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CANADIAN IONM NEWS

Official Newsletter of CANM

CANM
CANADIAN ASSOCIATION OF NEUROPHYSIOLOGICAL MONITORING

Contents

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Message from the President

Do you ever wish that you could reach out to your IONM colleagues with questions or to get their input? Wouldn't it be nice if the collaborative learning atmosphere of our annual symposium could extend year round? Well we thought so! So, we are excited to introduce the **Intraoperative Neurophysiology Discussion Board** to help put you in contact with other CANM members. We hope that you will take advantage of this easy to use web-based forum to both post and reply to threads on any topic related to IONM. You will also be able to see CANM updates and ask the Executive Board questions. We hope that the Intraoperative Neurophysiology Discussion Board will become part of your daily routine!

Exclusive access to the discussion board is only one of the many benefits of becoming a member of CANM. CANM members also enjoy a variety of perks including discounted rates to our 2015 symposium, priority access to CANM*talks*, the ability to register for individual courses in the Michener-CANM Graduate Certificate in IONM, and the opportunity to help shape the future of IONM in Canada by joining one of our committees or executive board. Full members will also be eligible for certain pre-requisite exemptions for the future Canadian IONM accreditation examination.

CANM welcomes anyone with an interest in IONM to join. We offer several membership categories with varying criteria so everyone can find the perfect fit. 2015 membership applications are now being accepted. Visit www.canm.ca for more details.

By joining CANM, you also become part of our tight-knit community. We are known for our inclusive and collaborative culture, which proudly welcomes colleagues from a variety of professional and educational backgrounds. Despite our diversity, we pose a strong collective voice for best practices in patient safety and optimal patient care and remain united to provide continual improvement in IONM training and education.

CANM members also develop close working relationships with colleagues across Canada and worldwide. In an emerging field, such as ours, these connections can be a life-line for problem solving, technique refinement, or new discoveries and developments in research and clinical care. So why not extend your network of peers and share your ideas, ask for advice, mentor, or support and help one another in reaching your professional goals. You may even make some great friends in the process - I certainly have!

So don't delay, the time to join CANM is now!

Laura M. Holmes, MSc, CNIM
President, CANM
The Hospital for Sick Children
Toronto, Ontario

Introducing: The Intraoperative Neurophysiology Discussion Board

Since our inception in 2008, CANM has developed a number of successful educational initiatives to advance the field and profession of IONM. Adding to our growing repertoire of programs is the new "Intraoperative Neurophysiology Discussion Board." This web forum serves as our latest online, platform on which professionals can share information, post questions, watch videos and respond to surveys related to intraoperative neurophysiology. Launched and managed by CANM, the Intraoperative Neurophysiology Discussion Board is poised to bring our community further together by allowing "real time" dialogue on a wide collection of IONM topics.

During the pilot phase of its development, only CANM members (Full, Associate, and International) will be granted access to our new online forum. To LOGIN and join the conversation we encourage you to become a member today. For further details on membership registration and the new Intraoperative Neurophysiology Discussion Board visit our website at www.canm.ca or visit the board directly at http://canm.proboards.com/

2015 CANM Membership Fees

FULL MEMBER:
$165

ASSOCIATE MEMBER:
$130

INTERNATIONAL MEMBER:
$165

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to sign up today
www.canm.ca/membership.html

New 2015 CANM Members

FULL MEMBERS

Erin Mercer – Calgary, AB
Joy Boldt – Airdrie, AB

ASSOCIATE MEMBER

Kelvin Jones – Edmonton, AB
Lashmi Venkatraghavan – Toronto, ON
Todd A. Zimprich - Sioux Falls, SD

8TH ANNUAL CANM IONM Symposium

September 25 – 26, 2015
Montreal, Canada

CANM has earned a reputation for hosting educational, highly interactive IONM symposiums. On September 25–26, 2015 we continue this proud tradition in the stunning city of Montreal, Canada with our 8th Annual CANM IONM Symposium. This year's event will be held in the Springhill Suites by Marriott which is connected to the Auberge Saint-Gabriel restaurant, the oldest restaurant in all of North America. Our venue is situated in the historic district of Old Montreal, which places you in walking distance to some of the city's best tourist attractions. A block of specially discounted hotels rooms have been allocated at the Springhill Suites for symposium attendees. Rooms are limited so please book today.

