# EFFICACY OF ORALLY ADMINISTERED SODIUM HYALURONATE GEL IN THE RACING THOROUGHBRED

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## Summary

This study was intended to observe the effect of orally administered sodium hyaluronate (HA) in the racing Thoroughbred. In this double blind, placebo controlled study, twenty-six horses were randomly chosen and given an oral gel for 59 days. Orally administered Sodium hyaluronate gel was found to prevent lameness in the racing Thoroughbred. Every other parameter used to measure soundness was also improved in the HA treated group. Also, every parameter used to measure routine maintenance of the racing Thoroughbred was improved in the HA treated group. All horses in the treated group with pre-existing conditions showed clinical improvement during the study.

## Introduction

To date, no studies have been published on the oral efficacy of sodium hyaluronate (HA). Because of HA's ubiquitous nature in all vertebrates and ongoing research into numerous applications, an attempt to prove oral efficacy was undertaken. Intra-articular administration of HA has been used in animals and man with reported clinical efficacy. More recently, HA has been used as an intravenous treatment. In people, circulating HA has been shown to be 10 to 100 micrograms/l with a half-life of two days or less.[1] In horses, the mean serum HA level was found to be 288 +/- 145 mcg/l.[11] It is mostly derived from the lymph.[2] Recent studies on hyaluronic acid have examined normal turnover and metabolism [2], changes in lymphatic flow[3], absorption through skin [4], changes in blood levels in various diseased states [5], immunomodulary effects [6], and many others. Additional applications utilizing modified hyaluronans and their benefits are being developed through clinical studies. Hyaluronic acid is a glycosaminoglycan found in all soft connective tissue and joint fluid. Other glycosaminoglycans with physiological significance have been shown to be absorbed orally.[7 8 9 10]

Potential and current applications of HA would include viscosupplementation of joints, wound healing, surface coatings, adhesion prevention, soft tissue implants, ophthalmology, cell preservation, and moisturizing agents. HA enters the bloodstream in significant amounts through the lymph and is rapidly absorbed via a receptor into liver endothelial cells where degradation follows.[1] Hyaluronic acid is a unique biopolymer distinguished by its biocompatibility, biodegradability, and broad applicability as a material with a promising role in various therapeutic applications. The purpose of this study was to evaluate HA's therapeutic affect when given orally to the racing Thoroughbred.

## Materials and Methods

Twenty-six actively training Thoroughbreds were randomly selected. Thirteen were given a placebo gel and thirteen were given a gel containing 100 mg of Sodium Hyaluronate. Duration of the study was 59 days. Horse 112 in the treated group was moved by the owner to a different trainer and racetrack and

was taken out of the study. Ages of the horses varied: seven two-year-olds, twelve three-year-olds, four four-year-olds, two five-year-olds, and one six-year-old. Because the half-life of circulating HA is two days or less, the horses were given 100 mg once daily. Upon completion of the study, training and veterinary records were evaluated. Number of days to the track was compared to number of days walked. In addition, horses examined by a veterinarian for any type of lameness were recorded. Horses were continuously evaluated for joint effusion, pain on flexion, and signs of lameness. Horses radiographed due to lameness were recorded. Pertinent history received from the trainers was recorded. Horses with pre-existing conditions were monitored and periodically evaluated.

## Results

Fewer of the horses in the treated group were examined for lameness. Eleven of the thirteen non-treated horses were examined for lameness while only four of twelve in the treated group were examined for lameness. This was found to be statistically significant, p=. 0137 (Fisher's exact test). Treated horses went to the track more days than the non-treated group (46 versus 41). This was not found to be statistically significant however, there was a trend toward significance and an increased group size 3 to 4 fold would be necessary. All horses in the treated group with pre-existing conditions improved. Eight of eight horses in the treated group with pre-existing conditions improved during the study, while three of six horses with pre-existing conditions in the non-treated group showed improvement. One of twelve of the treated group was radiographed during the study, while six of thirteen of the non-treated group had radiographs taken. More horses developed new signs of synovial effusion in the non-treated group, 8 of 13, than in the treated group, 5 of 12.

Results are listed in Tables 1 and 2 below:

**TABLE 1**

**TREATED HORSES**

| Horses | Age | Sex | Days To Track | Days Walked | Examined For Lameness | Radiographed |
|---|---|---|---|---|---|---|
| 101 | 5 | G | 45 | 14 | NO | NO |
| 102 | 2 | F | 41 | 18 | NO | NO |
| 105 | 4 | M | 38 | 21 | NO | NO |
| 106 | 5 | M | 31 | 28 | NO | NO |
| 109 | 4 | M | 46 | 13 | NO | NO |
| 114 | 3 | F | 43 | 16 | YES | NO |
| 116 | 2 | C | 54 | 5 | YES | NO |
| 118 | 3 | C | 49 | 10 | YES | YES |
| 120 | 2 | C | 52 | 7 | NO | NO |
| 122 | 2 | F | 50 | 9 | NO | NO |
| 124 | 2 | F | 50 | 9 | NO | NO |
| 126 | 3 | F | 53 | 6 | YES | NO |

