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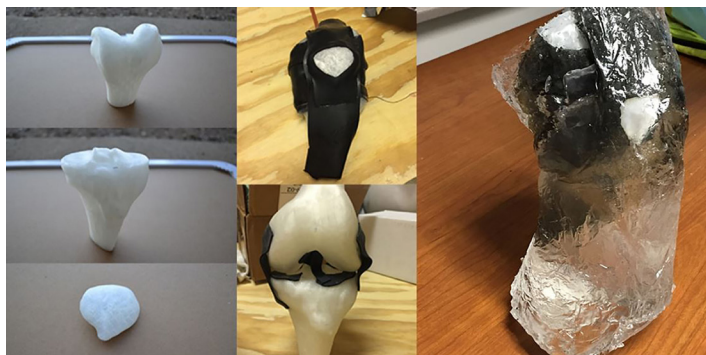
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can lead to complications including patient discomfort and damage to surrounding tissues. Current low cost models lack the anatomical fidelity required to replicate the procedure. Cadavers are costly and the number of procedures that can be performed on each is limited. High fidelity simulation models are expensive, making them less suitable for repeated training by inexperienced learners. A low cost, reusable, high fidelity model is conducive to repeated simulation of this important procedure, allowing the learner to become familiar with proper technique prior to performing arthrocentesis on a patient.

Educational Objectives: The objective was to design an anatomically accurate, low cost, reusable model, providing the learner an opportunity to learn the procedure in a low-risk environment. This method can serve as an excellent tool for developing learner proficiency while also maximizing patient safety.

Curricular Design: A de-identified CT scan of a knee was converted to a printable format using specialized 3D printing software. This image was then sent to an outside facility for print into a durable plastic model of the bony structures. The plastic pieces were then attached using rubber compression bands to replicate ligaments, tendons, and a joint capsule. A small hose was placed into the joint capsule to allow for refilling of the joint space, and a watertight seal was created around the joint capsule using epoxy. This structure was then encased in ballistics gel to simulate soft tissues while allowing for palpable underlying anatomical landmarks.

Impact/Effectiveness: The 3D printed arthrocentesis simulator provides a cost effective, realistic model. Given its anatomical fidelity, this model allows for parapatellar, suprapatellar, and infrapatellar approaches. The total cost of the initial model was \$215, with an estimated cost of \$35 for each subsequent “rebuild”. Each “build” was able to be punctured with up to 50 needle sticks by learners of multiple experience levels during our trial. This model also highlights the potential of 3D printing for use in other procedural simulations.



2 A Low Fidelity Model for Teaching Lateral Canthotomy Procedure

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Background: Lateral canthotomies are infrequent procedures performed on actual patients but is listed as a procedure by the EM Model of Clinical Practice that EM physicians must be able to perform. There are an edible model, a porcine model, a human cadaver model, and a ping pong ball and athletic tape model described but either they are not real-life or too expensive. To our knowledge no high-fidelity models of eyes on which lateral canthotomies can be performed.

Educational Objectives: The objective was to develop a life-like task trainer for hands on practice performing lateral canthotomies and provide an inexpensive simulator which was reusable

Curricular Design: The model was created using a ping pong ball as the eye. Eye sockets were formed by hollowing out a foam manikin head. A rubber band was placed inside the eye socket with the ping pong ball securing it into place. The rubber band was attached with straight pin laterally to the eye socket simulating the superior and inferior crura of the lateral canthal tendon. The area was covered with 2 layers of foam tape, simulating fascial layer and facial skin. The procedure was demonstrated by the faculty instructor and then each resident performed a lateral canthotomy with new rubber bands being inserted until all residents had practiced the procedure.

The materials used to create 1 training model which would allow for 4 individual cantholyses are readily available and inexpensive to purchase. Costs included 12 ping pong balls = \$5, 350 dressmaker pins = \$ 2-3 dollars, 6 foam mannequin heads \$ 17, 200 Rubber bands = \$7, foam tape roll = \$9, suture kit = \$8. Six trainers with 12 lateral canthal tendons = \$50 dollars.

Impact/Effectiveness: Thirty-three healthcare providers, 9 PGY1 transitional (TYR) residents, 2 physician assistants, 10 PGY1 EM, 5 PGY2 EM, and 6 medical students (MS) practiced the procedure and completed an assessment of the model employed. A five-point Likert scale was used to rate knowledge and comfort with the procedure before and after practice. The mean knowledge assessment increased from 2.69 to 3.69. The mean comfort level assessment increased from 2.34 to 3.5. The rating as life-like was 3.09. The model is inexpensive, easily rebuilt and highly life-like that allows multiple learners to practice a procedure that is infrequently performed.

3 A Novel Approach to Emergency Medicine Resident Orientation Using the Flipped Classroom Model

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Background: Emergency Medicine (EM) residencies perform an orientation for new interns. There does not seem to be consensus among programs regarding the length, content, or objectives of orientation curricula. Our goal for intern orientation was to offer a sufficient amount of time, guidance, and educational content to provide new interns with baseline knowledge of emergency medicine core content, enable them to work efficiently in our emergency department, and provide learners with the skills to succeed in residency.

Educational Objectives:

1. Bridge knowledge gaps of EM core content and ensure all learners meet our minimum medical knowledge and level one milestone requirements irrespective of their prior educational background
2. Provide administrative strategies, professionalism standards, and efficiency tools to succeed in EM residency and to complete milestones.

Curricular Design: Orientation was performed throughout the month of July 2016. The orientation curriculum included small group core content sessions using the “flipped classroom model,” clinical shifts in our emergency departments, a clinical and citywide scavenger hunt, ultrasound training, airway management, and charting efficiency workshops. Core faculty and third year EM residents created content based on common chief complaints and topics including chest pain, abdominal pain, shortness of breath, airway management, headache, back pain, etc. The content was presented in 55-minute case based interactive small group sessions. These included 2-3 cases where differential diagnosis, management, and disposition were discussed for each case. Prior to each session, interns were given the cases and targeted readings. Interns were also encouraged to use FOAMED resources.

Impact/Effectiveness: We provided core content material in a way that was interactive and improves retention in adult learners. Medical knowledge scores from the annual intern exam administered both before and after the curriculum showed a significant improvement in fund of knowledge (see figure and tables). General survey data indicated that interns felt more comfortable with core content after completing orientation; however, charting lectures did not prepare interns enough for the medical decision making portion of charting, which we intend to improve.

