CHRISTMAS 2014: STRANGE NATIVITIES

An antecedent of later developing communicative functions: the fetal index finger

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Introducing dynamic magnetic resonance imaging (MRI) broke new ground in visualising human fetal behaviour.¹ We use this method for detailed analyses of complex and coordinated fetal motor patterns, to study spontaneous motor activity, and for functional assessments of the young nervous system.² While analysing a fetus at 27 weeks of gestation during an uneventful pregnancy, we observed that the fetus repeatedly extended her index finger and “pointed” at the umbilical cord (fig⇓).³ We first believed our observation was purely incidental, but the reoccurrence left no room for doubt.

Despite being specialised and experienced in motor and socio-communicative development, we found ourselves describing a phenomenon related to both domains, even though socio-communication is far from its initial start-up at this point. We were thrilled to observe this isolated behavioural pattern at such an early age, because it provides new evidence of physiological behavioural patterns as antecedents of behaviours that only become functional at a later age. This is another piece in the puzzle of the evolution of human behaviour disproving assumptions about fetal intentions. And in terms of joint attention and intention to communicate, our fetus obviously was not aware that we were watching her with dynamic MRI.

Still, much remains to be learnt about the transition from intrauterine to extrauterine behaviour and the developmental trajectory from the first appearance of a motor pattern to later functionality of behavioural patterns (fig). In other words: we need to fathom the gap between the fetal ability to extend the index finger and its use in pointing, one of the first ways to interact with the world through communicative gestures.

Competing interests: We have read and understood the BMJ Group policy on declaration of interests and have no relevant interests to declare.

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Figure

The extended index finger. A motor pattern becoming functional at 27 weeks of gestation (MRI print of a dynamic, steady state, free precession sequence) and 9 days post term age, and later as a communicative form of joint attention at 14 months of age.
An antecedent of later developing communicative functions: the fetal index finger

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Footnotes

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References

