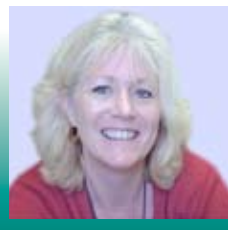


SMRT

President's Message



Carolyn Bonaceto, B.S., R.T., (R)(MR)

"I am overwhelmed by the dedication so many of our members show to achieving the SMRT goal of bringing quality MR specific education to technologists worldwide."

Overwhelmed ... there's no other word. I am overwhelmed by the dedication so many of our members show to achieving the SMRT goal of bringing quality MR specific education to technologists worldwide.

As I write this message I am in Florence, South Carolina, with **Cindy Hipps**, **Carol Lee**, **Melonee Elrod** and **Wendy Porter** as they prepare for their chapter meeting. As an SMRT Past-President, **Cindy Hipps** continues to inspire technologists to stay current in their field by participating in educational seminars. I am honored to be asked to participate and I am grateful for the opportunity to meet so many people practicing in our field.

Last month, I was fortunate to be asked to speak at the Atlanta SMRT Regional Educational Seminar hosted by **Bobbie Burrow**, **Carolyn Brown**, and **Donna O'Brien**. The effort that these people go to on behalf of their fellow technologists deserves so much recognition. The program was incredibly informative and current. And the hospitality they extended to the people who attended and their speakers was unbeatable.

John Posh hosted the John A. Koveleski Memorial SMRT Regional Educational Seminar in Hershey, Pennsylvania the last weekend in August. **Cindy Hipps**, **Bobbie Burrows** and **Candi Roth** presented a moving video detailing John Koveleski's dedication to SMRT, and the fun they all had together at so many

SMRT annual meetings. The co-chairs of the Regional had also invited John's family to attend the program. Meeting John's sisters was wonderful. It clearly meant so much to them to have the chance to see how much John was loved.

Laurian Rohoman, **Lyne Santello**, and **Kath-**

leen Mailly hosted the Eastern Canada SMRT Regional Education Seminar in Montreal which was video-conferenced at Toronto General Hospital with the help of local coordinators **Anna Kirilova** and **Nancy Talbot**. The program was well attended.

We have several other SMRT Regional Educational Seminars coming up soon. Please see Regional Committee Chair, **Janice Fairhurst's** report on page 6 to learn more. I hope you have the opportunity to attend at least one of these events. And it is not too soon to make plans for joining us in Toronto for the SMRT 17th Annual Meeting.

Choosing your representation is very important. Past-President **Cindy Comeau** put together a list of candidates for SMRT Policy Board and Executive Committee from all over the world. Her efforts will ensure that SMRT membership will have the benefit of leadership from all areas. One of the most rewarding benefits of being a member of the SMRT Policy Board is meeting so many dedicated, dynamic people from all over the world. President-Elect, **Wendy Strugnell** is assured of having the benefit of a team that will

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work together to offer the membership a strong voice in the MR community. I am looking forward to working with the new members of the Policy Board and Executive Committee.

Membership numbers continue to grow.


Currently there are 2251 members from 27 countries. It is very apparent that SMRT's ability to provide quality education has been acknowledged worldwide. During **Maureen Ainslie's** tenure as SMRT President, she introduced the "Each One Reach One" initiative. She challenged all SMRT members to encourage colleagues to become members

by sharing the benefits of the organization and our goals. Her efforts and those of all the past Membership Committee Chairs have paid off. Please keep the momentum moving in the right direction. Increasing membership numbers afford the organization the opportunity to improve our efforts exponentially.

The Education and Program Committee Chairs recently

announced the Call for Papers. Presenting a paper or poster at the annual meeting affords technologists and radiographers the opportunity to showcase their work to their peers and to the entire MR community. Judging from prior submissions, I have no doubt that this year will bring papers that demonstrate that technologists and radiographers don't just push buttons. We have much to be proud of. Give some thought to sending in a submission and please watch the SMRT web page for updates regarding submissions.

Before I close this message, I would like to take the opportunity to thank Jennifer Olson

and the staff at the home office for their constant support and efforts on our behalf. The home office recently moved to larger quarters but in spite of the chaos that is inevitable during a move of this kind Jennifer has continued to make herself available to me and the SMRT. Thank you so much Jennifer. 



**Membership numbers
continue to grow.
Currently there are
2251 members
from 27 countries.**

Editor's Letter

The past quarter of 2007 has provided many opportunities for the leaders and members of the SMRT to become involved. As you read this issue, keep in mind that literally hundreds of volunteer hours are expended each quarter of the year on behalf of the members and associates of the SMRT. The elected leaders of the Policy Board and Officers conduct the business and activities of the SMRT besides working in MR on a daily basis with balancing family and community commitments. Personally, I am proud to be a part of this dynamic, professional organization.

We begin this issue with the message from **Carolyn Bonaceto**, SMRT President. She describes her experience at the South Carolina Chapter meeting and her travels to Atlanta to participate in the Regional Seminar there. Seminars were also held in memory of John Koveleski, and in Toronto. Detailed reports and photographs are included later in this publication.

Annual Meeting Program Chairs, **Anna Kirilova**, **Caron Murray**, and **Nancy Talbot**, bring us up to date with the finalized didactic program. Note: those of you who have attended in previous years that a few changes have been made to the program format. Meeting planners consider suggestions in the evaluations each year and try to incorporate positive changes. It is not too late to make your plans to travel to Toronto and attend. Included in the Annual Meeting is the Joint Forum with the ISMRM. This year Chair, **Dave Stanley**, presents a



Julie Strandt-Peay, B.S.M., R.T., (R)(MR)

program with timely content and expert speakers. Please read his invitation and see program details on page 4.

Education Chair, **Sonja Robb-Belville** and her committee are prepared to evaluate the abstracts submitted by those of you who will share your work with your colleagues around the globe. The peer reviewed papers, posters and presentations are a highly regarded portion of the Annual Meeting. Details about how to submit your work or how to view the work of others at the meeting are available on page 5.

Regional SMRT Seminars bring quality, MR dedicated, education to an area near you, no matter where you are located. Chair, **Janice Fairhurst** shows us a preview of upcoming events. Don't see a seminar offering near you? Then consider planning and hosting a seminar. See the article on page 6 or check out the SMRT web-site for more information.

Reports from Regional Seminars held this past quarter begin with John Koveleski SMRT Memorial Meeting held in Hershey, Pennsylvania, USA. In attendance were members of John's family. Following on page 8 are reports and photographs from the seminars in the Northeast and Atlanta, Georgia, USA. Page 9 shows the unique field trip during the South Carolina seminar. Safety First!

Global Relations Co-Chairs **Jane Francis** and **Anne Dorte**

Continued on page 10 ➡

The SMRT Annual Meeting Update

From the 2007 Program Committee Co-Chairs



Anna Kirilova,
B.Sc., R.T., (R)(MR)



Caron Murray, M.R.T.,
(R) AC, (CT)(MR)



Nancy Talbot,
M.R.T., (R)(MR)

Join us at the 17th Annual Meeting of the SMRT on 3-4 May, 2008 in Toronto, Ontario, Canada. The Program Committee has finalized the educational program, which will bring to the international MR technologist community, a diverse educational experience. The Co-Chairs of the Program and Education Committees are pleased to announce the Call for Papers for this meeting. We would like to invite MR technologists and Radiographers from around the world to submit abstracts for presentation in oral and poster sessions at the Annual Meeting. Detailed instructions will be posted on the website at:

<http://www.ismrm.org/smrt>. Abstract submission deadline is 21 January 2008.

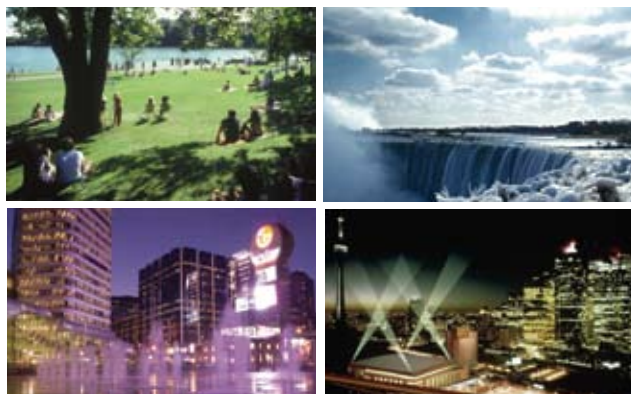
We begin our Program on Saturday morning with a *Welcome and Announcements* from our President, **Carolyn Bonaceto**. The Meeting then kicks off with a presentation on "Radiofrequency and Specific Absorption Rate Considerations" by **Dr. Joel Felmlee, Ph.D.**, from the Mayo Clinic, Rochester, Minnesota, USA. This talk is very timely with the increasing number of high field systems in operation worldwide.

