

A sodium hypochlorite/salicylic acid shampoo is effective in resolving canine superficial pyoderma, including those infections caused by meticillin-resistant staphylococcal strains, in a prospective open-label pilot study

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Abstract: Emergence of meticillin-resistance in canine staphylococcal isolates has inspired increased interest in topical therapy for treatment and control of pyoderma. Chlorhexidine shampoos followed by dilute bleach rinses are often recommended, but household bleach can dry the skin and is unpleasant to use. A shampoo formulated with sodium hypochlorite and salicylic acid was evaluated as sole therapy on client-owned dogs with generalized superficial pyoderma cultured positive for *Staphylococcus pseudintermedius*, including meticillin-resistant strains (MRSP). This prospective, open-label pilot study examined efficacy of the shampoo when used three times weekly for 4 weeks for the treatment of canine superficial pyoderma. Seventeen of nineteen dogs completed the study. Bacterial counts assessed cytologically were significantly decreased at 2 (0.59 +/- 0.51, $P < 0.0001$) and 4 weeks (0.18 +/- 0.39, $P < 0.0001$), compared to baseline (2.59 +/- 0.94). At week 2, 5/17 dogs had negative cytologies; at week 4, 14/17 had negative cytologies. Clinical severity scores decreased from 10.95 (+/- 2.92) at baseline to 5.8 (+/- 2.7, $P < 0.01$) and 3.65 (+/- 1.85, $P < 0.01$) at weeks 2 and 4, respectively. Client assessment scores decreased significantly from 12 to 7.3 (2 weeks, $P < 0.004$) to 6.2 (4 weeks, $P < 0.004$). Clients reported excellent lathering and dispersion, reduced malodor, and brightening of white and light coats. No owners reported skin dryness or other adverse events. This shampoo containing sodium hypochlorite in a non-drying vehicle is an effective aid in the treatment for canine superficial pyoderma.

Source of funding: TopVET Dermacare provided shampoo (currently licensed to Vetrimax[®] _as Command[™]), and generated the client questionnaire.

Conflict of interest: None declared.

Introduction:

- 1.Methicillin-resistant, multi-drug resistant staphylococcal infections are becoming more common in dogs.
- 2.Often topical therapy is the best choice.
- 3.Dilute bleach rinses are recommended but we lack data on optimal dilution.
- 4.A human gel wash containing 0.0061% sodium hypochlorite was found effective in treating *S. aureus* infections in atopic children.
- 5.A shampoo containing sodium hypochlorite and salicylic acid was developed for dogs.
- 6.The purpose of this study was to evaluate its use as sole treatment for superficial pyoderma in dogs, including those caused by methicillin-resistant staphylococcal strains.

Materials and methods:

- 1.The shampoo contains the antimicrobial agent sodium hypochlorite, the keratolytic agent salicylic acid, and a proprietary mix of surfactants, moisturizers, and conditioners.
- 2.Patients selected based on positive culture for methicillin resistant *S. pseudintermedius* or failure to respond to 2 different classes antibiotics; these dogs were subsequently cultured. Seventeen/nineteen completed the study (see Table 1)
- 3.Owners were asked to bathe their dogs for 5 minutes 3x weekly for one month.
- 4.Rechecks performed at 2 and 4 wks.
- 5.Photographs, cytology, clinical severity score, and owner assessment (see Table 2) completed at all visits.

