



## CAME Voice/Voix

### Teaching ultrasound guided kidney biopsies

Dr. Faisal Rehman – Western University - [faisal.rehman@lhsc.on.ca](mailto:faisal.rehman@lhsc.on.ca)

Innovation in medical education can take many forms. The following account sets out a project we recently completed at Western exploring better ways to teach ultrasound guided kidney biopsies. Prior to the development of this construct, there were no tissue-mimicking, anatomically correct models available to train nephrology residents to perform percutaneous kidney biopsies. The purpose of our project was to create an anatomically correct surgical model for the purposes of teaching nephrology residents the safe performance of ultrasound guided kidney biopsies.

The Schulich School of Medicine provides innovative funding to provide 2 years of summer research work for first year medical students. I partnered with a first year medical student Laura Berall and National Research Council Scientist Dr. Gordon Campbell. We obtained data on gross kidney dimensions from measurements taken from embalmed kidney dissections in the Anatomy Lab and based on this we created kidney and torso solid models. We next fabricated conceptual prototypes (plastic) using 3D printing.

The needle insertion characteristic of a biopsy needle penetrating the native tissues was obtained by using the Needle Insertion Force and Tracking (NIFT) measurement system developed at the National Research Council (NRC) on cadaver torsos. We used polyvinyl alcohol to mimic both the ultrasound medical images and the needle penetration properties of skin, subcutaneous tissues, and kidney. The construct was composed of: skin, surrounding tissues (fat, muscle), partial vertebral column, kidney (outer cortex, inner medulla). We then introduced the completed constructs to physicians in the Division of Nephrology at the Schulich School of Medicine at Western University. There were 8 consultants and 6 nephrology residents who performed kidney biopsies on two of the constructs. There was unanimous agreement that the construct was a powerful simulation tool for teaching kidney biopsies. We are now in the process of patenting this construct and also we are developing more models so that all Nephrology trainees can learn how to perform kidney biopsies on these constructs prior to learning this skill on real patients.

Please contact me at [faisal.rehman@lhsc.on.ca](mailto:faisal.rehman@lhsc.on.ca) if you would like to know more.

Medical student Laura Berall was awarded the prestigious Dr. Glen S. Wither Summer Research Training Program award for all of her efforts. Dr. Faisal Rehman was a 2015 CAME Certificate of Merit recipient.