Our second speaker of the day will be **Rhonda Walcarius, B.Sc., M.R.T., (R)(MR)**, from Sunnybrook Health Sciences Centre in Toronto, Ontario, Canada presenting on "Cardiac MR Tips and Techniques". Following a short break, our next speaker hails all the way from the Land of Aus, **Dominic Kennedy, Bapp.SC., (MIT)** from Queensland X-ray in Brisbane, Australia. Dominic will be speaking on "Challenges in Musculoskeletal MRI". In keeping with the challenges theme, the next presenter will be then be **Amy Basatemur, R.T., (R)(MR)**, from Ryan Veterinary Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania, USA. Amy will be talking to us about "Veterinary MRI" which poses such problems as how do you give contrast to an Anaconda with a tumour invading his rectumvery carefully!

The SMRT Business Meeting will take place prior to the lunch break to enable all attendees to participate. The didactic portion will then resume following the lunch break with **Dr. Thomas Helbich, M.D.**, from the University Health Network in Toronto, Ontario, Canada, speaking on "Hot Topics in Breast MRI." The day will conclude with a Global Forum and **Muriel Cockburn**, Radiographer, from Scotland will be speaking on "The Role of the MR Reporting Radiographer", followed by **Carolyn**

"MR Education Unlimited!"

The 17th Annual SMRT Meeting
3-4 May 2008 Toronto, Ontario, Canada



In conjunction with the 16th Scientific Meeting
& Exhibition of the International Society for
Magnetic Resonance in Medicine

Bonaceto, B.S., R.T., (R)(MR), SMRT President speaking on the CARE bill.

On Sunday 4 May 2008, the incoming President of the SMRT, **Wendy Strugnell, Bapp.SC., (MIT)** from Brisbane, Australia will open the Meeting by greeting all the attendees. The didactic portion of the day will kick off with a talk by **Brain de Souza, R.T., (MR)** from Montreal, Quebec, Canada, on "Vascular MRI at 1.5T and 3T". We will then have "Body MRI 2008: Tips and Techniques and New Advances" presented by **Dr. Russell Low, M.D.**, from San Diego, California, USA. Following a short break, **Dr. Jason Polzin, Ph.D.**, will then discuss "Parallel Imaging". The morning is then rounded off with the presentation of Proffered Papers followed by the SMRT Awards Presentation and Luncheon.

We start the afternoon off with something on the forefront of everyone's mind, the "Safety Forum: MR Safety Update". **Dr. Emanuel Kanal, M.D., FACR, FIS, MRM, AANG** from the University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania, USA, will bring us all up to date on the latest information on MR Safety concerns. **John Posh, R.T., (R)(MR)**, will join in on the discussion and discuss "The Challenges and Opportunities for the MR Safety Officer." This forum will be exciting and thought provoking!

Following the afternoon break, **Carolyn Roth, R.T., (R)(MR) (CT)(M)(CV)** will educate us on a "Brain Imaging Medley". Finishing off the day, will be an Artifacts and Remedies Forum moderated by **John Christopher, B.A., R.T., (R), (MR)** and **Laurian Rohoman, R.T., (R)(MR), AC(R)**. Audience participation will be expected and encouraged!

You do not want to miss these two days of superb educational opportunities in the beautiful city of Toronto. Plan now on attending this event for "MR Education Unlimited". [S]

Joint Forum ISMRM/SMRT: "NSF – A Multidisciplinary, Global Issue."

From the 2007 Joint Forum Co-chair



David Stanley
B.S., R.T., (R)(MR)

You are invited to attend the ISMRM/SMRT Joint Forum entitled "NSF, a Multidisciplinary Global Issue" at 2:00 to 4:00 PM, 5 May 2008. This forum is part of the ISMRM annual meeting being held in Toronto, Ontario. The topic this year will be Nephrogenic Systemic Fibrosis (NSF) in which many questions

have been raised regarding the administration of MR contrast agents to patients with renal function disorders.

We have put together an agenda with experts in the field including Dr. Emanuel Kanal, Dr. Tim Leiner, Dr. Eric Williamson and Cindy Comeau. Please review the following information and the agenda.


Overview: Described in 2000, Nephrogenic Systemic Fibrosis (NSF) is an emerging systemic disorder characterized by widespread tissue fibrosis. The purpose of this forum is to present and provide participants the latest information concerning the onset of NSF after the administration of intravenous contrast material for magnetic resonance (MR) imaging (ie, gadolinium chelates). Understanding the issue of NSF and careful patient management prior to the administration of

gadolinium contrast agents is now a requirement of consideration for all clinicians, radiographers, and technologists globally.

Target Audience: This two-hour session is designed for Radiologists, Physicists, Scientists, MR Radiological Technologists, MR trainees, and general audience who are all working in MRI. The course is designated as a intermediate level session.

Educational Objectives: Upon completion of this program the participant should be able to:

- ◆ Understand the history and impact of NSF on the MR community.
- ◆ Understand the global approach and findings for NSF.
- ◆ Recognize the need for careful patient screening for all MRA procedures.
- ◆ Be able to implement improved patient handling and screening procedures for gadolinium contrast studies.

This forum has the potential to answer many questions regarding NSF in your clinical practice. I hope to see you in Toronto, not only for the annual SMRT meeting, but also for the ISMRM/SMRT Joint Forum. 

ISMRM/SMRT Joint Forum

14:00-14:25 Dr. Emanuel Kanal

"NSF: Where have we been, where are we going".

Review the history of MRI contrast agents linked to this disease. Provide an update on patient management recommendations.

14:25-14:45 Dr. Tim Leiner

"NSF: Challenges of Gadolinium & NSF outside of North America".

A global perspective of the challenges related to NSF and gadolinium.

14:45-15:05 Dr. Eric Williamson

"Gadolinium and NSF: Risk factor screening and contrast administration."

Discuss findings from an extensive review of patient files.

Review techniques for risk factor screening and alternative approaches to imaging in the "at risk" population.

15:05-15:30 Cindy Comeau

"NSF Management: A Technologist Perspective".

Technologist perspective-implementation of new screening procedures, MRA protocol optimization, patient management.

15:30 PM-16:00

Q&A session with panel discussion

Share Your Work at the Annual Meeting!

From the 2007 Education Chair



Sonja K. Robb-Belville
B.S., R.T., (R)(MR)

The Education Committee is excited to be working in conjunction with the Program Committee to assemble a wonderful weekend of "MR Education Unlimited" at the 17th SMRT Annual Meeting in Toronto, Ontario, Canada. A key component of this

meeting originates from the papers and posters contributed by MR Technologists and Radiographers like you! The call for papers has gone out, and the Education Committee is seeking abstracts with a clinical or research focus. This is the perfect opportunity to share what you have been working on with your fellow MR Technologists and Radiographers.

Detailed instructions for the electronic submission of abstracts are available on the "Call for Papers" webpage on the SMRT website. To access the "Call for Papers" webpage visit the SMRT home page at www.ismrm.org/smrt, then click on the "Annual Meeting" link in the left hand menu, then select the "Call for Papers" link. Abstract submissions will only be accepted from MR Technologists and Radiographers. All submissions must be original work and not previously published.

All accepted abstracts will be evaluated by the Education Committee. The most outstanding abstract will receive the President's Award. Additionally, awards will be given to the 1st, 2nd, and 3rd place submissions in both the clinical and research focuses. These abstracts are then presented, by the author, as the Proffered Papers at the SMRT 17th Annual Meeting in Toronto.

All others will be invited to present their submission as a poster. The authors of the abstracts accepted for poster presentations are required to attend the SMRT Reception and Poster Walking Tour on Saturday, 3 May 2008, at 17:30 where awards for the 1st, 2nd, and 3rd place poster submissions, in both the clinical and research focuses, will be announced. This event provides an excellent opportunity for networking with MR professionals from around the globe that you do not want to miss!

*Detailed instructions
for the electronic submission
of abstracts are available on
the "Call for Papers"
webpage at
www.ismrm.org/smrt*

SMRT 17th Annual Meeting Program Schedule "MR Education Unlimited"

Time	Saturday, 3 May 2008	Sunday, 4 May 2008
07:45	Welcome & Announcements Carolyn Bonaceto, B.S., R.T.(R)(MR) SMRT President 2007-2008 Anna Kirilova, B.Sc. R.T.(R)(MR) 2008 Program Co-Chair	Welcome & Announcements Wendy Strugnell, BAppSc (MIT), SMRT President 2008-2009 Nancy Talbot, M.R.T. (MR) (R) 2008 Program Co-Chair
	Moderator: Charles Stanley, CRA, R.T.(R)(CT)(MR)	Moderator: Cindy Comeau, B.S., R.T.(N)(MR)
08:00	Radio Frequency and Specific Absorption Rate Considerations Joel Felmlee, Ph.D.	Vascular MRA (1.5 and 3T) Brian DeSouza, R.T.(MR)
09:00	Cardiac MR Tips & Techniques Rhonda Walcarus B.Sc., R.T.(R)(MR)	Body MRI 2008: Tips & Techniques & New Advances Russell Norman Low, M.D.
10:00	Break	Break
	Moderator: Anne Marie Sawyer, B.S., R.T.(R)(MR)	Moderator: David Stanley, B.S., R.T.(R)(MR)
10:15	Challenges in Musculoskeletal MRI Dominic Kennedy, BAppSc (MIT)	Parallel Imaging Jason Polzin, Ph.D.
10:45	Veterinary MRI Amy Basatemur, R.T., (R)(MR)	
11:15	SMRT Business Meeting	Proffered Papers
11:45		SMRT Awards Presentation and Luncheon
12:00	SMRT Luncheon	
	Moderator: Vera Miller, B.S., R.T., (R)(MR)	Moderator: Steven Shannon, R.T., (R)(MR)
13:00	Advances in Pulse Sequences/ Molecular Imaging Michael D. Noseworthy, Ph.D.	Safety Forum: MR Safety Update Emanuel Kanal, M.D., F.A.C.R.
14:00	President's Award Proffered Paper	Challenges & Opportunities for the MR Safety Officer John Posh, R.T., (R)(MR)
14:15	Proffered Papers	
15:00	Break	Break
	Moderator: Caron Murray, M.R.T.(R)(MRT)(MR) 2008 Program Co-Chair	Moderator: Pamela Vincent, R.T., (R)(MR)
15:15	Hot Topics in Breast MRI Thomas Helbich, M.D.	Brain Imaging Medley Carolyn Roth, R.T., (R)(MR)(CT)(M)(CV)
16:15	Global Forum: The Role of MR Reporting Radiographer Muriel Cockburn, R.T. CARE Bill Carolyn A. Bonaceto, B.S., R.T., (R)(MR)	Artifacts & Remedies Forum John Christopher, B.A., R.T.(N)(MR) Laurian Rohoman, R.T., (R)(MR), ACR
17:15		Adjourn
17:30	SMRT Reception Poster Walking Tour	