Table 2: Demographics and culture results of patients enrolled in the study

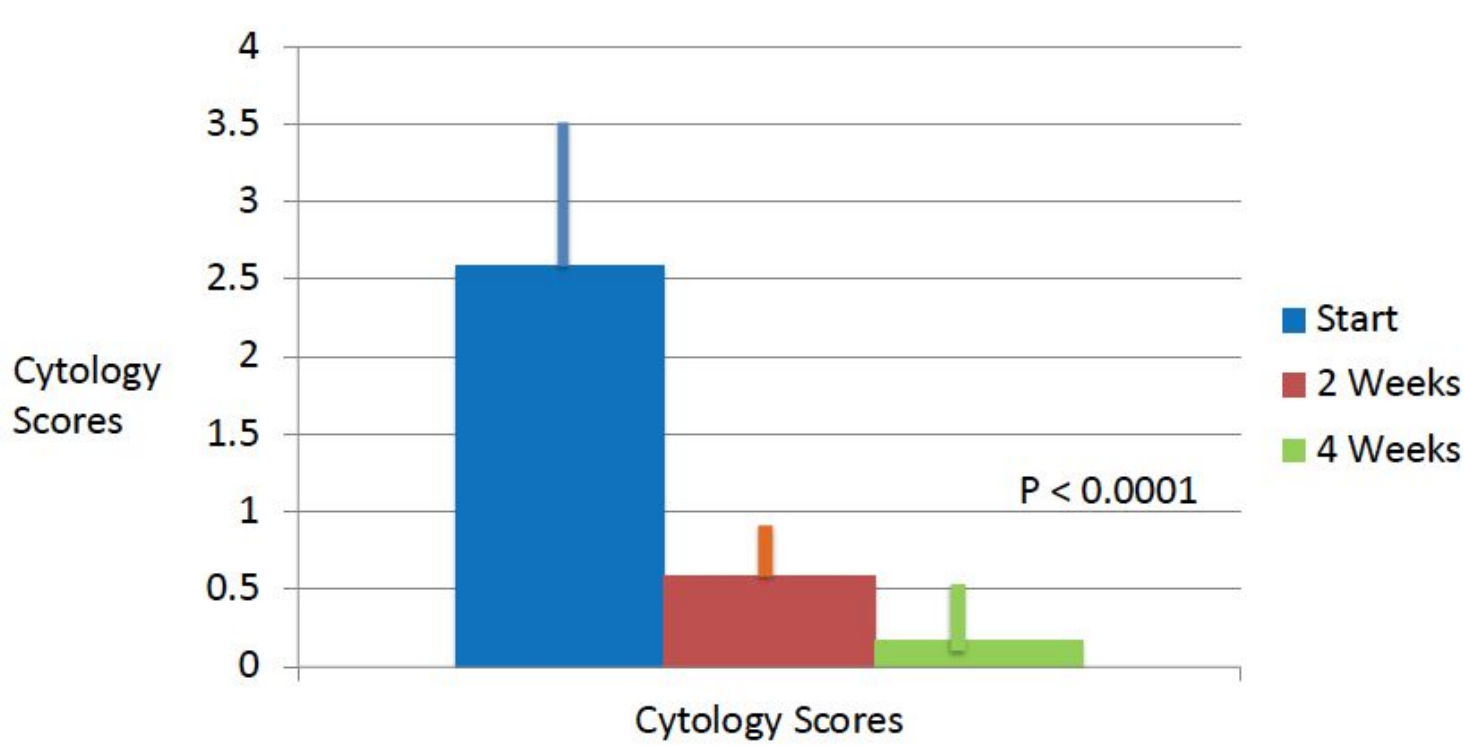
Breed	Sex	Age (yrs)	Atopic (yes/no)	Culture Results
Golden retriever	MN	6	Yes	MRSP
French bulldog	MN	3	Yes	MRSP
West Highland White Terrier	FS	4	Yes	MRSP
Viszla	MN	5	Yes	MSSP
West Highland White Terrier	MN	12	Yes	MRSP
Golden Retriever	MN	4	Yes	MRSP
Dogo Argentino	FS	5	Yes	MRSP
Boxer	FS	2	Yes	MRSP
Labrador Mix	MN	5	Yes	MRSP
Poodle (dropped out)	FS	9	No	MRSP
Cavalier King Charles Spaniel	FS	3	No	MRSP
Doberman Pinscher	FS	7	Yes	MRSP
French Bulldog	MN	2	Yes	MRSP
American Cocker Spaniel		5	Yes	MRSP
Shih Tzu	FS	3	No	MRSP
Maltese	MN	8	Yes	MRSP
Boston (dropped out)	MN	2	Yes	MSSP
German Shepherd	M	3	Yes	MRSP
Welsh Springer Spaniel	MN	7	Yes	MRSP

•17/19 dogs completed the study
•2 dogs dropped out; one with methicillin-resistant *S. pseudintermedius* (MRSP), one with methicillin-sensitive *S. pseudintermedius* MSSP

TABLE 1. These questions relate to the impact of your pet's skin disease on your quality of life over the last two weeks. Please read the questions and check one box for each.

