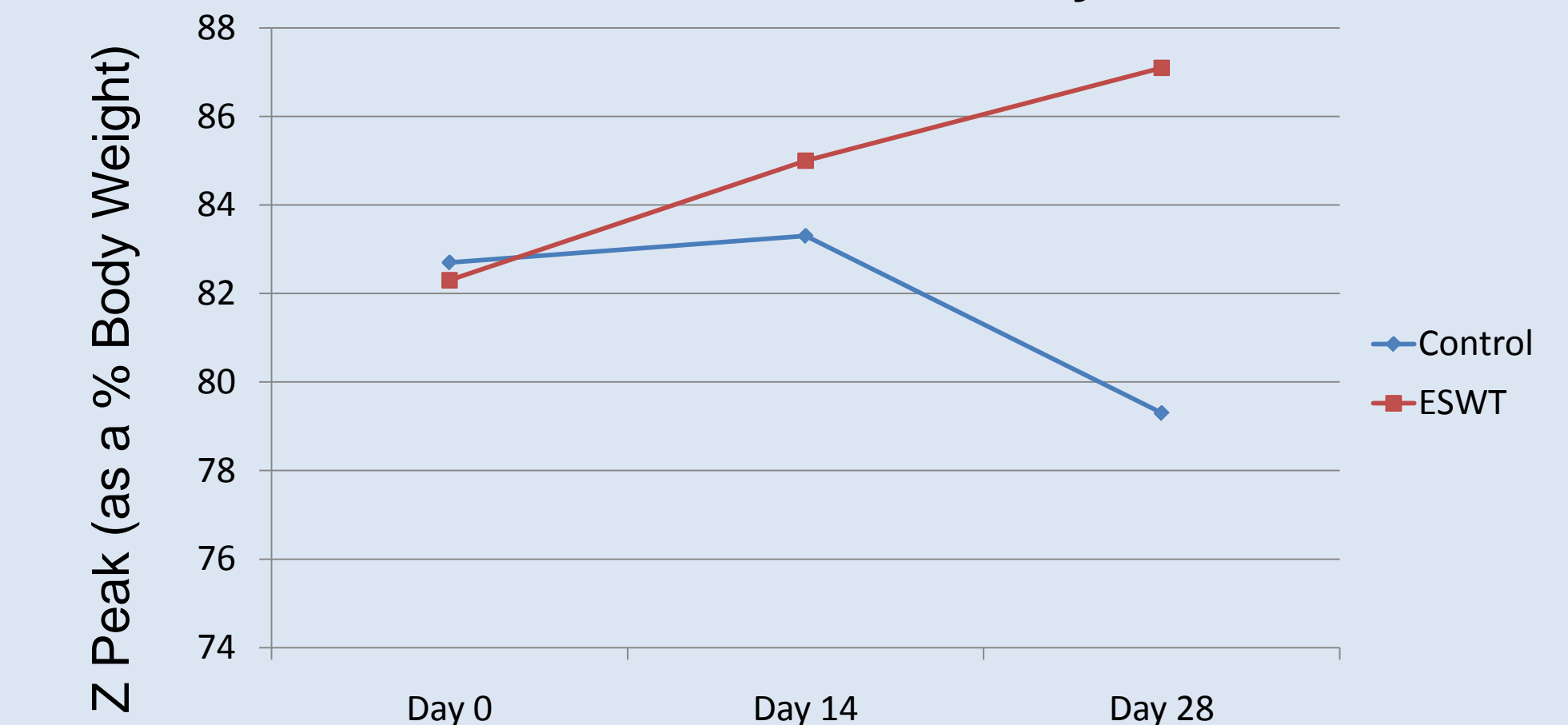


Fig 8. Peak Vertical Force of Dogs Receiving Sham Treatment Followed by ESWT



Conclusion

ESWT appears to be an efficacious addition to the multimodal approach to OA of the elbow