Regional SMRT Seminar News



Janice Fairhurst, B.S., R.T., (R)(MR),
Chair, Regional Committee

The primary objective of the SMRT Regional Committee is to bring high quality educational programs to a 'neighborhood near you'.

As someone who goes through their professional career in the scientific community, I marvel almost daily at the strides we make in technology. In our small niche of that realm, the technology that surrounds MRI and its many subcategories is an ever changing landscape. The need to stay current with these changes is imperative if we are to stay competitive in our field. The mission of the SMRT is to help us to do just that, by offering a '...forum for education, information, and research...'

Technology has also found its way into the educational realm, and this is great because we're all busy and it's very convenient to be able to sit at our computers and earn our CEU's. I am a huge advocate for using the technological advances of computers to help reinforce learning, but with that said, there is truly no substitute for the power of real, live, expressive, passionate people to teach and help us to understand something new.

I was recently out to dinner with some friends/colleagues, who also happen to be the New England Chapter organizers, and we were discussing the importance of continuing education. We talked about the trend of the on-line CEU and its impact on attendance to educational conferences. The consensus was that although there is no disputing the convenience of on-line learning, there is no replacement for networking with real people, and the feeling of camaraderie that goes along with that. SMRT regionals are a way to enhance our professional experience with others who share our enthusiasm for staying on top of an ever changing profession. You never know what new door may be opened when you have the opportunity to meet with other professionals in your field.

I encourage you to take advantage of the many opportunities that the SMRT offers by attending your local SMRT conferences, the word local having a very broad meaning these days for SMRT conferences are being held internationally in ever growing numbers.

SMRT Meeting News

The Months of October and November 2007 have been very busy for the SMRT home office in Berkley, California as they helped to put out 4 state-side regionals and 2 international meetings, all while trying to move their offices to their new location!! Talk about multi-tasking!

International

Laurian Rohoman organized the Eastern Canada Regional Educational Seminar in Montreal, Quebec, Canada on 20 October 2007. **Anna Kirilova** and **Nancy Talbot** organized the videoconference of the seminar in Toronto, Ontario, Canada.

Wendy Strugnell, SMRT President Elect, heads up the Australia-New Zealand Chapter. **Michael Kean** and **Michael Macilquham** co-chaired this very successful meeting. Their 2nd Annual Meeting was held in Melbourne, Australia on the weekend of 17 and 18 November 2007.

Anne Dorte Blankholm, SMRT Policy Board Member and Global Relations Co-Chair, is planning a Regional meeting in Arhus, Denmark on 29 February-1 March 2008.

Filip DeRidder, SMRT Policy Board Member and Membership Committee Chair is planning a Regional Meeting in Brussel, Belgium in 12 April 2008.

United States SMRT Meeting News

Cindy Hipps, **Wendy Porter**, **Carol Lee**, and **Melonee Elrod** co-hosted the South Carolina Local Chapter Fall Meeting in Florence, South Carolina on 27 October 2007.

The New England Chapter members, **Maryann Blaine**, **Carolyn Bonaceto**, **Janice Fairhurst**, and **Vera Miller** hosted the President's Regional Educational Seminar at Foxwoods Resort in Mashantucket, Connecticut on 3 November 2007.

Carlos Portillo chaired the Northeast Regional Educational Seminar in Baltimore, Maryland on 10 November 2007.

Northeast Ohio Local Chapter members **Kris Barnhart**, **Kristy Bates**, **Shelly Betchel** and **Darby Dummermuth** hosted the SMRT Northeast Ohio Local Chapter Meeting in Akron, Ohio on 11 November 2007.

Thank you to all the organizers for all of your hard work, dedication and enthusiasm for MRI education!! And as I have said before if you don't see your 'neighborhood' on the list of upcoming SMRT Regional's, I encourage you to host a meeting in your area! [S]

Regional SMRT Seminar News: Hershey, PA

Jason A. Hatter, R.T., (R)(CT)(MR), Chief MRI Technologist, Penn State, Milton S. Hershey Medical Center

The John Koveleski SMRT Memorial Meeting was held on Saturday, 25 August 2007 in the Penn State University Fitness Center Conference Center at the Penn State Milton S. Hershey Medical Center Campus in Hershey, Pennsylvania, USA. Over 100 friends, family and colleagues were welcomed to beautiful Hershey, Pennsylvania to the scent of chocolate and peanut butter, wafting from the Hershey Company's local Hershey's Chocolate and Reese's Peanut Butter Cup production plants. Attendees enjoyed sharing memories and reminiscing of a great friend, true leader, and MRI "Guru" who always had a smile on his face whether he was discussing MRI with a physician or fellow technologist or with a concerned patient or loved one.

The event was co-chaired by **Robin Kline R.T., (R)(MR)** of Penn State Milton S. Hershey Medical Center and **John Posh R.T., (R)(MR)** of The Imaging Center at Good Shephard in Allentown, Pennsylvania.

Slated Speakers for the day included **William Faulker B.S. R.T., (R)(MR)(CT)** speaking on Musculoskeletal MRI, who unfortunately could not attend due to airline issues, but his lecture was presented by the ever versatile and always comical **Carolyn (Candi) Roth. Cindy R. Comeau, B.S., R.T., (N)(MR)** speaking on Cardiac MRI, **John Posh R.T., (R)(MR)** speaking on MRI Safety, **Maureen N Hood, M.S., R.N., R.T., (R)(MR)**

speaking on Patient Care in the MRI Suite, **Carolyn Bonaceto, B.S., R.T., (R)(MR)** speaking on The Care Bill and What it Means to You, **Carolyn (Candi) Roth, R.T., (R)(MR)(CT)(M)(CV)** speaking on Protocol Optimization, **Bobbie Burrow, R.T., (R)(CT)(MR)** speaking on Abdominal Imaging at 3T, and **Gina M. Greenwood, MBA, R.T., (R)(MR)** speaking on Stem Cell Based Therapies and Imaging. The professionalism of the speakers and diversity of topics made for an interesting and educational day.

During the Koveleski Memorial Luncheon **Cindy T. Hipps, B.H.S., R.T., (R)(MR)**, presented both the Koveleski Family and the event Co-Chairs with memorial plaques, and also presented a touching PowerPoint presentation of images of John and his friends throughout the years.

At the conclusion of the meeting, both Robin and John thanked all who assisted in making the meeting a success, including the MRI Staff of the Penn State Milton S. Hershey Medical Center for all their hard work setting up, registering, arranging meeting space, creating gift bags, and scheduling food and technology services. They also thanked all who attended for their support of the meeting and made the announcement that the Koveleski Memorial Education Seminar will be held annually in memory of John and the legacy he leaves behind.



Left to right: Carolyn Bonaceto, Paulette Snyder (John's sister), Danielle Brinser (John's sister), Cindy Hipps, Carolyn Roth, Robin Kline, Bobbie Burrow, Shirley Bolan (Koveleski family friend), Gina Greenwood, and Cindy Comeau



Left to right: Carolyn Roth, Donna O'Brien, Carol Lee, Cindy Hipps, and Bobbie Burrow



Mark Spooner,
BPS R.T., (R)(MR)(CT)
NE Regional Chair

Northeast Regional Seminar

The SMRT Northeast Regional Seminar was held on 13 October 2007 at SUNY Upstate Medical University, Syracuse New York,

USA. This regional seminar attracted MR technologists and Radiographers from four different states and from Canada to the north. USA states represented were Vermont, Pennsylvania, Virginia and New York.

The program qualified for 8 CE credits and included a variety of topics. Presentations to attendees began with breast MRI, followed by protocol optimization and pulse sequence design. New information on contrast MRA was well received. Preparing the MR suite design and MR safety were helpful to the audience. Jorge Cortell from Kanteron Systems discussed the use of Osirix on the Macintosh and other open source software tools for MRI.



