The Radiographer

The official journal of the Missouri Society of Radiologic Technologists

Volume 78 Issue 2
June 2014

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The offical journal of the Missouri Society of Radiologic Technologists

An affiliate of the American Society of Radiologic Technologists

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In This Issue:

On the Cover:

A "selfie" taken by outgoing President Kelly McDonald with Henry Y Cashion, the longest coninuous member of the society and founder of the Henry Y Cashion Student Internship (see page 5)

The Missouri Society of Radiologic Technologists was founded in 1931, chartered as a professional and scientific society dedicated to education, communication and patient care.
As a not-for-profit corporation, the Missouri Society of Radiologic Technologists Inc. is a chartered affiliate of the American Society of Radiologic Technologists.
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It is with great regret the Board of Directors announces the resignation of Melissa Hart as Publications Chair and Editor of the Radiographer. For the last two years Melissa has devoted herself to publishing a quality newsletter. Unfortunately, personal and professional obligations has required her to step down. We will all miss Melissa and her professionalism and look forward to a time she can return to the Board.

M.J. and I have taken over stewardship of The Radiographer. We are joined by two old hands: Norm who is the MoSRT webmaster and proofreader for the newsletter, and Marty who is the historian and photographer of the society. Together we will build a journal that will:

Be THE source of information for issues facing Missouri medical imaging professional, especially the current hot topic: state licensing.

Have at least one educational article each issue.

Some members may question, "Why have a newsletter when we have a website?" This question is asked because of the similarities between the content of this newsletter and the society's website. But websites have to be updated continuously to be topical. A third function of this newsletter is to be an archive of that website so that each issue of The Radiographer is but a chapter in the history of the society.

But any newsletter or journal is only as good as it is relevant to the members. If it doesn't have anything in it that makes you think or smile, then it may not be worth the time or money it takes to produce. So please tell this new editor: What do YOU want to see in The Radiographer? If there is enough interest in a feature or column, then I promise we will do our best to make it a reality. In the coming issues we will test new ideas. Please give us your feedback on them and let us know what else we can do to make it more fun and educational to read this once a quarter.

Feel free to drop me a line at the address below anytime.

Rodney Fisher, MSRS, RT(R)(N)(CT)(BD), CNMT
Secretary and Publications Chair, MoSRT
Rodney.Fisher@MoSRT.org

The RAD PAD will be a regular commentary by different members of the society each issue. Topics related to the society or any facet of medical imaging are welcome. Guest commentators may send their submissions to the editor.

Calendar of Events

Date: June 27-29, 2014

What: ASRT Annual Conference & House of Delegates

Where: Rosen Centre Orlando, Florida

Who: American Society of Radiologic Technologists

Date: July 12, 2014

What: Board of Directors Meeting

Where: Holiday Inn Executive Center
2200 I-70 Drive SW, Columbia, MO

Who: MoSRT

Date: Jul 30 - August 2, 2014

What: 4-Day Mammography Workshop

Where: State Fair Community College Thompson Conference Center 3201 W. 16th St, Sedalia, MO

Who: Grant from the U.S. Department of Labor

Date: October 18, 2014

What: Seminar - 8 hours (details coming)

Where: Saint Lukes Medical Center,
Emerson Auditorium Saint Louis, MO

Who: Fourth District, MoSRT

Date: October 25-26, 2014

What: Seminar - 12 hours (details coming)

Where: St Joseph Medical Center,
1000 Carondelet Drive Kansas City, MO

Who: First District, MoSRT and
Kansas Society of Radiologic Technologists

From the President:

Dear fellow technologists and members of the MoSRT,

It is a pleasure to be elected as your new President for 2014-2015, I have had the opportunity to serve on the MoSRT Board over the past several years and look forward to serving many more.

If you are visiting this page for the first time, or are not a member of the MoSRT, I encourage you to visit the various pages of the website and explore the many opportunities you have at either the district or state level. Our Society welcomes you!! For those that have been members of the Society and would like to become more involved, I encourage you to either contact myself or another member of the board, there is always a spot to fill or an opportunity to become involved as we welcome and encourage our fellow technologists to become more active members in the profession. We currently have members representing every modality in medical imaging as well as representatives from hospitals, clinics, businesses and educational institutions from across the state.

The MoSRT is known for its involvement in working toward licensure of Radiologic Technologists at the state and national level by lobbying, introducing licensure bills and participating in RT-in-JC and RT-in-DC. We, as a Society, and Profession, will continue to fight for professional licensure to ensure the safety and wellbeing of our patients. This is, in fact, one of my personal goals for our profession, and by working with our licensure committee I hope to help lead us in a positive direction. To help with this endeavor, I encourage all technologists to contact your local representatives and encourage them to support our profession, every voice counts!