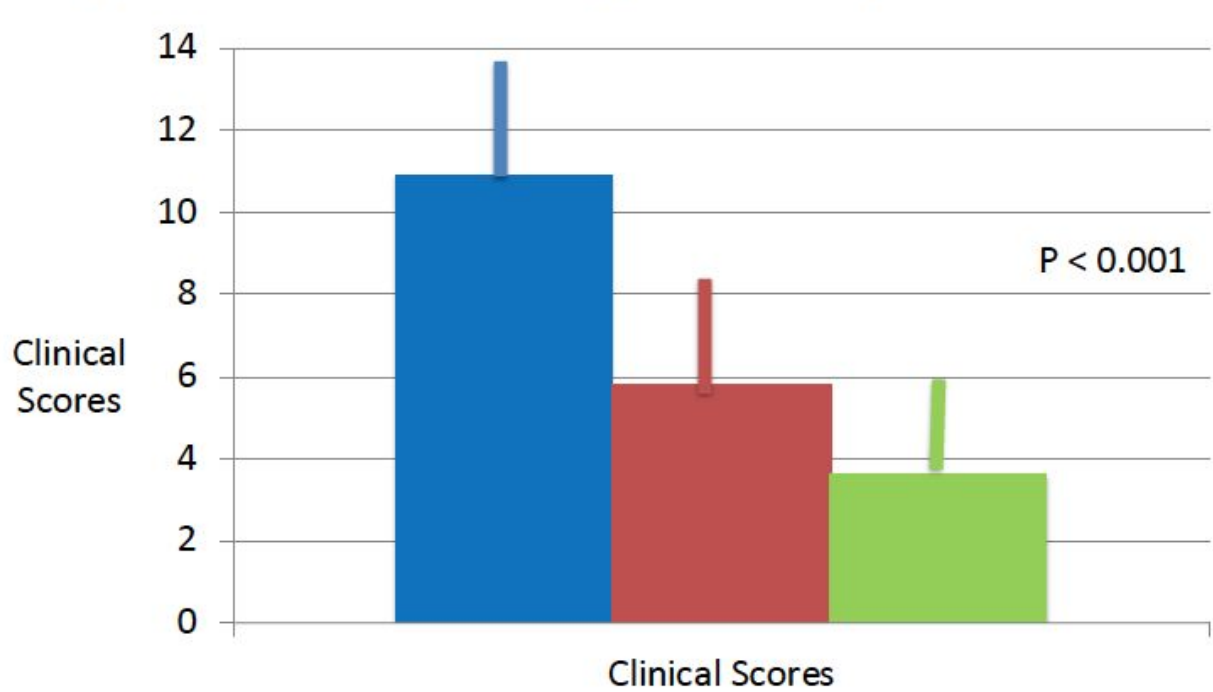
1. Over the last two weeks, how red are the lesions or bumps on your pet's skin?
☐ (0) There are no lesions on my pet's skin
☐ (1) The lesions on my pet's skin are mildly red
☐ (2) The lesions on my pet's skin are moderately red
☐ (3) The lesions on my pet's skin are severely red
2. Over the last two weeks, how bad is your pet's odor?
☐ (0) My pet does not have a bad odor
☐ (1) My pet has a mildly bad odor, but it is not very noticeable
☐ (2) My pet has a moderately bad odor that is noticeable
☐ (3) My pet has a severely bad odor that is very noticeable
3. Over the last two weeks, how bad is your pet's itch and discomfort?
☐ (0) My pet is not itchy
☐ (1) My pet is somewhat itchy and uncomfortable
☐ (2) My pet spends a noticeable amount of time licking or scratching
☐ (3) My pet will stop eating or playing to scratch and lick
4. Over the last two weeks, how much emotional distress (worry, embarrassment, frustration) have you experienced due to your pet's skin problems?
☐ (0) None at all
☐ (1) A little
☐ (2) Quite a lot
☐ (3) Very much
5. Over the last two weeks, how much physical distress (tiredness, exhaustion, sleep disturbance) have you experienced due to your pet's skin problems?
☐ (0) None at all
☐ (1) A little
☐ (2) Quite a lot
☐ (3) Very much
6. Over the last two weeks, how much time have you spent (putting on creams, washing, giving medicines) have you spent due to your pet's skin problems?
☐ (0) None at all
☐ (1) A little, about one hour a week
☐ (2) Quite a lot, about 2-4 hours a week
☐ (3) Very much, more than 4 hours a week
7. Over the last two weeks, how much household expense (travel costs, buying special products) have you spent due to your pet's skin problems?
☐ (0) None at all
☐ (1) A little
☐ (2) Quite a lot
☐ (3) Very much