Hotel Reservations
Contact Springhill Suites by Marriott at 1-866-875-4333 and reference "CANM SYMPOSIUM" to be included in the guest block and receive the discounted room rate. Reservation deadline ends Friday August 21, 2015. **Click Here to Book**

In addition to procuring a terrific location, CANM is privileged to have enlisted the distinguished Daniel Schwartz as our Keynote Speaker this year. This celebrated icon is regarded as a pioneer in neuromonitoring and will be presenting a "Historical Perspective on IONM" as his keynote address.

The 8th Annual CANM IONM Symposium is expected to be the apex event of CANM's educational agenda and we hope you join us this year for another premier gathering of medical and IONM professionals. All CANM members receive discounted admission to the symposium. For further information on CANM membership and symposium registration please visit the official CANM website at: www.canm.ca.

Sincerely,
Gina Bastaldo, MSc, CNIM
CANM Secretary
2015 Symposium Committee
Canadian IONM News Editor-In-Chief

CLICK HERE

Training-Induced Plasticity in Rats with Cervical Spinal Cord Injury

Krajacic A, Weishaupt N, Girgis J, et al. Training-induced plasticity in rats with cervical spinal cord injury: effects and side effects. Behav Brain Res 2010; 214, 323–31.

The field of intraoperative neurophysiological monitoring (IONM) has been growing rapidly in the last decade. As a neurophysiologist I have learned to appreciate the benefits of using basic research in order to refine the monitoring techniques that we are using today.

In IONM we are monitoring the integrity of sensory and motor systems that might be at risk during surgery. Injury to the sensory and motor tract, as it occurs during spinal cord injury, can result in transient to permanent motor and sensory deficits below the level of the injury. It is known that spontaneous recovery of function can occur but is limited.

During my time as a graduate student I investigated how we could promote such recovery. Earlier studies have shown that rehabilitative training can promote recovery through sprouting of new branches from the spared and injured axons, a mechanism known as plasticity. In our study, we were able to induce sprouting of corticospinal tract fibres in rats using rehabilitative training, so that they could improve their ability to reach for food pellets. In this study, rats were tested in a reaching task following a cervical lesion of the dorsal funiculus, the dorsolateral funiculus, or both (dorso-lateral quadrant). Starting 4 days after the insult, animals received rehabilitative reaching training for 30 min per day, 6 days per week. Six weeks later, these rats were then tested in the reaching task that they had been trained in.

We also tested them in a novel task which included crossing a horizontal ladder so that we could determine whether the training was sufficiently general so that it would translate to the recovery of other skills. We found that trained rats with a lesion involving the dorsal column were significantly better in reaching for pellets when compared to untrained rats. However, when crossing the horizontal ladder, rats that were trained in reaching made significant more mistakes than their untrained counterparts. Both effects were not found in rats with a dorsolateral funiculus lesion. This lead to the question whether the reaching training had directed the sprouting of corticospinal tract fibers to other descending tracts that are specific to reaching but not general enough to promote recovery in other tasks. Thus, we decided to ablate the pyramidal tract in rats with a dorso-lateral quadrant lesion. This ensured a complete transsection of the corticospinal tract fibers. We found that the reaching success was significantly reduced but did not eliminated. The preserved ability to reach suggested that other descending systems contributed to the training-induced recovery. Eliciting motor evoked potentials through stimulation of the primary motor cortex also indicated the involvement of other systems in the recovery.

In summary, this study demonstrated that training-induced corticospinal tract plasticity may contribute to recovery of motor function, but may also negatively affect untrained tasks as previously reported.

