

## Manual versus Pump Aspiration for Endovascular Stroke Therapy

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### Introduction

Manual aspiration thrombectomy is a well-established technique for coronary disease and has recently been published as a technique for endovascular stroke therapy. Modern endovascular stroke techniques such as aspiration stroke therapy or stent-tri-er technology allow for either manual aspiration or pump aspiration. We sought to compare both techniques to determine which allows for the greatest force generated.

### Methods

Force of aspiration at the tip of each catheter was measured and compared. Pressure at the tip of each catheter was measured utilizing a vacuum pressure gauge while the catheter was attached to either a 60 cc syringe or a standard aspiration pump set to -29 inHg. Force was then calculated utilizing the formula  $P = F/A$  ( $P =$  pressure,  $F =$  Force,  $A =$  Area; catheter tip inner diameter).

### Results

Force of aspiration at the tip of each catheter was measured and compared. Pressure at the tip of each catheter was measured utilizing a vacuum pressure gauge while the catheter was attached to either a 60 cc syringe or a standard aspiration pump set to -29 inHg. Force was then calculated utilizing the formula  $P = F/A$  ( $P =$  pressure,  $F =$  Force,  $A =$  Area; catheter tip inner diameter).

Table 1

Catheter	Distal ID (in)	Distal Area (in <sup>2</sup> )	Pressure Source	Force at tip (g)
SMAX ACE	0.060	0.002827433	Pump	18.6
SMAX ACE	0.060	0.002827433	Syringe	17.3
SMAX	0.054	0.002290221	Pump	15.1
SMAX	0.054	0.002290221	Syringe	14.0
Navian 058	0.058	0.002642079	Pump	17.4
Navian 058	0.058	0.002642079	Syringe	16.2
DAC 057	0.057	0.002551759	Pump	16.8
DAC 057	0.057	0.002551759	Syringe	15.6

Dimensions, area and force generated at the tips of catheters studied

### Conclusions

Pump aspiration generates the greatest amount of force when compared to syringe aspiration techniques. As such, pump aspiration techniques may be a more effective approach to endovascular stroke therapy than syringe aspiration.

### Learning Objectives

Understand the optimal technique for aspiration stroke therapy