The data indicate low sensitivity to thermal neutrons, while for fast neutrons, an increase in the SEU cross section with energy was observed. At high energies the results indicate that the cross section levels off.
**Conclusions:** The energy dependence of the SEU mechanism has been investigated for several SRAM memories. A 16 Mbit SRAM from the vendor Cypress was found to be the best candidate for a neutron detector. The characterization results provide a basis for estimating neutron fluence and dose from measurements with the SRAM detector.

**Poster: Physics track: Professional and educational issues**

**PO-1011**

**The CREATE Medical Physics Research Training Network: training of new generation innovators in medical physics**

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**Purpose/Objective:** Medical physics represents a bridge between physical sciences and medicine. Over the past century, physicists in the field have played a major role in transforming scientific discoveries into everyday clinical applications such as computed tomography (CT) and magnetic resonance imaging (MRI) or high-energy treatment of cancer. However, with the increasingly stringent requirements to regulate medical physics as a health profession, the role of physicists as scientists and innovators has been at serious risk of erosion, furthering the gap between scientific discovery and translation of discovery into medical applications. These challenges trigger the need for a new, revolutionized program that respects scientific rigor, attention for developments in basic sciences underpinning medical physics, innovation and entrepreneurship.
**Materials and Methods:** A grant proposal was funded by the Collaborative REsearch and Training Experience program (CREATE) of the Natural Sciences and Engineering Research Council (NSERC) of Canada. This enabled the creation of the Medical Physics Research Training Network (MPRTN) around two successful medical physics graduate programs at McGill University and Université Laval. Both of these programs have longstanding expertise in the training of medical physicists and are accredited by the CAMPEP. Members of the network at the initial stage consist of medical device companies, government (National Research Council Canada, Canadian Nuclear Safety Commission) and academia (McGill, U. Laval, Havard). The MPRTN/CREATE program proposes a new curriculum embedded within 3 main themes: 1) radiation physics, 2) imaging & image processing and 3) radiation response and bio-modeling.
**Results:** The MPRTN was created in 2013 (mprtn.com) and features (1) 4 new Ph.D. courses; (2) facilitated collaborations with basic sciences; (3) facilitated participation of medical devices industry in projects through participation of key-players and internships; (4) formal job-readiness training through workshops and the McGill 'Skillsets' program with involvement of guest faculty from academia, government and industry. MPRTN supported activities include 22 conferences; organization of 5 workshops and exchange travels made by four MPRTN trainees. Three patents were filed or issued, nine awards were won at conferences or best papers on research. Thirteen journal publications were accepted/published, 2 submitted; 102 conference abstracts. Collaborations with industry currently include 13 partners.
**Conclusions:** A medical physics research training network has been set up with the goal to expand the opportunities its graduates thereby harnessing job-readiness for industry, government and academia in addition to the conventional clinical professional role. One and a half year after inception, significant successes have been booked. However, the true challenge of the program is to demonstrate that with this training philosophy, continuous development and innovation is maintained as the core role of the clinical medical physicist.

**Poster: Brachytherapy track: Breast**

**PO-1012**

**Comparative study of surgery with or without intraoperative multicatheter breast implant for PBI**

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**Purpose/Objective:** The use of Partial Breast Irradiation (PBI) in early breast cancer has been increased it use and interest during the last years. Multi-catheter Interstitial Technique (MIT) offer high quality dosimetry parameters respect to others intraoperative procedures for PBI like balloon applicators, ELIOT or TARGIT. IMIMBI allows to see directly the tumor bed diminishing geographical error, optimizing the number of catheter necessary to encompass tumor bed, avoids a second invasive procedure, anticipates and shortens radiation therapy. However the risk to increase surgical complications limited it use during surgical resection.
To analyze the differences between complications, duration of surgery and hospital stay, total time of loco-regional treatment and control of disease among the standard conservative management respect to conservative surgery with intraoperative implant for perioperative PBI.