Fig. 1 Effect of bathing 3x weekly on bacterial load



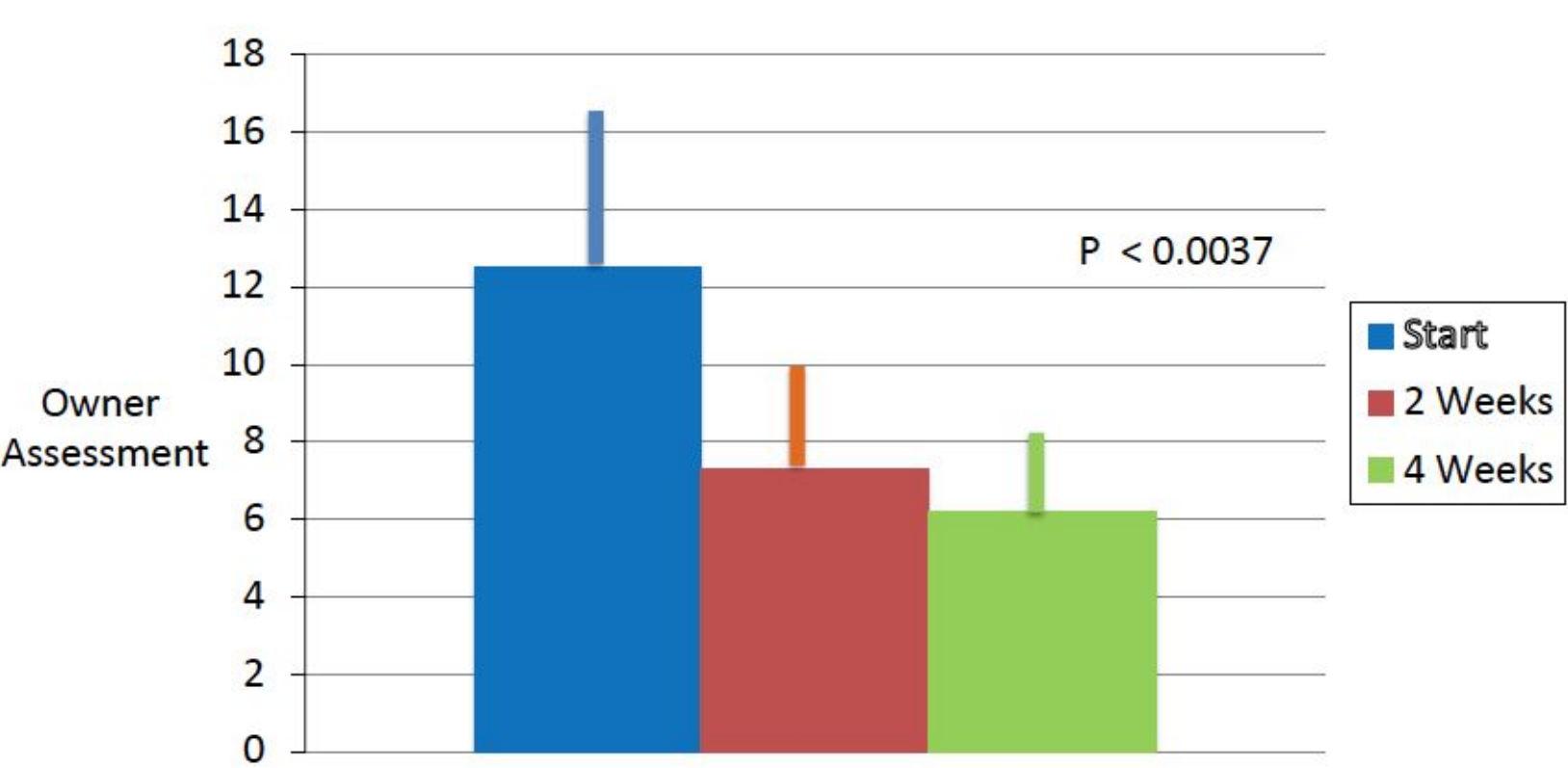
Dogs were bathed 3x weekly with the test shampoo. Samples for cytology were taken with acetate tape or adhesive slides at start, 2 wks, 4 wks and assessed at 100X oil immersion for bacterial counts. A minimum of 10 fields were examined. A semi-quantitative scale from 0-4 was used. 0 = no bacteria found; 1 = 1-5 bacteria/HPF; 2 = 6-10 bacteria/HPF; 3 = 11-15 bacteria/HPF; 4 = >15 bacteria/HPF. Findings at 2 and 4 wks statistically significant compared to start; no statistical difference between 2 and 4 weeks (Kruskal-Wallis one way analysis of variance). At wk 2, 5/17 (29%) dogs had negative cytology; at wk 4 14/17 (82%) were negative.

