Effects of a novel brace for treatment of the patients with adolescent idiopathic scoliosis; Good compliance leads to satisfactory results.

Kai HIRATA[1] Osamu SHIRADO[2] Masanori ABE[3] Takuya KIGAWA[1] Tatsuya ENDO[2] Masumi IWABUCHI[2]

1）Nippon Sigmax Co., Ltd
2）Aizu Medical Center Orthopaedics & Spinal Surgery, Fukushima Medical University
3）Tohoku Prosthetic and Orthotic Co., Ltd

Purpose

Many studies have shown that brace treatment is the only effective way to treat adolescent idiopathic scoliosis (AIS) conservatively. However, the compliance for brace treatment is low. We developed a novel brace and monitoring system to solve this problem.

The purpose of this study was to investigate the middle-term effects of a novel brace from both sides of the correction rate and wearing time.

Introduction of AMEC brace and monitoring system

【AMEC Brace】

Based on the principle of 3 point-fixation.

Lumbar Type / Thoracic Type
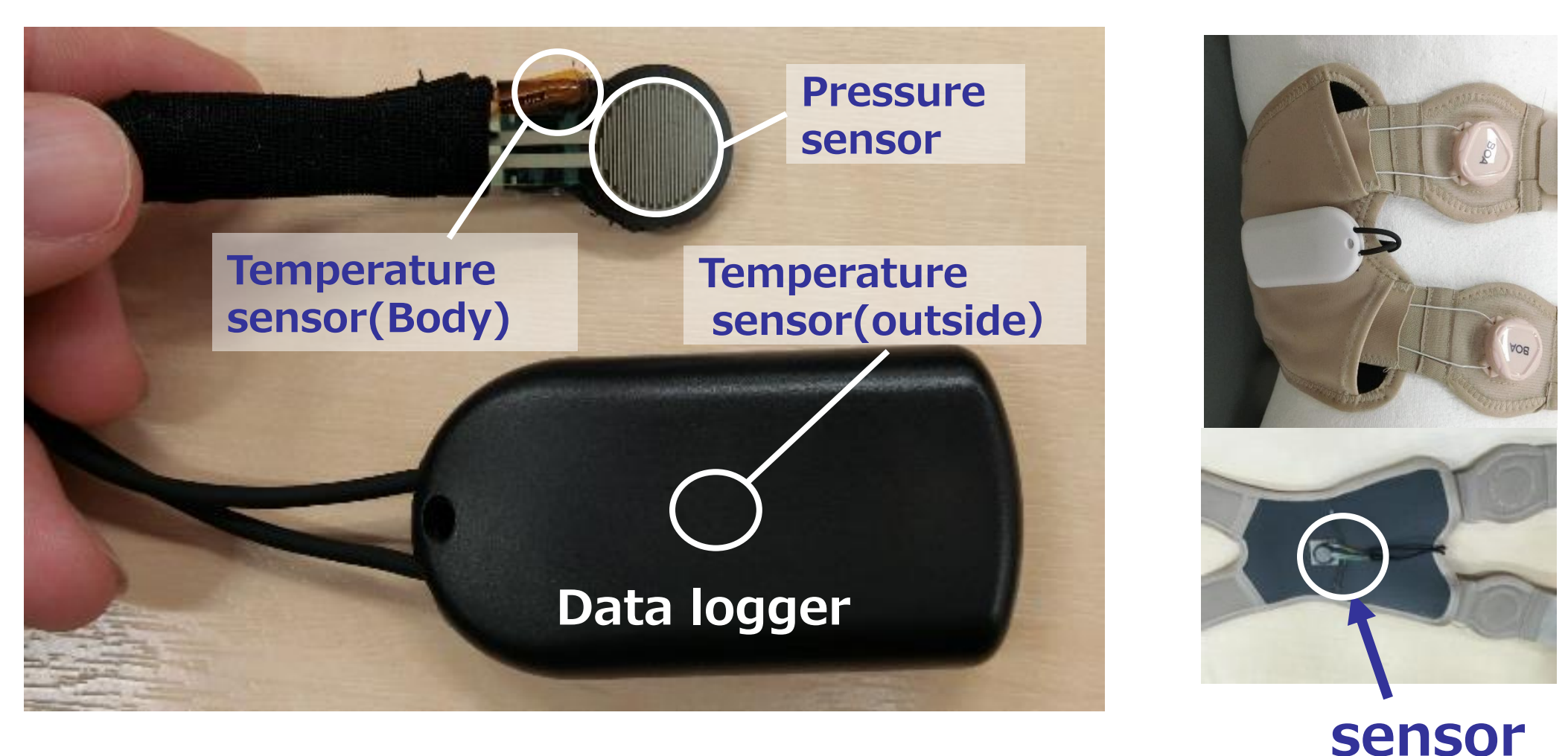
① Trunk Cuff：Made of FRTP
② Pad：Dial adjustment system
Concept：Light, Low profile, Easy to wear

