



# KROSSCHECK™

## LEVERAGE TESTING DEVICE

*Owner's Manual & User Guide*



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## ***Recommended Use of the Krosscheck™ Leverage Testing Device***

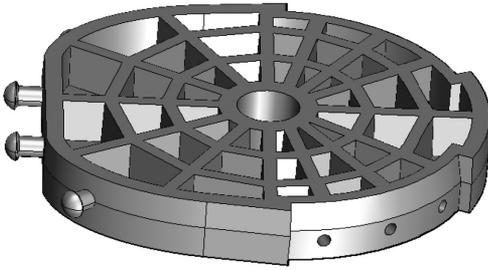
The Krosscheck™ Leverage Testing Device (KLTD) is designed as a complimentary work-up tool for veterinarians and farriers. This tool can be included in the standard lameness evaluation workflow to both add information for forming a diagnosis, as well as contribute to the structuring of a treatment plan. When the KLTD is used in conjunction with gait evaluations, nerve blocks, flexion tests, radiographs and other diagnostic imaging techniques, the ability to pinpoint a diagnosis can improve. Moreover, the use of the Leverage Testing Device encourages a close working relationship and participation between the veterinarian, farrier, horse owner and the horse. All members of the “Team” are able to offer input and hopefully make contributions that will ultimately help correct or at least improve the comfort and well-being of the horse.

Here is what Dr. Gayle Trotter had to say about the inclusion of Leverage Testing in a veterinarian’s lameness workup protocol.

“With an accurate presumptive diagnosis for lameness in horses, appropriate corrective measures often lead to a successful conclusion. However, chronic lameness can often present a disappointing challenge for many veterinarians. Leverage testing, and the interventions indicated by the testing results, offers options to help improve function in some of these cases. By paying careful attention during testing, and conscientiously monitoring case progress (and changing treatment as necessary) some of these cases can have significant improvement in their clinical signs and a return to useful function.” ~ Dr. Gayle Trotter, DVM, MS, Diplomate ACVS

# Component List & Assembly

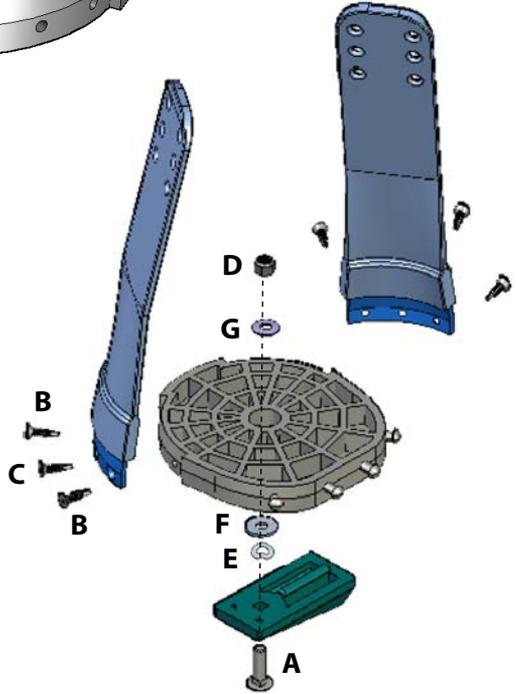
Base Plate (Sm, Md, Lg, XL)



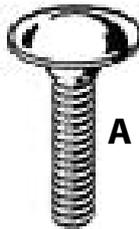
Wedged Dial (Sm, Md, Lg, XL)



Strap (x2)  
(Sm/Md or Lg/XL)



Carriage Bolt  
5/16 x 1"



A

Screw (x4)  
#8 x 3/4"



B

Pan Head Screw (x2)  
#8 x 1"



C

D  
5/16 Nylock Nut



E  
Wave Washer



F  
Flat Washer  
3/8 x 3/16"



G  
Flat Washer  
3/8 x 1/16"



*\*Non-Skid Adhesive Pad Not Shown in Illustration. It is applied to the FOOT Surface of the Base Plate*

# Application Instructions

## **General Notes & Recommendations:**

Prior to strapping the Krosscheck™ Leverage Testing Device (KLTD) to the horse's foot, there are several tips and guidelines to cover.

