



Differential sensory block during labor epidural analgesia: a prospective observational study to investigate the relationship of lower and upper sensory block levels to cold, pinprick and light touch



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Introduction

Assessment of sensory block during labor epidural analgesia **lacks standardization**. Sensitivity to cold, pinprick and light touch are well described methods of assessment of sensory block at cesarean delivery¹.

A zone of **differential block** to cold has been recently documented during labor analgesia, with an upper sensory block level (**USBL**) and a lower sensory block level (**LSBL**) likely indicating different densities of sensory block to cold^{2,3}.

Primary objective:

To determine the relationship between USBL and LSBL to cold, pinprick and light touch during labor epidural analgesia with a programmed intermittent epidural bolus (PIEB) technique.

Methods

- Research Ethics Board approval and written informed consent.
- **Study design:** Prospective observational cohort study.
- **Population:** Patients who received epidural analgesia for labor and delivery
- **Sensory block assessment:** USBL and LSBL to cold, pinprick, and light touch were assessed at 140 minutes after the loading dose:
 - Cold:** plastic bag half filled with ice chips
 - Pinprick:** single use neurological examination pin
 - Light touch:** cotton ball elongated to form a tendril

Primary outcomes: USBL and LSBL to cold pinprick and light touch.

Secondary outcomes: pain scores (VNRS 0-10)
motor block (Bromage scale 0-3)

Data analysis: Agreement between sensory block levels, as well as their correlation, were assessed with Kappa statistics, percent agreement and Spearman's correlation coefficient.

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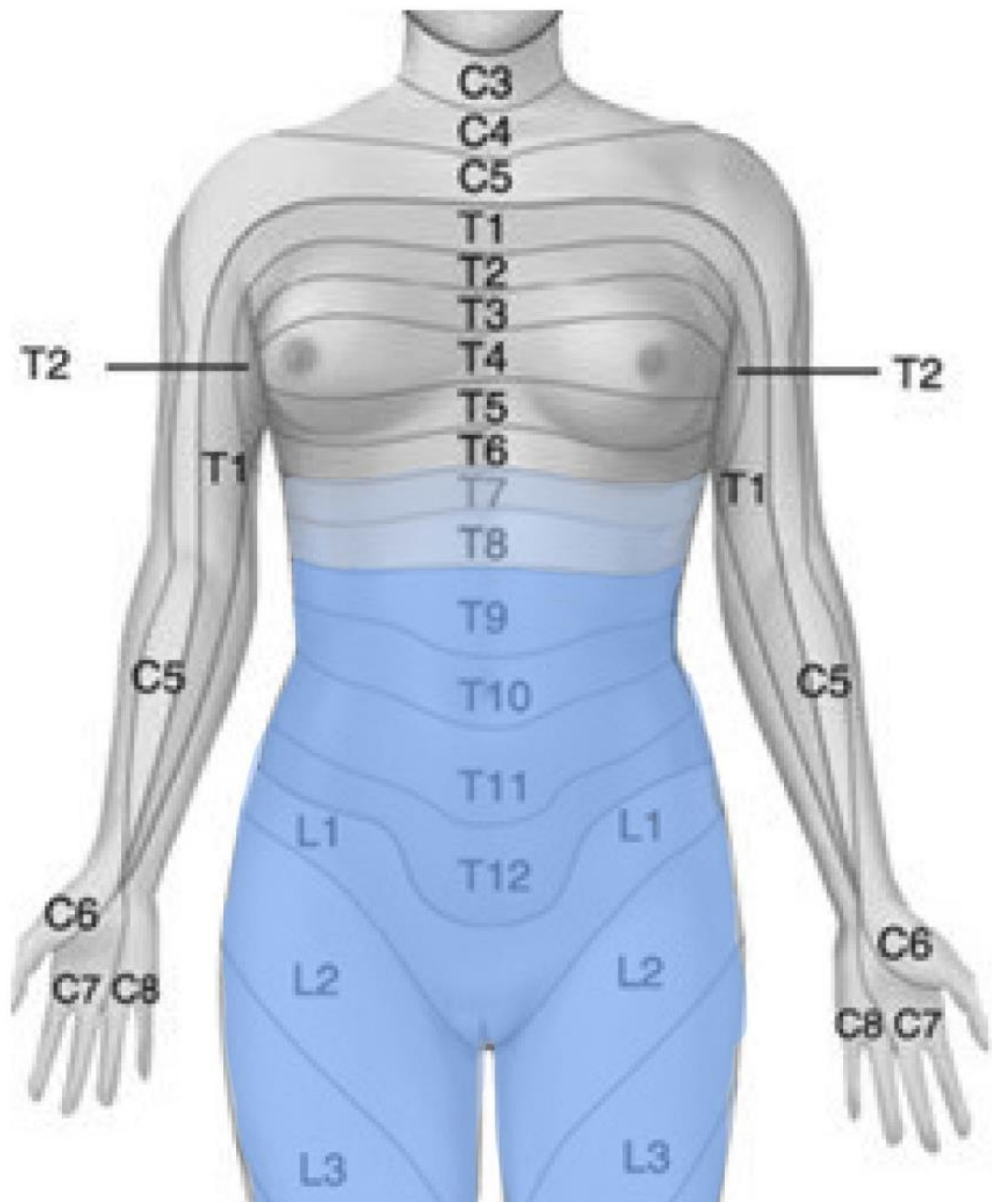
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Results