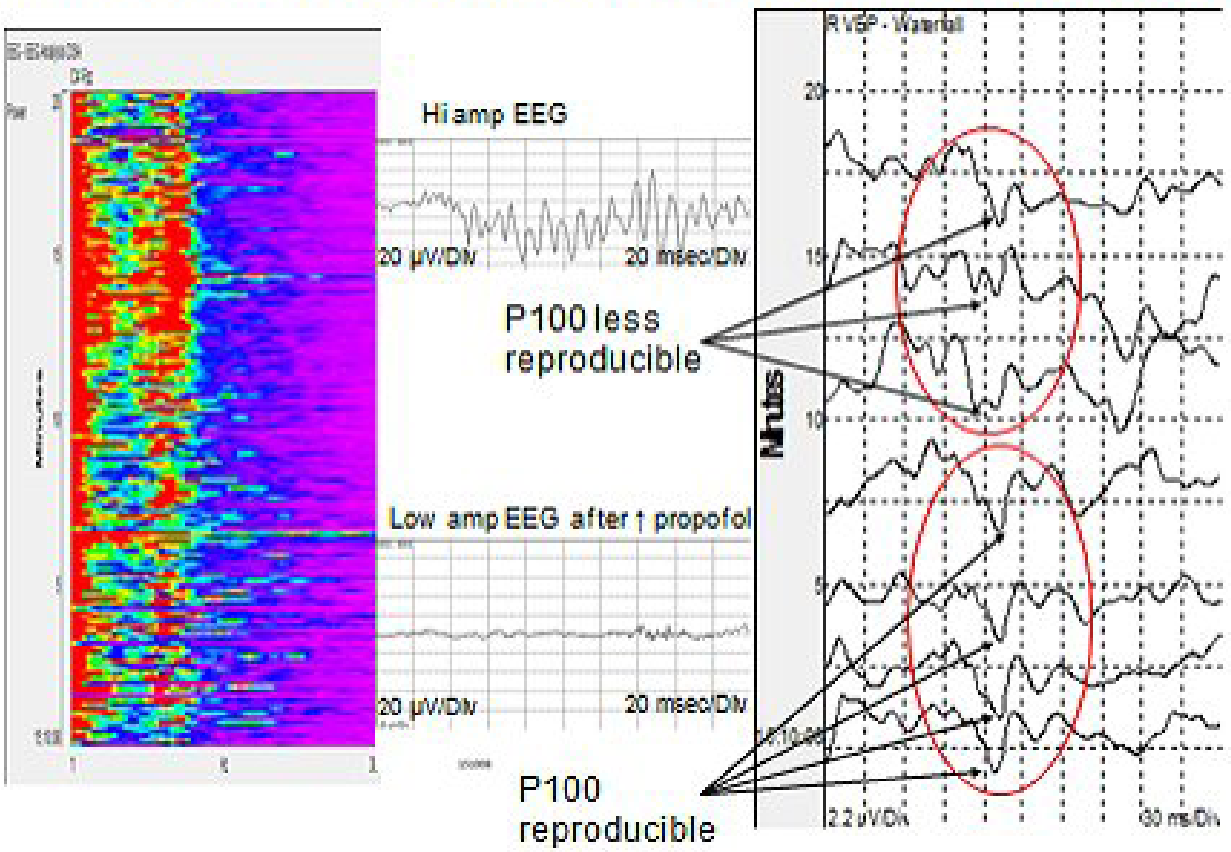
Aleksandra Krajacic, PhD, CNIM
Neurophysiologist
University of Alberta Hospital
Walter Mackenzie Health Sciences Centre
Edmonton, Alberta

Intraoperative Flash VEPs are Reproducible in the Presence of Low Amplitude EEG

David A. Houlden, Chantal A. Turgeon, Thomas Polis, et al. To the view full article go to Journal of Clinical Monitoring and Computing 2014:28(3):275–85. Online at http://link.springer.com/article/10.1007%2Fs10877-013-9532-8.

Low amplitude EEG improves FVEP reproducibility.

P100 less reproducible during high amplitude EEG (top). Propofol/narcotic anasethesia; 32 μV reject window in use.



Purpose

Flash visual evoked potentials (FVEPs) are often irreproducible during surgery. We assessed the relationship between intraoperative FVEP reproducibility and EEG amplitude.

Methods

Left then right eyes were stimulated by goggle light emitting diodes, and FVEPs were recorded from Oz-Fz′ (International 10–20 system) in 12 patients. Low cut filters were ≤5 Hz in all patients; two patients also had recordings using 10 and 30 Hz. The reproducibility of FVEP and the amplitude of the concomitant EEG from C4′-Fz were measured.