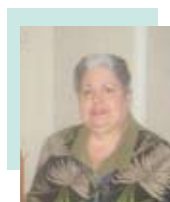
Attendees Bruce Paquette, Erin Dougherty, and Craig Pole from Ulica, New York



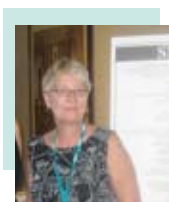
Jorge Cortell and John Posh discussing the use of Osirix during the afternoon break



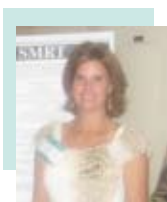
Dave Clemente assisting Charles Stanley with the AV equipment



Carolyn Brown
R.T., (R)(MR)
Co-Chair



Bobbie Burrow,
R.T., (R)(CT)(MR)
Co-Chair



Donna O'Brien
R.T., (R)(CT)(MR)
Co-Chair

Southeast SMRT Regional Report

On 22 September 2007, the Atlanta Chapter had another successful Regional Meeting held at St. Joseph's Hospital. Thanks goes out to all the attendees and the vendors for making our meeting a success.

Carolyn Roth, Bill Faulkner, Charles Stanley and the current SMRT president **Carolyn Bonaceto** were among the speakers for the day.

The speakers did a great job discussing breast imaging, chest imaging, perfusion, diffusion, and spectroscopy, 3T imaging and safety, update on the Care Bill and MRI myths. The audience also enjoyed talking to the vendors during lunch and breaks. The day was filled with everyone being able to network and all of the speakers did an excellent job.



William Faulkner and Sue Lance, Bracco representative



Donna O'Brien, Bobbie Burrows, and Suzanne Barnett, Berlex (Bayer) representative



Carolyn Bonaceto, Bobbie Burrow, Donna O'Brien, and Carolyn Brown

Regional SMRT Seminar News: South Carolina



Cindy Hipps
BHS, R.T., (R)(MR)

The South Carolina SMRT Chapter and GE Healthcare hosted the South Carolina SMRT Fall Educational Seminar at the General Electric (GE) Magnet Plant in Florence, South Carolina, USA on 27 October 2007. The 74 attendees were privileged to be welcomed by the GE Plant Staff with a guided tour and educational session about the manufacturing of superconducting magnets. Each attendee earned 8 hours of educational credit for the one day seminar. The Fall Educational Seminar organizing committee consisted of **Cindy Hipps, Carol Lee, Melonee Elrod, Wendy Porter** and **Scott Ramsey**.

The Friday before the meeting, GE, along with Confirma and Sentinelle hosted an MR Roadshow at the hotel showcasing new MR technology for MR Breast Imaging. About 30 Technologists were on hand to view this material. Afterward the Carolina hosts prepared a low country boil at the "Meet and Greet" that was sponsored by Insight Health Corp. Everyone enjoyed the fresh shrimp and fixins' prepared by the southern girls! We are thankful to Lynn Cranson and Jamie Knox for their support of this function.

The meeting started with educational lectures given by Dick Prorok, Southeast Region Zone Manager and Stuart Clarkson, Americas MR Training Manager from GE on surface coil technology and imaging. Both presenters did an excellent job of explaining how this technology has progressed over the years and what we should expect in the near future as this technology aids image quality and protocol optimization. They received positive feedback from the attendees for their presentations.

Our very own **Anne Sawyer** and **Carolyn Bonaceto** shared their expertise with the group in two break out sessions. While

one group toured the magnet facility, the other listened to Anne and Carolyn speak on 3T Considerations and Advanced Knee Imaging. Ms. Sawyer and Ms. Bonaceto did a great job presenting their material two times so everyone had an opportunity to tour the GE Magnet facility. Thanks to these ladies for an awesome presentation, not once but twice!!

Dr. Clemente, Neuro-Radiologist from Charlotte, was on hand to speak to the group about Neuro-Imaging at 3T. He provided the group with detailed images comparing what can be done on 3T vs. what is being imaged on 1.5T already. It is amazing how 3T adds to the diagnosis in neuro-imaging!

Jim Beier, Install Base Leader for GE and stationed at the GE plant gave a presentation on MR Magnet Engineering. Jim presented many things that should be considered before placing a magnet in a certain location. It was very interesting to hear about some of the problems that have occurred over the years with siting a magnet and how we have progressed with this technology since the beginning. Jim along with the plant manager, Mike Eggleston toured each attendee and walked them through the entire process of the manufacturing of a superconducting magnet. The GE plant in Florence, SC is responsible for manufacturing all superconducting magnets for GE Healthcare globally!

The South Carolina Chapter is very thankful to have had the opportunity to host the Fall Educational Seminar at the GE Plant in Florence, South Carolina! This was a wonderful opportunity for the attendees and they thoroughly enjoyed the day at the GE Plant. The GE Plant staff was delighted to have us there on site. They treated the attendees to breakfast, lunch and snacks during the day! Thanks to all the wonderful people at GE, especially Carolyn Wasko for making this meeting one to long be remembered!! [S]



Georges Clinton,
Carolyn Wasko, and
Scott Ramsey
from GE-Meeting
Coordinators



A special event at this SMRT Regional was the opportunity for all of the attendees to tour the GE magnet plant.

Attendees
enjoying the
low country boil
at the "Meet
and Greet"



Anne Sawyer and Dick Prorok
at the "Meet and Greet"





Jane Francis
DCR(R), DNM
Co-Chair
Global Relations
Committee

Following the global relations forum at the SMRT 16th Annual Meeting in Berlin, Germany the members of the Global Relations Committee are working hard to carry on the theme of the meeting “MR Education without Borders” to expand SMRT into Europe. Whilst this remains a challenge due to the multiple languages spoken we are excited to announce the first meeting to be held in the Benelux countries, (Belgium, The Netherlands and Luxembourg to the uninitiated!) organised by Filip de Ridder on 12 April 2008. Filip has organized a great programme with topics to include state of the art abdominal imaging, cardiac imaging, perfusion, angiography and What is the SMRT? Whilst this meeting will be held in the Dutch language, English is widely spoken and understood and Brussels




The global relations forum in Berlin, Germany was encouraging for the expansion of SMRT educational programs in many areas of the world.

is a fantastic city with good transport links to the rest of Europe so add this date to your diary.

Anne Dorte Blankholm from Denmark is traveling to Sweden to discuss the possibility of a meeting in Scandinavia early next year and is also planning to hold a meeting in Denmark so SMRT is expanding globally.

On a more disappointing note, despite an enthusiastic response from attendees at the forum there was a very limited response to both the emails sent out to those members on our return and from

the questionnaire sent out. Only two people in the UK replied and only 5.5% of the Europeans responded. What we need are your ideas and continued support to carry on the theme in Berlin of “MR Education without Borders.” 

Editor's Letter Continued from page 2

Blankholm share the up and downs of establishing education programs in Europe. The efforts have been slow but fruitful and there is promise of real growth potential in areas outside of North America.

The mission of the SMRT to provide quality education is epitomized by the Educational Seminars, home study series. Editor, **Anne Marie Sawyer** explains the latest topic *Update: MRI of the Brain*. The effort of all of the individuals involved in the Educational Seminars is appreciated.

One of our elected Policy Board members, **Randy Earnest**, agreed to tell his MR story. He has had many different experiences. Can you relate? Did you have an interesting path in your imaging career? Please contact the SMRT office if you are willing to share your story.

MR Safety expert, **Frank Shellock** explains the risks of a scleral buckle when presented with these individuals. He also announces his new book: *The Reference Manual for Magnetic Resonance Safety, Implants and Devices: 2008 Edition*.

Included in this issue are abstracts from some of the award winning contributions to the Annual Meeting in 2007. If you were not able to attend, you can read the information and appreciate the effort and quality of the work. If you were fortunate to travel to Berlin, Germany last May and see these presentations, then you have the opportunity for a pleasant review.

The many upcoming events are listed in the calendar on the last page of this issue.

Happy Reading! 

“It is exciting to think that as a technologist, we have not yet mastered all of the challenges in the imaging of that most fundamental part of our imaging background, the brain..”



Anne Marie Sawyer, B.S., R.T., (R)(MR)
Editor
SMRT Educational Seminars
Home Study Program

We are pleased to present the SMRT Educational Seminars, Volume 10, Number 4: “Update: MRI of the Brain.” This is the thirty-eighth home study developed by the SMRT, exclusively for the SMRT members.

We again revisit the brain, as it remains the anatomy most imaged by MR and where most technological advances, including software and hardware, are focused. MRI, MR angiography, spectroscopy, fMRI, diffusion, phased array coils and parallel imaging all began with brain imaging. As we go to higher field strengths, we encounter challenges in imaging of the brain that we previously encountered in imaging of the abdomen due to the interaction with higher imaging frequencies that more closely match the size of the anatomy being imaged.

Scott Atlas, M.D., Chief of Neuroradiology at Stanford University Medical Center (from a recent presentation) sums it up most succinctly when he says “New imaging technology is sold before most clinical applications are fully developed and well recognized by the physician community.” Therefore, “users are critical in determining the role of already purchased medical equipment.” You will see in the articles included in this home study, people in the MR community who are actively fulfilling this prophecy. They are busy in the development of our new applications that if not already in place in our MR facility are most certainly just around the corner.

