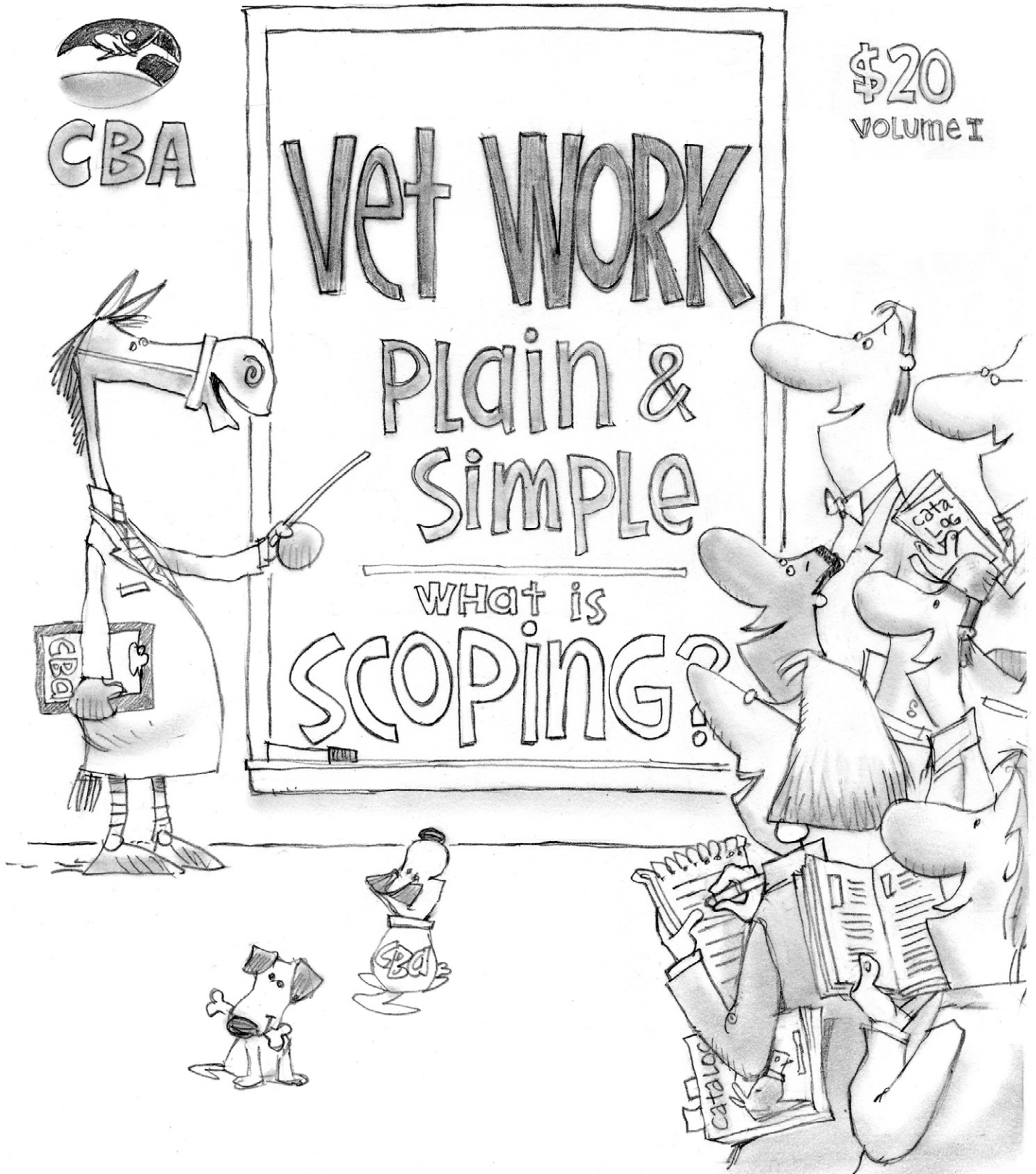




\$20
VOLUME I



Inside: *What is scoping? • Q&A on scoping with 10 veterinarians
A study on endoscopic evaluations by Drs. Scott Pierce and Rolf Embertson*

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Dear Reader,

There are times for every buyer when going to the horse sales is like fishing in a mountain stream for trophy trout. If you don't know which flies to use or where to cast, you might as well be fishing with a fly swatter.

The purpose of this series — *Vet Work: Plain and Simple* — is to serve as a guide and aid to prospective buyers at the sales, as well as an informative tool for breeders and consignors.

Each booklet in the series will be designed to inform and educate all those interested in the Thoroughbred, and each volume will address a different subject of importance related to the horse and to those who breed, buy, sell, race, and work with them.

The booklets will attempt to open up the complex world of veterinary procedures for everyone's understanding by using plain English and common sense. The goal is to provide a readable journey through some complicated topics, without compromising basic veterinary science.

Nonetheless, whenever possible, these informative booklets will strive to entertain the reader with a little humor or to offer charts and drawings that will speak a thousand words.

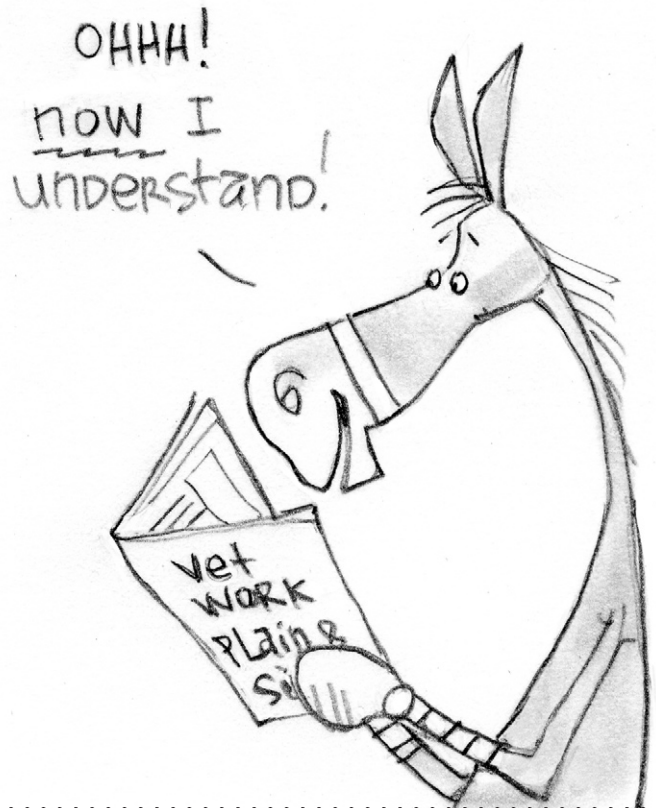
The first volume of the series focuses on the throat of the racehorse and what we can learn about it from an endoscopic exam.

