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The Beam

Mississippi Society of Radiologic Technologists

Inside This Issue

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Mississippi Society of Radiologic Technologists

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Happy new year! I know many people were looking forward to the end of 2020, and we made it through! While we are happy to see 2020 go, the challenges of the year will likely continue through 2021. We continue to battle COVID-19, however with the distribution of the vaccine, I am hopeful that we will see our state recover from this pandemic. On a personal note, I would encourage all front-line workers to receive the vaccine to protect yourself and others.

The Board of Directors had the challenging decision to cancel the annual conference this past October. While the feelings of disappointment were strong, it did help me see how important this annual event is to our society. I personally missed the fellowship, the fun, the learning opportunities, the student activities, and of course the costumes at the party! That being said, the Board of Directors are all very hopeful that we can hold our annual conference in October 2021. We will continue to monitor the situation and any decisions made regarding the 2021 conference made will be in the best interest of the health and safety of our members.

It is more important than ever to strengthen the voice of our profession! I want to continue to encourage MSRT technologist members and student members to get involved. Please contact a member of the Board if you would like information on how you can help. Volunteering is a wonderful way to network, build a resume, develop new leadership skills, meet others, and give back to our profession!

I am proud to serve as president of the MSRT this year, and excited to see what is in store for 2021!

Stay safe and be well,

Asher Street Beam, DHA, RT(R)(MR), MRSO

MSRT President

Student Manuscripts

Below are the top three (3) student manuscripts.

- "Diagnostic Use of fMRI on Psychopathic Individuals"
  — Zack Lyles
  1st Place
- "Hodgkin Lymphoma: How Radiologic Technology Assists in Diagnosing and Treating Hodgkin Lymphoma"
  — Ashley Terwilliger
  2nd Place
- "Different Types of Seizures and their Diagnosis with Multiple Modalities "
  — Abby Smith
  3rd Place

The Diagnostic Use of fMRI on Psychopathic Individuals

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Abstract

Empathy is the ability to both feel and understand the emotions and moods that another person experiences. This is a normal phenomenon that is experienced by the majority of the world's population. However, there does exist a number of individuals that lack this standard trait, often times referred to as psychopaths. These individuals have an altered brain structure that inhibits them from connecting to other individuals in this manner. Key structures involved in emotional learning and processing show abnormal activity in individuals without the ability to feel empathy. The concept of psychopaths possessing the ability to regulate their emotional states has become a much more studied topic, and with advancing imaging systems this is more easily studied. The use of fMRI has become a much more used modality in recent years and has provided many new insights into psychopaths' brain structures and if psychopaths truly lack the ability to feel empathy. This modality has become the go to in diagnosis of psychopaths, due to being able to track neural activity in areas of interest that typically show responses to emotional stimuli.

The Diagnostic Use of fMRI on Psychopathic Individuals

"Empathy is a multidimensional phenomenon that involves the ability to resonate with and understand the affective states of others" (Seara-Cardoso et al., 2015, pp. 3). A reader may ask themselves what an affective state is? The term affective state is often a synonym for a person's emotional responses or moods they may be feeling. Why is the concept of empathy and affective states an important one? For most of the population, these are basic traits that are experienced daily. However, a subgroup of the population, called psychopaths, do not experience traits like empathy or affective states. This inability to experience these emotional or affective states is best observed using fMRIs to track activity in the brain. Before going into much detail, a quick description of a psychopath is a person who is unable to feel typical emotions such as empathy, remorse, or even guilt. On average, a psychopath will display traits like poor decision making, impulsivity, and an unwillingness to learn from their actions with negative consequences (Hare, 2003; Espinoza et al., 2018).

One of the easiest and most convenient ways to diagnose individuals with psychopathy is to perform a scan called a functional MRI, abbreviated fMRI. This is a type of brain scan that tracks blood flow throughout regions of the brain and shows neural activity in regions of the brain where the blood is tracked. In this type of imaging, two scans of the brain, one with no stimuli and one with stimuli, are taken and then subtracted from each other to highlight differences in brain activity (Westbrook et al., 2005). This type of scan is ideal for tracking brain activity in the paralimbic system, which will be elaborated on in later sections of this paper, because during activities that stimulate the regions of the brain involved in emotional processing an increased blood flow is observed. This increase in activity causes certain areas of the brain to light up on an fMRI, indicating that an increase in blood flow is needed to function. Typically, in

these scans there is a range of colors offset by a white background which represents unstimulated areas of the brain. These colors are used to demonstrate the strength of an emotional response, with yellow being a low response and orange being a high one.