**1. WARNING** - The Krosscheck™ Device is primarily constructed of plastic, and although it works well on many surfaces, it can be slippery on some concrete finishes. For safety reasons, we highly recommend using the device only on rubber mats or firm dirt surfaces. We cannot be responsible for accidents that may occur if the device is used on slick concrete finishes.

**2.** The veterinarian or the farrier working on the case who will be in charge of making the grading evaluations needs to be the person picking up the foot that does not have the KLTD attached to it. A different individual that will not be responsible for evaluating the leverage grades can attach the boot and rotate the dial on the bottom of the device.

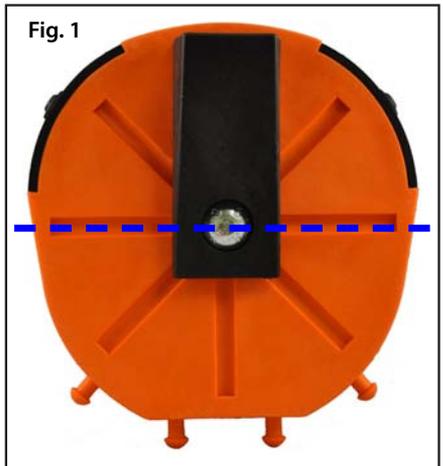
**3.** The person picking up the non-booted foot needs to remain consistent in how they approach the horse and how they pick up the foot. This will yield the most consistent information from the horse.

**4.** If at all possible, shoes should be removed prior to applying the Krosscheck™ Device. Reason for removing shoes are:

- Fitting the device is more difficult with the thickness of a shoe.
- Shoes/nails tear up the non-skid material on the foot side of the device.
- Removal of some flares or dorsal wall distortion may be necessary to get a proper fit and foot alignment on the device.

**5.** It is important to make sure that nerve blocks and/or sedation affects are worn off prior to doing the Leverage Testing procedure. The horse needs to be able to give a true pain response to the leverage test in order to offer reliable information. In addition, it is important for the horse to feel "TRUE" discomfort so that they do not incur further injury from having the foot leveraged.

**6.** When selecting the proper size boot, it is important to align the center of the KLTD as closely as possible to the center of articulation of the distal interphalangeal (DIP) joint. The center of the KLTD is basically the center of the attaching bolt for the wedged dial. (Fig. 1) To accurately locate the center of the DIP joint, we recommend using the NB Hoof Mapping Protocol as established by the Equine Lameness Prevention Organization.



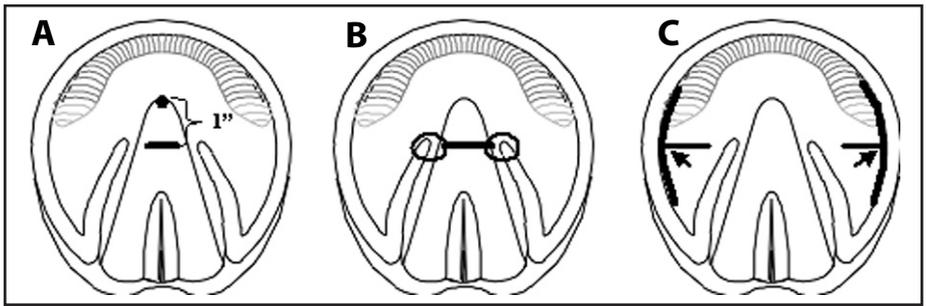
For the most current version please visit the ELPO website: [www.e-hoofcare.com](http://www.e-hoofcare.com).

In general, the center of the DIP joint is found through the combination of 3 methods, or the best 2 out of 3 in cases where all 3 do not fall in line with each other.

**A** - Measure back 1" (on medium size foot) from the TRUE (exfoliated) frog apex and make a mark.

**B** - Mark the termination point of the bars into the frog commissures on both sides of the frog. Generally there will be a 'swell' or reverse arc in the commissure that indicates the true termination of the bars.

**C** - Scribe a line along the sole/wall junction on both sides of the quarter region on each foot. It may be necessary to remove some chalky sole material to see this junction clearly. Visually or with a straight edge, mark the 'peak' or most outside point of that arc. This is generally the widest part of the 'sole'.



