

# LEGION<sup>®</sup> Vision System Intraoperative Efficiency and Surgical Outcomes

## INTRODUCTION

Cataract surgery is the most common ophthalmic surgery performed worldwide. More than 26 million cataract surgeries are performed annually. Driven by demographic changes and access to more medical services, procedure volume is growing at a compound annual rate of 3.1%.<sup>1</sup>

Phacoemulsification is the gold-standard treatment for cataract patients.<sup>2</sup> The application of ultrasonic (US) energy during phacoemulsification can carry the risk of endothelial cell loss and tissue damage, especially in hard cataracts.<sup>3</sup> In the conventional US mode, needle-tip movement is longitudinal, which can result in decreased cutting efficiency as the back-and-forth movement of the tip pushes away the nucleus.<sup>4</sup>

In 2006, torsional ultrasound (OZiL, INFINITI Vision System; Alcon Laboratories) was proposed.<sup>5</sup> Torsional US mode uses rotary oscillations at US frequencies to emulsify cataractous lens material in a seamless cutting motion from a tip that oscillates laterally.<sup>5,6</sup> The side-to-side movement of the phaco tip produces minimal repulsion of lens material, resulting in improved followability<sup>7</sup> and more effective lens removal with torsional US in comparison to the conventional US mode.<sup>5-7</sup> Torsional phacoemulsification produces less heat than longitudinal phacoemulsification and may provide thermal protection or reduce risk of wound burn.<sup>8,9</sup> Torsional phacoemulsification's advantages, including improvements in energy deliv-

"Phacoemulsification is the gold standard treatment for cataract patients."<sup>2</sup>

ery, thermal profiles, and machine fluidics, have been shown in laboratory studies.<sup>6,8-10</sup> Experimental data were supported by clinical study results.<sup>2,7,11</sup> Vasavada et al conducted a prospective, randomized, masked clinical trial to compare the intraoperative efficacy and postoperative outcomes of torsional ultrasound versus longitudinal ultrasound phacoemulsification procedures. Shorter surgical time ( $4.40 \pm 1.37$  and  $6.65 \pm 2.48$  min,  $P < 0.05$ ) and lower

fluid volume ( $101 \pm 40.44$  mL and  $125 \pm 37.76$  mL,  $P < 0.05$ ) use with torsional US is a demonstration of improved surgical efficiency when compared to longitudinal phaco technology. The postoperative assessment showed significantly less increase in corneal thickness in the torsional group on the first postoperative day ( $67.2 \pm 21.0$  vs  $83.6 \pm 49.0$ ,  $P < 0.01$ ). The decrease in the endothelial cell density also favored the torsional group

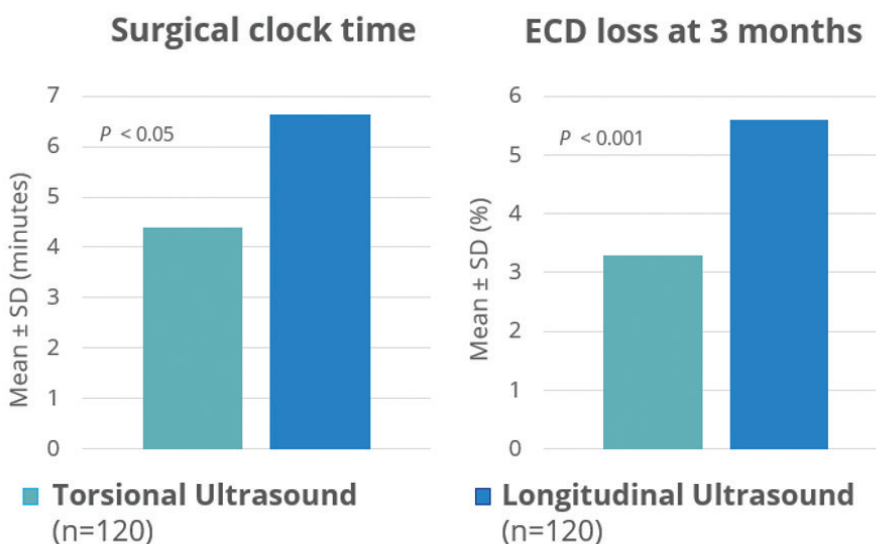


Figure 1. Surgical efficiency and patient outcomes (Vasavada et al, 2010).



Figure 2. LEGION® System components.

