



**Charleston  
Bending Brace®**

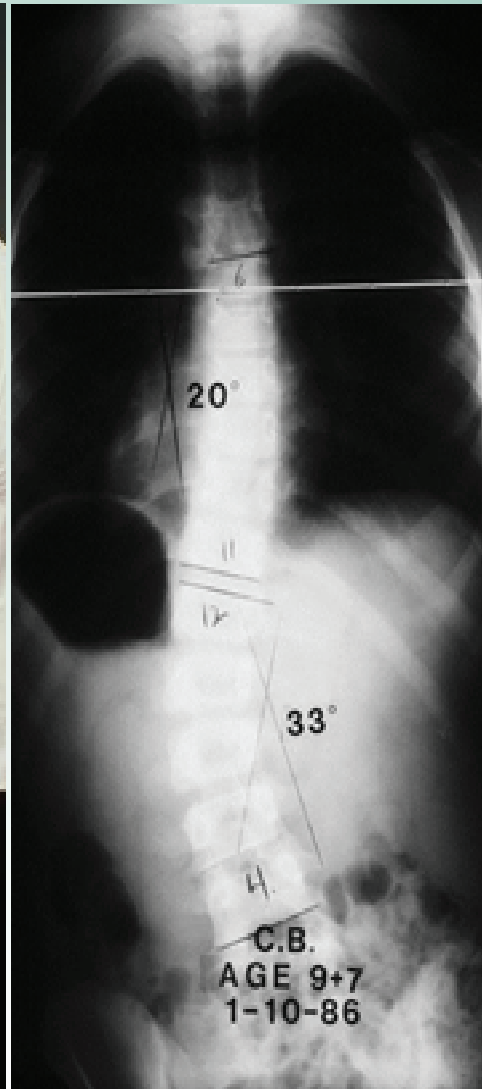
**3905 Ashton Shore Lane  
Mt. Pleasant, SC 29466**

