FLOW CHARACTERISTICS OF ELASTOMERIC AND PERISTALTIC ENTERAL PUMPS UNDER PRESSURIZED CONDITIONS: IMPLICATIONS FOR ENTERAL NUTRITION INTOLERANCE

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BACKGROUND

Enteral Nutrition Intolerance (ENI)

Common in tube-fed patients (nausea, vomiting, high gastic residuals).

Observation

Previous research highlighted patients with reported intolerance experienced improvements in feeding tolerance after switching to the elastomeric pump, while using the same EN formula as they previously used.

Knowledge Gap

While formula and patient pathology contribute to ENI, delivery system mechanics (flow profile, response to pressure) remain underexplored.

METHODS

Study Objective

To evaluate the flow profile of two enteral feeding pumps under standard, controlled conditions (baseline), and under increasingly pressurized conditions.

Mobility® Elastomeric Enteral Feeding Pump

Traditional Pump

	Elastomeric Enteral Feeding Pump	Traditional Pump
Flow Mechanism	Pressure-driven elastomeric flow	Motor-driven peristaltic flow
Flow Rate Control	Flow rate set by feeding set selection	Digitally programmed flow rate
Flow Rate(s) Tested	Four possible flow rates (one per available feeding set)	400ml/hr
# of Pumps Tested	12 pumps (one per test; 3 per feeding set)	1 pump used for all 12 tests

Testing Conditions

Each enteral feeding pump underwent 12 tests: six under baseline conditions and six under increasing pressure (to simulate rising intragastric pressure).

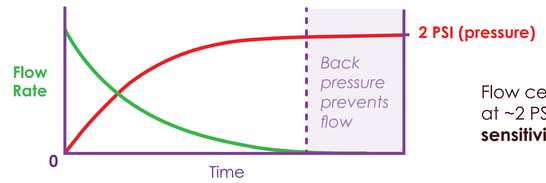
Data Collected

Flow and pressure data were collected and compared to baseline measurements to determine the impact of conditions of simulated back pressure on pump flow.

RESULTS

Elastomeric Enteral Feeding Pump

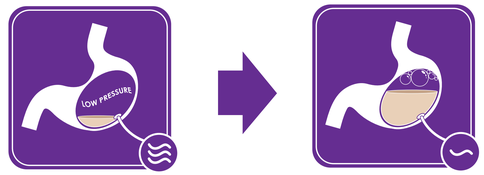
Flow rate decreased gradually under conditions of increasing pressure.
Flow ceased completely at ~2 psi.



Flow ceased completely at ~2 PSI, showing **strong sensitivity to pressure.**

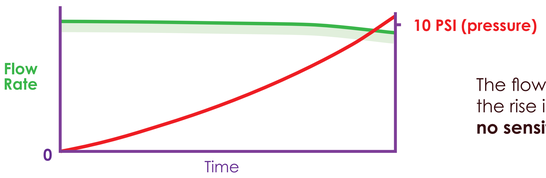
The pump's flow rate was affected by the rise in pressure showing strong sensitivity to pressure.

Real-world insight: The elastomeric pump responds to increasing stomach back pressure with a gradual reduction flow. This adaptive reduction in flow **could alleviate gastric discomfort** in patients prone to ENI, possibly explaining improved tolerability reported in the market.



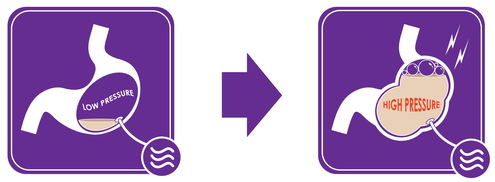
Traditional Pump

Maintained constant flow under conditions of increasing pressure (above 10 psi).



The flowrate is unaffected by the rise in pressure, **showing no sensitivity to pressure.**

Real-world insight: A traditional enteral feeding pump will sustain feeding despite stomach back pressure which **could increase gastric wall tension and discomfort** and may contribute to intolerance.



FLOW CHARACTERISTICS OF THE ELASTOMERIC PUMP MAY HELP TO EXPLAIN IMPROVEMENTS IN EN FEEDING TOLERANCE REPORTED BY PATIENTS

CONCLUSION

Distinct Flow Mechanics

Elastomeric pump

Pressure-adaptive flow may reduce gastric discomfort and improve EN feeding tolerance.

Traditional pump

Maintains **constant flow**, regardless of any changes in back pressure. This could increase gastric tension and risk of ENI

Key Insight

Delivery mechanics, not just formula composition, may significantly influence ENI development and patient comfort.

Next Steps

Controlled **clinical studies** are needed to determine how these mechanical differences affect **real-world outcomes.**

References

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