

## FAQ

### **Can a Leatt® GPX brace be used in a harnessed seat?**

No.

### **Can I use a Leatt neck brace if I have sustained previous injuries affecting my neck and/or spine?**

We cannot provide advice in cases of pre-existing medical conditions for a number of reasons. You should consult a qualified physician about the appropriate protection. We suggest you take the product information from our website to your physician consult.

### **Can I use a Leatt-Brace® over a motorcycle jacket with integrated armour?**

While the Leatt neck brace should sit on the front member, shoulder wings and thoracic member, as close to the body as possible, it can be worn over a jacket as long as it sits correctly on the shoulder, chest and the thoracic member areas. We cannot provide any assurances with respect to use of third party protective gear with the Leatt neck brace, since the manner in which such third party gear is used or worn, and its condition, may significantly affect the function of the Leatt neck brace.

### **Can I use a Leatt neck brace with a chest-protector?**

The Leatt neck brace can be worn over a chest protector as long as it sits correctly on the shoulder, chest and the thoracic member areas.

From the User Manuals, the best placement of the thoracic strut is directly up against the body, i.e. under the chest protector. The purpose of the thoracic strut is to prevent rotation of the Leatt neck brace.

When wearing a Leatt® Chest Protector, which has been specifically designed to accommodate the Leatt neck brace, the brace can be worn either over or under the chest protector. All Leatt® body protection include Leatt®'s unique BraceOn™ systems that keeps the brace securely in place and allows for individual movement of brace, protector and body.

### **Can I wash the padding?**

Yes, the padding should be removed from the brace and hand-washed in a mild detergent. Please consult your brace's user-manual for complete instructions on care instructions.

### **Can the Leatt neck brace prevent PURE axial loading?**

Pure axial loading cannot be prevented by any currently available brace. Achieving this will render an impractical device, as it would inhibit safe riding. The Leatt neck brace was designed to help reduce axial forces when acting in combination with other forces (bending moment and shear forces). This happens in most impact scenarios when the head goes into hyperextension (over-bending of the head in rearward direction) or hyperflexion (over-bending of the head in forward direction). The brace absorbs and reduces forces once the

head has moved out of the original line of impact and limits excessive range of motion of the neck.

### **Does the head need more ability to slide forward (or back) in its more “natural” motion?**

Allowing more frontal motion of the head (slide) creates higher shear forces (cutting forces), which in turn increases the likelihood of a serious spinal cord injury, through an increase of the Neck Injury Criteria. In addition to this, allowing the head to slide, increases the rotational angle of the neck during an impact, increasing bending moments (torques) on the neck. It is ideal to allow some rotation of the neck but to then limit this rotation through padded contact with the helmet. In addition to this, the padding on the upper surface of the brace allows for some absorption of force during chin/brace impact force, as the chin rotates through the helmet and onto the brace.

### **Does the Leatt neck brace absorb energy, or redirect the energy of the fall?**

Alternative Load Path Technology™ helps reduce forces on the spine by redirecting and dispersing energy away from critical areas during impact. The brace acts as a physical constraint through which an alternative load path can be developed providing an optimized combination of rigid motion limitation and deceleration through absorption. This principle is pivotal to the Leatt neck brace design and a world first.

In other words, if the head and neck are subjected to a force, and you can mitigate that force somehow, in the neck, and transfer that energy elsewhere – you may be able to reduce the incidence of neck injury.

In the design of the brace – both front and back – are biomechanical zones where the brace will flex to a point absorbing energy, offering a resilient surface to work as an alternative load path, and thereafter it will yield. Additionally, the design of the Moto GPX ensures that the head is decelerated in a controlled way so as to limit sudden deceleration forces on the brain, where the head is “stopped early” therefore reducing relative brain/head motion. These zones are designed to yield well before anatomical structures such as the sternum and the thoracic spine are at risk of damage.

### **Does the Leatt neck brace cause collarbone injuries?**

According to research, collarbone fractures (collar bone injuries) are approximately 50 times more likely than cervical spine fractures in Motocross and Supercross. Collarbone fractures usually occur in three ways, namely; i) a fall onto an outstretched arm, transmitting the force up the arm to the collarbone, ii) a direct fall onto the shoulder, transmitting force to the collarbone, or iii) helmet rim striking the collarbone in a fall with lateral flexion of the head/neck. The Leatt neck brace is designed to limit this type of collarbone fracture by protecting the collarbone from the helmet rim as the collarbone passes inside of the designed Collarbone Relief Area on the underside of the Leatt neck brace. It is important to remember that with the Leatt neck brace on, the arm/shoulder can be abducted (lifted up) all the way without the Leatt neck brace Collarbone Relief Area coming into contact with the collarbone, and preventing or reducing a bending force on the collarbone around the Leatt neck brace.

