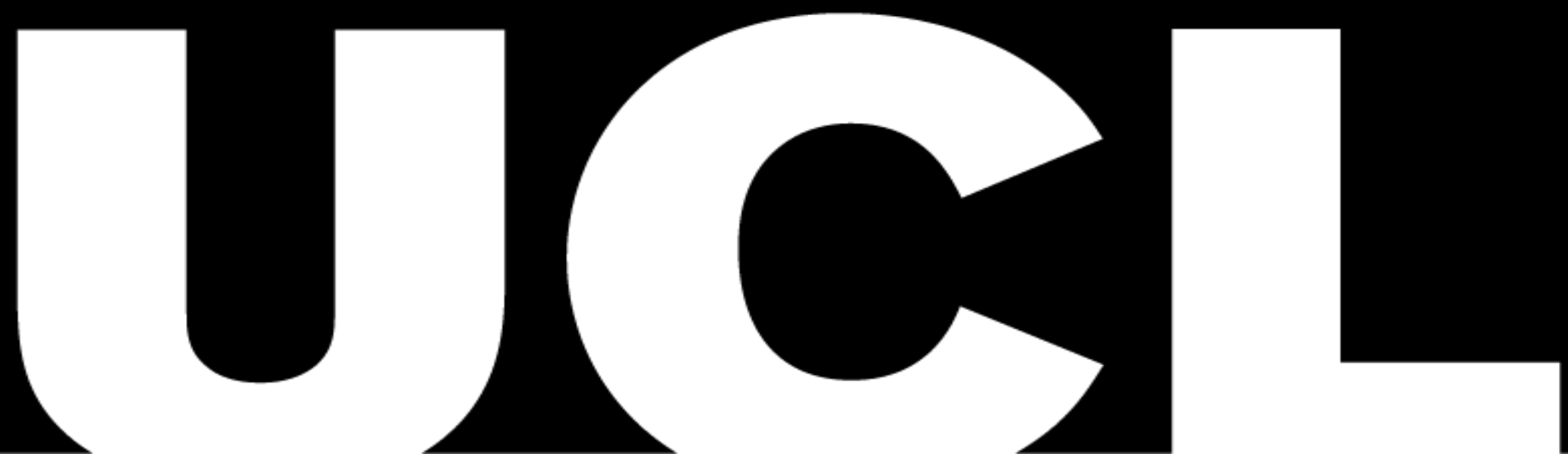


EP18.20: A SENSORISED GLOVE TO DETECT FETAL POSITION DURING LABOUR: A MIXED METHODS STUDY



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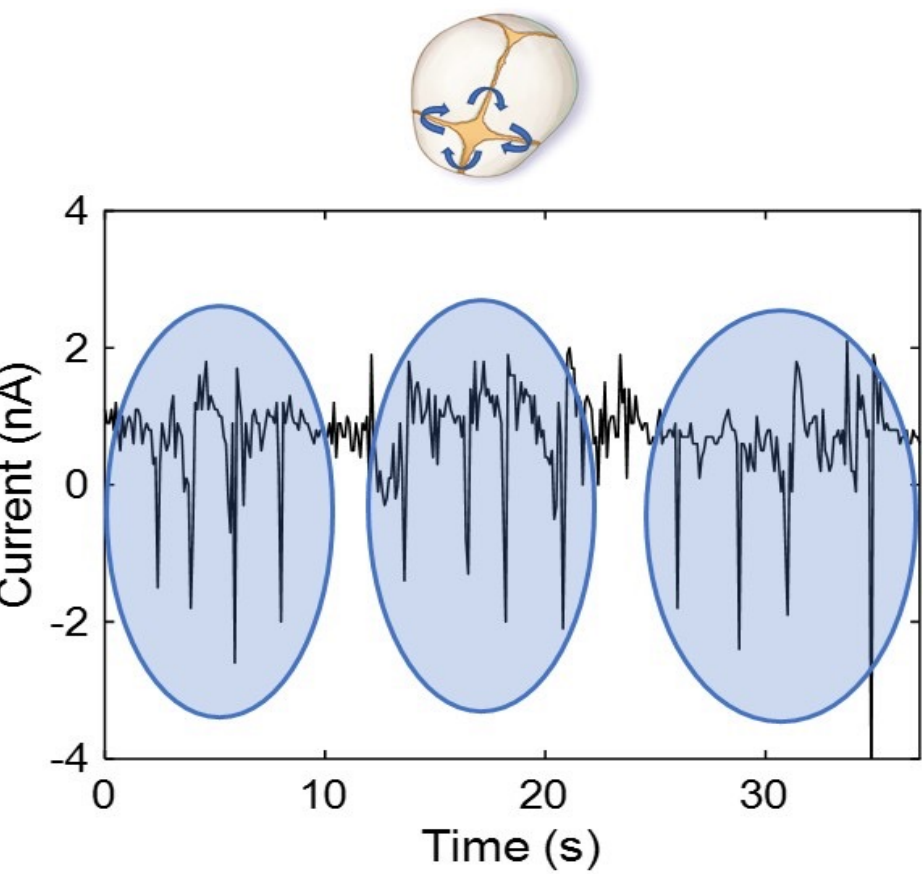
INTRODUCTION