It is exciting to think that as a technologist, we have not yet mastered all of the challenges in the imaging of that most fundamental part of our imaging background, the brain.

**SMRT
Educational Seminars
Volume 10, Number 4**

***Update:
MRI of the
Brain***

Functional imaging of the brain, for example, will require new methods of immobilization, post-processing, and real-time interaction with the patient during the MR examination.

Surgical interventions continue to change, and these innovations directly affect how we conduct pre-operative imaging of the brain - as is shown with great detail and expertise in our opening article by **Anna Kirilova, B.Sc., M.R.T.(R)(MR)** of Princess Margaret Hospital, Toronto, Ontario, Canada. **Mike Moseley, Ph.D.**, from Stanford University, California, USA, contributes an update to his always-popular discussion of diffusion- and perfusion-weighted imaging. The article by Drs. Young and Knopp of New York University Medical Center, New York, USA, provides a comprehensive review of MR of brain tumors including imaging techniques.

We would like to express our appreciation to **Kara Baczowski** and **Paul McElvogue** for writing the questions that compose the quiz. A very big thank you goes to **Bill Faulkner** for participating as our expert reviewer.

Thanks also to **Paul McElvogue**, SMRT Publications Chair and in the Berkeley, California, USA office of the ISMRM/SMRT, Jennifer Olson, Associate Executive Director, Mary Keydash, Publications Director, and the staff for their insight and long hours supporting these educational symposia.

Finally, we would like to thank John Wilkie and all of the wonderful people at Invivo/MRI Devices Corporation who support our home studies program, the SMRT Educational Seminars. Their continuing support of technologist and radiographer education brings quality continuing education to the SMRT membership worldwide. [S]



Randall Earnest
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Editor Note: Randy Earnest is an elected member of the SMRT Policy Board and currently chairs the By-laws Committee. He was invited to share his professional story.

If you were to ask me what I wanted to be when I grew up, an MR tech would not have been one of the choices; not because I don't find it completely fascinating but because it just wasn't invented yet. In fact, it wasn't until I was in high school that the first magnet came to my town and when I heard about it I was hooked.

Though NMR had been around for a while it wasn't until the early 1980's that we actually saw clinical MRI and once in the clinical world very rapid development took place with paramagnetic contrast agents (1981), Gradient echo imaging (1986), MR angiography (1987), EPI, developed (1977) but used clinically (1996), functional imaging (1992), a host of peripherals like power injectors, cardiac and respiratory gating, and coil development.

When I started my radiology training, which was a two-year hospital-based program, I knew I needed to become involved in MRI and, ultimately, I did. Almost immediately upon finishing my

X-ray schooling I applied for and was accepted into a program for MRI and CT. After finishing my MR training which consisted of one year of advanced radiologic science courses, part of a Bachelor's program through Weber State University, I continued to work in X-ray, per diem work in MR and MR related research with a small company while waiting for a position to open at the hospital where I was working. It was immediately apparent that MR was much better than X-ray. It was more cerebral and I was glad to be away from barium enemas and the whole general X-ray environment where the referring physician was often condescending and seemed to feel that he could do my job better than me but was too busy doing real work. In MR the doctors would look over my shoulder and say "what is that?" or "how do you get an image?" or my favorite, "cool." I was in a different world and I liked it.

While I went through my MR training, I worked for a small company that developed coils, MR contrast agents, and was developing at the very beginning, PACS. I worked specifically with the coil and contrast development but also had the opportunity to be a part of the PACS world and found this to be extremely intellectually stimulating, having the opportunity to be on the forefront of MR technology. This led to other positions in the biomedical world with clinical trials and clinical applications. This provided me the opportunity to travel all over the world and to meet incredible technologists, physicists, physicians, nurses, CROs and CRAs and many other individuals and organizations

on the cutting edge of MRI.

Subsequent to this position I have worked as lead tech for MRI, CT and X-ray and as director of diagnostic imaging, PACS administration, applications training for various MR systems, director for a not-for-profit organization that compiled a digital teaching library designed for the training and education of physicians in third world countries as well as residents in the US and other industrialized areas. Clearly, MRI is a vehicle that one can use to travel down a variety of roads. I am grateful that I have had the opportunity to travel along several of these roads and, though it is not possible to give a full list of options available, the following is a list of options that may have not been considered and are well suited for those with a background in MR.

*Clearly, MRI is a vehicle
that one can use to travel
down a variety of roads.*

Research: Research in MR is a very broad term, however, there are many facilities that conduct clinical trials and either have a dedicated program or are involved in trials intermittently either in-house or externally. Just take a look at the poster and oral presenta-

tions from SMRT members in past issues of *Signals* or from the annual conferences and it becomes apparent the spectacular breadth of research that is being done and where. There are countless device and drug trials that are in need of sites that can recruit a specific patient population. The following links contain a great deal of information on current trials: <http://clinicaltrials.gov>, <http://www.centerwatch.com>, <http://www.clinicalconnection.com>. To begin performing clinical trials in an institution that does not do research may be a daunting task but not impossible. Using the resource of the knowledge of the members of the SMRT can help.

CROs or Clinical Research Organizations: These are the businesses that typically help drug or device companies organize, run and validate the results of a clinical trial. CROs require the expertise of technologists with a clinical background to help manage these trials. There are many different opportunities from an imaging specialist to trial manager, to validation specialists. This provides techs the opportunity to see a wide range of new and developing practices, procedures, drugs and devices. A CRA or a Clinical Research Associate is someone who actually works with the trial site and insures that the site is capable of doing the work and monitors the sites compliance to the FDA regulations helping to insure that everything is in order for a successful trial. For someone who likes to travel this is a great job.

Physicist and Engineer: These jobs require more brain power than I possess, but I do find these fields fascinating. These individuals often work for the MR manufacturers and are typically the ones that come up with all of the incredible sequences and advances in MR. After developing a new sequence one could then invent an acronym for that sequence, that is not intuitive at all, and add it to the hundreds of other very confusing, non-intuitive sequence acronyms that exist in the MR world (yeah, you know what I'm talking about).

Radiologist Assistant: Though this is not really specific to, or even indicated for MR, it very well could be in time. This position is a radiologist extender position and in larger institutions may have a place specific to MR. 2005 saw the first class to graduate.

Radiologist: Sure, why not go big. The background in MR would be a great prelude for a neuroradiologist.

Applications: There are many opportunities for applications with systems manufacturers, device and software companies that are looking for individuals that have a background in clinical and research MR and have an aptitude for teaching and problem solving. It is often a great opportunity to travel and rarely gets old with the constantly changing scenery and clients.

Field Service Engineer: For those that are technically savvy and have a knack for knowing how things work, and maybe even more importantly, why it does not, a field service engineer may be the way to go. In a previous job it fell upon me to repair gradient and RF amplifiers. It got to the point that the repairs could be done in about 30 minutes and it was rewarding to accomplish this with a team of individuals that really had no idea of what they were doing. It would be even more rewarding, however, to go to a facility that is having trouble with a MR unit, knowing what to do, fix the problem and get them back up and running and scanning patients.

Post Processing Systems: There are quite a number of third-party vendors that provide post-processing or image analysis packages that need individuals with MR experience to provide everything from applications training to software development assistance. This, too, is a very dynamic field; anybody who has ever started to manipulate images with MIP, MPR, volume rendering, virtual fly-through knows that it can be very addictive.

Pharmaceuticals: There are quite a number of pharmaceutical companies developing drugs that are either MR specific i.e. used to enhance imaging, or are therapeutic agents that use MR to determine efficacy. This focuses on the research side but there are many positions in pharmaceutical sales promoting contrast agents.

Mobile MRI: Opportunities abound, provide the opportunity to travel some and to have a frequent change of scenery.

PACS Administration: Oddly enough, is an area that I have seen several MR techs move into, including myself. With all of the excitement surrounding NSF and the quick response by the attorneys to litigate, maybe becoming a lawyer would be the way to go.

Sales: An exciting field in the world of MR and other medical imaging equipment and there are some unique hybrid positions which I don't think have been around for too long that I find quite fascinating. There are still those that go out hospital door to hospital door selling equipment and drugs... but there is another part of the sales team in several large organizations for individuals that have a background in the engineering or physics side (the amount of an experienced MR tech) combined with a sales background.

Clinical MR is a truly fascinating and rewarding career but that it is only a small part of a large and dynamic field of opportunities made available to those who have the background, training and experience in MR.

This is a great opportunity to utilize the knowledge of the intricacies of MR, teaching, troubleshooting and selling.

Education: There are many educational programs available that need good teachers with a strong clinical background. I have found that the best teachers are those that are passionate about what they do. MR is a wonderfully fascinating field that tends to foster a large group of passionate individuals and it seems a natural fit, then, for those to teach others.

There are quite a number of entrepreneurial opportunities that exist in the world of MR. There are those that have started out-patient imaging centers and mobile services, MR safety programs, non-traditional educational programs and registry review services and many others.

