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The Effect of Pulsing on Transverse Ultrasound Efficiency and Chatter

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Abstract

Purpose: To evaluate the effects of micropulse, long pulse and continuous ultrasound on transverse ultrasound using Abbott Medical Optics' (AMO) WhiteStar Signature Pro with the Ellips FX handpiece.

Design: In vitro laboratory study

Methods: This study was conducted at the John A. Moran Eye Center Laboratory, University of Utah, Salt Lake City, UT, USA. Porcine lenses were hardened in formalin for 2 hours and equilibrated in BSS over a 24-hour period. The lenses were then cubed in 2.0mm by 2.0mm pieces. These pieces were stored in BSS until the time of experimentation. The AMO WhiteStar Signature Pro machine with the Ellips FX handpiece and a 0.9mm bent dewey tip with a 30-degree bevel were used for phacoemulsification. Three runs of 20 lenses each were performed, measuring efficiency and chatter. Transverse ultrasound varied in the three runs and included continuous, 6ms on/off micropulse, and 50ms on/off long pulse.

Results: Micropulse was more efficient than long pulse by 43% (P = .00003) and continuous by 42% (P = .000387). There were also less chatter events with micropulse than with long pulse and continuous ultrasound. However, this difference did not reach significance.

Conclusion: 6ms on and 6ms off micropulse transverse three-dimensional ultrasound is more efficient and produces less chatter events than both long pulse and continuous ultrasound.