

Maria Caulfield: Hello Professor Condic.

Prof Condic: Yes, hello

Maria Caulfield: Hello, thank you very much for joining us, for agreeing to talk to us today, and thank you also for sharing with us your testimony to Congress in 2013, and for giving us permission to use it in this enquiry. You've made it clear that your testimony today would be restricted exclusively to the scientific evidence and that you're not willing to provide your personal opinion on this matter, only your professional assessment of the evidence, we just want

to make that clear. So do say, if we, kind of...dive into your personal opinion and stray into that while sticking to your professional testimony because we are so grateful for, for you giving us evidence. So with that in mind, would it be possible for you to briefly outline your professional experience, and, in this particular area of expertise and the knowledge that you do bring to this inquiry? Prof Condic: Yes, I'd be happy to do so. First, I'd like to thank Lord Alton and the Members of

Parliament for giving me this opportunity to testify. I'm an associate professor of neurobiology and anatomy at the University of Utah School of Medicine, where I've held that position since 1997. I received my undergraduate degree from the University of Chicago, my doctorate from the University of California at Berkeley. My research over the last 25/30 years has concerned the development of the nervous system, in particular the sensory nervous system and the role of

stem cells in development. I've taught human embryology for over 30 years, and I'm currently the director of the embryology curriculum at the University of Utah School of Medicine. I've thoroughly reviewed the literature, medical literature on the topic of fetal pain in preparation for this testimony.

Fiona Bruce: Thank you very much Prof Condic, and we believe now you're going to deliver a presentation to us.

Prof. Condic: I'm sorry, I can't hear you.

Fiona Bruce: Can you hear me now?

Prof. Condic: A little bit better, yes.

Fiona Bruce: Thank you very much for speaking with us today. Are we right that you are going to deliver a short presentation to us?

Prof. Condic: Yes. I was going to do a presentation, if you're prepared to show it we can go ahead.

Fiona Bruce: Yes, please, thank you.

Prof. Condic: Alright, I'm going to try to stick exclusively to a prepared text to coordinate better with the people who are advancing the slides so please excuse me if it looks like I'm reading because I will be reading.

If I could have the first slide.. The experience of pain is clearly very complex. Here I've summarised the important events in brain development relevant to pain perception. The three points I'd really like to emphasise are, first: brain development begins very early. By 4 weeks post fertilisation. So I would note here that all of the ages I'm going to be presenting are relative to fetal development so the age of the fetus. If we want to compare that to gestational age or the age of pregnancy you need to add an additional two weeks. The second point I'd like to make is

that neural circuitry underlying the most basic response to pain is in place by 8 weeks. ...and this

is the earliest point at which the fetus experiences pain in any capacity. Finally, circuitry in the thalamus, that is primarily responsible for both fetal and adult pain perception...develops between 12 and 18 weeks post fertilisation. During this period, a fetus is well developed. All of the organs and structures are fully formed. She has a face. Fingerprints. And, based on my own experience with pregnancy, a definite personality.

The debate over fetal pain is not whether pain is detected by a 20 wk fetus; there is essentially universal agreement on this point. Rather, the debate concerns how pain is experienced by the fetus; i.e., whether a fetus has the same pain experience as a newborn or an adult.

The Royal College of Obstetricians and Gynaecologists (RCOG), the American College of Obstetricians and Gynecologists (or ACOG) and a review in the Journal of the American Medical Association (JAMA) have addressed this question in great detail. Yet these reports have received serious scientific criticism. Surprisingly, they assumed without evidence that for a fetus to have a "conscious" experience of pain, certain, late-developing cortical brain structures must exist. Yet many conclusive, modern lines of scientific evidence contradict this view. I will present just two of them.

First, it is entirely clear that children born without cortical brain structures are capable of conscious behaviors, including smiling when pleased, having preferences for particular kinds of music and having an adverse reaction to pain.

Here is a picture of such a patient, recognizing her physician. Yet she does not possess the brain

structures that RCOG and others erroneously insist are required for such conscious recognition. This is a scan of the little girl's brain. The red star indicates the limited cortical structures she has, and the yellow stars indicate empty space in the location of the cortical brain structures RCOG and others claim are required for "conscious pain perception." The blue star indicates the thalamus—the region of the brain that is in fact responsible for pain perception in this patient and

in all human beings. As I have noted, the pain-perception circuitry in this region of the brain is in place by 18 weeks.