If all 3 locations line up, connect the lines with a marker. If only 2 of the 3 line up, use those locations and scribe a line across the foot. This will get you relatively close to the center of articulation of the DIP Joint. Continue the line at the widest part up on to the outside of the hoof wall. This will make it easier to align it with the center of the KLTD.



### Preliminary Guidelines

1. As mentioned in the recommendations earlier, horseshoes should be removed prior to establishing a baseline and applying the Krosscheck™ Leverage Testing Device. However, we DO NOT recommend trimming the foot before leverage testing so that you can get a true reading on how hoof distortions may be affecting the lameness. An exception to this rule would be if there exists a gross amount of hoof distortion and you cannot effectively get the KLTD lined up and attached to the foot. In that situation, you may need to have SOME OF the distortions/flare removed. Do be conservative though, as you will want to leave enough foot to work with for establishing a properly balanced foot later on.

2. Documenting the results of the Leverage Test is a key factor in having success with the KLTD. *[Data Collection Forms (in triplicate) have been provided in your KLTD Kit and you can order more from EDSS, Inc. (719) 372-7463. You can also download forms from our website and print them out at your convenience.]* Therefore, prior to establishing a baseline and attaching the KLTD, we recommend you fill in all the required information on the form, or have an assistant do it for you.

3. The primary veterinarian or attending farrier who will be determining the leverage grades must first establish a BASELINE reading prior to the KLTD being attached to the horse's foot. When you decide which foot you would like to test first, you establish a baseline by picking up the opposite foot. For example, if you are going the TEST the Right Front foot, you will pick up the Left Front foot to determine the comfort level of the horse while standing primarily on the Right Front foot. (Figure 2) Along with determining the comfort of the weight bearing on the Right Front, you will also be judging how easily or compliant the horse is to having their feet picked up in general. You should pick up the foot at least 2 to 3 times in order to determine an average response from the horse. It is also important to establish a consistency in the way you ASK for the horse's foot. (Figure 3) If your approach to the horse and to the limb is not consistent, your leverage testing results will be less accurate.



Figure 2



Figure 3

## Attaching the Krosscheck™ Leverage Testing Device to the Foot

4. Select the proper size Krosscheck™ Device using the guidelines mentioned earlier (e.g. The center of the foot [widest part of the foot] should line up with the center of the KLTD.) (Figure 4) Always make sure that you start with the Wedged Dial in the center heel position. (Figure 4)

5. Slide the foot into the KLTD making sure that the toe quarters of the foot are pressed firmly against the base of the attaching straps. The rubber surface of the straps will help hold the foot in place during the leverage testing process.

6. Reach around to the front of the foot and grab one of the attaching straps. (Figure 5) Pull the strap across the toe to the opposite side of the hoof, then wrap it around the diagonal heel bulb and attach the end of the strap to the pegs on the back of the base plate. (Figure 6) The PEGS that you will hook the end of the strap to will be on the same side of the KLTD as the attached end of the strap.

7. Next, reach under and grab the other strap and again pull it across the toe to the opposite side of the foot. (Figure 7) The strap should

then wrap over the heel bulbs and attach to the pegs on the same side of the boot. Once both straps are hooked over the pegs, they should have crossed over each other both on the front of the foot and at the heel bulbs. (Figure 8)



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8

8. Once the KLTD is securely attached to the foot and placed on the ground, adjust the straps so that they cross the ankle comfortably. (Figure 9) If the straps are too low on the hoof capsule, they will not hold the foot as securely. (Figure 10)

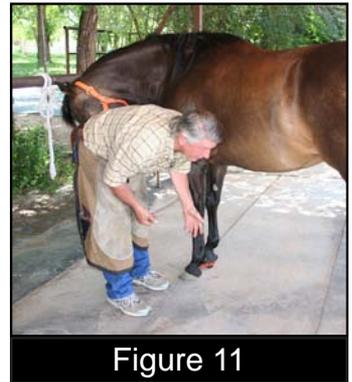


**Note:** To help keep the KLTD in good, working condition, set the foot on the ground, rather than letting it drop. Repeated slamming and jabbing of the toe of the boot into the ground may wear on the attachment support piece.