Results

Nine patients had low amplitude EEG (<30 µV); reproducible FVEPs were obtained from all eyes with normal pre-operative vision. The other three patients had high amplitude EEG (>50 µV); FVEPs were absent from three of four eyes with normal pre-operative vision (the other normal eye had a present but irreproducible FVEP). Raising the low cut filter to 10 and 30 Hz (in two patients) progressively reduced EEG and FVEP amplitude, reduced amplifier blocking time and improved FVEP reproducibility.

Conclusions

FVEPs were more reproducible in the presence of low amplitude EEG than high amplitude EEG. This is the first report describing the effect of EEG amplitude on FVEP reproducibility during surgery. Raising the low cut filter to a minimum of 10 Hz (15 Hz if available) combined with the use of reject windows and TIVA anesthesia is important for FVEP reproducibility.

Future Directions

Studies should be performed to determine if intraoperative FVEP change (or no change) can predict post-operative visual function and if intraoperative FVEP monitoring can reduce iatrogenic visual deficits associated with surgery that puts optic pathways (up to and including the optic chiasm) at risk.

David Houlden, PhD
Associate Professor, Faculty of Medicine, University of Ottawa
Neurophysiologist, Medical Imaging, Suite F118
The Ottawa Hospital, Civic Campus
Ottawa, Ontario

Announcing the Next CANM *talks*!

CANM is pleased to announce another session in our interactive webinar series, CANM *talks*. This upcoming CANM ***talks*** will be offered as a complimentary webinar series. Due to limited availability, priority access will be given to CANM members.

Tuesday March 24, 2015 – 7:30pm EST

Presenter: Jamie Johnston, PhD, CNIM

Topic: Informative IONM Case Studies

TO REGISTER:

Please send an email to **talks@canm.ca** with the subject "Register – March 24".

CANM *talks*

Pirjo H. Manninen, MD, FRCPC, Senior Neuroanesthesiologist Associate Professor IONM Advocate

Dr. Manninen is a senior neuroanesthesiologist at the University Health Network, Toronto Western Hospital. She holds the academic rank of associate professor at the University of Toronto and her research interests include awake craniotomy, cerebral vascular surgery, and IONM. Throughout her illustrious career, Dr. Manninen has published numerous articles related to IONM and she has become celebrated in our community for her support of our growing field. On February 17th, 2015 I had the privilege of interviewing Dr. Manninen on a variety of topics of concerning neuroanesthesia and IONM.

Gina Bastaldo (GB): There has been a plethora of published material examining the relationship between neuroanesthesia and IONM. In your opinion, what publication or text should be essential reading for all IONM practitioners? For all neuroanesthesiologists?
Pirjo Manninen: (PM): There are three key publications that would be useful to both IONM practitioners and neuroanesthesiologists. The first by Jameson and Sloan[1] describes the technical as well as the anesthetic aspects of monitoring and can be quite helpful to anesthesiologists who are eager to learn more about IONM. Two important publications by Glover and Carling[2] and Wang and colleauges[3] explore the use of IONM in scoliosis surgery which of course is becoming more relevant today. Finally, there is an article by Macdonald et al.4 published in the *Journal of Clinical Neurophysiology* which I'm sure most of the IONM community are already familiar with.

As for textbooks, many neuroanesthesia texts[5,6] have chapters or sections dedicated to IONM.

GB: There are many themes of research focused on the relationship between neuroanesthesia and IONM. In your opinion, what theme is most prevalent within this area of research today?
PM: The effect of anesthetic agents on neuromonitoring is the dominate theme of neuroanesthesia/IONM research because it is such an important relationship for anesthesiologists to understand. Also, we have the knowledge of anesthetic drugs whereas for other health care professionals to do this type of research may be more difficult.

Another dominant theme is the impact of IONM on surgical outcomes. Anesthesiologists are interested in exploring the benefits of neuromonitoring and answering the question "Does IONM improve surgical outcomes?" Of course many surgeons are interested in exploring this theme as well.

GB: In your research you have investigated the effects of anesthetic agents on IONM and also the influence of IONM on surgical outcomes. Does your academic interest lean towards one of these themes more than the other?
PM: Yes I have published research examining both of these themes. My interest lies equally with both.

