spiked arterial trace.⁶ The pressure in this system is also affected by the patient's blood pressure during anaesthesia which may be at variance from their normal.

Thus, the pressure that is measured by the system correlates with the intraosseous pressure; however, it is not the absolute pressure. What we imply by the sentence under contention is that the presence of an 'intraosseous pressure reading' in the absence of an arterial wave form should be interpreted with caution, as the pressure readings alone do not indicate the presence of an arterial blood flow. In the context of assessing head vascularity by our technique at present, the absolute pressure as recorded by the system does not contribute adequately to the surgical decision making in the absence of a wave form. To identify a safe range of pressure in the group, we require establishment of normal ranges of pressure in a standardised, accurate and reliable system which rightly would involve ethical issues.

**Vrisha Madhuri, Vivek Dutt, Kunder Samuel,
Abhay Deodas Gahukamble**

*Department of Orthopaedics, Christian Medical College, Vellore,
Tamil Nadu, India*

Address for correspondence: Prof. Vrisha Madhuri,
Department of Orthopaedics, Christian Medical College Hospital, Ida Scudder
Road, Vellore - 632 004, Tamil Nadu, India.
E-mail: madhuriwalter@cmcvellore.ac.in

Authors' reply

Sir,

We thank Sebestyen Andor, Boncz Imre and Toth Ferenc¹ for their interest in our article.² Ficat and Arlet in their landmark research on avascular necrosis have demonstrated the effect of intraosseous head pressures in the etiology of femoral head avascular necrosis (AVN);³ however, the role of the absolute pressures in the vascularity of the femoral head is not under consideration in our article.

Our technique is not a diagnostic technique for AVN, but a tool to assess intraoperative arterial blood flow to the femoral head to guide the surgeon. The decreased vascularity is at times because of the positioning of the dislocated head or capital femoral epiphysis due to stretch on the vessels, and will disappear once this is rectified.

The transducer in our system is not at the tip of catheter, and hence the pressures measured cannot be compared with intraosseous pressure data collected by some of the other techniques because of variables such as damping. Damping results from friction of the fluid moving within the tubing. When an arterial trace is sinusoidal and loses fine detail, it's called a 'damped' trace. Air bubbles, blood clots and excessively tortuous arterial line circuits are known to cause a damped trace.⁴ Paynel *et al.* have used short tubing to minimize sub optimal damping of the arterial trace.⁵ Soft tubings' on the other hand produce an under-damped

REFERENCES

1. Sebestyén A, Boncz I, Tóth F. Intra-operative femoral head vascularity assessment: An innovative and simple technique (Letter 2). *Indian J Orthop* 2012;46:114-5.
2. Madhuri V, Dutt V, Samuel K, Gahukamble AD. Intra-operative femoral head vascularity assessment: An innovative and simple technique. *Indian J Orthop* 2011;45:231-5.
3. Ficat RP, Arlet J. Functional investigation of bone under normal conditions. In: Hungerford DS (editor). *Ischaemia and necrosis of the bone*, 1st ed. Baltimore: Williams and Wilkins; 1980. p. 29-52.
4. Ercole A. Attenuation in invasive blood pressure measurement systems. *Br J Anaesth* 2006;96:560-62.
5. Paynel RA, Isnardi D, Andrews PJ, Maxwell SR, Webb J. Similarity between the suprasystolic wideband external pulse wave and the first derivative of the intra-arterial pulse wave. *Br J Anaesth* 2007;99:653-61.
6. Dyer I, Williams DJ. Common errors in clinical measurement. *Anaesthesia and intensive care medicine* 2005;12:405-7.

Access this article online

Quick Response Code:

Website:
www.ijoonline.com