With this, we hope to give buyers and industry professionals a better understanding of the purposes and practices of scoping and the relationship between airway function and racing success. On the pages following, the reader will find a cross-section of experienced and active sales veterinarians offering their opinions and reflections on the current viewpoints about scoping and its best use in their daily practices.

Sincerely,



Frank Mitchell



What is scoping and why is it done?

► **Recent research studies on the evaluation of yearling throats have shown that more than 98 percent of the yearlings had no throat problems that significantly impacted their racing careers and earning ability at the track.**



The procedure commonly called scoping is the examination of the horse's upper respiratory tract (paying special attention to the arytenoid cartilage that opens and closes the airway, the epiglottis, and the soft palate).

This seemingly simple procedure is done to check whether there is a significant problem with the young Thoroughbred athlete's airway.

The importance of scoping lies in the nature of the Thoroughbred as an athlete who is more dependent upon air, energy, and heart than upon sheer power. Any horse can bust out of a gate and run like crazy for a few hundred yards. At that point, however, they need to be able to breathe.

The farther a horse goes, the greater is the demand upon its respiratory and circulatory systems.

In fact, the requirement for proper breathing function is so important that the auction sales companies have written into their conditions of sale the acceptable parameters of what constitutes a saleable airway.

As Mark Cheney, DVM, said: "The horses who won't meet conditions of sale are obvious, and I think that there are very few horses who get rejected at the sales, anymore. You'll see 5,000 at the September sale, and there are very, very few of them that will not meet the conditions of sale."

Recent research studies on the evaluation of yearling throats have shown that more than 98 percent of the yearlings had no throat problems that significantly impacted their racing careers and earning ability at the track.

This is outstanding news for owners and

for breeders, as this new research about airway function is beneficial to both buyers and sellers.

How is scoping done?

Veterinarians perform the exam using an instrument called an endoscope, which is rather like a small video camera with a long, flexible hose. The optical end of the scoping tube goes up the horse's nose, as the veterinarian judges where the tip of the scope is and how the throat looks on a viewing screen.

Simple as it sounds, scoping requires a level of experience and sophistication as the vet handles the endoscope and then interprets what he or she sees.

To properly conduct the scoping, "the nature of a horse's temperament must be taken into consideration," according to Ruel Cowles, DVM.

"For example, some horses are nervous and may get themselves worked up,

causing a pharyngeal or laryngeal spasm — or both. A pharyngeal spasm will cause narrowing of the oral pharynx and can initiate dorsal displacement of the soft palate.

Likewise, a laryngeal spasm can cause displacement by moving the larynx backward, allowing the soft palate to slip on top of the epiglottis."

In short, Cowles is describing the way that the anatomy of a horse's throat can react when something weird is stuck up its nose. In humans, this response is similar to the gag reflex, and that tells us something about how horses respond to this procedure. They don't especially like being scoped, and it is a credit to those handling them that horses present themselves fairly well for the scope most of the time.

Because horses do not really like to be scoped,

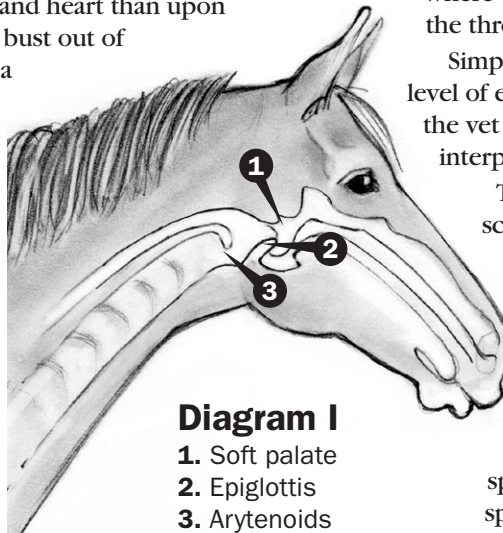


Diagram I

- 1. Soft palate
- 2. Epiglottis
- 3. Arytenoids

Just watch...
 When we hit the wire,
 His perfect throat is
 gonna be behind my
 beautiful nose!



some will resist, making it difficult to get a true reading on throat function.

Cowles said, “The key is to get them to relax so that they will not contract and alter their throat anatomy and physiology. Therefore, I try to scope every horse with no restraint. If I cannot get it scoped, I will first ask the groom to use a lip chain, and then I will try putting a twitch on them only as a last resort.”

The different modes of restraint tend to change the way a horse holds its head, therefore affecting the way the throat and its related muscles will behave and look during the exam.

As a result, veterinarians must use their horsemanship and experience when evaluating many yearlings’ throats.

The Normal Throat

When an experienced veterinarian comes to examine a throat, he or she is expecting to see a typical display of structure and function.

In addition to the standard movements of the arytenoid cartilage opening and closing the flaps on either side of the throat, vets also want to see a “normal” throat anatomy.

Diagram I shows that the soft palate should lie in front of and below the epiglottis. If this arrangement deviates from normal during racing, the effect can shut off part of the horse’s air intake, thereby limiting his ability to race successfully.

In addition to the arrangement of the parts of the throat, the veterinarian is looking to see that the physiology (or shape of things) is within the expected range for shape and size.

When veterinarians first began using the endoscope and making recommendations about performance based on findings with the instrument, they were covering new territory. As with many expeditions into unknown lands, some sizable errors occurred along the way.

Veterinarians, when first looking down the throats of prospective racehorses, did not have guidelines for what constituted normal variation in the throat and what was abnormal. Even among the things that were clearly abnormal, vets lacked information to quantify what conditions hindered racing performance and what did not.

Now, as the result of some important research by Scott Pierce, Rolf Embertson, John Stick, and others, we know that a wide range of variation in throat shape, size, and function is perfectly normal.

The Pierce and Embertson study shows that more than 98 percent of sales yearlings had throats we can now call “normal” because most variations had no statistically negative effects on racing and earning at the track. Since success at the track is the final judge of what we are doing, these data have powerful implications for scoping evaluations and interpretations.

The “Perfect” Throat

Along the way to learning the true parameters of a healthy and fully useful throat, many a superstition has developed. And none is more pervasive, or more in error, than the fallacy of the “perfect” throat.

Story continues on page 6



This is the kind of throat that performs all the textbook functions of the throat with ease, while looking like the ideal throat found in all the vet manuals.

Although many yearling buyers are in search of horses with “perfect” throats, only one yearling in five, six, or possibly seven actually has a throat that scopes as “perfect.” Nonetheless, essentially all the other yearlings in the sale have throats that function as well as the so-called “perfect” throat when it comes to competitive racing.

As Jeff Berk said, “The most important thing to remember is that there are variations within the range of normal. Just because we see something in a throat that is atypical does not mean that the horse will be compromised as a race horse.”