Besides performing an fMRI to observe brain structures to determine if a person is a psychopath, another way that can determine if an individual is a psychopath is by taking a test called the Hare Psychopathy Checklist-Revised also known as the PCL-R. The PCL-R is a test that allows a clinical examiner to compare an individual's score in relation to psychopathy to what the typical psychopath scores (Hare Psychopathy Checklist, 2020). However, it should be noted that in an attempt to categorize an individual as a psychopath, one should take a more cautious approach. A diagnosis of this magnitude carries very important clinical and personal consequences and has the potential to affect an individual throughout their lifetime.

Why is imaging the brains of psychopaths becoming a more important and common study being conducted? According to Kiehl and Hoffman (2011), psychopathy is a more common mental disorder than many people tend to believe. In fact, according to some statistics, psychopathy is twice as common as schizophrenia, generalized paranoia, and bipolar disorder. In addition to this, it is twice as likely as obsessive-compulsive disorder, panic disorder, and narcissism. Imaging individuals with psychopathic tendencies could be considered an important study to conduct if the disorder is believed to be as common as Kiehl and Hoffman suggest. As advancements and discoveries are being made, due to the study of psychopathy's neural structure, a treatment plan has the potential to be developed.

One reason that fMRIs are being performed more routinely on psychopathic individuals is that they usually share common neurological traits that are easily identified. Having this knowledge can prove to be valuable in the treatment of adolescents who show warning signs of

emerging psychopathic tendencies (Kiehl & Hoffman, 2011). This ability to diagnose and treat adolescents who show early warning signs of psychopathic tendencies has the ability to reduce the number of serial offenders, who fall into the psychopath category, in prisons and other detention centers. According to the authors Kiehl and Hoffman (2011), "Psychopaths are twenty to twenty-five times more likely than non-psychopaths to be in prison" (pp. 1). In addition to this benefit, another positive side effect of the study of psychopaths is that this condition will be better understood. Using the information gathered from studying these individuals', methods to reduce violent behavior in these adolescent individuals which has the potential to severely impact the number of psychopaths being incarcerated.

Due to imaging of incarcerated psychopathic individuals, alterations in the structure of the brain have been discovered. These individuals often display a reduction in the amount of gray matter present in the brain, fewer neurons compared to a non-psychopathic brain, and an increase in white matter (Kiehl & Hoffman, 2011,). Additionally, fMRIs of psychopaths have revealed is a decrease in the activity of the paralimbic system. The paralimbic system, which is a grouping of multiple parts of the brain, is involved in the processing of emotions and emotional intelligence. There are a multitude structures that fall into this system, but some of the most important ones are the amygdala, temporal lobe, and parahippocampal gyrus.

The amygdala, which is arguably the most important structure involved in emotional processing, shows reduced activity in the brain of a psychopath on a fMRI. How would this decrease in activity present of an fMRI? The area that the amygdala is located would appear yellow surrounded by a white background. In a normal brain structure, this area would appear orange with a white background, indicating a strong emotional response. This means that an individual with a reduced response is unable to recognize the emotions that another individual is

feeling. This lack of interpretation causes psychopaths to not recognize social cues related to emotions, which inhibits emotional learning for future reference, and causes an inability to feel empathy. In fact, an example of this phenomenon was observed in a study performed on adolescents who displayed early signs of psychopathy. The findings of this study suggest that individuals who display psychopathic tendencies show a decreased response in the amygdala to fearful facial expressions when they observe them (Ewbank et al., 2018; Marsh et al., 2008).

The temporal lobe and the parahippocampal gyrus both play similar but important roles in emotional processing and storage. These two structures work to encode emotional responses that an individual observes and uses for later reference when put into a situation similar to a past experience. Due to the decrease of activity within these regions, psychopathic individuals are not able to recall emotional responses they observe, and information on how to properly deal with these emotions. Since both structures play similar roles, they are often observed having paired responses. Similar to the amygdala, these areas are shown to have a decrease in activity in a psychopath, showing a more yellow and white scan.

