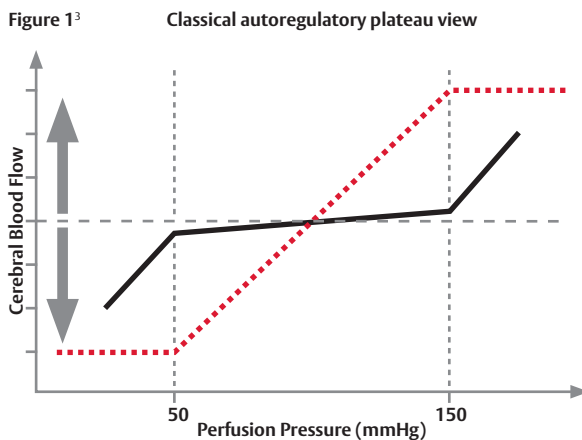


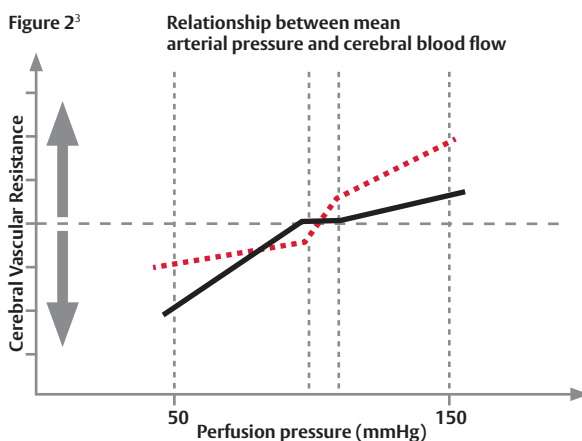
Changes in mean arterial pressure during surgery and the role of cerebral oximetry

Cerebral autoregulation is a mechanism that maintains a constant cerebral blood flow (CBF), in spite of fluctuation in cerebral perfusion pressure.¹ The classical definition of the cerebral autoregulatory plateau is a range of mean arterial pressure (MAP) between 50-150 mmHg (Figure 1).^{2,3}



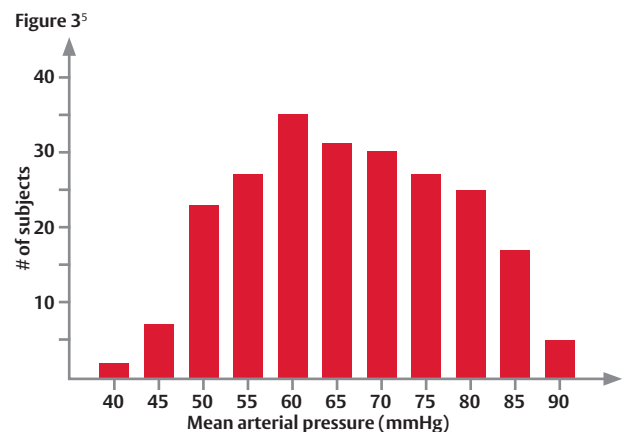
In this classical view, a MAP of approximately 50 mmHg has been considered as a lower limit of autoregulation (LLA).⁴ However, the lower limit of autoregulation can vary significantly from patient to patient based on their condition, disease state, and co-morbidities.⁵ The cerebral autoregulatory plateau can therefore shorten, lengthen, ascend or descend accordingly³ (Figure 2).

It has been suggested that the compensatory effects related to cerebral autoregulation do not maintain cerebral blood at a constant for a wide range of mean arterial pressure values. Rather, cerebral blood flow is altered to a greater extent during decreased perfusion pressure states, then when compared to periods of elevated pressure.³



*"The uncertainty of any specific blood pressure target based on this traditional LLA approach is further accentuated in the cardiac surgery population where hypertension is highly prevalent...the degree to which the LLA is shifted, if at all, has always been uncertain. As a result, anesthesiologists have been unable to reliably determine when an individual's blood pressure may be too low."*⁴

Joshi, et al., demonstrated that there was much variability in the LLA (i.e., a range of 43-90 mmHg, Figure 3) and found that predicting the MAP at the LLA based on clinical history and preoperative arterial blood pressure was imprecise. The mean MAP at the LLA was 66 mmHg and 54% of the patients enrolled in the study had a MAP at the LLA above the calculated mean of 66 mmHg for the group.⁵ (Figure 3).



Note: Number of subjects versus the mean arterial blood pressure at the lower limit of cerebral blood flow autoregulation during cardiopulmonary bypass based on the transcranial doppler-determined mean velocity index.⁵
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The accuracy and precision of ForeSight Elite cerebral oximetry lends itself as an important assessment in managing a patient intraoperatively.^{5,6} This technology can provide an additional piece of information about the adequacy of cerebral oxygenation.⁵

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