

Laser Scans in Bledsoe Custom Knee Bracing Criteria and Instructions

Laser scanning can be an accurate and easy way to obtain a model of a patient's leg if proper techniques are utilized. However, common errors can result in a model that does not accurately represent the proper shape. The following criteria are intended to help minimize the errors and provide the greatest accuracy possible resulting in a custom brace that fits the patient properly. The criteria are divided into several categories making it easy to remember the key points.

Proper Equipment

Bledsoe Brace Systems can receive and carve leg models from the most prevalent O&P industry standard file format (.aop), produced from the Insignia Laser Scanning System (Hanger) or the Polhemus Fast Cobra laser scanner. We utilize an Insignia CAD/CAM carver. A reasonably good computer with Internet access should be available to e-mail the files to Bledsoe Brace Systems.

Facility Preparation

The laser scanning systems mentioned above both utilize magnetic field detectors to establish the relative position between the scanning head and the patient's leg.

- **The scanner should remain several feet away from any metal objects.**
- The room should be dimly lit or semi-darkened.
- Patients should have a stable place to stand and a place to hold on for balance.
- A small box or plastic chair should be used to support the patient's other foot and leg to allow the scanner head to fit in between the legs.
- A **black non-reflective background is essential**. It will prevent stray reflections off of walls or other objects that creates noise in the file rendering it useless.
- A light-colored elastic stockinet or cover for the patient's leg will increase contrast. You must have a smooth consistent reflective surface without patient hair.
- Black elastic or Velcro bands act as terminators of the scan at the upper and lower sections of the leg.

Patient Preparation

The patient should be prepared as follows:

- The patient should be asked to wear shorts.
- The leg should be covered with stockinet high enough to allow **8" or more above and below the knee after trimming the model**.
- The position of the medial femoral epicondyle should be marked and referenced as part of the scan.
- A black band at least 2" wide should be wrapped circumferentially around the patient's thigh and calf at a point at least 9" – 10" above the knee and 8" below the knee to act as boundaries. There should be enough room on the scan to allow for trimming the model with 8" remaining above the knee at the back side of the leg after horizontal trimming.
- Attach the magnetic position detector (transmitter or receiver according to the system) to the patient in accordance with the manufacturer's instructions.

Patient Position

The patient should be positioned as follows:

- The patient should be standing with most of the body's weight on the leg to be scanned.
- Handrails or some other support should be used to assist the patient with proper balance (avoid metal!).
- The opposite leg should be positioned out of the way (maybe with the foot propped upon a small box or plastic chair located to the side and back).
- The knee should be bent or flexed at approximately 5° to 10° (if in doubt, extend the leg fully then move the kneecap forward about 1" to 1-1/2").
- Allow the patient to relax until just before the scan.
- Just prior to scanning, the patient should be asked to isometrically contract the leg muscles in a firm but comfortable manner.
- The patient should be asked to remain **as motionless as possible** during the actual scan.

Scanning Techniques

The following scanning techniques are important:

- Scanning should be done with smooth constant speed vertical motions with as little rotational movement of the wrist as possible. Scanning too fast leaves gaps, and too slow may create too much data to process.
- Tilting the laser up or down should be minimized. This reduces scan accuracy.
- Avoid accelerating and decelerating, and any rapid movements.
- Maintaining the beam on the leg surface avoids reflections off of surrounding objects.
- Avoid turning the scanner sideways.
- Move around the patient to scan all areas vertically and avoid reaching around behind the leg.
- If the patient moves, the scan should be discarded and a new scan started.
- Make each sweep overlapping the previous sweep slightly.
- Look at the computer screen to see what sections remain to be scanned.
- If the system is equipped with a point collector, indicate the medial femoral epicondyle.

File Manipulation and Preparation

After scanning, the following file manipulations are important:

- Smooth the outer surface of the model using the tools in your software.
- If possible, allow the system to optimize and reduce the number of triangles in the mesh.
- Be certain to close the top and bottom of the scanned model with a surface.
- Carefully scrutinize the model for discrepancies and unusual noise or movements.
- The vertical scan axis must be centered in the A/P and M/L planes by tilting the model to align the vertical axes and position the center axis as close as possible in the center of the volume.

Sending the File

The finished file should be attached to an e-mail sent to the following e-mail address for laser scans:

sales@bledsoebrace.com

Suggested Subject line:

Custom scan order

In the body of the email, please be certain to include the following information:

Acct #

PO #

Contact Name:

Billing Account Number, Name, and Address (if different from account):

Patient Name:

Age:

Weight (lbs):

Inseam (inches):

Gender: M or F

Diagnosis:

Affected Leg: L or R

Instability/Deficiency: ACL, PCL, Combined, MCL/LCL/Meniscus, or None (prophylactic use)

Functional Brace Type: Axiom, Axiom-D, Ultimate CI, Ultimate Dynamic, Axiom Sport (Reg or Hi-Impact)

***Shell Color Number (refer to Custom Color Chart):**

OA Condition: Medial (Varus) or Lateral (Valgus)

OA Brace Type: Thruster RLF or Aligner ESE

Specify if 24 hour manufacturing turnaround desired. Additional charges apply.

Specify if a shipping method other than FedEx 2Day or UPS 2DA is desired. Additional charges apply.

* Custom Color Chart also found at www.bledsoebrace.com. If no color specified, brace color will be black. Custom colors are not available on Custom OA braces.

Options/Accessories (additional charges may apply)

Under sleeve qty: 1 or 2

Padded Over sleeve qty : 1 Or 2

Patellar guard (Ultimates and Axiom Sport only):

AFO attachment (OA braces only):

Carrying Bag:

Custom Embroidery on Bag:

Additional Pad and/or Strap Sets:

Our website also features a special page where you can attach the scan file and enter all appropriate information in one online form. The page may be accessed by following the "On-line Order Form" link found on this page: <http://bledsoebrace.com/custom/order.asp> .

Bledsoe Brace Systems

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