The take home message is this: Clinical MR is a truly fascinating and rewarding career; but that it is only a small part of a large and dynamic field of opportunities made available to those who have the background, training and experience in MR. Over time I look forward to seeing more of what MR has to offer and it seems to be a profession that deserves to be supported, promoted and made better by each of us. [S]

Scleral Buckle



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This article represents the views of its author only and does not reflect those of the International Society for Magnetic Resonance in Medicine and are not made with its authority or approval.

The application of a scleral buckle (note, this is a procedure not an implant) or “scleral buckling” is a surgical technique used to repair retinal detachments and was first used experimentally by ophthalmic surgeons in 1937. By the early 1960’s, scleral buckling became the method of choice when the development of new materials, particularly silicone, offered surgeons new opportunities for improving their outcomes.

The buckling element is usually left in place permanently. The element pushes in, or “buckles,” the sclera toward the middle of the eye. This buckling effect on the sclera relieves the pull (traction) on the retina, allowing the retinal tear to settle against the wall of the eye. The buckle effect may cover only the area behind the detachment, or it may encircle the eyeball like a ring. The buckle holds the retina against the sclera until scarring seals the tear. It also prevents fluid leakage, which could cause further retinal detachment.

Scleral buckles come in many shapes and sizes. An encircling band is usually a thin silicone band sewn around the circumference of the sclera of the eye. In rare instances, a metallic clip may be used for scleral buckling. Some metallic clips may pose a risk to patients undergoing MRI procedures.

Tantalum Clips

Tantalum is quite ductile and malleable, so it can be bent a number of times without breaking. Tantalum clips were found to be less bulky than sutures for scleral buckles allowing the surgeon to adjust the tension of the circling band. Furthermore, tantalum clips did not cause tissue reaction and did not harbor infection for scleral buckles. Because Tantalum is a non-ferrous metal (non-magnetic), Tantalum clips are considered safe for patients undergoing MRI.

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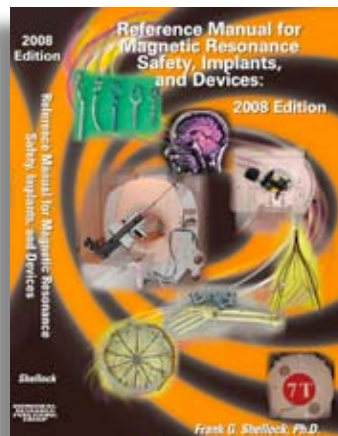
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Michels RG. Scleral buckling methods for rhegmatogenous retinal detachment. *Retina*. 1986;6:1-49.

The internationally acclaimed series, the *Reference Manual for Magnetic Resonance Safety, Implants, and Devices: 2008 Edition* (600 pages; ISBN 978-0-9746410-4-1), includes updated guidelines and recommendations from the latest information in the peer-reviewed literature as well as documents developed by the International Society for Magnetic Resonance in Medicine (ISMRM), the American College of Radiology (ACR), the Food and Drug Administration (FDA), the National Electrical Manufacturers Association (NEMA), the International Electrotechnical Commission (IEC), the Medical Devices Agency (MDA), and the Institute for Magnetic Resonance, Safety, Education and Research (IMRSEr).

This textbook is a comprehensive yet concise information resource on MR safety and patient management for healthcare professionals.

- Section I presents safety guidelines and recommendations.
 - Section II has the latest information for implants, devices, and materials tested for safety in the MR environment.
 - An Appendix provides website information for more than 120 biomedical companies to facilitate finding the latest company information for implants and devices.
 - New information pertaining to MRI Contrast Agents and Nephrogenic Systemic Fibrosis (NSF) is included.
- “The List” now has information for more than 1,800 objects with over 600 implants tested at 3-Tesla.



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Whole Spinal Cord MRI as a Routine Screening Examination in Multiple Sclerosis - Use of Parallel Imaging

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Introduction

Although functionally important, the spinal cord (SC) is not part of routine MRI examinations in MS patients. Routine assessment in the sagittal plane allows a fairly quick reference, but for the detailed visualisation of pathology a transverse view is commonly used. Multi-array coils and parallel imaging provide new opportunities to examine the entire SC in the transverse plane. We were interested in the sensitivity and potential gain of fast whole SC MRI when combining high resolution, high sensitivity sagittal and transverse MRI.

Patients and Methods

A large cohort of 256 MS patients (178 women, 78 men, 24-74 years old, EDSS 0-7.0) with different MS subtypes (CIS, RRMS, SPMS and PPMS) were prospectively investigated clinically and laboratory markers and MRI over 1 year. Examinations were performed on a new MRI system (SIEMENS 1.5T Avanto) which offers multi-array-coils and parallel imaging techniques, both essential for the fast and complete assessment of the whole neuro-axis.

Sagittal and transverse whole cord MRI:

- 9 sagittal slices PD and T2- weighted TSE, 3 mm (2000/23; 4420/102, FOV 2x230mm, matrix 641x351)
- 60 transverse slices PD and T2- weighted TSE, 6 mm (2980/9.9/89 FOV 270mm, matrix 256x512)
- Total acquisition time: approx. 13 min.
- 1,5 T Siemens Avanto with TIM technology:

Combination of multi-array-receiver coils with parallel imaging

Results

Abnormal signal change on SC MRI of MS patients were found in 86% of patients. In approximately half of these scans, only focal lesions were identified. Diffuse cord abnormalities were found in about 20% of the scans. In another 20 % of all patients both focal and diffuse abnormalities in the spinal cord are seen.

Most Focal lesions were located in the cervical cord (59%). An additional peak of focal lesions was found at the mid to lower thoracic region (Th6-10: 18%; Fig. 3). The mean number of lesions per patient was 4 (range: 0-11).

In 28% of patients, the transverse plane identified additional abnormalities and this added 16% to the total number of lesions. A questionable abnormality was confirmed or rejected with the help of transverse slices. In particular, lesions located in the lateral aspects of the cord were confirmed using this approach. Interestingly 5 patients without lesions in the sagittal scan showed abnormalities in the transverse plane.

Discussion

This study demonstrates that high resolution screening MRI of the entire SC in 2 planes is feasible and advantageous when compared to sagittal MRI only. The fast data acquisition allows brain and cord MRI as a single exam. Our results are in line with previous SC studies in regard to the frequency and location of SC lesions. The demonstration of lesions in the entire neuro-axis allows a comprehensive assessment. Besides screening exams various specific situations capitalise on this (CIS, primary progressive MS). Given the high sensitivity of SC MRI even a negative SC has great clinical value (e.g. in the presence of multiple brain lesions).

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Muscle Blood-Oxygen Level Dependent (BOLD) Imaging: A potential Tool to Evaluate Chronic Compartment Syndrome

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Graeme Wardlaw, Alex Dobranowski, Michael D. Noseworthy.

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Introduction:

Muscle compartment syndrome is thought to occur when the connective tissue defining the muscle compartment does not stretch in response to increased physical activity. The result is an increased intramyocellular pressure and intense pain. In heavy repetitive use of muscle such as in decathletes, the problem is known as chronic compartment syndrome (CCS) and it is typified by transient loss in circulation that can eventually lead to more serious long term damage if not treated (e.g. by fasciotomy). The current MR approach for assessing microvascular characteristics relies on rapid intravenous injection of a gadolinium contrast agent. However, this "snapshot" method is often inconclusive in the case of CCS as it does not provide a dynamic evaluation of microvasculature change with time. Alternatively, microvasculature may be best represented by non-linear dynamic temporal analysis of Blood Oxygen Level Dependent (BOLD) signal. BOLD signal modulation is directly due to variation in the ratio of oxy- to deoxy-haemoglobin. Experiments on human muscle have shown that this approach is sensitive to the tissue microvascular blood flow dynamics. Here we show this approach may be useful for the clinical assessment of CCS.

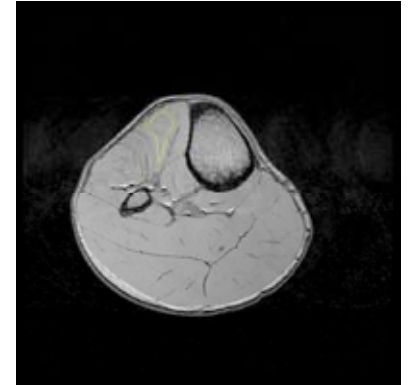


Figure 1. Axial slice through lower leg showing ROI in Anterior tibialis (yellow).