These findings highlight key differences between psychopath and non-psychopath's brain structure. Non-psychopathic individuals typically display an increase in gray matter and neurons, with a reduction in white matter as they age. As mentioned earlier, psychopaths not only do not display this, but demonstrate a brain structure that is the exact opposite of a non-psychopathic individual. Psychopaths also show a decrease in paralimbic system activity due to the impairment of key structures involved in empathy and emotional intelligence. Non-psychopathic individuals do not display these characteristics and are able to both learn from unfamiliar situations and recall previous situations.

One explanation as to why a psychopath is unable to regulate their emotional reactions is their shortened attention spans. Their inhibited attention spans are believed to cause an inability for a psychopath to understand emotional reactions and their consequences, due to not being able to focus on these situations. This then plays a factor in why psychopaths are not able to learn from the emotional consequences of their actions (Espinoza et al., 2018; Newman, 1998). It is assumed that the inability of a psychopathic individual to regulate their emotions can be the cause of anti-social behaviors to manifest. Individuals with these antisocial behaviors often have excessive reactions to being provoked and will show aggressive tendencies in inappropriate situations (Ewbank et al., 2018; Frick & Viding, 2009). One could say that due to a psychopath not being able to experience the emotional weight of their actions, they would have a reduced sense of morality. This would explain their heightened aggression and actions based on antisocial behaviors.

However, while many studies have concluded that psychopaths do not have a high reaction to emotional stimuli, some information gathered indicates that they are able to experience some responses to emotional stimuli. There are many studies that have been done that show psychopaths can register some response to faces displaying a range of emotions. Psychopaths are also able to, in a sense control how much of a reaction to these faces they experience, leading to the theory that psychopaths may in fact share an ability to regulate emotional responses (Shane & Groat, 2018). This ability to regulate an emotional state is defined as emotional upregulation.

According to Shane and Groat (2018), many models that are made to predict the ability of a psychopath to upregulate their emotions indicate that they are unable to do it. In contrast to these models, the study that the two researchers conducted showed that the test subjects involved

were capable of emotional upregulation. The ability to upregulate emotional responses would show increased levels of activity in the three key structures of the paralimbic. This data contradicts the assumption that psychopaths have a decreased functioning in the regions of the brain associated with the ability to increase and control one's emotional state. However, in another study done, it was shown that an individual's ability to upregulate their emotional state is proportional to their score on the PCL-R test. This means that individuals that scored a lower score on the test show a greater ability to upregulate their emotions compared to those who scored higher (Anderson, et al., 2017; Espinoza et al., 2018). Due to conflicting evidence from the two previous mentioned sources and the studies that were conducted, it may not be possible to say if upregulation of emotions for psychopaths is possible.

It is not an incorrect statement to say that the study of psychopaths and their ability to feel emotions, affective states, neural activity, and the ability to upregulate emotions is a mostly unknown field of science. However, due to advancements in imaging systems and interest in the field, this type of study will surely become more common place. Due to the uses of fMRI, and the multiple discoveries about the ability to feel empathy from this modality, treatment plans may one day be developed to treat this disorder that is becoming more common in today's world.

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Technologist Manuscripts

Below are the top three (3) technologist manuscripts.

- "Going for Gold: MRI Use Among Olympic Athletes"
  —Mekayla Rainey
  1st Place
- "MRI Conditional Pacemakers: Pacing Toward Safer Imaging"
  — Callie Shephard
  2nd Place
- "Chronic Traumatic Encephalopathy: Protecting Future Minds"
  — Hannah Stovall
  3rd Place

Going for Gold: The Role of Magnetic Resonance Imaging Among Olympic Athletes

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Abstract

Magnetic Resonance Imaging (MRI) is a specialized imaging modality that uses a strong magnetic field to acquire high resolution images of tissues and anatomical structures for diagnostic purposes. Because of the ability of MRI scanners to use different weighting factors to enhance the contrast of certain pathologies, it has become a leading imaging service in the field of sports medicine. Many athletes experience traumatic injuries due to the constant stress placed on the joints and muscles in their bodies. This research paper focuses on the use of magnetic resonance imaging in diagnosing injuries among Olympic athletes, which are some of the most elite and highly injured percent of patients within sports medicine. Throughout this article, the following topics will be discussed: the primary use of MRI within sports medicine, the introduction of MRI into the Olympic Games, the prevalence of its use among Olympic athletes during the games, the most significant injured areas, and the most common scans performed. Lastly, there will be a case study review, which highlights the significance of utilizing MRI in diagnosing acute muscle injuries.

