

Comparison of a 120W Moses with Conventional 120, 100 and 30W Holmium Laser For Cystolitholapaxy (PD07-08)

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Disclosure

Dr. Baldwin:

- Consultant for Olympus
- Lecturer for Cook Medical
- Chief Medical Officer StepLite



Background

- Treating large bladder stones in a cost effective and minimally invasive manner can be challenging.
- Traditionally, open cystolithotomy is used to treat large bladder stones.
- Open surgery has increased morbidity compared to endoscopic management of bladder stones.¹



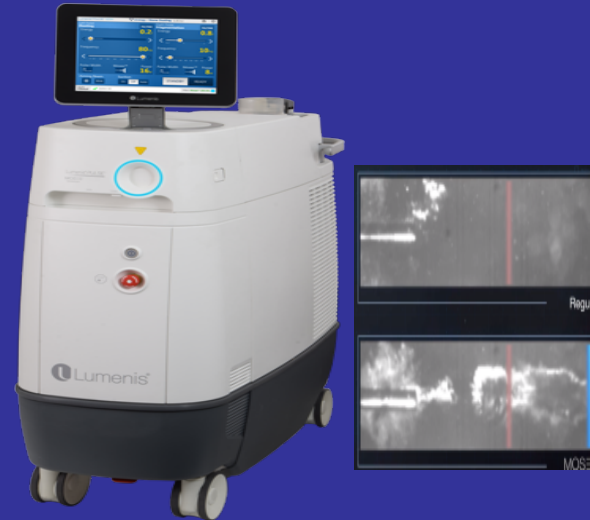
1. Bhatia V., et al.: Vesical lithiasis: open surgery versus cystolithotripsy versus extracorporeal shock wave therapy. J Urol. 1994;151:660–662

Background

A variety of laser machines and fibers are currently available to treat bladder stones