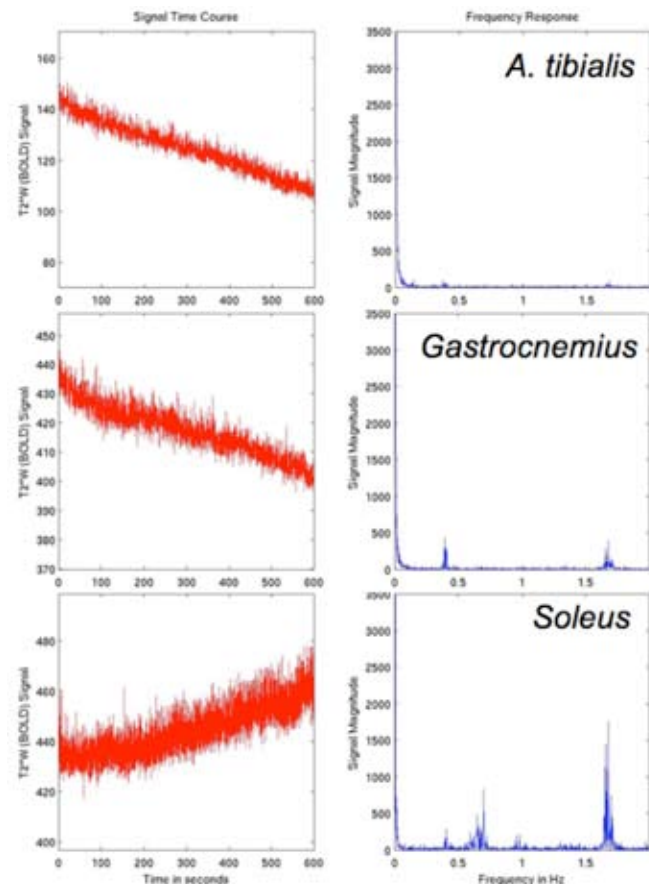


Figure 2. Raw BOLD signals (left) and their corresponding Fourier transforms following intense exercise in an elite athlete with chronic compartment syndrome (CCS).

Materials and Methods:

The right calf of an athlete with unilateral compartment syndrome was scanned using a 3T GE short bore MRI system and a quadrature transmit-receive extremity RF coil; previous medical history and investigation indicated compartment syndrome was suspected in the anterior tibialis region. High resolution T1-weighted SPGR images were acquired prior to functional imaging. Mid-calf axial BOLD images were acquired using a Gradient Echo sequence with an EPI readout ($\alpha=70^\circ$, TE/TR=35/250ms, FOV 24cm, 64x64 matrix). 3072 contiguous images were acquired over 12.8 minutes at a rate of 4 per second (4Hz). Data acquisition was performed prior to and immediately following 30 minutes of intense exercise. BOLD data obtained from muscle regions of interest (ROIs; soleus, gastrocnemius, anterior tibialis) were spatially aligned with anatomical slices and Fourier transformed into frequency spectra using in-house programs written in Matlab (The Mathworks, Natick MA).

Results & Discussion:

Figure 2 shows a time course of the BOLD signal for a region of interest (ROI) selected from each of medial gastrocnemius following intense exercise. A prominent cardiac peak could be easily seen at 1.7Hz in both gastrocnemius and soleus muscles. This was notably absent in the Anterior tibialis, suspected to be the muscle inflicted from CCS. The absence of cardiac frequency in the A. tibialis implies blood flow has been cut off due to the compression in this compartment. The soleus has a more prominent cardiac peak as blood flow through slow twitch muscle is known to be greater than fast twitch gastrocnemius). The peak at 0.4Hz was thought to be due to respiration, which would also manifest as a fluctuation in microvascular oxygenation. The overall signal decrease following exercise implies the oxy:deoxyHb continues to decrease, possibly due to elevated metabolism. Under the stress of exercise, the muscle recruits more blood vessels to feed the working muscles. This

increase in blood flow and oxygenation however, also changes the dynamic behaviour of the BOLD signal; more flow/O₂ also implies much more obvious flow pulsatility and order in the temporal signal, as seen by the dominant cardiac frequency peak post exercise. This peak disappeared in the presence of 80mm superior and inferior saturation bands contiguous with the slice of interest

SUSCEPTIBILITY WEIGHTED IMAGING (SWI) SEQUENCE FOR BREAST CALCIFICATIONS AT 3TKellyAnne McGorty¹, William Fazio¹, Daniel Kim¹, Yulin Ge¹, Jian Xu², Linda Moy¹¹NYU Medical Center, Radiology, NY, NY, United States, ²Siemens Medical Solutions USA Inc., Malvern, PA, United States**Purpose**

Mammographic detection of ductal carcinoma-in-situ (DCIS) typically identifies a cluster of microcalcifications, and may miss DCIS without calcium deposits or is masked by dense breast tissue, common in pre-menopausal women. Dynamic contrast-enhanced MRI can be used to detect calcified DCIS with an accuracy of 50-85% compared to mammography and in addition to may detect uncalcified DCIS which is undetectable by mammography (1). Calcium is weakly diamagnetic and may produce susceptibility changes on susceptibility weighted imaging (SWI) as hypointense (dark) regions [2,3]. The purpose of this study was to evaluate the utility of SWI to identify calcifications which are mammographically occult.

Method

Ten women underwent a contrast enhanced MRI on a 3T whole-body MRI system (Siemens; Tim Trio) equipped with a 4-channel breast coil (Invivo). SWI was performed on the same image/table position as contrast-enhanced MRI. Regions of interest were chosen from the post-contrast images. Low spatial resolution imaging to include entire breast screening parameters include: 3D GRE sequence, TE/TR = 20/32 msec, BW = 130Hz/pixel, FA=15°, FOV= 280x280 mm, matrix = 192X192, scan time = 3:36minutes. High resolution images were performed in regions of suspicious enhancement. High resolution sequence parameters included: TE/TR = 9.8/23ms, BW=130Hz/pixel, slice thickness = 2.0mm, FOV= 175X280 mm, matrix = 320X512, FA= 15°, scan time = 6:07 min. Imaging parameters were optimized based on “best” visualization of large fluid filled areas or macrocalcifications. Manual 3D shimming was performed to reduce field inhomogeneities. Mammographic and pathologic correlation was performed.

Results

The clinical indications for breast MRI were: six for staging of their disease, two high-risk screening, and two for an inconclusive mammogram. SWI evaluation did not detect any susceptibility artifact in the two benign seroma cavities. In three women with enhancement in the breast, no abnormality was seen on SWI. The enhancement is presumed to be benign. In four women, SWI noted increased susceptibility in regions where calcifications were seen. The findings seen SWI was larger than the extent of calcifications seen on mammography (2.5 vs. 1.4 cm). One woman presented with a new asymmetry with no associated microcalcifications in her right breast on mammography (Fig 1A). On contrast enhanced MRI a regional area of non-mass-like enhancement was seen (Fig 1B). SWI images showed a similar pattern of susceptibility artifact (Fig 1C). At mastectomy, high grade DCIS was found in this patient. High resolution allowed for better conspicuity of the susceptibility artifact, in comparison to the low resolution technique.

Conclusions

Our results demonstrate that SWI was able to identify susceptibility artifacts from calcifications that were both visible and occult on mammography. SWI may be able to identify microcalcifications that are occult mammographically in pathology proven DCIS and to help us understand the spectrum of DCIS.

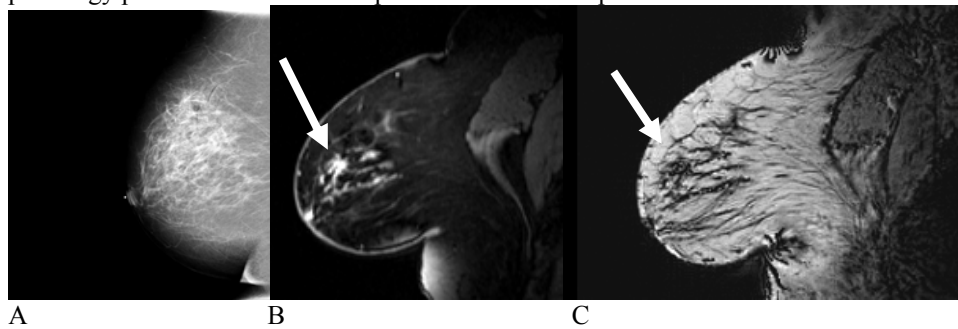


Fig. 1. Comparison of breast images with DCIS: a) mammography, b) dynamic 3D contrast-enhanced MRI, c) SWI. Arrows point to DCIS lesion.

Referentes:

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2. Haacke, E.M et al. MRM 2004; 52: 612-18
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OPTIMISING DSC PERFUSION-IMAGING BY MINIMIZING SUSCEPTIBILITY ARTEFACTS AT 3 TESLA PARALLEL IMAGING AND SE VERSUS GRE

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Purpose

DSC perfusion imaging at 3 Tesla field strength is associated with pronounced susceptibility artefacts close to tissue/bone and tissue/air interfaces. These susceptibility artefacts have the effect that parts of the brain cannot be evaluated. Clinicians and researchers are therefore reluctant to use Dynamic Susceptibility Contrast (DSC) at 3Tesla in diseases where these areas play an important role such as: Alzheimer's disease, stroke, tumour and epilepsy.

Method

In order to optimise DSC imaging at 3T with respect to susceptibility artefacts 12 volunteers were scanned. They were separated in two groups: The first group of 6 volunteers had a standard GRE EPI perfusion sequence and a GRE EPI perfusion sequence where the parallel imaging technique Sensitivity encoding (SENSE/ASSET) was used. The second group of 6 volunteers had a GRE EPI perfusion and a SE EPI perfusion sequence. The size of susceptibility artefacts was evaluated by measuring the area of visible brain for each sequence. The two-tailed t-test for matched pairs was used for statistical analysis.