GB: In view of the fact that IONM is more commonly practiced in the U.S. than in Canada, do you believe American anesthesiologists are generally more familiar with IONM compared to their Canadian colleagues?
PM: I think you have to look at this in two ways. First and foremost, the majority of neuroanesthesiologists in Canada, U.S. and Europe have some degree of IONM knowledge. We have been exposed to it through our practical training and work, academic lectures or published literature. IONM is a part of our practice so I would say that neuroanesthesiologists in Canada and the U.S. should have an equivalent awareness of IONM. It is vital that neuroanesthesiologists understand the effects of anesthetic agents on IONM so we can administer an optimal anesthetic.

Second, it is true that those anesthesiologists who are not often involved in neurosurgical cases may be less familiar with IONM. Nevertheless, all Canadian anesthesiologists receive some level of IONM education during their residency training. IONM is included in all residency exams across Canada and in fact our exposure to IONM has increased over the years.

GB: The Anesthesiology and IONM Departments at the University Health Network share a strong, collaborative relationship. What recommendations do you have for IONM practitioners at other health care institutions who are attempting to strengthen relations with neuroanesthesiologists? What recommendations do you have for neuroanesthesiologists trying to do the same?
PM: If you look at it from a practical perspective, communication is the key. A successful collaborative relationship requires a great amount of interaction between both groups (neuroanesthesiologists and IONM team).

At the beginning you need to establish a rapport between the two groups. The best way to start is to have an initial meeting between the lead IONM technologist and chief anesthesiologist or the anesthesiologist who is most interested in neuromonitoring. There needs to be communication back-and-forth so that you both understand what your own perspective departments require. Also, both groups (anesthesiologists and IONM team) must participate in educational sessions so that they have knowledge of both sides of the fence.

Lastly, in centres where IONM is not often performed it is even more important that there be a constant flow of communication between the anesthesiologist and IONM technologist. There should be discussions prior to the Surgical Safety Checklist regarding the type of neuromonitoring that will be performed because by the time the checklist is performed the anesthesiologist has already drawn his/her drugs. Furthermore, I would even advise that in centers where IONM is rarely performed there be consultation between the anesthesiologist and the IONM technologist a few days or a week before the scheduled surgery.

GB: You have extensive expertise in clinical neuroanesthesiology and IONM. In your opinion, what is a common misconception anesthesiologists have regarding the field of IONM? What is a common misconception IONM practitioners have regarding neuroanesthesiology?
PM: Some reservations anesthesiologists may have towards IONM include: “What are you doing here, why are you in my way, you are taking up too much time, are those needle electrodes safe” and perhaps the most common is “don’t tell me how to give my anesthetic?” Anesthesiologists who are even less familiar with IONM may speculate “Does IONM work or what effect does it really have on patient outcomes?” These misconceptions are certainly shared by surgeons as well.

From the IONM technologist perspective, one misconception is that you may think it’s easy for us to quickly modify or change our anesthetic technique. Or perhaps you do not take into account that the patient is in poor health and a challenge for us to anesthetize. The IONM technologist may also not realize that when they see a change in the patient’s neurological recordings that often translates into more work for the anesthesiologist. It adds one more element or challenge for us. For example, we may need to administer additional drugs to raise the patient’s blood pressure.

GB: Similar to other health science fields, neuroanesthesia has undergone significant advancements in recent years. How do you see the practice of neuroanesthesiology evolving over the next 5 to 10 years in response to the growing use of IONM?
PM: The major change in neuroanesthesia over the last decade comes with the move to more minimally invasive surgeries. As these (mini craniotomy and spine surgeries) take less time we now need to assess carefully the anesthetic agents we will use. For example the use of shorter acting drugs which leave the patient's body rapidly. This also means that we can shift our anesthetic technique more easily which is good news for IONM technologists.

During the last decade there have also been considerable advancements in new equipment such as those used for measuring patient awareness. In regards to new drugs, there has been less influence over the last 5 to 10 years because the process for their introduction into clinical practice is time-consuming and slow.

GB: In your extensive clinical and academic career you have been very active in training young anesthesiologists. What advice would you bestow on a novice anesthesiologist who has just been introduced into surgical cases involving IONM?
PM: My advice would be to take the time to learn IONM. Attend lectures, read, but also make the effort to understand the practical components of neuromonitoring such as electrode placement. Furthermore, it's important to study the differences between SSEP, MEP, and EMG. Learn the effects that anesthesia has on each IONM modality.