( $3.3 \pm 0.8$  vs  $5.6 \pm 2.5$ ,  $P < 0.001$ ), indicating improved endothelium protection (Figure 1).<sup>7</sup>

### LEGION® SYSTEM

The LEGION® System (Alcon) is a compact, advanced, gravity-based phacoemulsification platform. The LEGION® System uses OZil® torsional phacoemulsification technology (including OZil® Intelligent Phaco [IP] software; Alcon) and CENTURION®-based gravity fluidics (Alcon). The system is compatible with a range of accessories (Figure 2).<sup>12</sup>

The CENTURION®-based Fluidic Management System (FMS; Alcon) used for the LEGION® contains a rotary vent valve that is designed to provide precise venting control versus the INFINITI® system's (Alcon) non-adjustable on-off

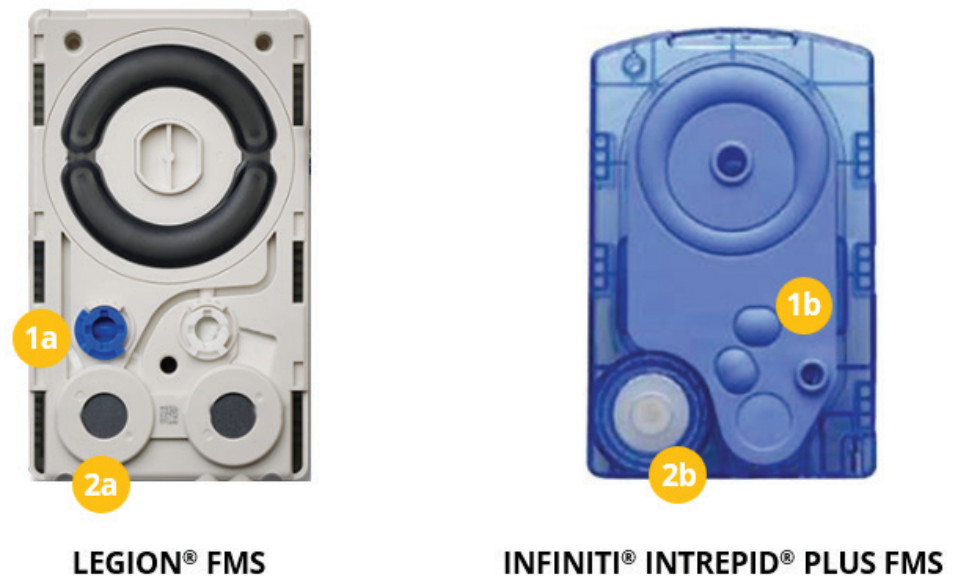


Figure 3. The Fluidic Management System (FMS) includes a rotary vent valve (1a), on-off vent valve (1b), optical vacuum pressure sensor (2a), and mechanical sensor (2b).

vent valve. Also, the CENTURION®-based FMS contains the optical vacuum pressure sensor that is designed to increase precision in vacuum detection versus the INFINITI® mechanical sensor (Figure 3).<sup>12,13</sup>

### LEGION® SYSTEM CLINICAL DATA

LEGION® system clinical performance data has been recently presented at international congresses.<sup>14-16</sup> Shetty et al conducted a prospective, randomized, single-center study to compare surgical efficiencies and outcomes between torsional and transversal phacoemulsification. Two hundred eyes (all grades of cataract) of 200 patients were randomized into torsional (OZil® technology LEGION® system: group 1, n = 100) and transversal phacoemulsification (Ellips FX Technology Sovereign Compact: group 2, n = 100) study groups. Two experienced surgeons performed phacoemulsification using either torsional or transversal technologies as per randomization. The recorded surgical video was assessed for various parameters such as chatter, followability, chamber stability, etc., by a third independent surgeon using the questionnaire grading of surgical video recording. Mean US time and mean case time were significantly less in group 1. The postoperative versus preoperative central corneal thickness (CCT) difference was more in group 2 when compared to group 1, but was not significantly different (Table). Better followability, ease of chopping, and reduced chatter was noted in group 1 based on the surgical video assessment.<sup>14,15</sup>

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**TABLE. PROSPECTIVE, RANDOMIZED, COMPARATIVE, SINGLE-CENTER STUDY RESULTS.<sup>14,15</sup>**

Median [95% CI]	Group 1 (n = 100 eyes)	Group 2 (n = 100 eyes)	P value**
Mean Ultrasound Time (S)	33.6 [28.98,46.86]	94 [80.84,100.16]	<0.001
Mean Case Time (S)	343 [318.84,374.86]	370.5 [330.0,480.0]	<0.001
Diff CCT* (µm)	16 [13, 20.72]	19.5 [13, 25.37]	0.15

\*Central Corneal Thickness difference postop vs preop  
 \*\*Kruskal-Wallis Test Sample size: n = 200 eyes

"The LEGION® system, with its torsional ultrasound capability and advanced surge protection, enables surgical efficiency and good postoperative outcomes."

### CONCLUSIONS

Advances in phacoemulsification technologies may lead to better clinical outcomes in patients undergoing cataract

surgery. The LEGION® system, with its torsional ultrasound capability and advanced surge protection, enables surgical efficiency and good postoperative outcomes. ■

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