30W Dornier Holmium laser machine



120 W Lumenis Pulse 120H +/-
- Moses

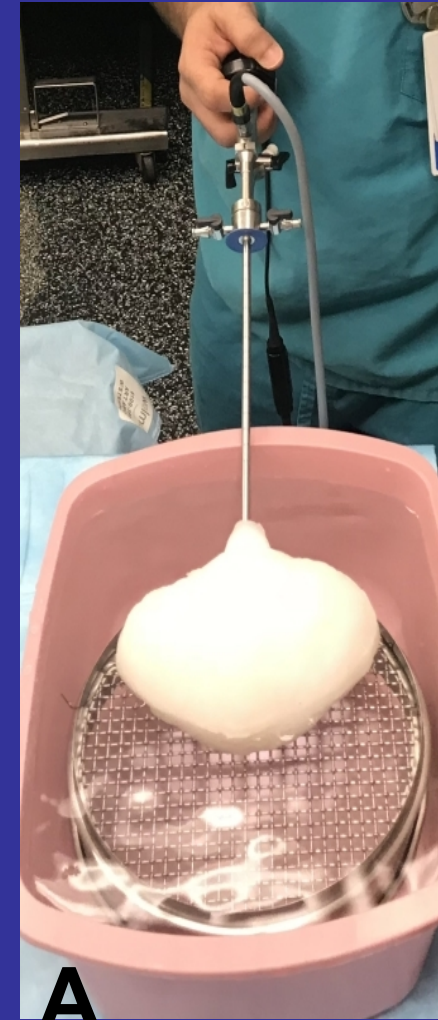


Olympus Empower 100W

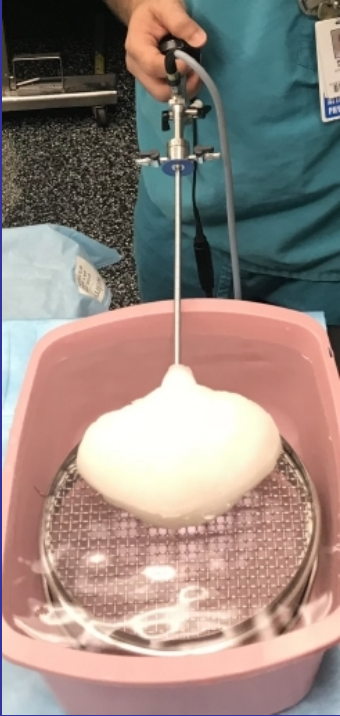


Background

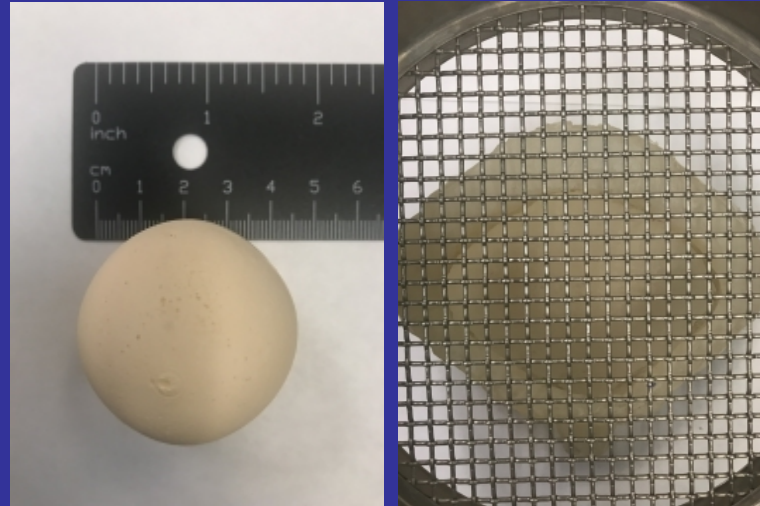
The aim of this study is to compare efficacy and cost of various Holmium laser devices during benchtop cystolitholapaxy



Methods



A benchtop simulation of laser cystolitholapaxy was performed



20 identical 4 cm BegoStones placed on a 5.3 x 5.3 mm metal mesh (allow passage of fragments <5mm) within a 3D printed bladder model



laser fiber activated to perform lithotripsy, with residual stone fragments collected under the mesh in the bench-top model

Methods

- Study arms (5 stones per arm) with laser boxes operated at maximum energy:

Laser Machine	Fiber	Energy (Joules x Hertz)
Conventional 30W	550 μ m	2.5 J x 8 Hz
Olympus Empower 100W	550 μ m	3.3 J x 30 Hz
Conventional 120W	550 μ m	4 J x 30 Hz
120W Holmium laser with Moses technology	550 μ m	4 J x 30 Hz



Methods

- Primary endpoint:
 - Total **laser** fragmentation **time**
 - Total **operation time**
 - Amount of residual **stone fragments** at the end of lithotripsy
 - Number of **laser fiber strippings** required



Methods

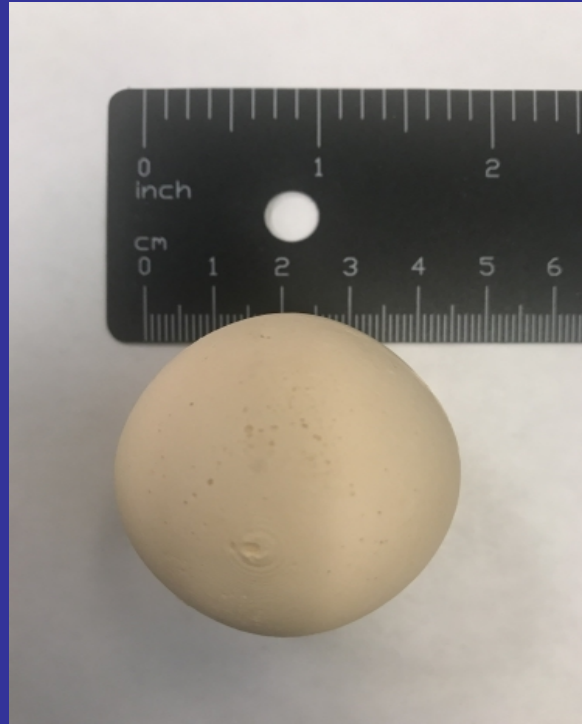
- Secondary endpoint was **cost**:
 - The cost of the laser machine:
 - Lumenis \$210K, Olympus \$95K, Dornier \$35K),
 - The cost of fibers:
 - Moses \$770.4, regular 120W \$610.0, 100W \$313.73 and 30W \$313.73/fiber
 - Mean cost of OR time in California (\$37/min)¹

1. Alex Macario MD, MBA. **What does one minute of operating room time cost?** Journal of Clinical Anesthesia (2010) 22, 233–236.