Fig. 2 Effect of bathing 3x weekly on clinical scores



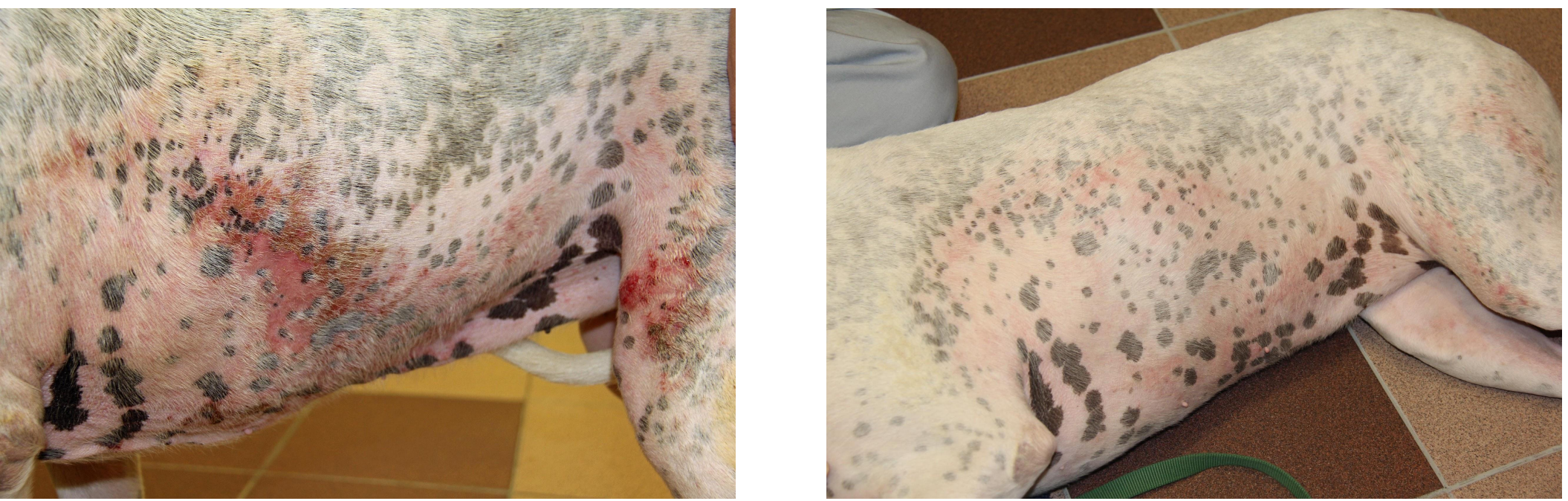
Clinical severity was assessed by ranking erythema, crusting, odor, pruritus, and % of affected body area from 0 (none) to 3 (severe) for a maximum score of 15. Severity at 2 and 4 wks was significantly different from start (Kruskal-Wallis one way analysis of variance). There was no difference between 2 and 4 wks. Means and standard deviations shown.