**Materials and Methods:** A comparative study between two groups matched for age, surgical technique, size, nodal status and adjuvant treatment was performed. The control group received conservative surgery and standard EBRT 50-60 Gy in 5-6 weeks. The experimental group received conservative surgery with IMIMBI for perioperative PBI 34 Gy in 10 fractions.
**Results:** A total of 160 patients, 80 in control group and 80 in the experimental were analyzed. The median age and follow up were 56 vs. 60 years (p> 0.05) and 55 vs. 33 months (p<0.05), respectively. Surgical technique in control vs. experimental group includes Lumpectomy alone in 10% of each group, lumpectomy with sentinel lymph node dissection in 82% vs 88% and lumpectomy with axillary dissection in 5% vs. 1%, respectively. The median tumor size was 11 mm vs. 12 mm in control and experimental group, and all patients were pN0. Median number of catheters were 9 (6-14), double plane implant in 100%, median D90 of 3.3 Gy median V100 and V150 of 35 and 10 cc respectively with DHI 0.72. Minor complication (infection, seroma, bleeding) were recorded in 14 patients (8.7%) seven in each group and major complication (reintervention due to bleeding o dehiscence) in 2 patients (1.2%) one in each group. Median operative time, hospital stay and time from surgery to end of radiation were 97 '(range 27'-309') vs. 123' (range 72'-234'), 2 days for each group and 130 vs. 11 days in the control and experimental groups respectively. No local failure or distant failure were observed and excellent cosmetics results were recorded in more than 80% of both groups.
**Conclusions:** The optimal time to perform MIT is intraoperative because is safe, fast, effective and provides a significant improvements in logistical issues like reduction in overall locoregional treatment. Also allows to take advantage of excellence in dosimetry derived of MIT avoiding a second invasive procedure.

**PO-1013**
**CTV definition in perioperative breast brachytherapy with closed cavity for APBI**
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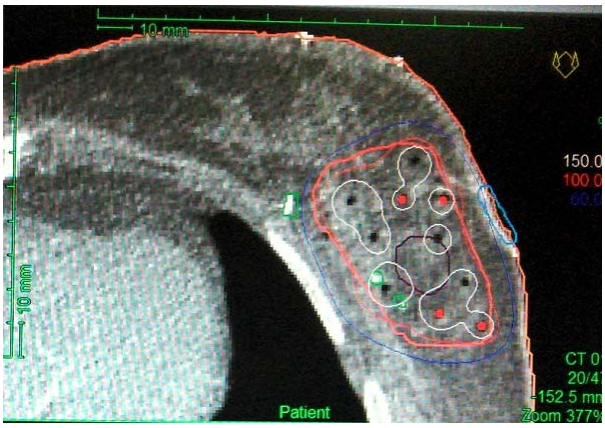
**Purpose/Objective:** Accelerated partial breast irradiation (APBI) is used increasingly. Clinical Target Volume (CTV) definition with multicatheter implant is not easy when closed cavity technique is used for breast conserving therapy. A perioperative implant allows us to know the right location of the tumour bed and CTV. We analyze clinical and dosimetric aspects of CTV definition with perioperative brachytherapy for APBI.
**Materials and Methods:** We review 10 cases of women with low risk breast carcinoma that underwent conserving surgery. During the same procedure, with the opened cavity, a perioperative multicatheter implant with parallel plastic tubes was performed, using the reference of the surgeon to place the tubes at the exact position. One central catheter, or guide-tube, was inserted perpendicular to the skin scar at the bottom where the tumour was located, and then the surgeon closed the cavity usually marked with clips. The rest of the tubes were inserted forming triangles in two or three planes to cover a security margin. A planning CT scan was performed 2-4 days later. The area above the guide-tube was drawn with central clips if present, and a margin of 1-1.5cm was expanded avoiding 1cm from skin and pectoral muscle. The resulting volume was adjusted to cover the lateral plastic tubes with a margin of a few mm to obtain the CTV. The prescription dose was 4 Gy to the CTV per eight fractions twice a day.
**Results:** Four patients required nine catheters in two planes and six patients 10-12 catheters in three planes. The mean CTV volume was 83.9cc (67.7-116.6cc). Mean dose non-uniformity ratio (DNR) was 0.32 (0.28-0.35). Mean dose to the 90% of the CTV (D90) was 4'04Gy. Maximum dose per fraction to the lung was 1.75Gy (0.75-2.28Gy), and to the heart in 5 left breasts was 1 Gy (0.65-1.3Gy). Clips were placed in six cases and half of them were far from the implanted area and were not included in the CTV. In six cases several small air cavities were detected some of them outside of the CTV area.
**Conclusions:** Perioperative implants are the most exact way to define the right CTV. The guide-tube is a good system to define the central area of the CTV in the planning CT when the cavity is closed. Clips and small air cavities are related to the area manipulated by the surgeon, the surgical bed, but are not always useful to define the tumour bed, which is the real area to be irradiated (Fig 1). With perioperative brachytherapy, less number of catheters are required and the CTV volume is smaller than usual with postoperative multicatheter technique for APBI.




**Poster: Brachytherapy track: Gynaecology**

**PO-1014**
**OAR Intra/interfraction dose variability in tandem-ovoids MRI/CTguided brachytherapy for cervical c·ncer**
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**Purpose/Objective:** To estimate intra- and inter-fraction HRCTV and OAR dose variability in two consecutive day IGABT