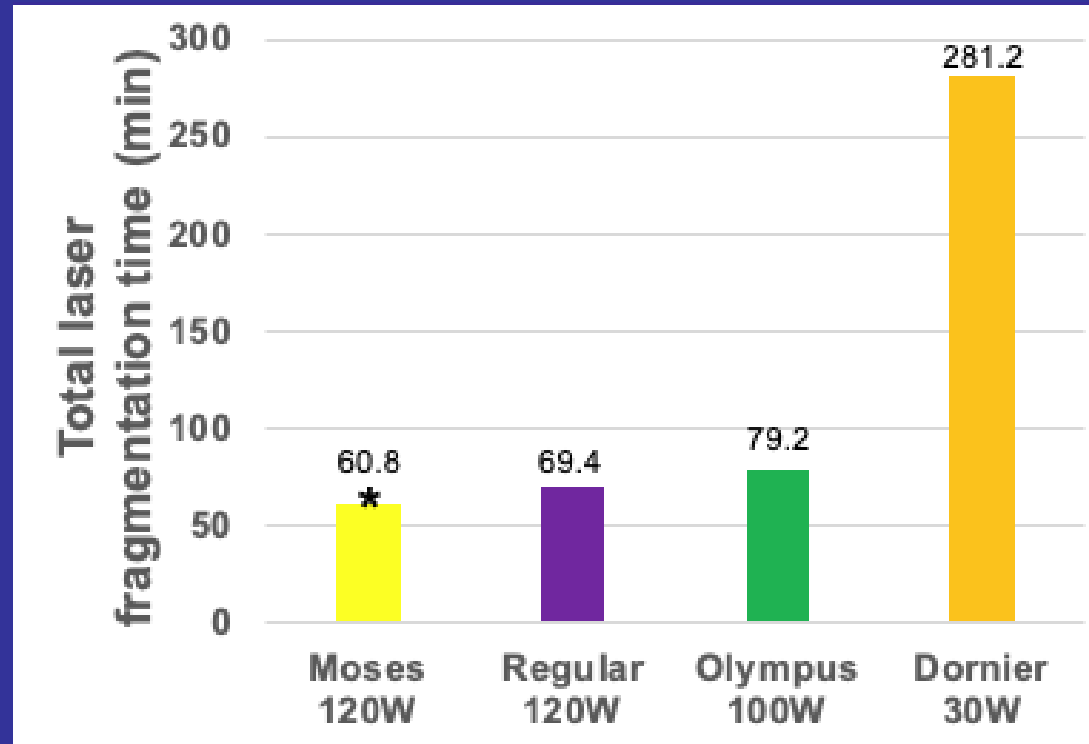
Results

- Stone weights were similar between groups (mean 61.42 g, $p=0.524$).