【Monitoring system】

It consists of a temperature sensor, a pressure sensor, and a data logger.
Measurement interval：every **10** minutes
Both data can be saved for **300** days.

Pressure sensor / Temperature sensor(Body) / Temperature sensor(outside) / Data logger / sensor

Brace compliance：

→『**no wear**』,『**wear**』,『**effective wear**』

Methods

The subjects are **14** patients with AIS.
The AMEC brace treatment was started with the consent of patients and guardians.
The follow-up period is 1 year.
We observed the brace compliance using the monitoring system for 1 month.

【Inclusion criteria】
・10~15 years
・Cobb angle of 25~40 degrees
・Risser sign less than 3
・Within 2 years after menarche

Results and Discussions

There were **8** lumbar and **6** thoracic curves.

	Initial correction rate	Correction rate after 1 year	wearing time after 1 year
Lumbar (N=8)	43.7 %	42.9 %	16.3 hours/day
Thoracic (N=6)	29.0 %	22.6 %	9.3 hours/day

The AMEC brace was enough effective to treat the patients with AIS with high compliance.
It was especially effective for the lumbar curve.
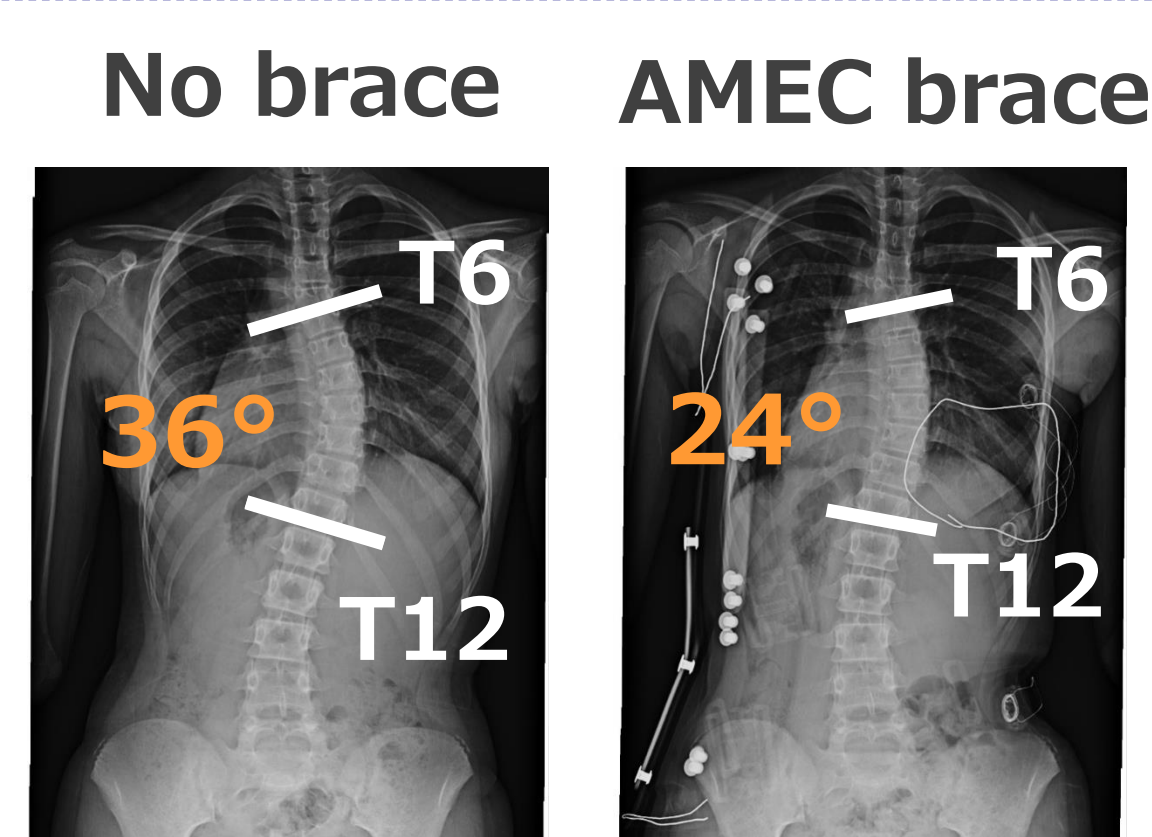Thoracic type modified brace design.