Our profession as a whole would not be able to move forward without the support of all our fellow technologists, that's why I encourage all of you to become involved in the MoSRT at some level. We are here to support, encourage and bring innovative ideas to the forefront. I will continue to move forward with plans that have already been set in place by our previous President and Board and will also do my best to bring new life to the Society. I believe in being economically and fiscally responsible, and will continue to look for innovative and new ways of supporting our Society. I hope to work with several new committees this year to establish recognition awards for technologist in your communities and better recognize those that have had a positive impact in the field of medical imaging.

WE are here to serve YOU! If there are any ideas, questions or concerns, please contact myself or another Board member and we will do our best to address your needs. Again, it is a pleasure to serve on the MoSRT board and I appreciate all the support that has gotten me into this position to serve.

Janet Akers
MoSRT President

2014-2015 Henry Y. Cashion Student Interns

Cody Triplett
Cox College

Rebecca Gasper
Hillyard Technical Center

My name is Cody Triplett and I am currently a second year student in the Associate of Science in Radiography program at Cox College in Springfield, Missouri. I will complete the program after this upcoming summer semester and will graduate from Missouri State University with a bachelor's degree in Radiography in August. I was born in Springfield and grew up in Golden City, a small community in southwest Missouri. Quite recently, I was accepted into the 21st Century, Inc. School for Radiation Therapy Technology in Fort Myers, Florida where I will spend the 16 months following my bachelor's completing certification in radiation therapy.

My desire to help others and my interest in technology inspired me to get into the field. It offers the best of both worlds for me, where I can apply my scientific knowledge and technological understanding in ways that help me care for and help my patients. I first became interested in radiologic technology early in high school at a job fair and it has been an excellent fit for me.

I am honored to have been selected as one of this year's Henry Cashion Student Interns. I am excited about the opportunity to represent the MoSRT, both in the state of Missouri and in other areas of the country.

My name is Rebecca Gasper. I am currently a first year student at Hillyard Technical Center in St. Joseph, Missouri. In the spring of 2015, I will graduate Hillyard and North Central Missouri College with an associate's degree in Applied Science and Certificate of Achievement.

I grew up in a very small town, Hamilton, MO, where I attended New York Elementary and Penney High School. While in High School I had the opportunity to attend Grand River Technical School where I spent part of my junior year exploring health care career options. It was here that I discovered radiology. During my senior year I spent half of my school day at a local hospital, Hedrick Medical Center in Chillicothe, MO in the radiology department. It was during this time when I decided this was the career for me. The radiology field seemed to immediately captivate me and I found that the ever-evolving technology and patient care really fascinated me.

I am very honored and grateful to have received the Henry Cashion Student Intern Award. I am excited to take advantage of all of the exceptional opportunities offered to me in this next year. An exciting opportunity has been given to me to attend many educational meetings and represent the MoSRT. I will also be lobbying for the CARE Bill with the MoSRT to better the future of our profession.

Spotlight on a MoSRT Volunteer:

Find out why volunteers choose to dedicate their time to the MoSRT…and perhaps become inspired to do the same!

Kelley McDonald
Past MoSRT President (2013-2014)

Q. How long have you been volunteering for the MoSRT?

A. 13 years. I started out as a lecturer during the annual conference and moved into coordinating the student bowl competition. Since then, I have held various officer and committee positions within our affiliate. Currently, I have the position Senior Board Member.

Q. How did you become involved?

A. I first became involved as a student. I attended 3 annual conferences as a student, the first being in Columbia MO in 1998. My instructors were very involved with MoSRT and I figured that I should be too! Stephanie Whisler said she had a spot for me on the board and I totally felt honored to participate. There was never a question of "if" I would volunteer. It was only "how" or "where" I would serve. Several board members were very welcoming to me at the time and I have never looked back.

Q. What has been your most memorable experience with the MoSRT?

A. My most memorable experience with the MoSRT has not been the awards, banquets or honors, although these are fantastic, but the camaraderie that I have felt with my fellow technologists. I enjoy working with my colleagues towards a common goal and achieving something meaningful. I want to leave a legacy to the next generation of technologists that MoSRT is a strong voice for their profession. AND I have made some lifelong friendships through MoSRT that I treasure.

Q. What do you value most about volunteering for the MoSRT?

A. I love how the MoSRT feels like family. The people who work with and serve the MoSRT support each other and are very loyal and devoted to our mission. MoSRT also gives many opportunities for technologists to be honored and awarded for work within our field through competitions and volunteerism. This is something that I think is awesome! I love seeing technologists being honored for their hard work!

Q. Do you have any advice to encourage others to become involved with the MoSRT?

A. Don't be intimidated by time commitment or lack of experience. MoSRT has something for everyone and no job is too small! Last year, we added 8 new board members. That was amazing! Don't be afraid to contact us to see what small way you can contribute and give back to your profession.