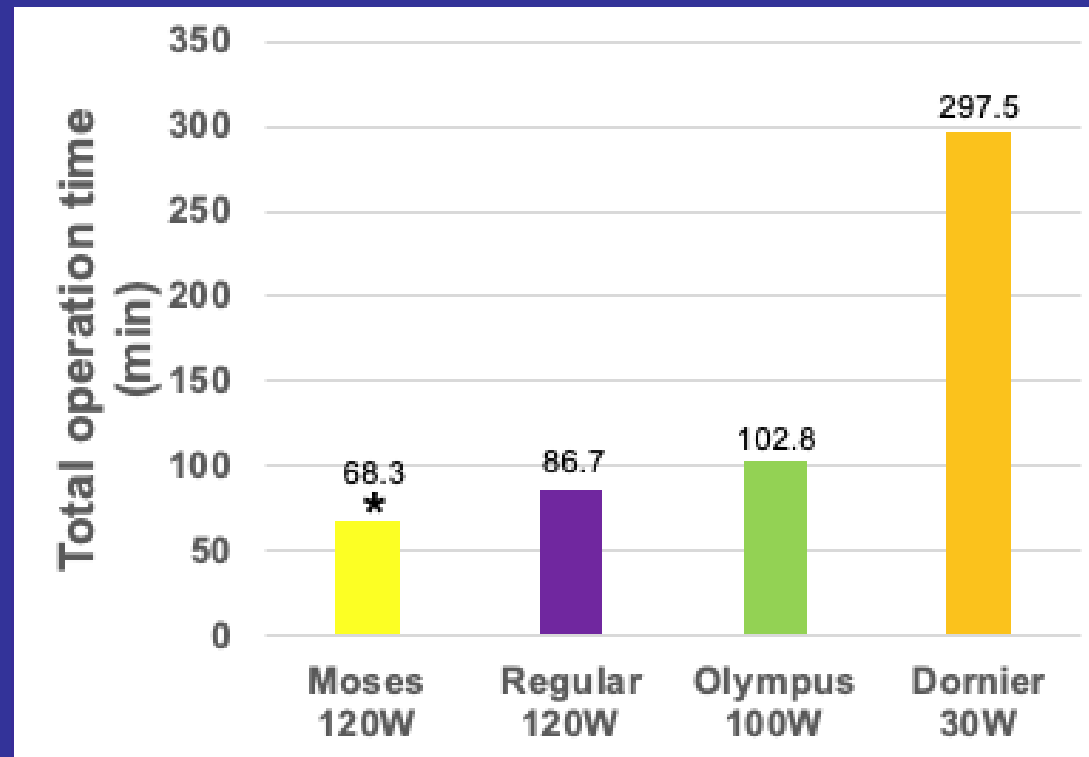
Results

- The Moses laser required less lasing time (60.8 min) compared to all other groups



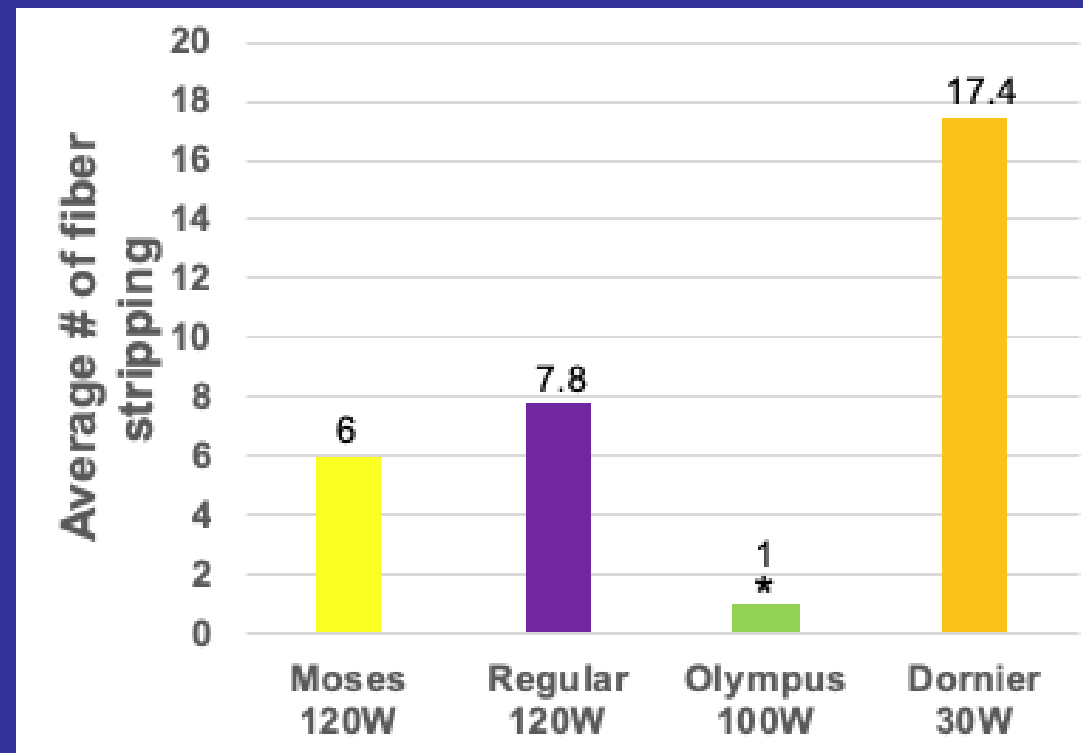
Results

- The Moses laser required less total operation time (68.3 min) compared to all other groups