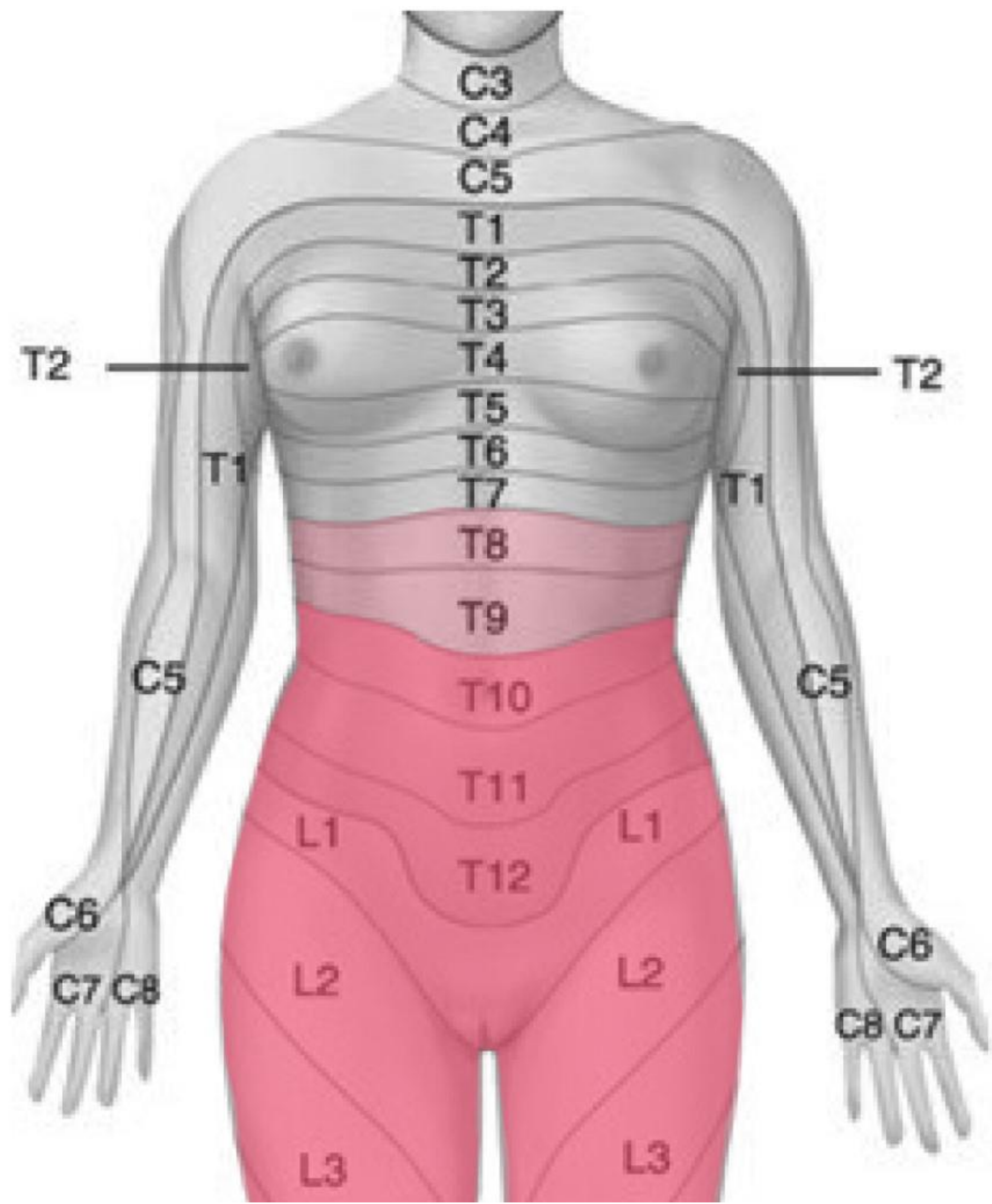
We studied 30 patients.

Two distinct levels of sensory block (USBL and LSBL) to cold and pinprick were observed. Only one level was observed to light touch, with the median (IQR): T10 (L2-T8).