## Leverage Testing Evaluation Protocol

9. After attaching the KLTD and placing the foot on the ground, the horse may move their foot around and seem uncomfortable, especially if they are not use to having anything attached to their feet. Do not misinterpret this response as "pain" discomfort. The horse may need a moment to become use to the device being attached to the foot. They will usually become comfortable with it and then you can start your evaluation. Please note however that if the horse has had the KLTD on for several minutes without any fidgeting or apprehension, and then becomes uneasy or unable to find a comfortable spot, then this is mostly likely due to actual pain or discomfort. *We will cover more on reading the responses later.*

10. Once the horse has become use to the device being attached to their foot, you can begin your evaluation. Start by picking up the foot that does not have the device attached to it. Again, the way you approach the limb and pick up the foot should be the same as when you established your baseline. (Figure 11 & 12) Once you have picked up the foot, you will normally only hold it up for 2 to 3 seconds. At this time, you should be forming a judgement on



(A) how easily the horse picked the foot up, and (B) how willingly the horse holds the foot up or how urgent they are about putting the foot back down.

11. After 2 to 3 seconds, you will then place the foot back on the ground. At this stage you will evaluate (C) how quickly and how much they load the foot you just put back on the ground, and (D) how quickly and how much they unload the foot with the KLTD attached to it. (Figure 13)

12. You will repeat steps 10 and 11 at least 2 or 3 more times. Your final “grade” will be determined from your evaluation of the horse’s response throughout the whole process. Simply doing steps 10 and 11 one time will generally not give you enough “real” information because the horse may be a little apprehensive about what will happen when they pick up the non-booted foot. The second and third time you pick up the foot will usually yield the best information.

13. Additional responses from the horse can sometimes offer meaningful information as well. These are often times things that are noticed by your assistant, the farrier, or the horse’s owner. For example, the position of the other feet in order to re-distribute weight loading, attention or focus of the horse, licking & chewing to denote a feeling of relaxation, etc. can all be meaningful bits of information. In time, your personal experiences with the KLTD and the participation of the owner will likely enhance the usefulness of the Leverage Testing process in your diagnostic protocol.

14. Once you have completed all the required steps, you will need to make a determination of the Leverage Testing Grade for that foot with the Wedged Dial in the current position. The grading scale is located on the Data Collection Form and is listed below as well.