- Vaginal examination (VE) in labour **highly subjective**
- Instrument placement during operative vaginal birth (OVB) **often inaccurate**
- Intrapartum ultrasound more accurate than VE in diagnosing fetal position, but **doesn't improve OVB success**
- Our group designed a sensorised glove (which creates current peaks when examining a neonatal suture) to accurately and objectively **assess fetal position**, and **support OVB training** (Figures 1, 2)



Fig 1

Fig 2 Anterior Fontanelle



Posterior Fontanelle

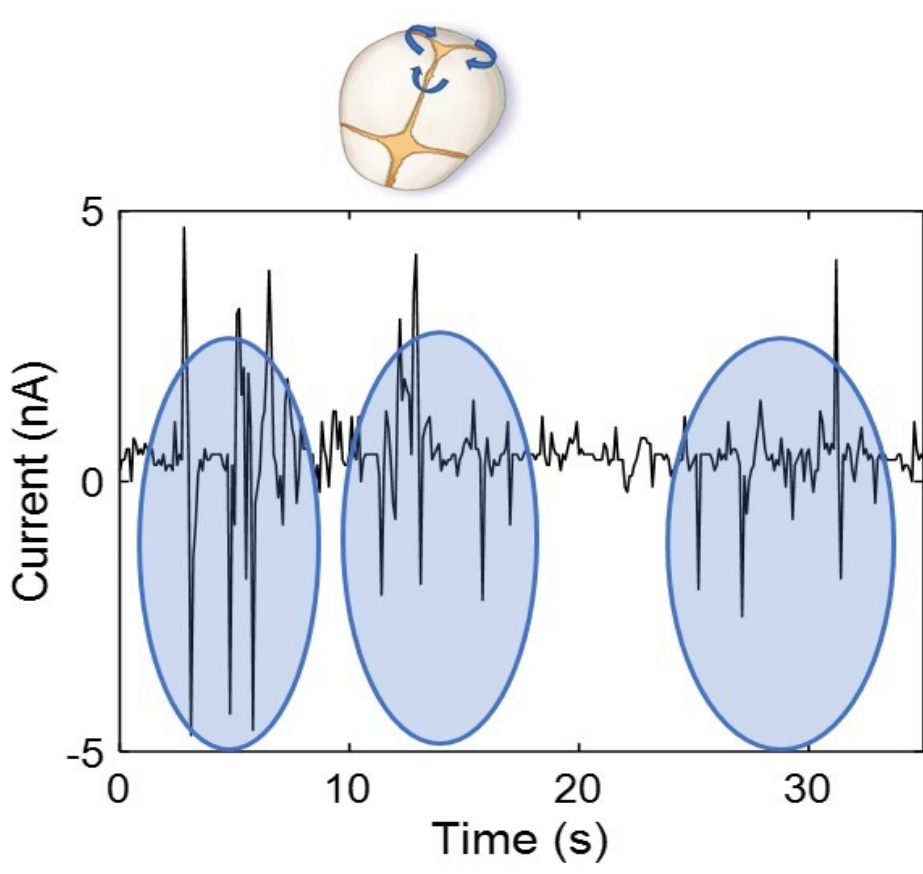


Figure 1: The sensorised glove with a triboelectric sensor spray-coated onto the tip of the forefinger

Figure 2: Signals produced when the sensor is passed over the sutures on a model of a neonatal head. Note the current peaks associated with the sutures eg. 4 current peaks associated with the 4 sutures surrounding the anterior fontanelle