Keywords: MRI and Olympic athletes, sports medicine, magnetic resonance imaging, elite athletes, medical imaging, radiology, imaging services

Going for Gold: The Role of Magnetic Resonance Imaging Among Olympic Athletes

For many years, the Olympic Games have been celebrated among nations as an extraordinary sporting event. During this exciting mixture of competition and culture, the audience holds their breath at daring stunts, close finishes, and extreme displays of athletic ability. Most people are aware of the tedious training an athlete must go through to prepare for the games. The rigor, tension, and long hours are not foreign stories to the common audience. Perhaps the most challenging part of training for the Olympics comes from the injuries sustained during practices and competitions. Among the many therapeutic and diagnostic measures used to get the athletes back to peak performance, magnetic resonance imaging (MRI) is one of the most crucial components used. The prevalence of the use of MRI to evaluate Olympic athletes has steadily increased, and the different types of scanners have made tremendous advancements to diagnostic imaging for sports medicine. These factors, combined with high-profile cases that have illustrated the importance of MRI use among Olympic athlete recovery, all add compelling evidence to the necessity of MRI imaging for Olympic athlete recovery.

Magnetic Resonance Imaging in Sports Medicine

MRI in Sports Medicine

Long before its use among elite Olympic athletes, MRI was considered the gold standard of imaging in sports medicine. The primary focus of sports medicine is to assist athletes in their recovery from sports related injuries and help them return to the competitive field in a timely manner. Imaging is critical not only in detecting these injuries but also in developing a strategic plan for the recovery of the athlete. While many other imaging modalities can be used, magnetic resonance imaging (MRI) is primarily helpful because it allows doctors to “visualize soft tissues

with excellent contrast and provide high spatial resolution and multiplanar assessment" (Guermazi et al., 2017, p. 650). At the most basic level, MRI uses a magnetic field to acquire images in order to evaluate tears and injuries to the muscles and soft tissues of the body. Common injuries among athletes include knee injuries (such as ligament and meniscus tears), hamstring tears, rotator cuff injuries, and head injuries (Domingues et al., 2018).

Pulse Sequences for Sports Imaging

The most important aspect of MRI imaging that makes it dynamically helpful in the realm of sports medicine is its use of various pulse sequences to enhance problematic areas. Within the basic contrast parameters, T1 weightings are known to display fluid as dark, low signal areas, while T2 displays fluid as bright, high signal areas. In addition to these, there are fat suppression weightings, which diminish high signal areas of fatty tissue, and diffusion weightings, which are "helpful in detecting subclinical changes in muscles after strenuous exercise, detecting muscle injury on a microscopic level, and differentiating injured muscles from normal control muscles" (Guermazi et al., 2017, p. 652). These weightings are also critical in detecting hematomas, infections, and common bone lesions. While this is helpful to athletes, the primary advantage of using MRI pulse sequences is that they assist in determining any edema presence and changes within the tissues surrounding the injury. This is important because as the athletes heal, the intensities of fluid decrease on MRI images (Guermazi et al., 2017). MRI imaging also works well "as to detect and evaluate the extent of atrophy and fatty infiltration and scar tissue formation in chronic injuries" (Guermazi et al., 2017, p.650).

MRI Use in Olympic Games

Prevalence

Because of the strenuous tension placed on muscle groups by elite athletes, injury due to competition is likely unavoidable. The high rate of injury among athletes at Olympic games caused the International Olympic Committee (IOC) to implement a polyclinic, a specialized clinic offering dynamic imaging services to injured athletes and Olympic personnel. Though the offered services ranged from radiography to ultrasound, MRI was the most frequently used modality to evaluate athletic injuries. Despite its popularity, MRI use at the Olympic games is still fairly new. According to Domingues et al. (2018), MRI was not introduced into the Olympic games until the 2010 Winter Olympic Games in Vancouver, Canada, during which the first imaging facility was instituted at the games to serve the athletes. The demand, however, for MRI continues to increase.