In order to evaluate the impact of the sequences on perfusion data the SNR and SNRc was calculated in a ROI containing both grey - and white - matter. The two-tailed t-test for matched pairs was used for statistical analysis. The SNR and SNRc was calculated for the entire brain in each voxel and maps was created and visually inspected. Furthermore the diagnostic quality was evaluated by an experienced neuroradiologist who rated the perfusion map's (CBF, CBV and MTT) and the perfusion modulus images on a scale from 1 to 5 (1=poor and 5=excellent). The Exact Wilcoxon was used as statistical test.

Results

The results showed that SENSE technology reduces susceptibility artefacts in DSC imaging at 3Tesla field strength. The results documented that the use of SENSE technology on the GRE perfusion sequence minimized susceptibility artefacts ($p=0.03$). The SNR increased with the use of SENSE ($p=0.03$ at baseline and $P=0.01$ at peak contrast) SNRc increased using SENSE ($p=0.025$). Furthermore the diagnostic quality improved using SENSE ($p=0.02$).

The results comparing the GRE and the SE sequences showed that the SE displayed smaller susceptibility artefacts ($P = 2.55 \cdot 10^{-5}$). There was no significant difference in SNR at baseline ($p=0.06$). Significant difference was found for SNR peak contrast ($p=0.04$) and SNRc ($p=0.04$) where the GRE sequence displayed the best signal as expected from theory. Rating the diagnostic quality the Exact Wilcoxon found no significant difference ($P = 0.79$) between the GRE and the SE sequence.

Conclusions

It was concluded that the use of SENSE technology in combination with the GRE sequence in DSC imaging at 3 Tesla reduced susceptibility artefacts and improved the diagnostic quality.

Furthermore, that the SE sequence can be used in DSC imaging at 3 Tesla to minimize susceptibility artefacts, without impairing the diagnostic quality.

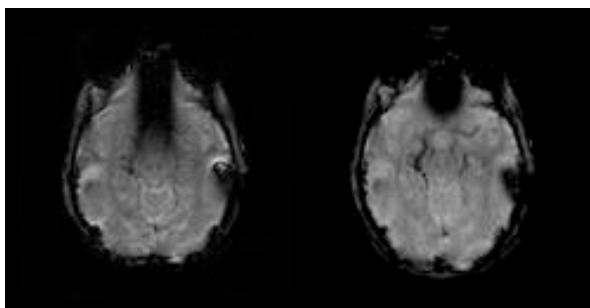


Fig. 1. Left without SENSE. Right with SENSE, at same level.

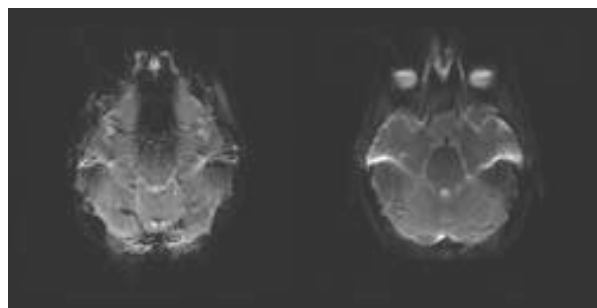


Fig. 2. Left GRE. Right SE, at same level.

MR Angiography on the Move: Enhanced Workflow in Large-FOV MRA due to Continuously Moving Table Acquisition

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Purpose:

MR angiography (MRA) of the peripheral arteries today is performed as a multi-station examination featuring patient table movement in order to allow for stepwise extension of the field-of-view (FOV). Although various multi-station approaches have shown to be effective and accurate, repositioning of the table between discrete stations reduces the scan time efficiency due to interruption of data acquisition during this process. Additionally, gradient non-linearities at the edges of individual FOVs might lead to artifacts between successive stations. Recently, continuous moving table techniques have been developed in order to improve data acquisition efficiency and to provide the physician with seamless images of the extended FOV.

The purpose of the present study was to evaluate a novel MRA technique featuring continuous moving table acquisition (TimCT, Siemens Medical Solutions, Erlangen, Germany). Peripheral MRA with the continuously moving table method was compared with a conventional multi-station protocol with regards to its clinical routine workflow and image quality achieved.

Methods:

Ten patients with occlusive arterial disease of the peripheral vasculature were examined with both techniques: 1) multi-station MRA and 2) continuously moving table MRA on a Siemens Avanto 1.5T system. For signal reception a full set of surface phased-array RF coils (Tim technology) was used, covering the peripheral vessel system from the renal down to the pedal arteries.

While the multi-station protocol requires 12 steps to perform peripheral MRA (Fig. 1) (localizers, native scans, and contrast scans for each individual station), the TimCT moving table protocol can be streamlined down to 6 steps: 1) large-FOV "FastView" localizer; 2) TestBolus technique for contrast bolus timing; 3) "VesselScout", displaying the peripheral arteries over the whole extended FOV; 4) native scan of the 3D FLASH MRA sequence; 5) contrast injection; and 6) post contrast injection repetition of the 3D FLASH MRA sequence. For both protocols contrast agent (0.2 mmol/kg GD-BOPTA) was injected with a biphasic injection scheme. Conventional three-station 3D peripheral MRA served as standard of reference. Scanning parameters for the conventional protocol were individually adapted for each station (pelvis/upper legs/lower legs): 3D FLASH: FOV 400x500 /400x500 /400x500 mm², matrix 345x384 /345x384 /410x520 and a total acquisition time of 15/15/20 sec. Scanning parameters for the continuously moving table protocol were: 3D FLASH: FOV 400x1300 mm, matrix 320x320 allowing for an acquired isotropic voxel size of 1.3 mm³ within a total acquisition time of 77 sec. Image quality was assessed on a segment per segment basis on coronal source images for both protocols by two radiologists in consent using a five point scale.

1	Position 230mm above feet	1	Fastview
2	📡 I_trufisp_feet	2	📡 TestBolus_tra
3	📡 II_trufisp_legs	3	📡 Vesselscout
4	📡 III_trufisp_abdomen	4	📡 Angio_pre_1300mm
5	📡 I_f3d-cor_feet_pre	5	📡 inject
6	📡 II_f3d-cor_legs_pre	6	📡 Angio_post_1300mm
7	📡 III_f3d-cor_abdomen_pre		
8	📡 inject gad		
9	📡 III_care_bolus_cor		
10	📡 III_f3d-cor_abdomen_post		
11	📡 II_f3d-cor_legs_post		
12	📡 I_f3d-cor_feet_post		

Fig. 1: Workflow of a conventional three-step multi-station peripheral MRA protocol (left) in comparison to the continuously moving table peripheral MRA protocol (right). While the multi-station protocol requires 12 steps to perform peripheral MRA, the continuously moving table protocol can be streamlined down to 6 steps.



Fig. 2: Conventional three-station peripheral MRA (A) compared to continuously acquired 3D peripheral MRA (B, C) in a patient with occlusive arterial disease. Note the overlapping FOVs in (A) while the TimCT acquisition provides one large seamless FOV (B, C).

Results: Compared to images acquired with the standard peripheral MRA imaging protocol, continuously acquired data sets showed excellent correlation in all patients. Assessment of image quality revealed identical values for the conventional multi-station protocol compared to those data collected with the continuous technique. Image interpretation and vessel assessment on continuous images was facilitated due to the lack of discontinuity artifacts. The time for data reconstruction was comparable for both protocols (2 min). From a users point of view, the workflow of the TimCT protocol was facilitated since planning of the 3D MRA data set is performed on only one data set (VesselScout) while three individual 3D image slabs have to be positioned and oriented in the conventional multi-station protocol.

Conclusion:

The robustness of the technique, the image quality achieved as well as the improved operability compared to conventional 3D multi-station peripheral MRA justifies further evaluation of the continuously moving table technology in clinical routine examinations.

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2008 CALENDAR OF EVENTS

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NORTH CENTRAL REGIONAL EDUCATIONAL SEMINAR

Spectrum Health Butterworth Campus, East Auditorium, Grand Rapids, Michigan, USA

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FEBRUARY

WEST REGIONAL EDUCATIONAL SEMINAR

Aurora Doubletree Hotel, Denver, Colorado, USA

Hosted by the SMRT Rocky Mountain Chapter

29 FEBRUARY
1 MARCH

DENMARK REGIONAL EDUCATIONAL SEMINAR

Arhus University Hospital, Arhus, Denmark

15
MARCH

SOUTHEAST REGIONAL EDUCATIONAL SEMINAR

Patewood Medical Office Building, Greenville Hospital System, Greenville, South Carolina, USA

Hosted by the SMRT South Carolina Chapter

12
APRIL

BENELUX (BELGIUM, NETHERLANDS, LUXEMBURG) EDUCATIONAL SEMINAR

Universitair Ziekenhuis Brussel, Brussel, Belgium

3-4
MAY

SMRT 17TH ANNUAL MEETING

The Metro Toronto Convention Centre, Toronto, Ontario, Canada

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MAY

ISMRM 16TH SCIENTIFIC MEETING & EXHIBITION

The Metro Toronto Convention Centre, Toronto, Ontario, Canada



17th Annual Meeting • 3-4 May 2008



Save the date!

SEE PAGE 3-5 FOR DETAILS ON THE

SMRT 17TH ANNUAL MEETING

IN TORONTO, ONTARIO, CANADA