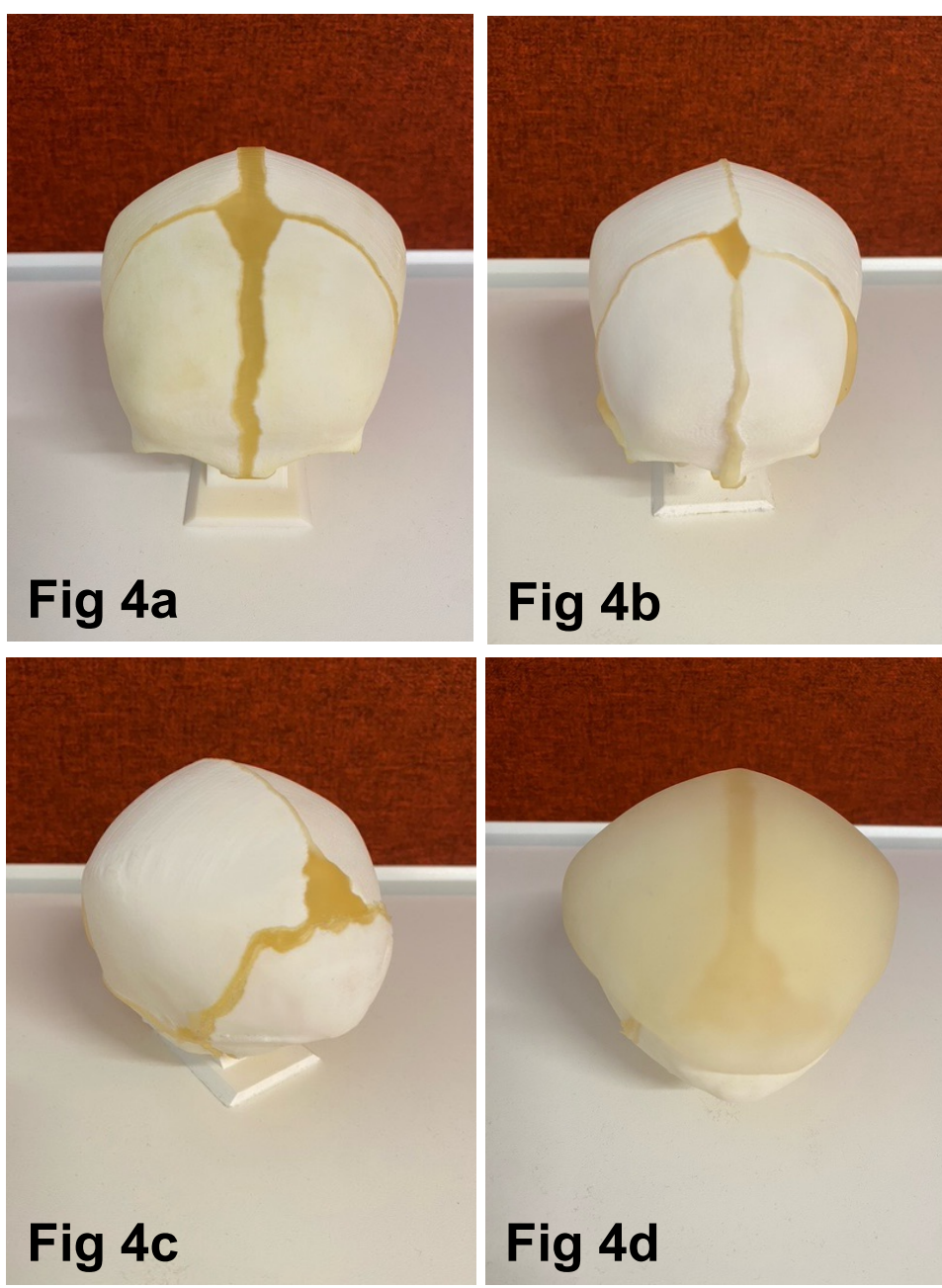
METHODS

- Midwives, obstetricians, and midwifery/medical students were recruited, and examined **3 phantoms** of a neonatal head with the glove; **one with no caput/moulding, one with caput, and one with moulding** (Figures 3, 4a-d)
- The models were placed in **3 positions** (occipito -posterior, -anterior, and -transverse)
- Signals produced were analysed
- Interviews and thematic analysis performed
- The percentage of sutures accurately detected (defined by a distinct current peak) was calculated

Fig 3 Study set up



Figure 4a: model with no caput/moulding, 4b-c: model with moulding, 4d: caput



RESULTS

- 3 midwifery students, 5 medical students, 5 obstetricians and 5 midwives took part
- In **4 cases**, the glove could **not detect any sutures**, with the highest percentage of sutures detected = **50%** (Figure 5)
- Interviews - **easy to use** and **did not affect haptic feedback**, but awkward to don and care needed not to disrupt the sensor
- Feedback: **positively accepted by patients** and would **reduce the need for repeated examinations**, and would **positively impact** upon training