Correction rate (Typical)

No brace / AMEC brace

T11 / 34° / L3 / T11 / 20° / L3
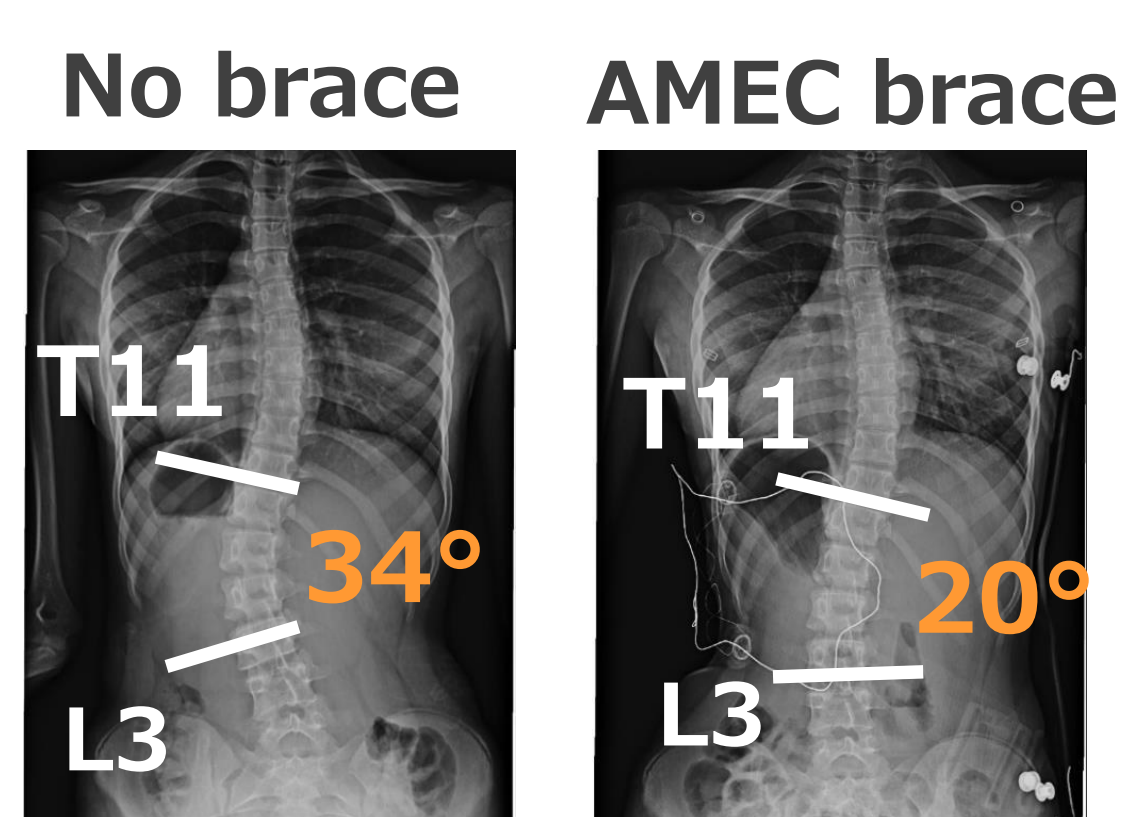
【Lumbar curve】
・14years old
・Female
・Risser sign 3