## **How do I get the best fit for my Leatt neck brace?**

Optimal brace fitment is achieved by selecting the correct combination of adjustment pins, thoracic strut angle and (for certain models) setting the height adjustable front and rear tables to a position that suits your body shape and the size, length and range-of-motion of your neck, as described in our user manual.

There are 3 rules of thumb to check whether your brace fits correctly:

- 1. The brace should fit snug, but not too tight. When you lift your arms, the brace should comfortably move up with your arms and drop back onto your shoulders when you drop your arms. If the brace stays up, it is too tight and should be adjusted.
- 2. You should be able to comfortably fit your fingers between your back and the thoracic member of the brace. If you can't fit your fingers between your brace and your back, it is too tight and should be adjusted. If your whole hand fits, it is too loose and should be adjusted.
- 3. Finally, when pressing down on the front or rear table of the brace, it should not rock back and forth excessively on your shoulders. If this occurs, then the brace is too loose and should be adjusted. If no movement occurs, then the brace is too tight and should be adjusted.

## **How does a helmet interface with a Leatt neck brace?**

The interface between the helmet and the brace is an important aspect in our 'Alternative Load Path Technology' (ALPT®). In the event of an accident, the first reaction of the head (and neck) is naturally to move out of the way of the applied force. This is an extremely effective method (provided by Mother Nature) of reducing the total amount of force transmitted to the neck. Thereafter, the ALPT® offered by the Leatt neck brace comes into play, effectively transferring significant force away from the neck safely to other body structures. Our braces are delivered with a user manual that explains the way to optimize the brace setup.

## **How does the pressure from the brace (in an accident) adversely affect the sternum?**

It takes a large amount of force to damage the sternum. The surface area of the bottom platform of the brace has been maximized to keep pressure transfer to the sternal area as low as possible. The bottom surface of the brace is also padded to assist with load transfer. The top surface of the brace has been engineered to first absorb forces and then to fracture at predetermined loads well before injury thresholds of vital structures are reached such as the sternum.

## **How is the safety of the Leatt neck brace qualified or quantified?**

In the European Union the GPX and Kart versions are certified in terms of Health & Safety requirements of directive 89/686/EEC that covers Personal Protective Equipment.

During the certification process, because no standard exists in the EU against which to evaluate the performance of a neck brace, the Notifying Body was very cautious. It meant

that we had to convince them that our design philosophy, manufacturing specification, quality processes and the extensive testing was appropriate and sufficient to back up the claims we make of our brace. Only then was a CE certificate awarded.

### **I ride both moto and downhill, which brace can I use?**

While the GPX and DBX braces are structurally the same, the main difference is in the padding. The padding on the DBX braces is specifically designed for bicycle application and has a lower profile than any padding currently available for GPX braces. Leatt® does NOT recommend using DBX-specific padding for motorcycle applications.

If you want to ride both moto and DH, we recommend you purchase a GPX brace. If you find the padding too restrictive for DH, then you can purchase a DBX-specific padding kit and just change the padding to suit the application.

### **In road/street accident, what happens if the rear wing (STX) catches on the ground during a slide?**

As with the DBX and GPX braces, the top upper lip of the brace is designed to break in a situation like this.

### **Is there a third party organization that rates or approves this type of device? Are there any CPSC regulations or standards?**

Unfortunately in both the European Union and in the USA there is no standard against which the performance of unrestrained torso neck protective devices can be measured. Nor can we find any CPSC regulations or standards in the USA that apply to motorcycle neck braces. For this reason Leatt® is collaborating with the SFI Foundation in the USA to create what will become Standard SFI 57.1 that will cover these products.

Testing has formed an integral part of the research, prototyping and development of the Leatt-Brace®.

Initial formal testing was done at the SABS (Southern African Bureau of Standards) Land Mobility Technologies Laboratory and followed by extensive biomechanical pendulum testing at the BMW Accident Research Center in Munich, Germany. Results were meticulously combined with field studies by professional motorcyclists, bicycle riders and medical authorities and the ride and comfort of the brace was evaluated by KTM Factory Riders

In support of testing, the Leatt® Biomedical Division – the Leatt® – Lab – is well equipped with pendulum, dynamic and static test rigs, sophisticated simulation, modeling and finite element analysis software and a Hybrid III Anthropometric Test Dummy. Based on their in depth understanding, our biomedical engineers are able to develop the most sophisticated models that depict what happens in the neck during an accident and then evaluate new brace prototypes on the test dummy to determine their design effectiveness.

