Comparison of Saline Usage in the DualWave™ Arthroscopy Pump: Inflow-Only vs Combination Inflow/Outflow Configurations

Arthrex Research

OBJECTIVE

This study compared the amounts of saline the DualWave arthroscopy pump uses in inflow-only and combination inflow/outflow lines.

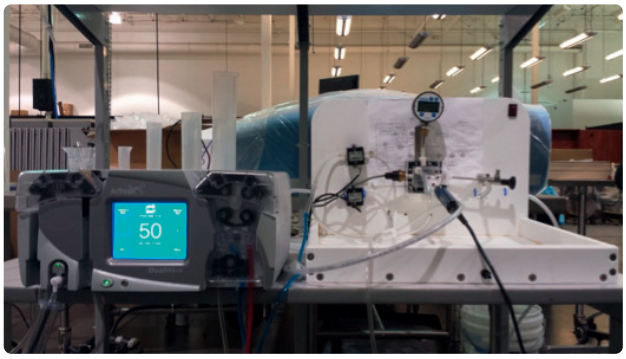
METHODS AND MATERIALS

Table 1: Equipment used for saline usage test.

DualWave arthroscopy pump	AR-6480
Synergy[Resection™] console	AR-8305
Shaver handpiece	AR-8330H
Dissector, 5.5 mm × 13 cm	AR-8550DS
ReDeuce™ pump tubing	AR-6411
DualWave outflow tubing	AR-6430
Scope sheath	AR-3371-4000
HD arthroscope, 30°, 4 mm × 152.5 mm	AR-3350-4030
Bridge cannula, 5.5 mm	AR-3032-5.5
Inflow cannula adapter, w/ stopcock	AR-3035L
Humm-Vac vacuum pump (part #HPV12)	
DwyerOmega commercial-grade vacuum	

The items listed above were assembled in a standard arthroscopy fashion, with the scope sheath, cannula, and shaver blade inserted into an acrylic joint simulation model to contain the fluid. Tubing was assembled according to the instructions for use, and the DualWave arthroscopy pump was positioned at the same height as the acrylic joint model.

Figure 1: Setup used for saline usage test.



Using onboard fluid usage monitoring capabilities, the DualWave arthroscopy pump measured the total fluid used. This system provides real-time data on the fluid rate while running and displays the total fluid used when stopped. The arthroscopy pump was turned off between each test to fully reset the fluid usage monitor.

Two different configurations were evaluated for the amount of saline used during the following sequence of operation:

01. Run pump at 50 mmHg for 2 minutes with no shaver activation
02. Activate and run shaver for 2 minutes
03. Deactivate shaver and continue running pump for 1 minute

Both Setup 1 and Setup 2 used a standard inflow tubing configuration on the DualWave arthroscopy pump. Additionally, Setup 2 used a standard outflow tubing configuration with the shaver suction tubing attached to the shaver handpiece.

Setup 1:

- The vacuum pump was set to -12 inHg and attached to the shaver handpiece.
- The arthroscopy pump was set to a pressure of 50 mmHg.
- The suction value of -12 inHg was chosen based on a user survey of preferred settings for Stryker Neptune suction devices, with most users reporting a range of -8 inHG to -12 inHg.

Setup 2:

- The arthroscopy pump was set to a pressure of 50 mmHg with shaver suction set to Medium. Cannula tubing was not used in this setup.

RESULTS

Table 2 shows the mean and standard deviation values for the amounts of saline the DualWave™ arthroscopy pump uses in inflow-only and combination inflow/outflow lines.

Table 2: Saline usage results.

	Inflow Only (mL)	Inflow/Outflow (mL)
Sample 1	1144	930
Sample 2	1124	874
Sample 3	1118	921
Mean	1129	908
Standard deviation	14	30

CONCLUSION

A significant amount of saline can be conserved (approximately 221 mL or 20%) by using a combination of inflow and outflow lines on the DualWave arthroscopy pump at the proper settings.