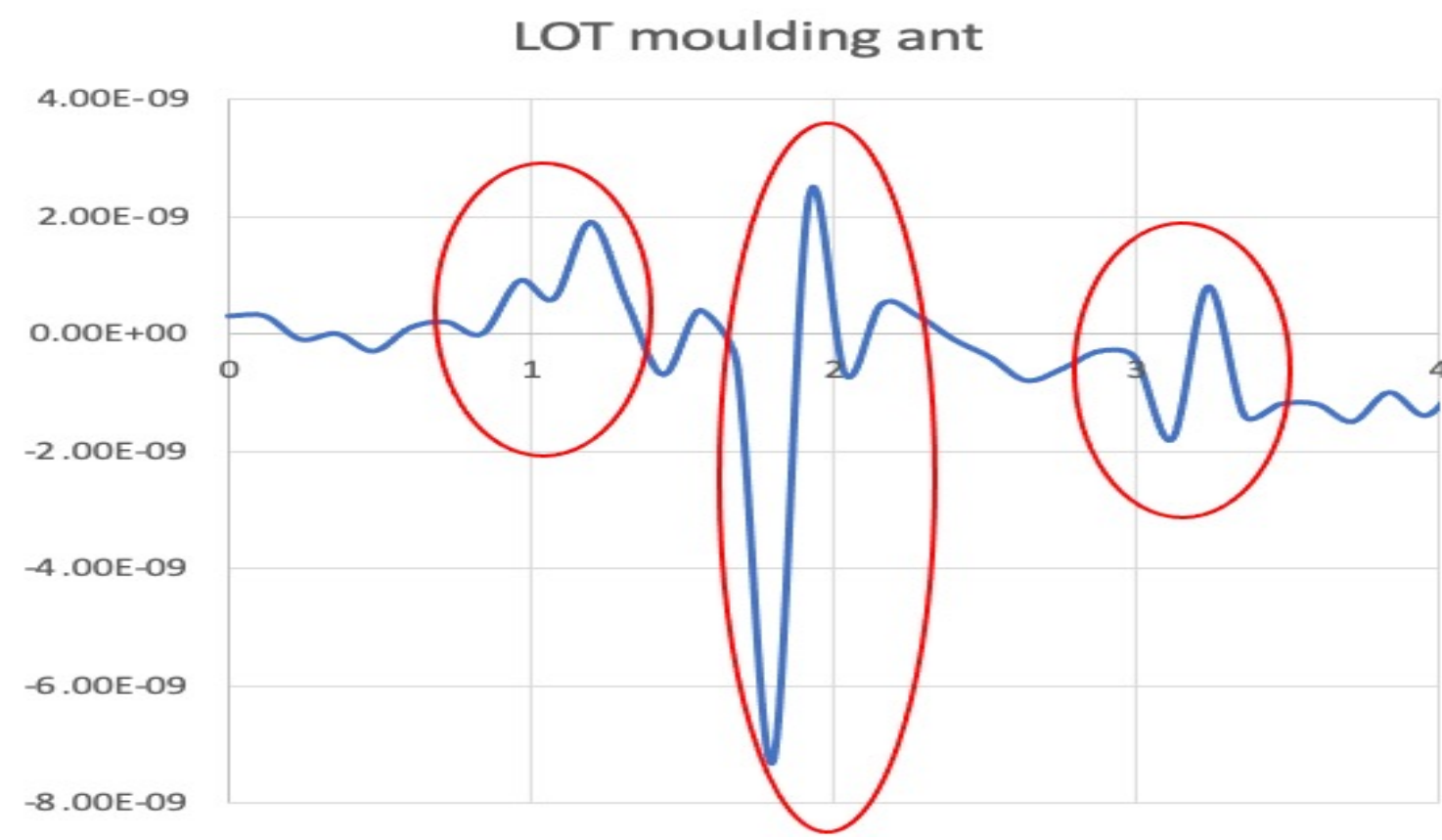


Figure 5: Peaks formed when examining the anterior fontanelle in the moulding model in the left occipito-transverse position. There are three distinct current peaks (demonstrated by the red ellipses) when the glove passed over the sutures associated with the anterior fontanelle. Here, the participant did not pass over the fourth suture, so there were not four distinct current peaks that would coincide with this.

OBJECTIVES

- To assess whether the sensorised glove could **determine fetal position** on neonatal head models
- To gain intended-user views on its **design/acceptability**

CONCLUSION

- Sutures detected in up to **50%** of exams, but rates were lower in others - this could be due to the sensor placement
- Considerable development**, especially with placement of the sensor, is required, with **significant clinical potential**
- The glove is **acceptable** to clinicians and students in both **clinical practice** and as a **training aid**
- Any future clinical study should compare its ability to detect fetal position with the gold standard – ultrasound