Of the 11,274 athletes that performed in the 2016 Rio Olympic Games, 1540 underwent diagnostic imaging procedures at the Olympic imaging center (Domingues et al., 2018). At least 893, or 58 percent, of these were MRI scans. In the 2016 Paralympic Games, 400 of the 629 athletes had diagnostic MRI scans. While the types of scans performed varied at each game, there are some notable consistencies. Among the most prevalent are knee, shoulder, ankle, and lumbar spine scans (Domingues et al., 2018). Because of the types of sports involved, these areas have become high-risk injury areas; however, there are still many other scans performed on smaller areas such as the wrist and hand. As advancements in the field of MRI continue, there is an increasing presence of magnets being used at the elite imaging centers. Studies show that there were 6.94 percent more scans at the 2016 Rio Olympic Games than at the 2012 London Olympic Games (Domingues et al., 2018).

Significant Detected Injuries

The most significant MRI detected injuries occurred at the high-risk areas discussed above. Among these areas, the knee was most commonly injured (Kompel et al., 2018). Many Olympic sports require an extreme level of athleticism that puts a great amount of pressure on the joints. Over time, the joints can wear down and degenerate, leading to an injury that can decrease an athlete's performance time. According to Kompel et al. (2018), at least 113 of the 11,274 athletes at the Rio Games had a knee MRI scan. In his breakdown of the confirmed injuries, Kompel et al. (2018, p. 882) explained "of all the athletes who underwent a knee MRI, 80 (70.8%) had at least a ligament sprain, meniscal or tendon or patellar retinaculum tear, or a bone contusion or fracture."

Alongside these injuries, the most common abnormality present within these athletes was knee cartilage damage. Certain MRI sequences are more useful at detecting tears than others. A study of a female long-distance runner revealed that fat suppression T2 weighted images showed both complete and complex tears of the anterior cruciate ligament (ACL) and the meniscus (Kompel et al., 2018). The T2 weighted fat suppression sequences also showed ligament damage and joint effusion well, by depicting them as brighter areas. While other modalities can certainly be used to further review these injuries before treatment, it is MRI that best diagnoses these types of complex tissue injuries (Kompel et al., 2018).

The second most significant area of injury among Olympic athletes is the shoulder. At the 2016 Rio Olympic Games, 55 athletes were referred for an MRI of the shoulder (Murakami et al., 2018). While this is a small number of athletes, the effects of injuries to the shoulder are often long lasting and can greatly impact an athlete's career. The most impacted athletes were participants in a variety of sports that included volleyball, gymnastics, boxing, judo, and swimming. The MRI scans revealed that 96 percent of these scans revealed at least two abnormal

findings (Murakami et al., 2018). Some of the most common MRI detected injuries of the shoulder include rotator cuff injuries (partial tears and tendinosis) and labral tears. Coninck et al. (2016) describes the labrum as a fibrocartilaginous region of tissue that surrounds the glenoid cavity. MRI sequences that are fluid-sensitive are best used to demonstrate these tears, specifically the T2 weighted fat suppression sequences. This is an ideal sequence since it visualizes both rotator cuff tendinosis and labral tears. It is also important to note that the best MRI planes to diagnose these injuries are the coronal and axial planes (Coninck et al., 2016).

Which is better? 3 T versus 1.5 T

MRI scanners are typically utilized at either a 1.5 Tesla (T) strength or a 3 T strength. Though both are useful in demonstrating injuries and pathologies, there is some question as to which magnet produces better imaging for sports medicine physicians. It is a common belief that a 3 T magnet, because of its stronger magnetic field, produces better images with increased detail necessary for diagnosing tears and injuries. Though a prominent ideology, both a 3 T and 1.5 T magnet were used in the Olympic polyclinic. In addition to this, imaging procedures on Olympic athletes that took place outside of the polyclinic also varied in use between the two magnets. Regarding the detail of images, Roemer and Guermazi (2016) explained that a 3 T magnet does have an increased signal-to-noise ratio, which can either decrease scan time or increase spatial resolution. This aspect brings many benefits, such as increased patient comfort (due to shorter scan times) and better visualization on smaller structures, such as ligaments in the ankle or the wrist (Roemer & Guermazi, 2016).

