

EVALUATION OF TRANSVERSAL VERSUS TORSIONAL ULTRASOUND MODALITIES IN PHACOEMULSIFICATION

Thesis

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LIST OF ABBEREVIATIONS

CCT: central corneal thickness

CDE: cumulative dissipated energy

CV: coefficient of variation

ECC: Endothelial cell count

ECL: endothelial cell loss

EFX: effective phaco time for Ellips Fx

e.g.: for example

HEX: hexagonality

IP: intelligent phaco

LOCS: lens opacities classification system

PO: postoperative

SD: standard deviation

SPSS: statistical package for social sciences

US: ultrasound

UST: ultrasound time

Introduction

Phacoemulsification has gained acceptance as the standard technique for cataract surgery worldwide. It utilizes ultrasonic energy to break up and remove a cataractous lens. More ultrasonic energy and time are needed for hard nucleus removal than for softer ones, thus increasing the risk of surgical induced trauma, especially corneal endothelial dysfunction. ⁽¹⁾

Recent developments in phacoemulsification have made cataract removal safer and more efficient. Advances in power modalities have provided more options, allowing surgeons to customize their techniques, to reduce phaco energy and duration. ⁽²⁾

The torsional phaco (OZil[®]) used in Infiniti[®] phacoemulsification machine is a hardware and software upgrade which includes a dedicated handpiece that produces side-to-side oscillations of the phaco-tip. Comparing with the jackhammer motion in conventional longitudinal phaco, the improved OZil[®] torsional oscillation sheers the lens material with virtually no

repulsion, thereby dramatically reduced phaco energy required for lens removal without compromising efficiency. Furthermore, torsional phacoemulsification emulsifies in both to and fro directions and thereby does not waste energy. ^(3; 4)

However; with torsional movement alone, the tip may get clogged with denser nuclei. That is why “Intelligent Phaco” (OZil IP[®]) was invented. When OZil IP[®] detects occlusion at a maximum vacuum setting, it delivers few milliseconds of longitudinal phaco relative in amount to the torsional amplitude, releasing the occlusion, restoring the aspiration and flow, and keeping the lens material at the best shearing plane without inducing repulsion. ^(5; 6)

The latest innovation in this field was the new transversal ultrasound incorporated in the Ellips FX technology. Unlike the OZil technology in which the phaco-tip can only oscillate either torsionally or longitudinally or alternates between both, the Ellips FX technology blends both transversal and longitudinal movement at the same time creating an elliptical stroke