Relation to later racing performance

Scott Pierce and Rolf Embertson of Rood & Riddle Equine Hospital in Lexington, Ky., discovered that throats which seemed only average or even below-average on examination with the endoscope were just as functional as throats which appeared to be “perfect” when scoped.

They chose to do this research because of a growing awareness that the appearance of a throat when examined wasn’t giving them a clear line on which horses were better racers. Veterinarians, in general, were finding that a number of horses that were being turned down because of scoping issues were nonetheless going on to be top racehorses. Thus, Pierce and Embertson decided to look into it.

They evaluated a group of more than 800 yearlings with the endoscope and classified them into Grades I through IV (a grading system generally known as the Cornell scale). Grade I throats were those who had the ideal shape (symmetry) and coordinated movement (synchrony). Grade II throats missed the ideal with moderate deviations in symmetry, synchrony, or both. Grade III throats had serious faults of shape or movement, and Grade

► ABSTRACT OF STUDY BY DRS. PIERCE AND EMBERTSON

Horses graded IIa and IIb rated the same as horses graded I

In 2001, Dr. Scott Pierce and Dr. Rolf Embertson of Rood & Riddle Equine Hospital in Lexington examined more than 800 yearlings and correlated their throat evaluations with eventual starts and earnings.

The veterinarians rated these young horses’ arytenoid function on the Cornell scale of grades from one to four, with Grade I best and Grade IV worst. They also assessed and graded the epiglottis in the yearlings’ throats on a scale from normal to Grade IV.

Only the bottom 1.5 percent of the yearlings (those which had Grade III throats) showed a significant negative difference in starts, earnings, or earnings per start.

In a second research study (2001) authored by John Stick, et al., of Michigan State, 427 yearlings were scoped and graded in the same fashion as those in the Pierce-Embertson study. Stick, et al., also found no significant differences in racing performance between Grades I, IIa, and IIb. Stick, et al., also found that, as a group, yearlings with Grade III throats were less successful on the racetrack. In addition, the study by Stick, et al., found no correlation between epiglottis and racing performance.

“Just because we see something in a throat that is atypical does not mean that the horse will be compromised as a race horse.”

— Jeff Berk, DVM.



Story continues on page 8



► **The Pierce and Embertson study shows that more than 98 percent of sales yearlings had throats we can now call “normal” because most variations had no statistically negative effects on racing and earning at the track. Since success at the track is the final judge of what we are doing, these data have powerful implications for scoping evaluations and interpretations.**

IV throats were paralyzed.

More than 98 percent of the sales yearlings evaluated were graded in categories I or IIa or IIb. Less than 2 percent of the sales yearlings had Grade III throats, and none of the 816 in the study were found to have paralyzed function.

The researchers then followed these horses through their racing careers, correlating the endoscopic grades to total earnings and earnings per start.

Pierce and Embertson found no statistically significant difference between the horses in Grade I and those in Grade II. In the terms of the study, both Grades I and II are normal for performance, and performance on the racetrack is the criteria that matters. Only the tiny percentage of horses evaluated with Grade III throats had a significant negative difference in racing and earning potential.

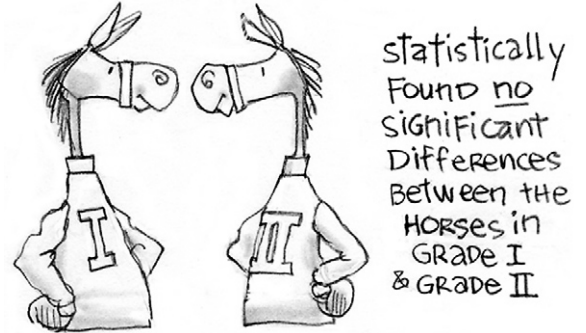
Breeders, therefore, who present a young horse with moderate asynchrony or asymmetry can feel confident that they are offering a normal horse with prospects for racing that are equal to any other on the grounds, according to airway function.

Based on this research, buyers can now feel confident that the young prospects they buy do not need an ideal “textbook” throat to be effective or even outstanding racehorses. *(The complete research article is on pages 17-18)*

Role of the vet

As this research resonates through the veterinarian and sales community, it also causes some rethinking of the purpose and use of endoscopic procedures and information. While scoping remains an important tool, “the exam should be one of many factors that the client can use,” said Jeff Berk, DVM. “It is a piece of information that should be used along with many other items while the client decides whether the horse is suitable.”

Gone are the days when the results of scoping swept half of a buyer’s short list of prospects off the table. Berk continued: “What sometimes happens and what shouldn’t happen is that veterinary opinion often carries too much weight. When there is a minor variation of the throat from normal, the client can get scared and get off



the horse without evaluating that single piece of information in light of everything else that relates to the individual.

“In addition to scoping results, attention should be paid to x-rays, pedigree, conformation, and the way the horse moves. There are many variations of normal, and there are many horses with variations who are out there running quite well. Many veterinary findings are not as important as clients seem to think.

“In our society, a doctor is typically looked upon as an authority, and when a doctor or veterinarian is talking to an uninformed client, there is a tendency for the client to attach greater significance to the doctor’s opinion. This makes sense as veterinarians are looked at as having an informed opinion. But we as veterinarians can only assign a certain percentage of risk to a specific situation, whether an endoscopic evaluation, an OCD lesion, a chip in an ankle, or whatever. Although some findings are really bad and cannot be overcome, most of the time we are dealing with gray areas.

“As an example, if I were examining a horse for you, I might say that the throat is within normal limits but that the left arytenoid is somewhat asymmetrical. You, as the client, may be predisposed to think that any irregularity is a ‘problem’ and may therefore be inclined to walk away from that horse and find one without a ‘problem.’ Therefore, veterinarians, as professional advisers, need to find ways to communicate clearly and effectively with clients in order to indicate how a clinical finding ranks within the normal spectrum so that buyers do not unnecessarily miss out on purchasing a good horse that they like in every other way.” ■

What qualifies a vet to evaluate throat function?

Experience is probably the best teacher. Seeing yearlings at rest is one thing, but seeing them come off the racetrack is an important part of accurately correlating airway function to airway conformation. In years past, we have tended to be more critical and probably thought we knew more about throats than we did — especially at the yearling stage — and if you never see throats at the racehorse stage, it is not helpful in evaluating the potential in yearlings.

— JAY ADDISON

The key is experience: to be properly experienced you should have scoped a lot of racehorses and a lot of yearlings.

— RUEL COWLES

A couple of things qualify a veterinarian. Number one, constantly updating oneself in terms of current research about how these horses scope and the outcome in their racing careers.

Second, a veterinarian must also attain a reasonable amount of experience with young horses, particularly horses in training.