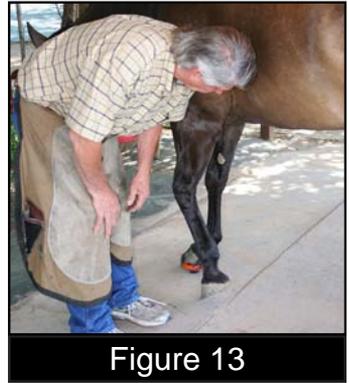
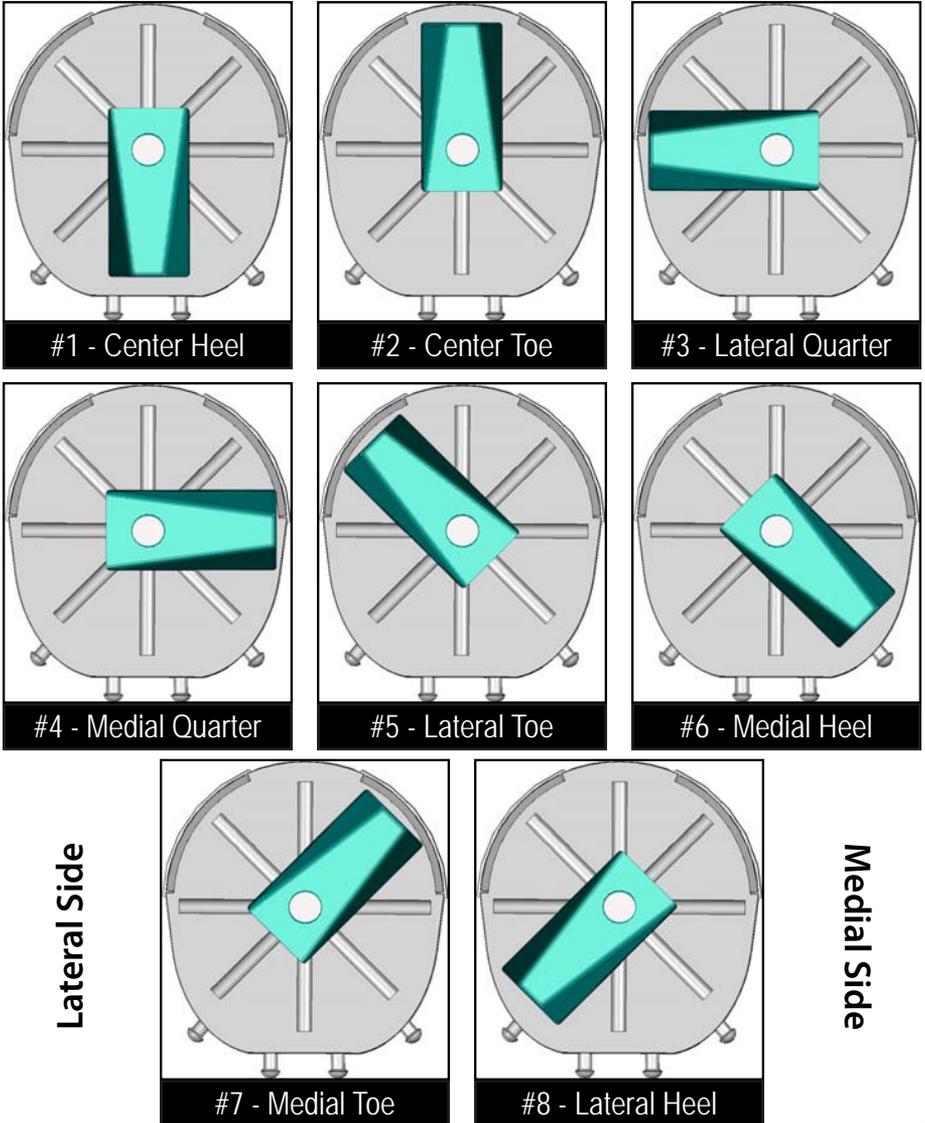


Figure 13

<b>- 1</b>		<b>- 2</b>	<b>- 3</b>
Mild Dislike		Moderate Dislike	Strong Dislike
Will Pick Up Other Foot But Will Not Hold it Up For Long. Unloads Other Foot Faster Than The Base Line.		Will Pick Up Other Foot with Hesitation, But Anxious to Put it Back on the Ground. Unloads Leveraged Foot Immediately.	Unwilling to Pick Up Other Foot or Cannot Even Get Foot with Leverage Device Placed on the Ground Due to Discomfort.
<b>0 (Neutral)</b>	Indifferent	Displays No Definite Comfort or Discomfort with the Position of the Leverage Device. Similar to the Base Line.	
<b>+ 1</b>		<b>+ 2</b>	<b>+ 3</b>
Mild Like		Moderate Like	Strong Like
Willing to Pick Up Foot. Not In a Hurry to Place it Back on the Ground. Unloads the Other Foot Similar or Slower than the Base Line.		More Willing to Pick Up Foot. Slow to Put Foot Down. Not Eager to Unload the Other Foot. Relaxes and May Elicit Some Licking & Chewing.	Picks Up Foot Without Asking. Holds Foot Up After Letting Go. Does Not Unload Leveraged Foot. Lots of Licking & Chewing.

15. After you have decided on a leverage evaluation grade for the foot with the wedged dial in the current position, you can turn the dial to the next recommended location. To turn the wedged dial, simply lift the thicker outside portion slightly and push the dial to the desired position. There is a locking mechanism molded into the base plate surface of the wedged dial that will fall into each groove as you rotate the wedge. If you find moving the wedged dial difficult, we have included a “Dial Handle” that can be inserted into the hole at the end of the wedge to make lifting and rotating easier. Below is a diagram that shows the recommended leverage testing sequence. You can modify it slightly to suit your own needs if necessary, but do keep in mind that you should always work in diagonals around the foot.