**843-884-2202  
[www.cbb.org](http://www.cbb.org)**

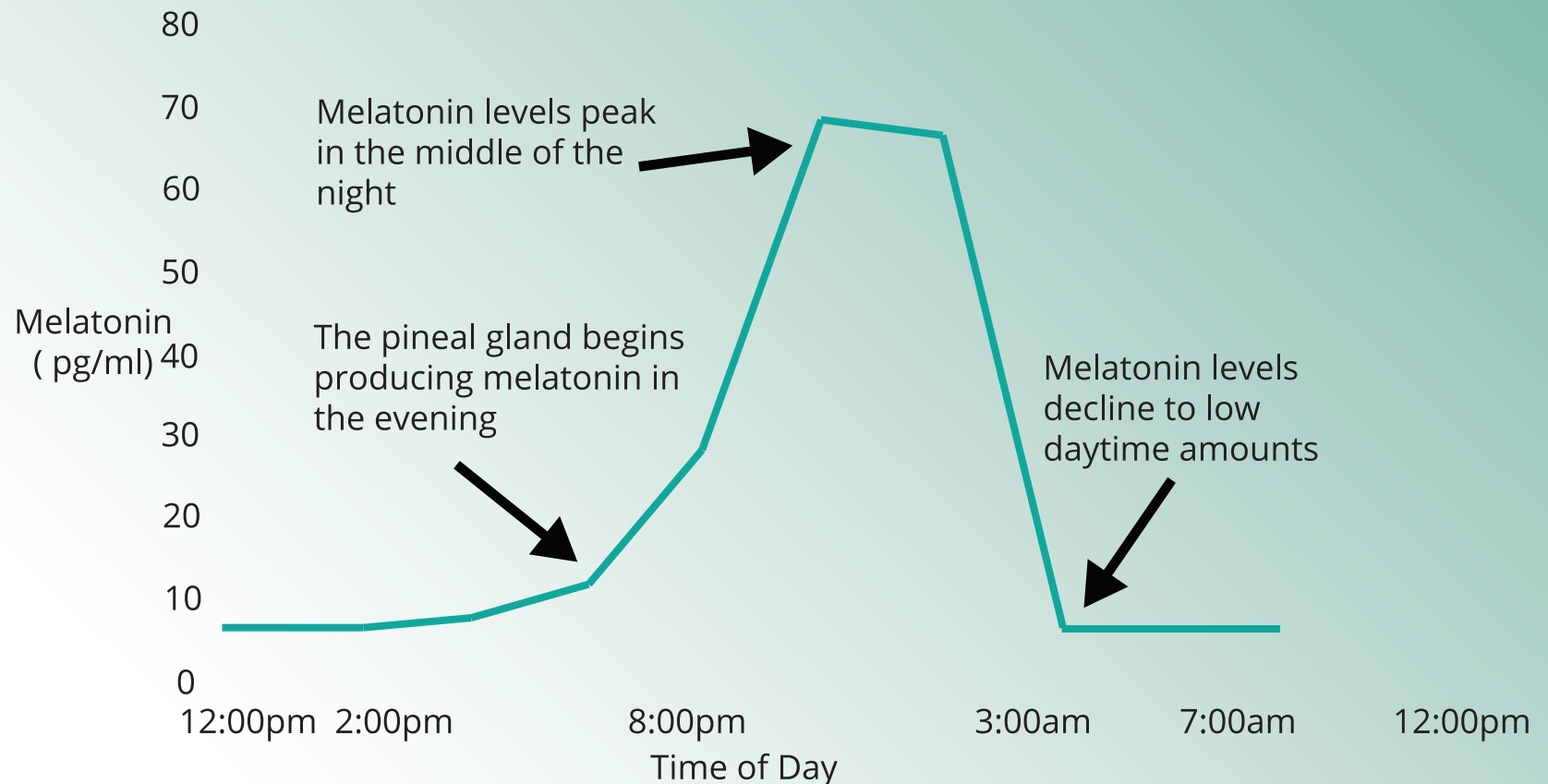


**Non-Surgical  
Nighttime  
Scoliosis Management**

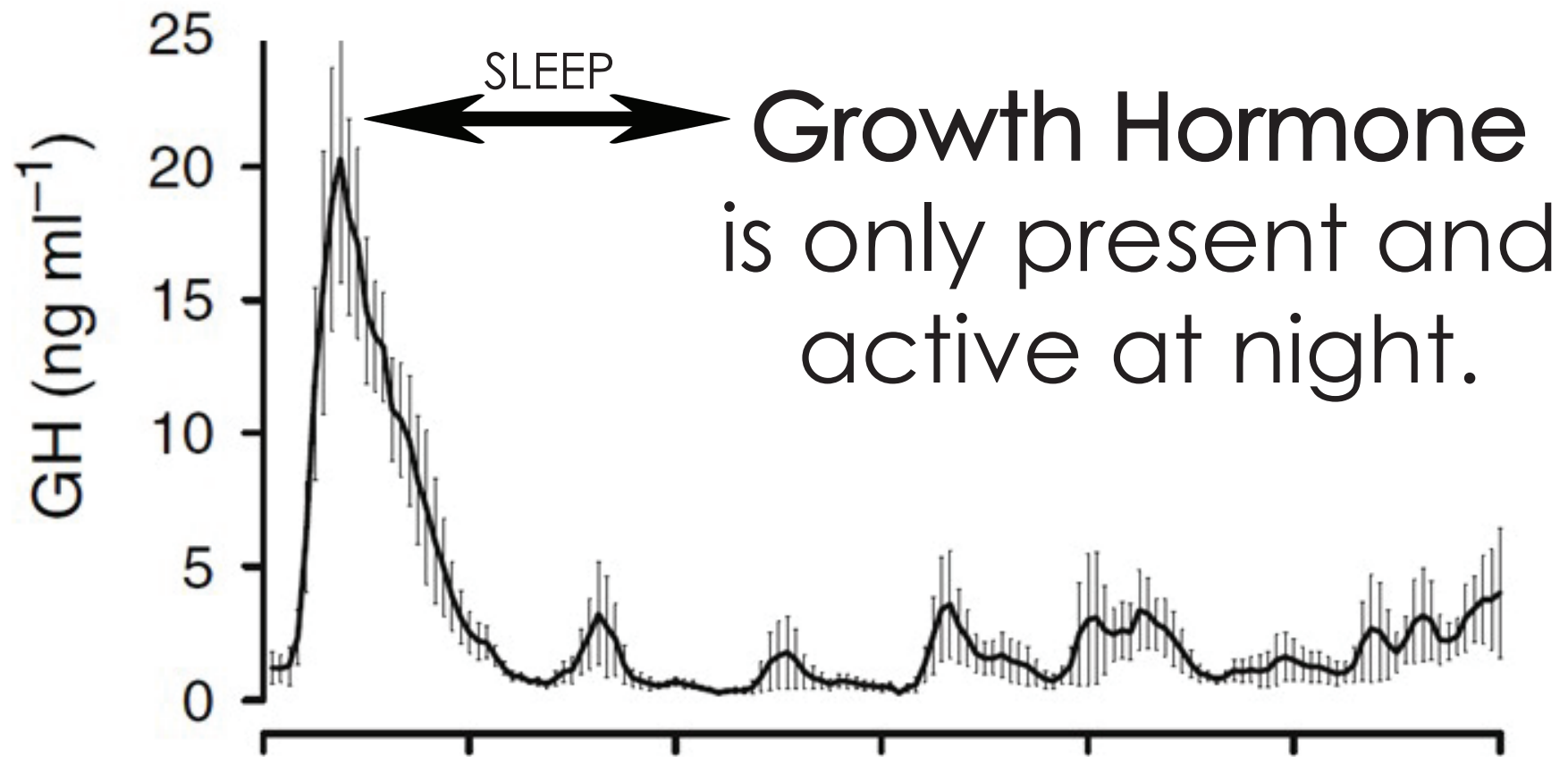
# BENDING BRACE: GROWTH MODULATION



- ① **IF** scoliosis is a disorder of **GRAVITY** then **daytime** support is necessary.
- ① **IF** scoliosis is a disorder of **GROWTH** then **nighttime** bracing may be all that's required.



- 🕒 Levels are high at **night** - minimal levels during the day
- 🕒 Levels are low in patients with progressive AIS



Brandenberger G, "The 24-h growth hormone rhythm", J Sleep Res. 2004 Sep;13(3):251-5.

# TIBIAL GROWTH IN LAMBS



“...at least 90% of **bone elongation occurs during recumbency** and almost no growth occurs during standing or locomotion. The authors hypothesize that growth may also occur in children during rest or sleep.”

Noonan KJ, et al. JPO 2004;  
24(6):726-31

## Spinal Growth Modulation by Compression

1. Villemure I. Aubin CE. Dansereau J. Labelle i. H. European Spine Journal. 13:83, 2004
2. Newton PO, et.al. Spine. 30:2608, 2005
3. Stokes IA, Aronsson DD, et.al. Journal of Orthopaedic Research. 24:1327, 2006

## Correlates to Biomechanical Effectiveness of Brace Treatment in AIS

“In the framework of the **Hueter-Volkman principle**...in brace correction predicts long-term outcome of the treatment and provides insights in the understanding of brace biomechanics.”

Clin J, Aubin CÉ, Sangole A, Labelle H, Parent S Spine 2010 ;35(18):1706-13.