— JEFF BERK

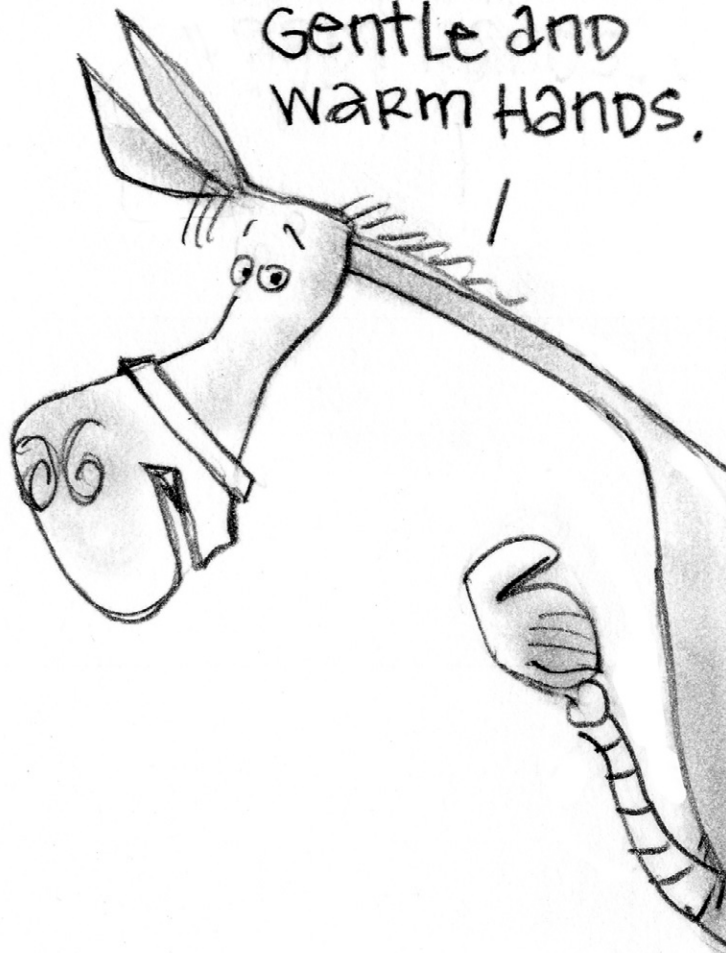
When it comes to evaluating throat and airway function, veterinarians are just making an intelligent guess, and experience helps.

— SAM FERGUSON

Experience. While any licensed veterinarian may perform an endoscopic examination of a sales yearling's throat, you will find most veterinarians doing sales work have years of experience examining throats of all ages of horses. Continued training and following recent research improves our understanding of upper airway function.

— CRAIG VAN BALEN

PERSONALLY,
I THINK THE
MOST IMPORTANT
QUALIFICATION IS
GENTLE AND
WARM HANDS.



Veterinary findings and the buyer's role

► *The purchaser's role is to become knowledgeable enough so that he or she can understand the information and evaluate the professional opinion.*

.....

► *People want to buy the horses that make their short lists, and it's our [the vets'] job not to get in the way unless the yearling has a significant problem.*

.....

How should a buyer go about including veterinary findings in purchasing decisions?

Although additional research may help us understand the probabilities of success better, one way of assessing the situation with most horses is this. If the horse without any significant findings is worth \$100,000, then with the finding, the first question is, "Do you still want the horse?" If the answer is, "yes, I really want the horse because it is a good quality individual," you might decide that risk decreases its value. Then it is time for the advisers to sit down and say, "This horse has 5 percent probability or 10 percent probability of being diminished as a racehorse by this finding. But if we can purchase him for 15 percent or 20 percent less than what we were expecting to pay, then the risk to reward ratio is in our favor."

The veterinarian is an information gatherer, and in this case the information is the effect that any anomalies in the throat (or elsewhere) might have on a horse's racing career. The purchaser's role is to become knowledgeable enough so that he or she can understand the information and evaluate the professional opinion.

A fully informed client, therefore, in consultation with the vet, should be able to assess the probabilities for racing, along with the athleticism and desirability of the animal, and then determine an appropriate valuation.

Perhaps the most important thing to remember is that there are variations within the range of normal, and just because we see something in a throat that is atypical does not mean that the horse will be compromised as a racehorse.

For instance, if we indiscriminately x-rayed all the horses running, like we indiscriminately x-ray all the sale horses, we would be amazed at what some of them are running with quite successfully.

— **JEFF BERK**

It is up to the client to become educated [about throats and other central issues regarding horses]. The vet gives an opinion and then the owner, trainer, and other parties to the discussion need to come into the decision process so that there isn't just a verdict from a vet alone. Vets should not be making the decisions.

I've found that people want to buy the horses that make their short lists, and it's our job not to get in the way unless the yearling has a significant problem.

— **SCOTT PIERCE**

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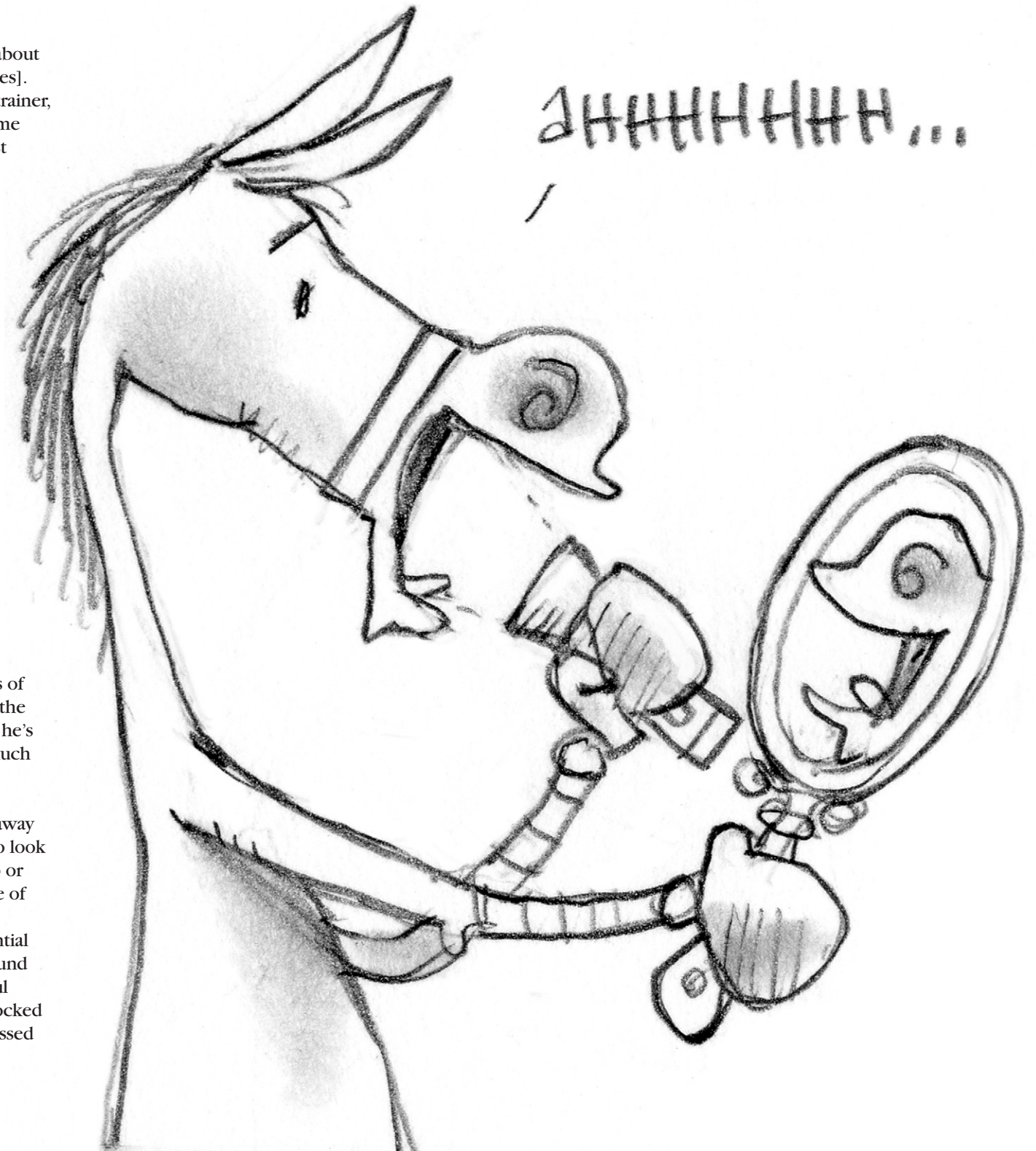
Scoping usually boils down to a conformation evaluation of the throat, rather than a pathological examination. But we have too many veterinarians who evaluate and reject a horse on criteria other than those acceptable for rejection.