16. Repeat Steps 10 - 15 for each Wedged Dial position.



## Leverage Testing Results

When you have tested the horse in each position and recorded the grades, you will need to evaluate your results for both diagnostic and treatment development purposes. As mentioned at the start of this guide, the Leverage Testing Device is intended to be used in conjunction with your other diagnostic and imaging protocols. The results of the leverage test may offer some supporting information for a diagnosis that has already been established, or it can offer a direction for focusing specific imaging methods such as Radiographs or MRI. The following table is simply a general reference guide for primary structures that are most likely being influenced through the leverage testing. This is not to be considered a guide for determining a specific diagnosis, nor is this a list of ALL structures being affected.

<b>Table of Affected Structures</b>	
<b>POSITION OF WEDGE DIAL</b>	<b>PRIMARY STRUCTURES AFFECTED OR INFLUENCED</b>
#1 (Heel)	<ul style="list-style-type: none"> <li>- Decreased Tension of Deep Digital Flexor Tendon</li> <li>- Third Interosseus Muscle (Susp. Lig.) &amp; Extensor Branches of Susp. Lig.,</li> <li>- Increased Tension of Dorsal Digital Extensor Tendon</li> </ul>
#2 (Toe)	<ul style="list-style-type: none"> <li>- Increased Tension of Deep Digital Flexor Tendon</li> <li>- Third Interosseus Muscle (Susp. Lig.) &amp; Extensor Branches of Susp. Lig.,</li> <li>- Decreased Tension of Dorsal Digital Extensor Tendon</li> <li>- Increased Tension on Impar Ligament</li> <li>- Increased Tension on Collateral Sesamoidean Ligament</li> </ul>
#3 (Lat. Qtr.)	<ul style="list-style-type: none"> <li>- Increased Tension of Medial Collateral Ligament of DIP &amp; PIP Joint</li> <li>- Decreased Tension of Lateral Collateral Ligament of DIP &amp; PIP Joint</li> <li>- Coffin Joint Surface (contact on lateral side)</li> <li>- Increased Tension of Medial Collateral Sesamoidean Ligament</li> </ul>
#4 (Med. Qtr.)	<ul style="list-style-type: none"> <li>- Increased Tension of Lateral Collateral Ligament of DIP &amp; PIP Joint</li> <li>- Decreased Tension of Medial Collateral Ligament of DIP &amp; PIP Joint</li> <li>- Coffin Joint Surface (contact on medial side)</li> <li>- Increased Tension of Lateral Collateral Sesamoidean Ligament</li> </ul>
#5 (Lat. Toe)	<ul style="list-style-type: none"> <li>- Increased Tension of Palmar Medial Collateral Ligament of DIP Joint</li> <li>- Decreased Tension of Dorsal Lateral Collateral Ligament of DIP Joint</li> <li>- Increased Tension of Medial Collateral Sesamoidean Ligament</li> </ul>
#6 (Med. Heel)	<ul style="list-style-type: none"> <li>- Increased Tension of Dorsal Lateral Collateral Ligament of DIP Joint</li> <li>- Decreased Tension of Palmar Medial Collateral Ligament of DIP Joint</li> <li>- Decreased Tension of Medial Collateral Sesamoidean Ligament</li> </ul>
#7 (Med. Toe)	<ul style="list-style-type: none"> <li>- Increased Tension of Palmar Lateral Collateral Ligament of DIP Joint</li> <li>- Decreased Tension of Dorsal Medial Collateral Ligament of DIP Joint</li> <li>- Increased Tension of Lateral Collateral Sesamoidean Ligament</li> </ul>
#8 (Lat. Heel)	<ul style="list-style-type: none"> <li>- Increased Tension of Dorsal Medial Collateral Ligament of DIP Joint</li> <li>- Decreased Tension of Palmar Lateral Collateral Ligament of DIP Joint</li> <li>- Decreased Tension of Lateral Collateral Sesamoidean Ligament</li> </ul>

*\*The above table is only offered as a general guide. The participation of a qualified equine veterinarian and the use of further imaging diagnostic equipment may be required to verify any findings on a per horse basis.*