Similar results are seen for animals that have had the regions of the brain RCOG insists are "required" for a conscious experience of pain experimentally removed; these animals remain conscious and continue to show a vigorous response to painful experiences.

Surprisingly, even the evidence cited by RCOG itself does not support the conclusion that cortical circuitry is required for conscious awareness of pain.

For example, RCOG cites a study of pain sensitivity published in PNAS in support of the key conclusion they would like to draw that cortical activity is required for conscious pain perception, and therefore the fetus cannot experience pain prior to the development of this circuitry in the third trimester. Yet the paper RCOG invokes as evidence clearly demonstrates that thalamic activity is associated with the psychological experience of pain in all study participants, while cortical activation is only seen in subjects who report a very high sensitivity to pain. In this study they analyse the responses of 17 normal adults and categorised their sensitivity as either high, moderate or low. Importantly all of these subjects experience pain; they

were aware of it and they perceived it as painful. Yet the low sensitivity subjects did not show activation in the regions that RCOG insist are necessary for pain perception. And all subjects showed activity in the thalamus. Here you can see the data from this paper showing many of the subjects showed no activity in the region of the brain that RCOG insists is necessary for a conscious experience of pain. Well, all of the subjects showed activity in the thalamus, the same part of the brain that was preserved in the child born without the cortex that we had just discussed, who also had a conscious experience of pain. From this we can conclude that some aspects of how we think about painful experiences may require cortical circuitry, but being consciously aware of pain does not.

In addition to the neurobiological information I have just presented, what we directly observe about a fetus' response to pain is also very clear. Fetuses delivered prematurely exhibit pain-related behaviors, such as those shown here. Pain response observations are very precise and based on objective criteria. Strikingly, the earlier fetuses are delivered, the stronger their response to pain, due to the absence of later-arising brain circuits that inhibit pain responses in older infants and adults.

Similarly, fetuses at 20 weeks post fertilization have an increase in stress hormones in response to painful experiences that can be eliminated by appropriate anesthesia, just as for an adult.

These and many other direct observations of fetal behavior and physiology have resulted in a clear consensus among professional anesthesiologists that the use of anesthesia is warranted in

cases of fetal surgery, not based on pragmatic reasons (like suppressing fetal movement), but rather, based primarily on the fetus' experience of pain.

In conclusion,...because I would like to read them for you. The RCOG review cites "limited evidence" in support of its central conclusion that pain cannot be consciously experienced until the third trimester and it ignores...that contradicts this assertion. I'm trying to pull up my version of this presentation so I can read it with you, but I think we're just going to have to pass. I'm not technologically adapted enough to do that. But these are the lines of evidence that are ignored by the RCOG review. They all represent very substantial bodies of scientific evidence that refute the central assertion that in order for a fetus to experience pain on a conscious level it

requires circuitry that is not developed until late in the third trimester. So I'd like to conclude my presentation with that information. Thank you very much.

Maria Caulfield: Thank you very much Professor Condic. That's a, you know, very helpful outline of the evidence that's there. I just have one question and then I'll hand over to my colleague. You gave testimony to Congress in 2013, and that was a comprehensive assessment of fetal pain at that time. Has there been any update in that evidence since then?

Prof. Condic: I am having a very hard time hearing you. If you could...move closer to the microphone.

Maria Caulfield: Ok, so your testimony in 2013 was a very comprehensive assessment of the evidence around fetal pain at that time. Is there an update on any new evidence since then?

Prof Condic: I'm sorry, I still cannot hear you.

Maria Caulfield: Ok, shall we run it with ...

Lord Alton: We're actually running out of time, shall we ...so Professor Condic, would it be okay if we emailed you the last few questions? Would it be ok if we emailed you the last few

questions?

Prof Condic: Yes, of course.

Maria Caulfield: Thank you

Lord Alton: Thank you for your time.

Fiona Bruce: Very helpful, thank you so much