True pathological horses should get thrown out, but too many horses in the middle get rejected due to our ignorance or inability to predict how they will work out. The main problem with rejecting those horses in the normal range with minor deviations is that the breeder has spent two and a half years of effort and a lot of money getting that horse to the sale, and as soon as a vet looks at him and says he's questionable, the horse is tainted and worth much less.

Unfortunately, if a vet puts the shadow of doubt on a horse, it can cause buyers to walk away unnecessarily. There is always another horse to look at. In this market, sellers are lucky to have two or three prospective buyers on a horse, and if one of those walks, the seller can be in deep trouble.

The other loser in the situation is the potential buyer. Too many good horses with middle-ground throats or questionable throats make successful racehorses. Yet they have been mistakenly knocked off lists to the detriment of the buyers who missed out on a horse they wanted to buy.

— **STEVE CONBOY**



The importance of a second opinion

Buyers who really like a horse should get second opinions on any negative findings.

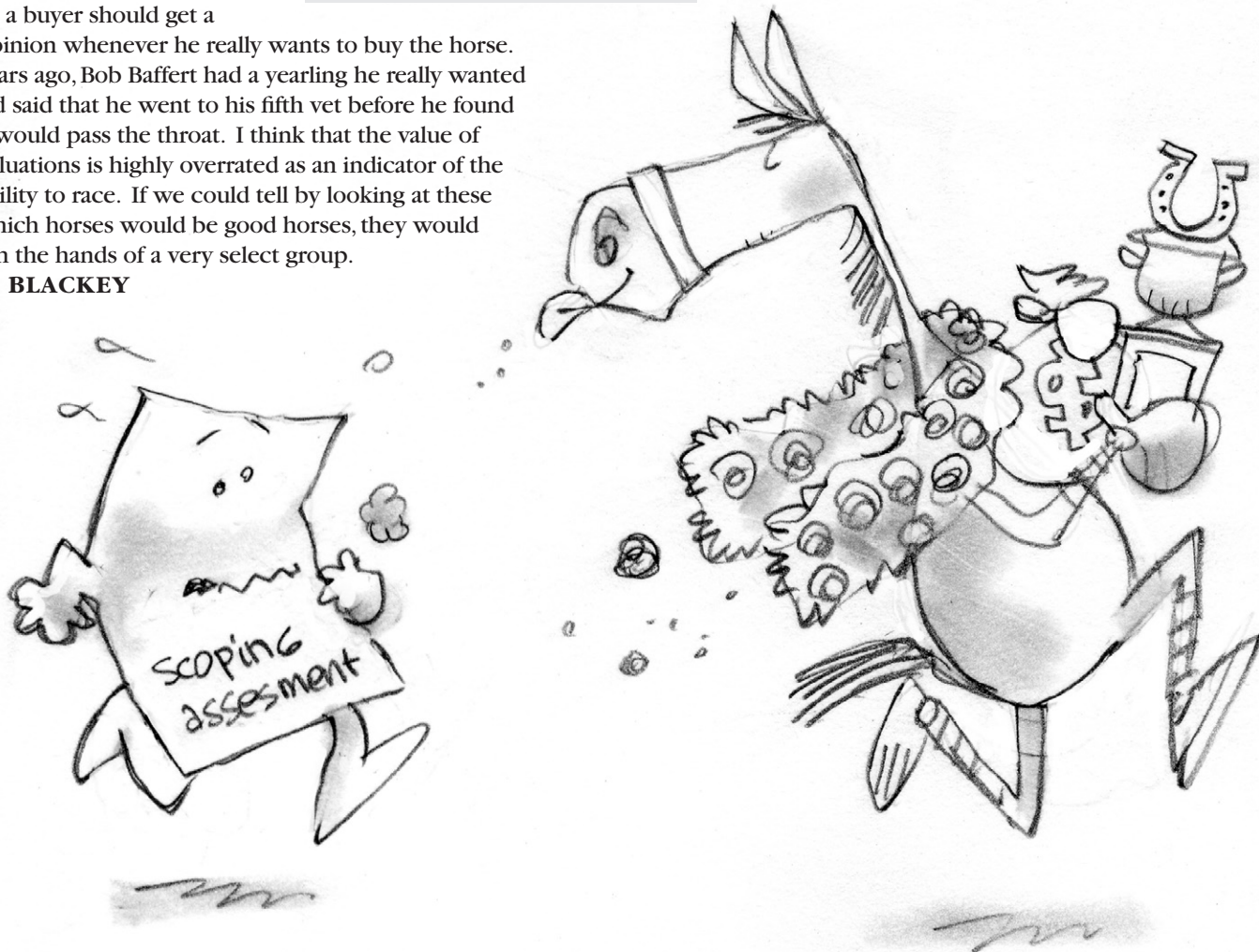
Some of the reasons that vets disagree about assessing a throat are that many times horses' throats change from morning to night. If they are given acepromazine to tranquilize them, it will affect the way the throat looks and behaves. Also, pharyngitis, tired horses, and even improper restraint from the handler will all negatively affect the throat's appearance and behavior.
— SCOTT PIERCE

If we could tell by looking at these throats which horses would be good horses, they would wind up in the hands of a very select group.