### **What are the differences between the braces in the Leatt® range?**

The main difference between the GPX Adventure and GPX Club (GPX) and DBX Ride and DBX Comp is adjustability. The GPX Adventure/DBX Ride's front and rear tables are in a fixed position, while the front and rear tables of the GPX Club/DBX Comp are fully adjustable.

Both PRO braces have fixed front and rear tables, which are lower profile than the lowest setting of the Adventure/Comp braces. The PRO range of braces are also significantly lighter than any other Leatt neck brace currently available.

For full details of features, please consult individual product pages on the website.

### **What happens if/when my chin hits the brace?**

The Leatt neck brace has been specifically designed in such a way that the front platform limits extreme neck extension by bringing the head to a controlled stop against the helmet rim, chin and brace upper members. The brace itself has sufficient padding to decrease the chances of concussion in the case of an impact to the chin. No safety device can protect against every possible situation, provide stated protection if worn improperly or modified by the rider or others, or against reckless behavior.

### **What is the best way to use a Leatt neck brace with a pressure suit/body vest?**

The Leatt neck brace should sit on the front member, shoulder wings and thoracic member, as close to the body as possible. Any other arrangement may adversely impact the protection afforded by the Leatt neck brace. We cannot provide any assurances with respect to use of third party protective gear with the Leatt neck brace, since the manner in which such third party gear is used or worn, and its condition, may significantly affect the function of the Leatt neck brace. As for the touching of the helmet on the rear member of the brace, it is quite normal for there to be slight contact when tilting the head backwards.

When wearing a Leatt® Body Jacket, Body Vest or Back Protector, which has been specifically designed to accommodate the Leatt neck brace, the brace can be worn either over or under the device. All Leatt® body protection include Leatt®'s unique BraceOn™ systems that keeps the brace securely in place and allows for individual movement of brace, protector and body.

### **What is the difference between the DBX and GPX brace?**

While the GPX and DBX braces are structurally the same, the main difference is in the padding. The padding on the DBX braces are specifically designed for bicycle application and has a lower profile than any padding currently available for GPX braces. On the 5.5 model the DBX braces have a slight cutout in padding on the rear upper table.

### **What is the function of the Thoracic Strut?**

The thoracic strut's main function is to keep the brace in place upon impact, so while it also absorbs some of the impact forces, it basically keeps the brace in place for just long enough so the upper portion can do its job in the event of a serious crash. The strut is designed to break at about 70lbs (32kg) of force, which is far below the forces required to injure this area. To put this into perspective: back protector impact testing specifies a pass force of 9kN which is 30 times the fracture force of the strut. Statistics have shown, in cases where riders have broken their backs in a motorcycle accidents (without braces worn), that the most common vertebrae to break are in the mid to lower Thoracic Spine region, as this is where

the back curves/flexes most. A twig always snaps at its point of maximum curvature (The same can be said for the C5 vertebrae in the shorter Cervical Spine). The fact that the Leatt® Thoracic Strut ends in this mid thoracic (T5) region (if a rider is wearing a Leatt-Brace®) is therefore irrelevant, as the strut will fracture well before injurious levels are reached and in addition the load transfer is shared by the paraspinal muscles (running on either side of the spine). In fact, some of our testing has shown that the support of the strut at this level helps prevent excessive “buckling forces” of the most curved portion of the thoracic spine.

### **What kind of helmet can I use with a Leatt-Brace®?**

We suggest the purchase of a D.O.T, Snell, ECE or other similar industry standard approved helmet, simply because we believe that a helmet built to a defined standard offers a more consistent guarantee of protection and performance. However, in practice, the Leatt-Brace® is designed to work with all full-face helmets, or a deep profile open face helmet that covers your ears.

### **What kind of injuries does it prevent against?**

The Leatt neck brace helps protect against the following extreme movements that could result in serious injury:

- Hyperflexion – over-bending of the head in a forward direction
- Hyperextension – over-bending of the head in a rearward direction
- Lateral Hyperflexion – over-bending of the head to one side
- Posterior Hypertranslation – extreme movement of head and helmet, rearward on the neck
- Coupled Axial Loading – helps prevent axial loading only when the axial forces act in combination with other mechanisms..

### **Which area of the back is most vulnerable to spinal injuries?**

Published data clearly states that the T6/T7/T8 area is known to be the area of most spinal injuries (without the brace). These statistics are well published in all reputable biomechanical journals.