Correction rate
→ **41.2**%

No brace / AMEC brace

36° / T6 / T12 / 24° / T6 / T12

【Thoracic curve】
・11years old
・Female
・Risser sign 1

Correction rate
→ **33.3**%

Wearing time (Typical)

wear / no wear / 1 month
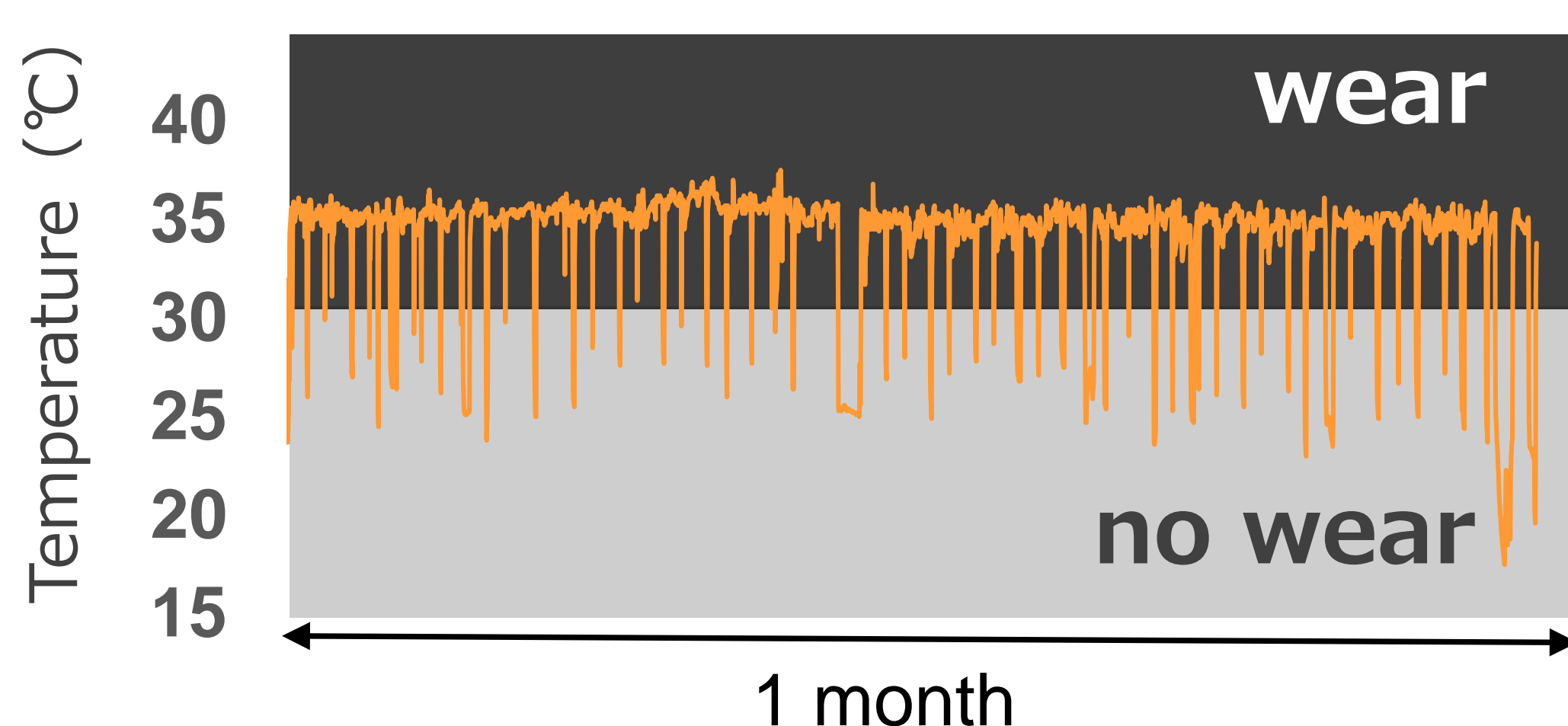
Wearing time: **21.2** hours/day