Legislative Update

SECOND REGULAR SESSION

[TRULY AGREED TO AND FINALLY PASSED]

SENATE BILL NO. 527

97TH GENERAL ASSEMBLY

2014

4405S.01T

AN ACT

To amend chapter 9, RSMo, by adding thereto one new section relating to the designation of medical radiation safety awareness day.

Be it enacted by the General Assembly of the State of Missouri, as follows:

Section A. Chapter 9, RSMo, is amended by adding thereto one new section, to be known as section 9.179, to read as follows:

9.179. March twenty-seventh of each year shall be designated as "Medical Radiation Safety Awareness Day" in Missouri. The citizens of this state and our health care professionals' community are encouraged to observe the day with activities designed to educate and enhance the awareness of not only the benefits of radiographic medical procedures, but the potential dangers of overexposure to radiation during diagnostic imaging and radiation therapy as well in order to reduce the frequency of adverse events and allow our citizens to make informed decisions about their medical care.

✓

Hello , I wanted to share this great news with you! Senate bill (SB527) has been introduced by Senator Wallingford and is ready for the Governor to sign making March 27 an annual celebration of "Medical Radiation Safety Awareness Day". This will certainly help in our march toward state licensure for medical imaging professionals!! I think we have a target date for our next advocacy day on the Hill! See you in Jefferson City March 27th!!

Diane Hutton, BA, RT(R)
President Elect, MoSRT, Legislative Activities Chair

2014 Conference Round-up

Student Quiz Bowl First Place

St Luke's School of Radiologic Technology
Ann Malaker, Corben Palmer, Jennifer Fisher,
Mary Wooldridge (coach), Mary Winters

2nd Place - Linn State Technical College
Nicole Prewitt, Jennifer Hagenow, Mark Brekke,
Kerry McDaniel, Vicki Johnson (coach)

3rd Place - Saint Louis Community College at Forest Park
Megan Ryan, Stephen Martin, Victoria Smith, Brandi Boehner,
Sally Polta (coach)

4th Place - Avila University
Janie Staley, Melanie Bergstrom, Samuel Harvey, Cecelia Mata,
Kristi Littleton (coach)

Scientific Display Winners

Technologist Display Winners

First Place
Dean Brake
Saint Louis Community College at Forest Park

Seond Place
Norman Hente
BarNor Services

Third Place
Maggie Ogden
Rolla Technical Center

Student Display Winners

First Place
Victoria Hammer
Rolla Technical Center

Second Place
Hanna Sweet
Saint Louis University

Third Place
Jason Wahidi
Saint Louis University

Conference Round-up Continued

Scientific Essay Winners

Technologist Winners

First Place
Tara Hathcock
Mercy School of Radiology Technology

Second Place
Thaddus Morris
Cox College

Third Place
Benjamin Morris
CoxHealth Medical Center

Honorable Mention
Alan Schiska
Missouri Southern State University

Student Winners

First Place
Cody Triplett
Cox College
(Published in this issue)

Second Place
Samuel Harvey
Avila University

Third Place (Tie)
Candace Rongey
Hillyard Technical Center

Scholarship Winners

Student Winners

Robert A. Feldhaus Memorial Student Scholarship
Katie Hay
Cox College

Stephanie A. Whisler Memorial Student Scholarship
Natascha Matesowicz
Rolla Technical Center

MoSRT Student Scholarship
Kimberly Harfst
Rolla Technical Center

Technologist Winners

No applications received in 2014

Conference Round-up Continued

Ulysses D. Murray Lecturer

Tammy Homan MSRS RT(R)(M)(CT)
Southeast Hospital

Life Membership

Benjamin Morris, MSEd, RT(R)(T)(CT)
CoxHealth Medical Center

MSRT Award of Excellence

Diane Hutton, BA, RT(R)
Heartland Regional Medical Center MO

Student Essay Winner

Cody Triplett

Head Over Heals:

Understanding the Anode Heel Effect

Abstract

The anode heel effect, or anode cutoff, is a well known phenomenon that occurs inherently due to the construction of the x-ray tube. Traditionally, it has been utilized in certain projections to obtain radiographs with more even overall density. However, with increasing computer technology that can adjust image quality accordingly, more attention can be paid to considering patient dose, especially to radiosensitive areas of the body. This experiment and research provides data that aims to create a better understanding of how source to image distance (SID), technical factors (mAs and kVp), and equipment age impact the extent of the anode heel effect, with more emphasis on patient dose than image quality. Nonuniformity in the beam due to the effect was measured by using S#'s, which indicate the amount of exposure an image receptor (IR) receives. The data obtained suggests that technique changes create the most drastic alterations in anode cutoff. In addition, greater source to image distances and older equipment appear to increase the magnitude of the effect. These factors are under the direct control of the radiographer and he or she may be able to use knowledge of how they impact the heel effect and position a patient accordingly so as to reduce exposure to sensitive parts of the body.