## Treatment Recommendations

It is our opinion that unrecognized and untreated hoof capsule distortions are a major contributing factor in many common lameness issues today. The Instructional DVD includes specific guidelines for preparing feet to minimize or eliminate hoof distortion. For best results, these guidelines should be closely followed. The type or style of shoe that is applied to the foot is less important than the hoof trimming. In many cases where the Leverage Grade varies by only 1 or 2 points from one position to its diagonal position, the lameness can usually be greatly improved through the recommended hoof preparation guidelines. In circumstances where the point spread from one position to its diagonal position is 3 or more, then a temporary mechanical apparatus (like a wedge rail) may be required in addition to the recommended hoof preparation protocol. Extra prosthesis or apparatuses built into the shoe or added to the shoe should be used with caution and monitored closely by the attending veterinarian and farrier. Examples of available mechanical devices and possible applications will be available on our website as they are submitted.

For full details on the recommended hoof preparation protocol, please visit our website. Below is a list of “general” guidelines we recommend for optimal treatment results.

- 1.** The live, “functional” sole should be used as your primary guide for trimming the hoof wall to achieve medial/lateral and dorsal/palmar balance.
- 2.** Heels should be prepared so they:
  - a)** have a similar curvature
  - b)** end close to the back of the frog (usually within 1/4”)
  - c)** are close to the level of the live sole
  - d)** offer a solid base of support for the back of the foot
- 3.** The sole in the toe region should not be over-trimmed. Only chalky, exfoliating material should be removed.
- 4.** The hoof wall in the toe-quarters (pillars) should be prepared close to the level of the live sole and at an equal height on each side relative to the live sole.
- 5.** The hoof wall should be dressed to eliminate flares and to achieve a uniform wall thickness all the way around when viewed from the bottom.
- 6.** The hoof wall should be dressed prior to fitting shoes so that the shoe is not shaped to match flares or distortions.
- 7.** The foot surface of the shoe should be equally distributed around the widest part of the foot from a dorsal/palmar perspective.
- 8.** In most instances, a slight roll in the toe of the shoe is helpful for minimizing leverage on the internal structures, especially in cases where lameness exists.
- 9.** Shoes with a half round or beveled outer perimeter are helpful for cases where lameness exists, especially for horses that turn circles.

# 1 YEAR LIMITED WARRANTY

The Krosscheck™ Leverage Testing Device comes with a 1 Year Limited Warranty on Product Defects & Failures. Certain components are susceptible to damage from normal wear and tear while using the device. Under the Warranty, we will replace the following components should they become unusable.

- **Wedged Dial** (Up to 2 Wedge Dials Per Size can be replaced under the terms of the warranty.)
- **LTD Strap** (Up to 4 Pairs of Straps Per Size can be replaced under the terms of the warranty.)
- **Non-Skid Adhesive Pad** (Up to 3 Pads Per Size can be replaced under the terms of the warranty.)
- **Base Plate** (1 Base Plate Per Size can be replaced under the terms of the warranty. Proof of Defect or Damage must be submitted to qualify for replacement.)
- **Bolts, Screws & Fasteners** (Can be requested with replacement parts.)

To qualify for replacement of defective or damaged components, you must **Register** your Warranty prior to making a claim. Without a valid Warranty Registration, we cannot process replacement requests.

You can Register your Warranty by Mail or Online at: [www.LeverageTesting.com](http://www.LeverageTesting.com)

## Contact Information

### **Technical Support, Purchasing & Product Replacement (Outside Europe)**

Equine Digit Support System, Inc.  
506 State Hwy 115 ~ Penrose, CO 81240 ~ USA  
Phone: (719) 372-7463 ~ E-mail: [edssinc@nbhoofcare.com](mailto:edssinc@nbhoofcare.com)  
[www.nbhoofcare.com](http://www.nbhoofcare.com)

### **Technical Support, Purchasing & Product Replacement (Europe)**

Total Foot Protection, Ltd.  
Bridge House Equestrian Centre ~ 5 Oaks Road  
Horsham ~ West Sussex ~ United Kingdom ~ RH13 0QW  
Tel: +44 (0)1403 791000 ~ Website: [www.totalfootprotection.com](http://www.totalfootprotection.com)

### **Documentation & Additional Product Information**

**[www.LeverageTesting.com](http://www.LeverageTesting.com)**