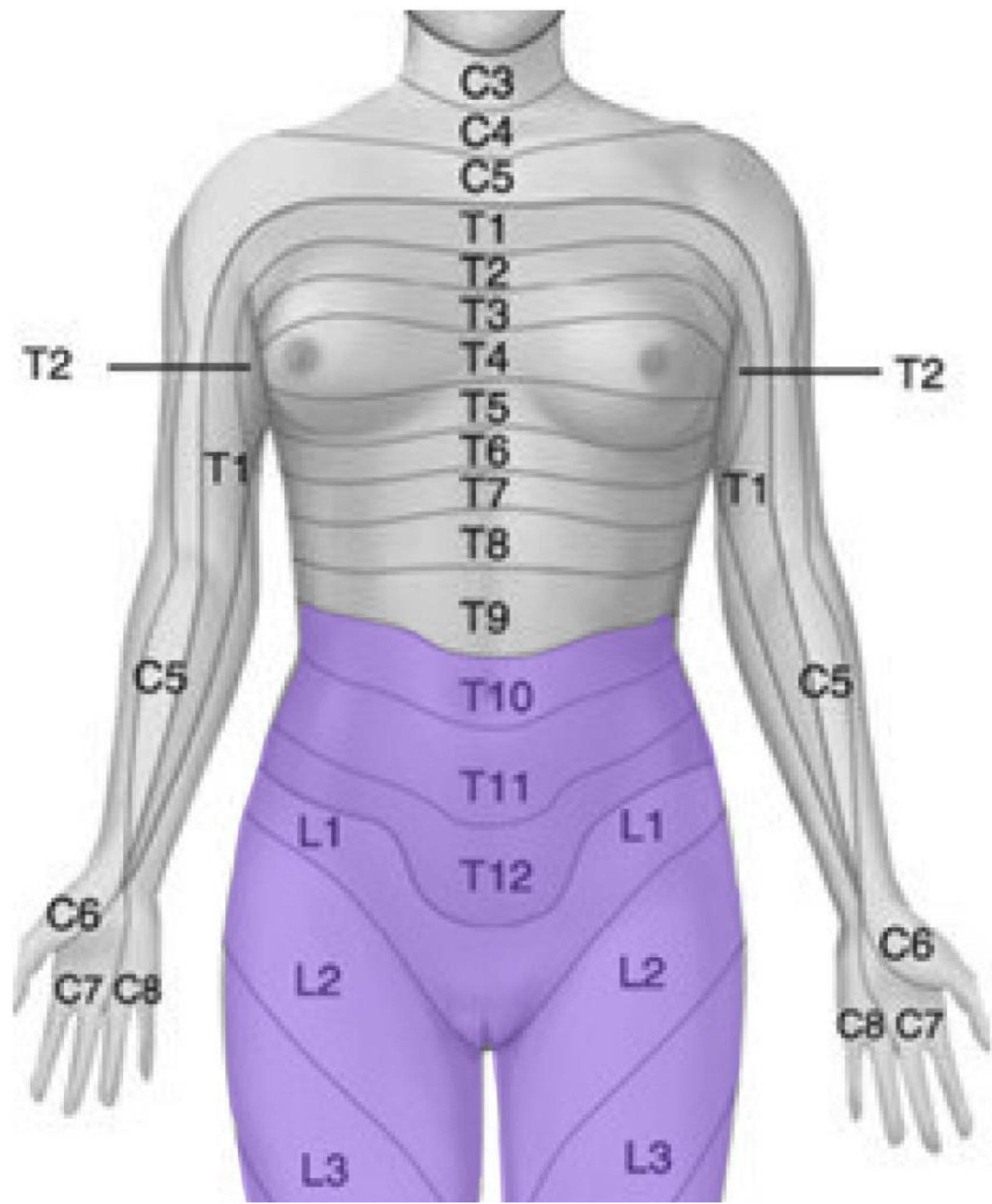
	USBL Median (IQR)	LSBL Median (IQR)
Cold	T7 (T7 -T6)	T9 (T10 - T8)
Pinprick	T8 (T10 - T6)	T10 (T12 T10)



Cold



Pinprick



Light touch



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Results (continued)

Substantial agreement between USBL and LSBL to cold (kappa: 0.76).

Substantial agreement between USBL and LSBL to pinprick (kappa: 0.72).

Moderate agreement between USBL to cold and USBL to pinprick (kappa: 0.57).

Moderate agreement between LSBL to cold and LSBL to pinprick (Kappa: 0.52).

No significant correlation between light touch and either USBL or LSBL to cold or pinprick.

All patients scored 0 on the Bromage scale and no patient exhibited pain at the time of assessment.

Discussion

- We observed **two sensory block levels to ice and pinprick** (USBL and LSBL), typically two segments apart within each type of stimulus.
- Sensory block to cold is usually 1 segment higher than its pinprick counterpart for both USBL and LSBL.
- Light touch is unreliable as a modality of sensory block assessment during labor epidural analgesia.

Further studies are warranted to determine:

- Clinical significance of two distinct levels of sensory block
- If one modality, cold or pinprick, is superior to the other in assessing sensory block during labor

References

1. Hoyle J, Yentis SM. Anaesthesia.2015;70:421-8;
2. de Souza Soares EC et al. Can J Anesth 2022;69: 750-5;
3. Casellato JF et al. Can J Anesth.2022;69:1471–1476.