- ① This study quantified the Charleston Bending Brace's biomechanical effect, which consists in inverting the asymmetrical compressive loading in the major scoliotic curve
- ① The reduction of the major scoliotic curve varied between 58% and 97% and was in the range of published clinical data.
- ① Internal compressive stresses up to 1 MPa were generated on the convex side of the major scoliotic curve and tensile stresses up to 1 MPa on its concavity

**Labelle H, Clin J, Aubin CE, Parent S Spine 2010  
1;35(19):E940-710**

# EARLY INTERVENTION STUDY

- ① Early intervention treatment with the CBB may reduce progression to full-time bracing threshold.
- ① This study focused specifically on curve magnitudes between 15-25 degrees in skeletally immature, pre-menarchal females.
- ① 100% of patients in the control group (observation) resulted in curves progressing to standard criteria for full-time bracing.
- ① 29% of patients randomized to night time wear were maintained without curve progression. (Statistically significant).

# GROWTH MODULATION



- ① Bending increases pressure on convex vertebral growth centers to reduce growth
- ① Can be used for high thoracic curves
- ① Double curves are difficult to brace but can be treated by bending brace

## New Evidence. New Solutions.



**CBB Standard**

- MPE (Modified Polyethelene)
  - Anterior Opening
  - Dynamic Lumbar Pad (CBB Type II Curve Only)



**CBB - Lite**

- Softer Polyera Material
- Recommended for Smaller Patients
  - Neuromuscular Anomolies



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**NON-SURGICAL NIGHTTIME  
SCOLIOSIS MANAGEMENT**