It is important to note that these changes, though significant, are not large enough to dictate the magnets that should be used on elite athletes. Because of this, it is left up to the

facility to determine which magnet is used since the images are almost equally diagnostic on both scanners. In a further explanation, Roemer and Guermazi (2016) stated:

> As radiologists, we love beautiful images! Of course, we also aim to provide our referrers with the most appealing examinations possible and, certainly, these will often be based on 3 T imaging. Having the choice of an examination at 1.5 or 3 T for the same price—of course I would opt for the 3 T—given the radiologist invests the same amount of time he/she would for a 1.5 T examination. A 3T MRI performed in 10 min will look similar or worse than that of a 1.5 T MRI at 20 min. If I were claustrophobic, I would greatly appreciate the shorter examination without compromising diagnostic accuracy (p. 894).

Many advancements are being made in 3T magnets in order to make them more useful within the field of sports medicine. Certain attributes, such as compositional MRI, which can show pathologies before they are structurally present, will bring great benefits to this field (Roemer & Guermazi, 2016). These advancements are helpful because they could play a key role in halting a progressive injury or illness in an athlete before it impacts their competitive career.

Case Study

As advancements in MRI continue to grow, the use of these imaging services at the Olympic Games will undoubtedly increase. These advancements, paired with high profile cases in which diagnostic MRI was used, will be factors that continuously press the IOC to implement even further use of these scanners at Olympic polyclinics. There have been many cases to support the critical role of MRI among Olympic athletes, such as that of Abbey D'Agostina in the 2016 games, who fell and tore both her ACL and meniscus after colliding with New Zealand runner Nikki Hamblin (Strout, 2016). Perhaps one of the most notable cases of diagnostic MRI

use among Olympic athletes was that of eight-time Olympic gold medalist, Usain Bolt. During his final race in his career at the 2017 IAAF World Championships in London, Bolt finished third after injuring his hamstring and toppling to the ground in the 4x100 meter relay. According to Crema et al. (2016), hamstring injuries are common among Olympic athletes. Their study of the prevalence of image detected muscle injuries at the 2016 Rio Olympics, revealed that at least 42.6 percent of the athletes experienced hamstring injuries, with at least 60 percent of them being sprinters (Crema et al., 2016).

The injury, which was initially reported as a cramp, caused Bolt to have to go through a series of imaging procedures. The official diagnosis was hidden from the public until Bolt posted an image of his MRI on Twitter, which he promptly deleted minutes later. It was here that he revealed that he had a "tear of the proximal myotendinous junction of biceps femoris in my left hamstring with partial retraction" (Huebsch, 2017). As confirmed by Bolt himself, MRI played a major role in his diagnosis and undoubtedly was used constantly to monitor his recovery. During a press conference interview, Bolt said "After the injury, I tried to get home quickly because we had to treat it. I just continue to treat the injury until we get a chance to do an MRI tomorrow (Monday) to see if it (the injury) is worse than first thought" (Jamaica Radio News, 2017). Regarding MRI usefulness in diagnosing hamstring tears, the following has been concluded:

> MRI is useful in determining multiple characteristics or hamstring injuries, including the size and extent of the injury (length and volume), the specific muscle involved (semitendinosus, semimembranosus, and/or biceps femoris – short and long head), the location of the injury (proximal versus distal injuries and muscle-belly injury versus musculotendinous injuries versus intratendinous injuries), and the signal intensity of injuries (Greenky & Cohen, 2017).

Though Bolt's full recovery process has not been fully revealed, it can be properly concluded that MRI continued to play a role in his recovery.