If they find that their veterinarian may be hypercritical about the endoscopic exam, they probably would want a second opinion. If they present 10 horses, and five fail the scope, they might want a second opinion. If only one or occasionally two out of 10 fail, I would be comfortable with that ratio.

For example, I scoped 30 horses this morning, and had nothing lower than an A-. All 30 would have passed my criteria for purchase, and one had an anatomical abnormality. The occurrence of horses that would fail the scope should be relatively infrequent.
— MICHAEL SPIRITO

I think a buyer should get a second opinion whenever he really wants to buy the horse. Several years ago, Bob Baffert had a yearling he really wanted to buy and said that he went to his fifth vet before he found one who would pass the throat. I think that the value of throat evaluations is highly overrated as an indicator of the horse's ability to race. If we could tell by looking at these throats which horses would be good horses, they would wind up in the hands of a very select group.
— CHET BLACKKEY



At the sales, roughly what percentage of yearlings do you not recommend for purchase because of scoping issues?

Less than 5 percent. I've got a pretty common sense approach to these things, and I'm scoping these horses as babies at the farm, then at the sales, and then I watch some of them with less than perfect throats go on and win Grade 1 races. I believe that it takes a lot to fail a throat.

The problem with scoping is that we think that it's a good way to evaluate a horse. But like a lot of radiographic evaluations, it has little to do with whether these horses can win races.
— **CHET BLACKKEY**

In my experience, most horses will work, unless they have some major deviation.

Today, I would not recommend probably less than 5 percent of the yearlings, and 10 years ago, it could have been as high as 20 percent.
— **JAY ADDISON**

About 2 percent are not passable as being racing sound.
— **SAM FERGUSON**

Probably, it would be close to 5 percent, including the horses that don't meet the conditions of sale and certain buyers' guidelines. I attempt to be fair and as lenient as possible.

If a horse is borderline, I will ask who else has scoped him. I will consult with others, then share my opinion and the consulting opinion with the client. This gives him all the information to consider and the opportunity to seek a third opinion, if needed.
— **RUEL COWLES**

I would recommend all horses that are I, IIA, IIB arytenoid function be purchased and would not recommend less than 10% of the throats that I scope. About 85-90% are in the normal range for throat anatomy and function. I stay away from the pass-fail terminology. My job is to gather information, assess it, and communicate it to an educated client.
— **CRAIG VAN BALEN**

► *The problem with scoping is that we think that it's a good way to evaluate a horse. But like a lot of radiographic evaluations, it has little to do with whether these horses can win races.*



What do you think of the comment, “OK to race, not OK to pinhook?”

It's a real situation. Pinhookers believe that they cannot take a horse to a 2-year-old sale without a perfect throat because buyers are so selective. They are buying the yearlings to resell, not to race. People would like to say it's the same, but it's not because buyers at the 2-year-old sales are generally not very forgiving.

It all comes down to education of the buyers and future owners, and that takes time.

— SAM FERGUSON

It's a fact of life because the pinhookers want a specific type of throat. This perception is obviously a disadvantage to sellers because it moves a sizable number of buyers off their horses, but it is an advantage to those people who are buying horses to race.

Those buyers who are interested in racing can find horses with very good conformation and prospects but with only an “average throat” for very realistic prices. This situation has occurred because we have a two-tiered system: horses bought to race and horses bought to pinhook. Those two different markets have different standards. Pinhookers don't want a horse that goes in 10.2 and then has a throat that is

asymmetric because instead of getting \$200,000 for it at a 2-year-old sale, they may get \$50,000.

— RUEL COWLES

“OK to race, not OK to pinhook” is an embarrassing statement. It doesn't make any sense. All of this is supposed to be about racing. How could he be one and not the other? The problem gets back to people being convinced that they need a perfect throat. What they are saying is that he doesn't have a perfect throat, but he is

OK to race, which tells you right there that the notion of needing a perfect throat is a bunch of nonsense.

Pinhookers and vets need to get together at the 2-year-old sales and straighten this out. The present hypercritical situation is a huge disservice to buyers who are looking for good horses that will win for them.

— CHET BLACKKEY

I think the statement “OK to race, not OK to pinhook” sums up the fickleness of the industry. If it's OK to race, it ought to be OK to pinhook. But pinhookers tend to want an unblemished horse to begin with because there are so many things that can go on between the time of their purchase and when the horse makes that 10-second dash. They want to eliminate as much risk as possible up front.

Unfortunately, a lot of good horses get rejected. If pinhookers won't bid on them, the sellers have only end users to count on, which weakens the marketplace and hurts everyone in the long run.

— STEVE CONBOY

The problem gets back to people being convinced that they need a perfect throat. What they are saying is that he doesn't have a perfect throat, but he is OK to race, which tells you right there that the notion of needing a perfect throat is a bunch of nonsense.

I THOUGHT
PINHOOKING
WAS SUPPOSED TO
BE ABOUT RACING!



Summation

Most important single point about scoping

First, we need to appreciate that a lot of these horses overcome what we perceive as abnormalities. Secondly, the airways are in a constant state of change. The same sales horse can fail the vet in the afternoon and then pass the vet the next morning.

As long as the yearling has reasonably good arytenoid function, most other findings have limited predictability.

Our basic role is to pass on information to our clients, and horses who fail the vet do so because they have impaired function or some kind of

significant problem.

The troubling part is that there is such limited predictability on what we see at the sales and what the horse can then do at the racetrack. Things change, and horses often have a way of overcoming problems.

