joint visualization compared to an extensile interportal capsulotomy.

**Paper #4**

**COMPARISON OF PRESSURE MEASUREMENT ACCURACY OF FIVE ARTHROSCOPIC FLUID PUMP SYSTEMS**

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FDA Status: Not Applicable  

**Summary:** Arthroscopic pump displayed pressures can vary greatly from actual intra-articular pressure.  

**Introduction:** Potential fluid management complications, including retroperitoneal fluid extravasation, can arise during hip arthroscopy. This risk relates directly to fluid pressure and operative time. The recommended pressure ranges by different arthroscopic pump manufacturers varies widely creating confusion over this important safety issue.  

The purpose of this study was to compare the pressure measurement accuracy of five common arthroscopic fluid pump systems and use this information to inform pump safety.  

**Methods:** Patients were randomized to undergo hip arthroscopy with one of five available arthroscopic fluid pump systems (Linvatec/Conmed 24K, Stryker Crossflow, Arthrex Continuous Wave III, Smith and Nephew Dyonics 25, or Depuy/Mitek FMS/DUO+). The difference between the displayed pump pressure and the intra-articular fluid pressure was measured throughout the surgical case using a spinal needle at the operative site connected to an arterial line pressure measurement means. Each of the five pumps was used for five cases.  

**Results:** The mean pressure differences between the displayed pump pressure and measured intra-articular pressure in mmHg were as follows: Linvatec 24K (-9 ± 2), Stryker Crossflow (4 ± 6), Arthrex Continuous Wave III (10 ± 5), Smith and Nephew Dyonics 25 (62 ± 16), and Depuy/Mitek FMS/DUO+ (61 ± 8).  

**Conclusion:** Arthroscopic pump displayed pressures can vary greatly from actual intra-articular pressure. This data suggests that there are two basic design approaches to the display of pump pressure. The first, (Arthrex, Linvatec, Stryker) reflects as closely as possible the true pressure within the joint. The second (Smith-Nephew, Depuy/ Mitek) appears to reflect what the hydrostatic pressure would be with a bag of irrigant positioned at a variable height above the surgical site. The second method does not attempt to anticipate the true intra-articular pressure and would not be expected to represent accurate intra-articular pressure given frictional flow losses in the cannula/tubing circuit.  

A more accurate approximation of 'true' pressure for each pump can be accomplished by adjusting the displayed setting by the pressure difference observed in this study. Our experience suggests that a true pressure of 40-45 mmHg for the majority of a hip arthroscopic procedure provides a good visual working field while minimizing the risk of fluid extravasation into the soft tissues and thus is our recommended pressure range.