Effective wear / wear / 1 month
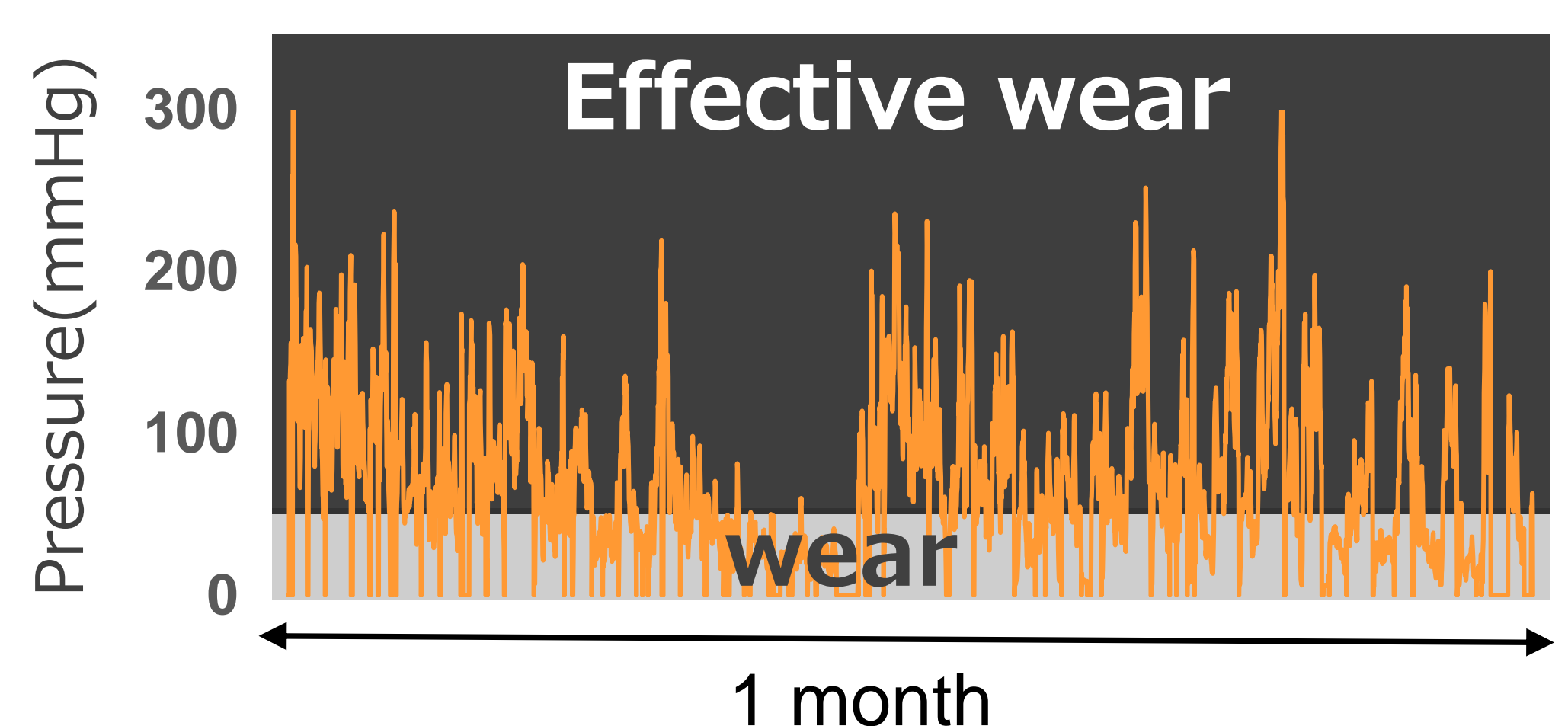
Effective wearing time: **13.9** hours/day

As in the past study(Weinstein, 2013), correction rate after 1 year was high for lumbar curve with long wearing time.

Conclusion

We conclude that good compliance for brace treatment leads to satisfactory results.