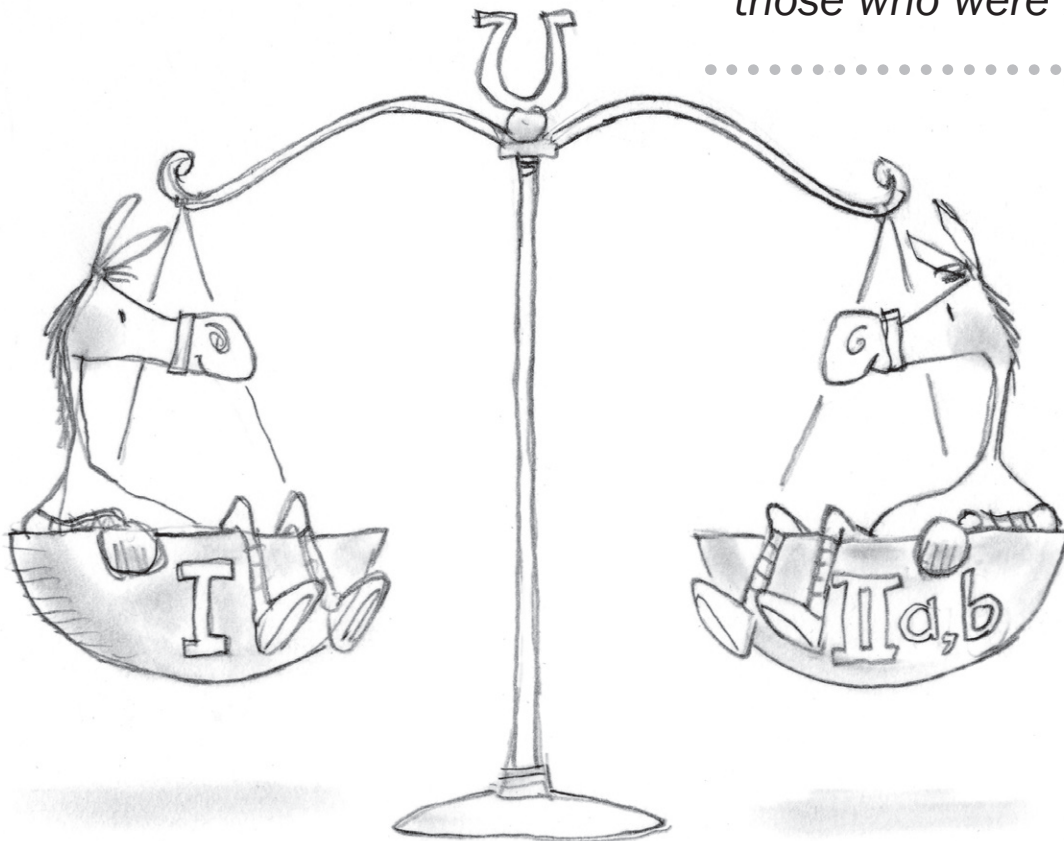
I've seen horses who are champions and multiple Grade 1 winners who would, at best, be marginal on an endoscopic exam at a sale, and that's what has brought a lot of insight into our understanding about what horses are capable of doing. This demands a more liberal approach in evaluating them.

— JAY ADDISON

Summation continues on page 16



Two recent scientific studies found that yearlings who were graded as IIa or IIb on endoscopic evaluations had the same racing success as those who were rated as Grade I.



Summation (continued from previous page)

Most important single point about scoping

Scoping is, by and large, an inappropriate method of predicting a horse's ability to train.

The people who are really good at picking quality racehorses aren't bothered much by normal throat deviations (or other minor veterinary issues). They just stay focused on finding the good athlete.

— **CHET BLACKKEY**

.....

Ruling out a horse with a major problem makes scoping the very most important part of an examination of a horse for purchase - much more important than the radiographs.

— **MARK CHENEY**

.....

Try to be lenient because these horses will outrun your scoping prognosis. Don't be too tough because most other factors will become more significant in a horse's performance than the results of the scope. A lot of horses that are borderline are going to be fine. Give the horse the benefit of the doubt if the buyer will give you that leeway. And if you can, don't knock the horse off the list. Instead, come back the next morning or in the evening or call someone else to see if you can honestly give the horse a passing grade. Flunking is easy, but passing the horse who is a little marginal is the thing that needs to be done more often. There are so many other problems that stop them from being racehorses, rather than their throats, and the only proven negative relation between scoping and racing is paralysis of the arytenoid.

— **RUEL COWLES**

The one comment that hits it hardest for me is that every veterinarian who is scoping (or evaluating) sale horses should have owned horses and tried to sell them at the sales. Then they would recognize the significance of their comments on the seller's situation and on the health of the business.

I wouldn't ask any vet to pull punches but rather to understand the effect their opinions and comments will have on the people who provide the product and form the basis for the industry. If they can't be confident and exact about what they decide, they should be careful about how they communicate their findings.

Until you've bred a mare, have gotten a foal, kept him healthy and sound, worked with him to get him to the sales in proper order, and then had someone come through the shedrow swinging a scope and saying he isn't quite right, you don't understand what a punch in the gut that is.

— **STEVE CONBOY**

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We need to do more research on airways and other veterinary issues. I have recently evaluated 375 airways from foal to yearling, and I'm also trying to put together a couple thousand yearlings to show normal airway findings and the percentages of airway disease in a large group of horses.

There's plenty of reason to scope horses for tangible and verifiable problems, but minor to moderate asymmetry and asynchrony do not equate to lower performance on the racetrack.

— **SCOTT PIERCE**



Correlation of Racing Performance to Yearling Endoscopic Evaluation

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There was no difference in racing performance for horses with *Grades* I, IIa, and IIb arytenoid symmetry at two or three years of age. Compared with normal controls, horses with *Grade* III arytenoids had fewer starts and less earnings as 3-year-olds. Yearlings with mild and moderate flaccid epiglottis had fewer starts and less earnings as 2-year-olds when compared with normal controls; there was, however, no difference at three years of age. Authors' address: Rood and Riddle Equine Hospital, P.O. Box 12070, Lexington, KY 40580. © 2001 AAEP.

1. Introduction

In the sales environment, clients ask veterinarians to perform an endoscopic examination of the upper respiratory tract (URT) and assess future racing performance. Recommendations are based on the structural, functional, and anatomical characteristics of the URT, recognizing that these yearlings have yet to be subjected to athletic training. The purpose of this study was to compare endoscopic examinations of the URT in sales yearlings to racing performance at 2 and 3 years of age.

2. Materials and Methods

Endoscopic examination of the URT of 816 Thoroughbred yearlings was performed by the first author in the same year. Arytenoid function and epiglottic character were examined in a stall with twitch restraint through the right nostril, using the swallowing reflex and nasal occlusion. Number of starts, earnings, and earnings per start at ages 2 and 3 were used as response variables in analyses of variance with various groupings as explanatory variables.

Arytenoid function was graded using a modified I–IV scale.^{1,2} *Grade* I, synchronous and symmetrical; *Grade* IIa, mildly asynchronous or asymmetrical, maximal abduction easily achieved; *Grade* IIb, asynchronous or asymmetrical, maximal abduction with difficulty; *Grade* IIIa, asynchronous or asymmetrical movement cannot maintain full abduction; *Grade* IIIb, limited movement but arytenoid cannot fully abduct; *Grade* IV, no arytenoid movement.

Epiglottic structure was graded normal (N) and 1–4 abnormal. A normal (N) epiglottis had good thickness, length, and definition with serrated edges. A *Grade* I epiglottis had a slightly flaccid epiglottis and good length and texture, but was slightly thinner than normal without serrated edges. A *Grade* II epiglottis had mild flaccidity, adequate length, thinner than normal curled edges, and no dorsal vasculature. A *Grade* III epiglottis was moderately flaccid, very thin, and bent easily. A *Grade* IV epiglottis was severely flaccid, extremely thin, was markedly short, and bent easily.