**TREATED TOTALS**

| Horses | Age | Sex | Days To Track | Days Walked | Examined For Lameness | Radiographed |
|---|---|---|---|---|---|---|
| N/A | N/A | N/A | 552 (Ave. 46) | 156 (Ave. 13) | 4 OUT OF 12 | 1 OUT OF 12 |

**NON-TREATED HORSES**

| Horses | Age | Sex | Days To Track | Days Walked | Examined For Lameness | Radiographed |
|---|---|---|---|---|---|---|
| 103 | 3 | C | 44 | 15 | YES | NO |
| 104 | 3 | C | 19 | 40 | YES | YES |
| 107 | 3 | F | 43 | 16 | YES | NO |
| 108 | 3 | C | 34 | 25 | YES | YES |
| 110 | 3 | C | 19 | 40 | YES | YES |
| 111 | 3 | F | 46 | 13 | YES | NO |
| 113 | 3 | C | 45 | 14 | YES | NO |
| 115 | 6 | G | 50 | 9 | NO | NO |
| 117 | 4 | C | 44 | 15 | YES | YES |
| 119 | 4 | F | 50 | 9 | YES | NO |
| 121 | 2 | C | 46 | 13 | NO | NO |
| 123 | 2 | F | 54 | 5 | YES | YES |
| 125 | 3 | F | 45 | 14 | YES | YES |

**NON-TREATED TOTALS**

| Horses | Age | Sex | Days To Track | Days Walked | Examined For Lameness | Radiographed |
|---|---|---|---|---|---|---|
| N/A | N/A | N/A | 539 (Ave. 41) | 228 (Ave. 18) | 11 OUT OF 13 | 6 OUT OF 13 |

## Table 2

**TREATED HORSES**

| Horse | Pre-existing Condition | Condition | Improved | New Joint Effusion During Study | Location |
|---|---|---|---|---|---|
| 101 | YES | Osslets | YES | NO | N/A |
| 102 | NO | N/A | N/A | YES | CARPUS |
| 105 | YES | Severe T Sheath I | YES | NO | N/A |
| 106 | YES | Chronic Osslets | YES | NO | N/A |
| 109 | YES | Osslets | YES | NO | N/A |
| 114 | YES | Stifle Soreness | YES | YES | Carpus |
| 116 | NO | N/A | N/A | YES | Stifles |
| 118 | YES | Right Shin | YES | YES | Stifles |
| 120 | NO | N/A | N/A | NO | N/A |
| 122 | YES | Stiff Behind | YES | YES | R. Carpus |
| 124 | NO | N/A | N/A | NO | N/A |
| 126 | YES | Fetlock Effusion | YES | YES | Stifles |

**NON-TREATED HORSES**

| Horse | Pre-existing Condition | Condition | Improved | New Joint Effusion During Study | Location |
|---|---|---|---|---|---|
| 103 | YES | Stiffness Behind | YES | YES | Carpus |
| 104 | NO | N/A | N/A | NO | N/A |
| 107 | NO | N/A | N/A | YES | Fetlocks |
| 108 | YES | Left Front Sorene | NO | YES | Stifles |
| 110 | NO | N/A | N/A | NO | N/A |
| 111 | YES | Stifles Injected | YES | YES | Fetlocks |
| 113 | YES | Hock Lameness | YES | YES | Stifles |
| 115 | NO | N/A | N/A | YES | R.F.Paste |
| 117 | YES | Hocks Injected | YES | YES | Carpus |
| 119 | NO | N/A | N/A | YES | Stifles |
| 121 | NO | N/A | N/A | NO | N/A |
| 123 | YES | Rt. front fetlock e | NO | NO | N/A |
| 125 | NO | N/A | N/A | NO | N/A |

## Discussion

Orally administrated Sodium Hyaluronate in a gel preparation was found to prevent lameness in the racing Thoroughbred. Lameness's varied from mild to severe. Many were characterized as mild but were significant enough to warrant a request by the trainer for an examination by the veterinarian. All parameters measured improved in the HA treated group. There was statistical significance in HA's ability to prevent lameness however in the other groups measured there was no statistical significance but a trend was observed and was thought that an increased study size would reveal other significant findings. This would tend to support the numerous anecdotal reports and testimonials about the effectiveness of oral HA. About thirty days into the study the examiners could "sense" the treated horses. One horse in the treated group had numerous fetlock injections of HA before the study, however during the study this horse had no intra-articular injections. Horses maintained on a daily dose of oral sodium hyaluronate showed improvement of all soundness characteristics measured.

Hyaluronic acid is a glycosaminoglycan. Numerous glycosaminoglycans of physiological significance have been proven to be absorbed orally. This mucopolysaccharide is ubiquitous in the body and plays a vital role in many functions. In this study, sodium hyaluronate was found to be efficacious when administered orally.

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