In summary, MRI is a diagnostic imaging service that is crucial for diagnosing muscle and tissue injuries among athletes. This specialized modality utilizes a magnetic field to obtain high resolution images of anatomical structures and pathologies. The differences between a 3T and 1.5T magnet are important, but not significant enough to distinguish one more than the other in terms of diagnostic results. Due to the various sequence weightings such as T1, T2, fat suppression, and diffusion weighting, MRI is among the most common imaging procedure used to evaluate injuries among elite athletes. While the use of the magnets at the Olympic polyclinic is new, their effectiveness in diagnosing on site injuries continues to press the IOC to implementing these magnets on Olympic clinic sites every year. There are many other benefits to the usage of MRI as a primary diagnostic tool among Olympic athletes that were not covered in this paper. Both functional MRI and MRI based research among athletes are uncharted waters that are waiting to be explored. There is also much research being conducted to correlate MRI scans to predictions of recovery time for injured athletes. As many more advancements are made to magnetic resonance imaging, there will undoubtedly be an increase in their use at the Olympic Games.

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Student Delegates

Student Delegate elections were held online utilizing an election software. Pictured below are the two new Student Delegates that were elected and will start serving in May of 2021. Congratulations to Kiana Jones (left) and Shae Miller (right).

Congratulations!

MISSISSIPPI SOCIETY OF RADIOLOGIC TECHNOLOGISTS

Membership Application

Members will receive an automated email prompting online renewal. If you have not submitted payment within 30 days of the due date, your name will be removed from the membership roster.

Annual Membership Fees	
Student (1 year)	$10.00 (USD)
RT (Active Membership) (1 year)	$30.00 (USD)
Associate Membership (1 year)	$35.00 (USD)

Please make checks or money order **payable to MSRT** and mail to:

Mandy Pearson
MSRT Executive Secretary
1914 Hwy 15 South
Ovett, MS 39464

Preferred membership and/or renewal is online. However, this form is accepted. Complete the following form and return with payment.

MSRT Member #: _____

Name: _____

Address: _____

City: _____ State: ____ Zip: _____

Telephone #: (____) _____ - _____

Email: _____

MSRT is now only sending the BEAM electronically, so it is essential to provide us with an email address.

Check one: ___Student Associate ___ ARRT certified ___

If applying as a student, please give the name of the Radiologic Technology program you are enrolled in.

School: _____

ARRT certified technologists: Please provide the following information: ARRT# _____

Primary Modality (Please circle)

Radiography	**Education**	**Sonography**	**CT**	**MRI**
Bone densitometry	**CIT**	**Mammography**	**Dosimetry**	**Radiation Therapy**
Nuclear Medicine	**Quality Management**	**Military**	**Management**	**RA**
RPA				

MISSISSIPPI SOCIETY OF RADIOLOGIC TECHNOLOGISTS

Change of Information or Address Form

MSRT Member #: _____

Name: _____

Old Information:

Address: _____

City: _____ State: ____ Zip: _____

Telephone #: (____) _____ - _____

Email: _____

New Information:

Address: _____

City: _____ State: ____ Zip: _____

Telephone #: (____) _____ - _____

Email: _____

This form can either be mailed or returned via email to the following

Mandy Pearson

1914 Hwy 15 South

Ovett, MS 39464

mandy.pearson@jcjc.edu

From the Editor

Hello everyone! I hope you all had a wonderful Christmas and New Years!

I hate that this edition of The Beam was cut short again. Due to not being able to host conference though, there just wasn't a ton of information to put together. However, like Asher stated earlier, we are hopeful things will work out and we will be able to have conference in October 2021. It just wasn't the same seeing memories on social media of previous conferences and not being able to add to those this past year.

I hope everyone is staying healthy. Thank you to all of you for your work throughout this pandemic. These are crazy times but we have all pushed through and are continuing to work hard daily for our patients.

Don't forget the MSRT is always looking for new members and volunteers. Something we hold tight to everyday is "there is power in numbers." So whatever it is you can do to help, supporting the MSRT and fighting for out profession is so important right now. Feel free to reach out to any of us on the Board of Directors (names are listed on our website) and we will help you find a way to get involved.

Students, be thinking about and preparing for the Student Prep Bowl that happens at conference. Not only is it a good way to study and be more prepared for registry, it's a fun time! Also, be thinking about the Manuscript and Exhibit Competition. If you have any questions about either of these, reach out to your instructors or anyone with the MSRT.

Again, thank you all for the work you're doing throughout this COVID-19 pandemic. I'm hoping for better days to come in the near future.

Adrian Brewer, R.T.(R)