Race records were obtained from the Jockey Club Information Service. Statistical analysis using ANOVA compared the number of starts and earn-

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ings per start for the different arytenoid grades and epiglottic grades ($p < 0.05$).

3. Results

Graded arytenoid function was recorded in 812 yearlings, revealing 158 (19.5%) *Grade I*, 580 (71.5%) *Grade IIa*, 61 (7.5%) *Grade IIb*, 13 (1.5%) *Grade III*, and 0 *Grade IV* arytenoid functions. There was no statistically significant difference in number of starts, earnings, or earnings per start when yearlings with *Grades I, IIa, or IIb* arytenoid functions were compared. These yearlings were then grouped and considered normal.

Thirteen yearlings with *Grade III* arytenoid function were compared to the normal yearlings. No significant difference was seen in any response variable at two years of age. There was a significant difference in number of starts (5.14 vs. 2.31, $p = .0348$), in earnings (\$39,736 vs. \$8,753), and in average earnings per start (\$5,980 vs. \$1,834) as three-year-olds.

Of 813 yearlings, epiglottic structure was graded normal (N) in 648 (80%), slightly flaccid (*Grade I*) in 112 (14%), mildly flaccid (*Grade II*) in 34 (3%), moderately flaccid (*Grade III*) in 17 (2%), and severely flaccid (*Grade IV*) in 2 (<1%). Using any of the response variables, there was no significant difference in performance between normal horses and horses with *Grade I* epiglottic characteristics (min $p = 0.1906$). This population was considered normal. When 34 yearlings with *Grade II* epiglottis (mildly flaccid) were compared to normal yearlings, however, there was a significant difference in mean earnings (\$14,688 vs. \$4,025, $p = .0011$) and average earnings per start (\$3,726 vs. \$1,585, $p = .0361$) at two years of age. There was also a difference in earnings as 3-year-olds between normal horses and horses with *Grade II* epiglottis, but there was too much variability for it to be significant ($p = .3307$). There was no significant difference in the median values of N and II. There was a difference in average earnings per start at 3 years of age but it was not statistically significant ($p = .1368$).

When 17 yearlings with a *Grade III* epiglottis (moderately flaccid) were compared to normal yearlings, total earnings at 2 and 3 years of age was not significantly different. At two years of age there was a significant difference in average earnings per start (\$3,726 vs. \$918, $p = .0001$). There was a

difference in average earnings per start at age 3, but the difference was not statistically significant ($p = .0793$). Yearlings with *Grade IV* (severely flaccid) epiglottis were not evaluated because of their small number.

Seventy-three yearlings were recorded as having a small pharyngeal lumen. There was a significant difference in earnings at 3 years of age (\$40,270 vs. \$25,091, $p = .0276$) when these yearlings were compared to normal controls.

4. Discussion

There was no statistically significant difference in any parameter in the horses with *Grades I, IIa, and IIb* arytenoid functions. Functionally, these can be considered normal. Yearlings with *Grade III* arytenoid function either had higher or average earnings per start at age 2, which finding was influenced by one horse that won more than \$350,000 at age two but was unraced at three. At three years of age, there was a significant difference in number of starts and earnings between horses with *Grade III* arytenoid function and normal controls, which suggests performance limitation.

There was a significant difference between the earnings of horses with *Grade II or III* epiglottis and normal horses at 2 years of age, but at 3 years of age the difference was not significant. At 2 years of age, earnings per start were lower than those of normal horses ($p = .0011$), but at age 3 there was no statistical difference.

The technique used for epiglottis evaluation is semiquantitative, but no statistical difference was found in any of these groups during their 3-year-old year. The results of an endoscopic examination can have a major affect on the price of a yearling. Many yearlings with flaccid epiglottis' are discounted on prepurchase endoscopic examinations. This study should help us become more tolerant of a less than perfect epiglottis in yearlings. Small airways as a yearling seem to be detrimental.

References

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Definition of Terms

ABDUCT: referring to arytenoid function, it means the ability of the arytenoid to move out of the way, allowing better air flow as a horse breathes.

ASYMMETRICAL AND SYMMETRICAL: refers to the shape of the arytenoids. If they have the same shape, they are symmetrical, and if not shaped the same, they are to some degree asymmetrical.

ASYNCHRONOUS AND SYNCHRONOUS: refers to the movements of the arytenoids. If they move at the same time and in the same way, they are synchronous. If they do not, the arytenoids are to some degree asynchronous.

ARYTENOID CARTILAGE: cartilage structures that work like flaps to open the airway and tense the vocal cords when the horse breathes in air. They close the airway when the horse is swallowing to protect the windpipe (trachea) from feed contamination.



DORSAL DISPLACEMENT: backward displacement, referring to the soft palate displacing backward over the epiglottis. In swallowing, the soft palate normally and momentarily displaces over the epiglottis but returns to its normal position underneath the epiglottis. The term "displacement" is when the soft palate moves on top of the epiglottis and stays there.

ENDOSCOPIC EXAMINATION (SCOPING): use of an endoscope to examine a racehorse's or prospective racehorse's upper respiratory tract to determine general health and functioning of a horse's airway and its prospects for racing.

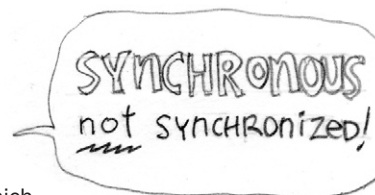
ENTRAPMENT: condition with several possible causes that prevents the epiglottis from moving properly.

EPIGLOTTIS: muscle tissue that covers the windpipe when a horse swallows. It fits through a hole at the rear of the soft palate.



FLACCID: soft; refers to the muscle tone of the epiglottis being flabby; may sometimes be a factor in entrapment and other problems with the epiglottis.

LARYNGEAL HEMIPLEGIA (OR ROARING): a condition in which the arytenoid flap becomes completely paralyzed. As a result, the arytenoid and the attached vocal cord obstruct airflow when the horse breathes and produce a "roaring" sound. Most commonly affects the left arytenoid and is often associated with trauma to the recurrent laryngeal nerve which runs down the horse's neck, around its heart, and back up the neck. (This nerve is responsible for moving the left arytenoid, and trouble with the nerve affects function of that arytenoid.)



OCCCLUSION: manual closing of the horse's nostrils to make the horse take a deep breath and encourage it to more fully abduct the arytenoids.

SOFT PALATE: the muscular floor of the pharynx and the roof of the back part of the horse's mouth.

UPPER RESPIRATORY TRACT: the arytenoid cartilage, epiglottis, and soft palate are the principal structures described in an exam of the upper respiratory tract.



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