Fig. 3. Effect of bathing 3x weekly on owner assessments



Owner assessments were obtained by compiling the scores for each visit using the information in Table 1. Mean baseline owner assessment scores were significantly decreased at 2 and 4 wks. The difference between 2 and 4 wks was not significant (Kruskal-Wallis one way analysis of variance).

Selected Patients



Start (Cytology Score = 4)

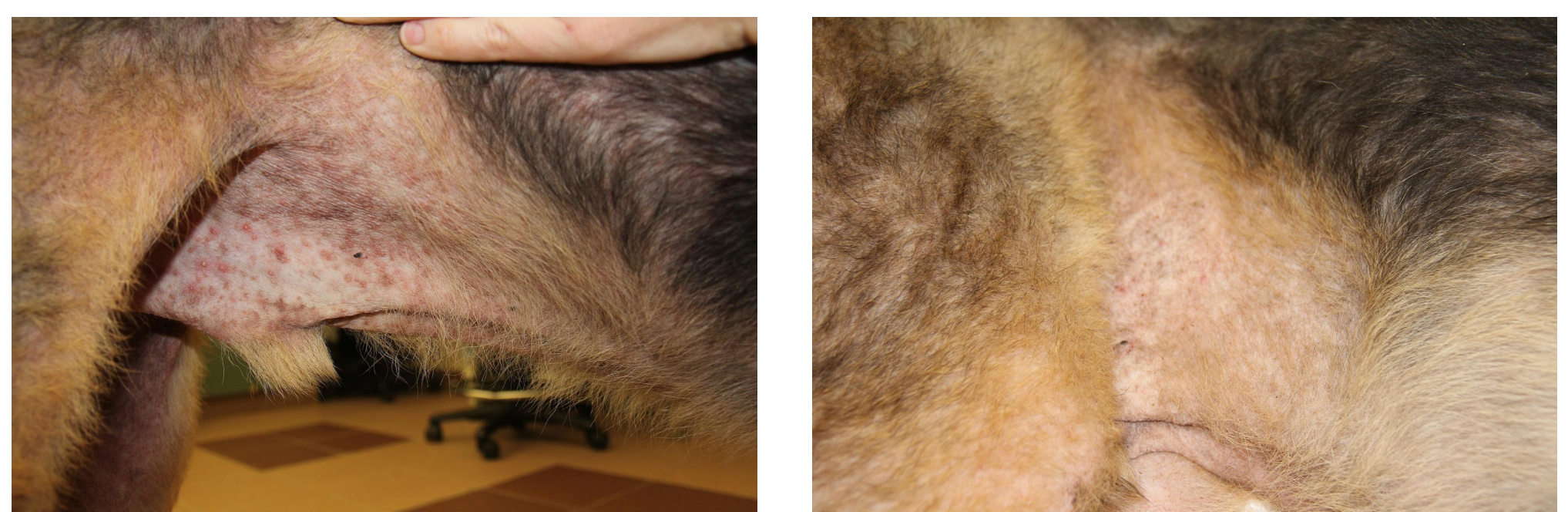
4 wks (Cytology Score = 0)



Start (Cytology Score = 2)

2 wks (Cytology Score = 1)

4 wks (Cytology Score = 0)



Start (Cytology Score = 3)

4 wks (Cytology Score = 0)

Results and Conclusions:

- 1.Fourteen/seventeen dogs had negative cytology after 4 weeks. Of the 3 remaining dogs, cytologies decreased from 2+ to 1+, 3+ to 1+, and 4+ to 1+.
- 2.Clinical scores were also significantly reduced; it is important to note that clinical scores would be expected to lag behind cytology scores due to the time taken in healing; i.e., bacteria are dead before healing of the skin is complete. Redness, crusting, and odor decreased. Itching decreased, but 16/17 dogs were atopic, so residual itch remained.
- 3.Owner assessment was determined according to the questions in Table 1. Since 16/17 of the dogs were atopic, residual skin disease was present, requiring continued care by the owner.
- 4.We conclude that this shampoo, containing sodium hypochlorite and salicylic acid, significantly reduced bacteria on the skin and is an effective aid in the management of canine superficial pyoderma.