Lastly, you should observe neurological recordings alongside IONM technologists in the operating room. Watch and take note of how your anesthetic technique is influencing their waveforms.

(This interview has been edited for length and will be posted on www.canm.ca in April, 2015)

Gina Bastaldo, MSc, CNIM
Secretary, CANM
Editor-In-Chief Canadian IONM News
Toronto Western Hospital, University Health Network
Toronto, Ontario

Articles

1. Jameson LC, Sloan TB. Neurophysiologic monitoring in neurosurgery. Anesthesiol Clin 2012;30(2):311–31.
2. Glover CD, Carling NP. Neuromonitoring for scoliosis surgery. Anesthesiol Clin 2014;32(1):101–14.
3. Wang AC, Than KD, Etame AB, et al. Impact of anesthesia on transcranial electric motor evoked potential monitoring during spine surgery: a review of the literature. Neurosurg Focus 2009 Oct;27(4):E7.
4. Macdonald DB, Skinner S, Shils J, and Yingling C. American Society of Neurophysiological Monitoring Intraoperative motor evoked potential monitoring - a position statement by the American Society of Neurophysiological Monitoring. Clin Neurophysiol 2013;124(12):2291–316.

Textbooks

5. Neuroanesthesia. Cottrell and Young 5th edition 2010, Chapter 7 Mosby Elsevier.
6. A Practical Approach to Neuroanesthesia. Mongan, Soriano, Sloan 2013, Chapter 26 Wolters Kluwer/Lippincott Williams & Wilkins.

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Education Update Winter 2015

September 15, 2014 marked a significant leap forward for IONM education with the launch of the new CANM-Michener Intraoperative Neurophysiological Monitoring Graduate Certificate Program. CANM has been carefully planning this education program for several years and, more recently, partnered with The Michener Institute for Applied Health Sciences to make it happen. For those readers who are unfamiliar with the program, below are some of the important details:

Program Highlights

- Online for greater accessibility
- Designed to be taken by people with full-time employment
- Complete certificate program is a 2-year commitment
- Six courses ranging from clinical sciences to advanced IONM techniques
- First cohort runs September 2014 to September 2016
- Currently only one intake per year with a new cohort starting every September
- CANM members can take individual courses and do not need to take the entire certificate program
- Faculty are drawn from an international pool of subject experts

Where Are We now?

The first cohort of students has successfully completed Course 1, Clinical Sciences for IONM, and is already working on Course 2, Basic Principles of IONM.

For those readers who are not familiar with the Graduate Certificate Program, I would like to take this opportunity to provide a few details – specifically about courses being offered in 2015.

The entire certificate program consists of six courses, and each is comprised of twelve 1-week modules:

Courses

1. Clinical sciences for IONM
2. Basic Principles of IONM
3. IONM Modalities I
4. IONM Modalities II
5. Considerations for IONM
6. Advanced topics in IONM

Below is a brief overview of the three courses that will be offered in 2015:

COURSE 2: IONM 120 Basic Principles of Intraoperative Neurophysiological Monitoring (January 2015).

This course begins with an overview of IONM, including its history, evolution and the role of IONM in the modern health care system. The course quickly moves on to its major focus which is the underlying principles of IONM. The learner will be introduced to basic electronic theory, the nuts and bolts of biomedical instrumentation and how bioelectric signals are evoked, recorded, processed and displayed.

COURSE 3: IONM 130 Intraoperative Neurophysiological Monitoring Modalities I (May 2015)

This course is the first one to delve into IONM modalities. Topics include ABRs, EMG, and EEG. There will also be sections on specialized EMG applications such as monitoring and evaluation of cranial nerves, reflexes and peripheral nerves.

COURSE 4: IONM 140 Intraoperative Neurophysiological Monitoring Modalities II (September 2015)

This course covers more of the modalities that are the bread and butter of IONM. Topics include SSEPs, TcMEPs and many specialty applications such as D-wave recording and monitoring/mapping of the eloquent cortex.

It is important to remember that CANM members are welcome to take individual courses. Courses 3–6 are specifically geared toward basic and advanced topics in IONM and will be very helpful for new and experienced IONM practitioners alike.

Stay tuned for more education-related updates in future newsletters. In the meantime, please do not hesitate to contact us with any questions that you have. We can be reached via our email address, info@canm.ca

Happy learning!

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