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A Novel Approach to Increased Fidelity for Neonatal Circumcision

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Abstract

Neonatal male circumcision is a procedure commonly performed in the United States (US), on roughly 50% of newborn males.[1] Pediatricians are one of several specialists performing this procedure; the Accreditation Council for Graduate Medical Education (ACGME), which accredits residency programs in the US, states that pediatric trainees "should receive real and/or simulated training when [neonatal circumcision is] important for a resident's post-residency position".[2] Due to competition among specialties and local practices, pediatric residents may have little clinical exposure to circumcision, necessitating simulated experiences. However, there is currently only one pediatric circumcision model on the market. An existing Lifeform Neonatal Circumcision Trainer sold by eNASCO was trialed by several practicing physicians using the Gomco Circumcision Clamp. It was useful to demonstrate procedural steps but lacked haptic feel and ability to simulate adhesiolysis or foreskin stretching. We substituted the manufacturer's foreskin with a balloon tip over the model prosthetic to address these issues.

Objective

To increase the haptic feel and fidelity of an existing circumcision model for the purpose of enhanced procedural training

Methods

To simulate the foreskin, a blush colored size 350Q Qualtex balloon was found to best fit the prosthetic model and adhere to the glue. Measuring from the closed end, two inches of balloon is cut off to simulate the prepuce. A small hole is cut in the top of the balloon before fitting it over the prosthetic. A blunt plastic cannula attached to a 1 cc syringe is used to draw up and inject glue through the hole creating simulated adhesions around and below the glans of the penis. Several types of glue were tested but Fast Patch Vinyl Adhesive best adhered to the penis model after removing its original foreskin. The modifications were at minimal cost. The vinyl glue was $4.99 and the balloons were $11.99 for 100. Assuming the glue makes 100 foreskins the cost of the modification is $0.17 each.

This procedure is being integrated into the Term Newborn rotation, a required rotation for all first year residents. The residency program is exploring additional use of this training during an elective Delivery rotation, typically completed by senior residents planning to need the skill in their postgraduate practice.

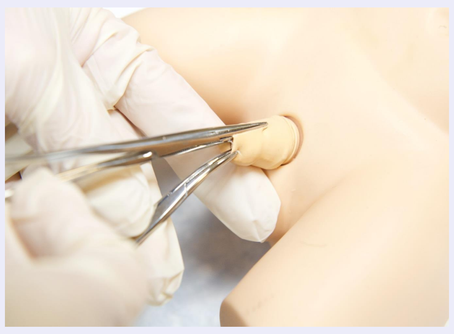
Supplies used

Original and revised models

Results

Evaluation to date has consisted of verbal faculty and resident feedback. The tissue was noted to be of a more realistic thickness and allowed for practice securing all preputial tissue over the bell, a challenging aspect of the procedure. Participants noted an inability to visualize the linear indentation made by crushing the tissue with a hemostat typically seen prior to cutting the dorsal slit, a feature of the procedure we were not able to replicate. Participants found adhesiolysis more realistic with the new version, although the glue separates somewhat during bell insertion, which does not impede securing the Gomco.

Adhesiolysis



Linear indentation technique

Foreskin stretched over Gomco bell

Completed circumcision

Discussion

Neonatal circumcision is an important skill for a subset of pediatric trainees, and the current lack of realistic task trainers has led to innovations seeking to improve fidelity.[3,4] Previously published models have utilized meat products, which are subject to spoilage and challenges of long-term storage. Our low-cost design avoids decomposition issues and provides for ease of set up, given it is a small addition to an existing model. Issues with preputial glue adherence and linear indentation can be improved still. We feel this model substantially enhances the existing commercial option.

References

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