

Nasogastric Tube Design to Reduce Clogging and Simplify Flushing

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Herein we present a new helical slit tip for the nasogastric (NG) tube to reduce clogging, as well as an accompanying modular in-line flusher to simplify flow restoration to a clogged tube. Nasogastric tubes are one of the most ubiquitous medical devices used in urgent and intensive care situations. Most commonly used to evacuate the stomach during cases of small obstructive bowel

syndrome and surgical operations, the NG tube is prone to clogging. A detailed analysis of nasogastric tube obstruction in an ex vivo model was performed. The proposed NG tube tip is an improvement over the current state of the art. Clogging by suction to the mucosa is prevented by the continuous and helical nature of the suction area. Clogging by food particles is avoided by introducing slits rather than holes, and thus inhibiting close packing and clogging of the particulate on the suction tip. The modular in-line flusher is a device that combines into one push the many steps a caregiver usually takes to unclog the tube via flushing, with no disconnections required. Use of the redesigned NG tube and modular in-line flusher will reduce the need to troubleshoot and replace NG tubes, saving care providers' time, reducing hospital costs, and reducing patient discomfort.

Concept Selection in the Development of Medical Devices: The Case of the Smart Stent-Graft

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During product development, ideas are narrowed down to a single one by the designers in order to satisfy the customers'

needs. This process is called concept selection and is crucial to the development of new products because, from this point onward, the design team is committed to a concept whose modification implies delays and additional costs. Decisions made during the concept selection phase are often difficult due to the uncertainty caused by the lack of objective data. However, it is possible to reduce this uncertainty assessing each concept's expected costs and benefit. Medical devices, before entering the market, are scrutinized by several agencies around the world to assess their clinical- and cost-effectiveness. In order to reduce the uncertainty associated with concept selection, the parameters evaluated by the multiple agencies should be used to support the idea to pursue. However, as that data are not available yet, in this paper, several parameters were identified to evaluate each concept and, for each metric, the most adequate measurement technique was described. This paper also presents a specific implementation of the design process for a new stent-graft.