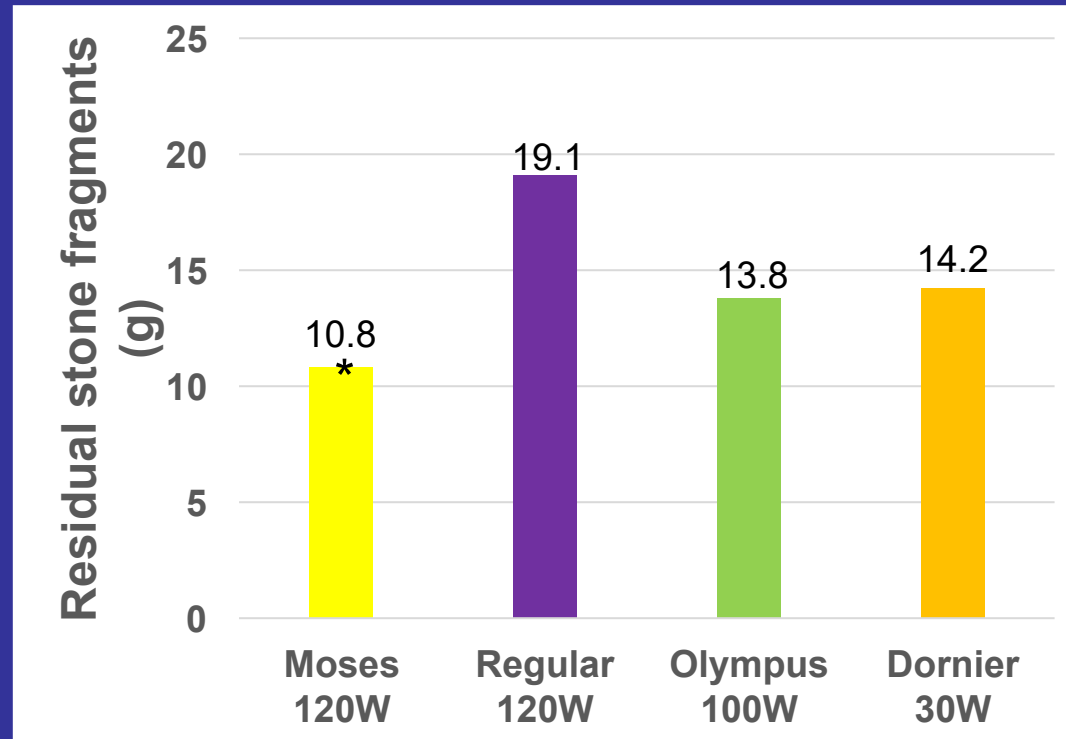
Results

- The Olympus 100W laser required less fiber stripping (1) compared to all other groups



Results

- The Moses laser had less residual stone fragments (10.8 g) compared to all other groups



Cost effectiveness

- Moses technology would result in an estimated cost savings of \$522, \$820 and \$8023 per case compared to the regular 120W, 100W and 30W lasers, respectively.
- When factoring purchase price, Moses became cost effective after treating 140 cases compared to the 100W laser and after only 22 bladder stones compared to the 30W laser.
- In contrast, the 100W laser became cost effective after only 8 bladder stone cases compared to the 30W laser.



Conclusions

- The Moses technology would treat bladder stones most cost effectively in high volume institutions
- The Olympus 100W laser was cost effective in low to moderate volume centers.
- The 30W laser would only be cost effective in very low volume centers.



Thank you!