Introduction

The anode heel effect is an important radiographic concern, both when considering image quality and patient dose. The effect's existence is inherent in the design of the x-ray tube, but itsmagnitude can vary based on a number of factors. Some of these factors are under aradiographer's control and should be considered when making exposures.

The heel effect itself is defined as the nonuniform distribution of radiation intensities within the primary beam, with the exposure rate in the beam emitted at the anode side of the tube being lowest (Selman, 2000). Conversely, the beam emitted nearest the cathode side of the tube has the highest exposure rate.

The effect is due to the construction of the x-ray tube and its magnitude is primarily dependent upon the anode's target angle. The anode target in the tube is angled and allows the effective area of the target to be much smaller than the actual area of the electron interaction (Bushong, 2013). This is known as the line-focus principle, and its purpose is twofold. Because the area of electron interaction can be made larger, heat distribution is improved, increasing tube capacity and decreasing wear on the anode. In addition, a smaller effective focal spot results in improved image detail due to an increase in spatial resolution (Bushong, 2013). Therefore, image detail is better with smaller target angles (see figure 1). However, a consequence of angling the target is the heel effect. It occurs because electrons interact with atoms at various depths into the target. Primary x-rays that are created in the target must then traverse the thickness of the anode before being emitted. This thickness is greater for photons that are emitted toward the anode

side of the tube than it is for those emitted toward the cathode side, resulting in increased absorption of primary x-rays on the anode side (Bushong, 2013). Therefore, a smaller target angle results in a larger heel effect (see figure 2).

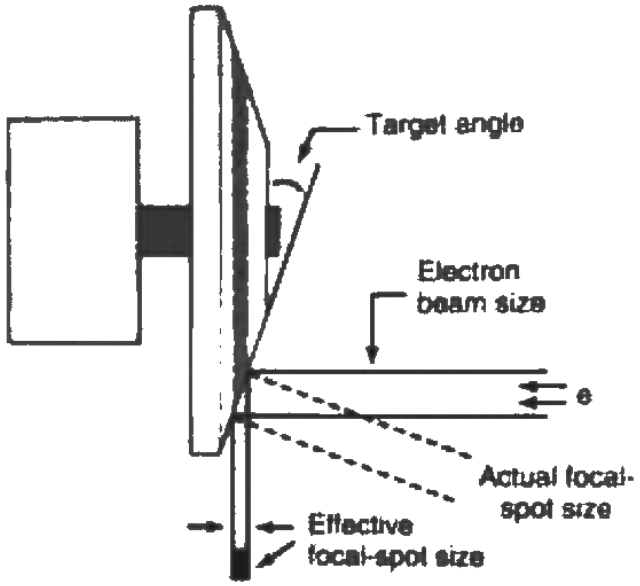


Figure 1 **– The line-focus principle; as target angle decreases, so does the effective focal spot size. Bushong (2013) pg. 114**

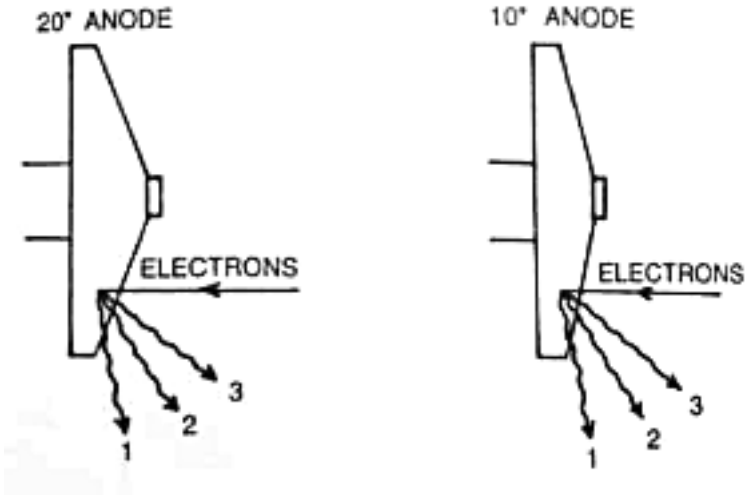


Figure 2 **– As target angle decreases, anode cutoff increases. Selman (2000) pg. 254**

Head Over Heels continued

According to Bushong (2013), the difference in radiation intensity across the useful beam of an x-ray field can vary by as much as 45%. This results in radiographs that receive a considerably larger exposure rate at the end of the image receptor placed under the cathode end. This nonuniformity in exposure is often utilized to image body parts of widely varying thicknesses. For example, the anteroposterior projection of the thoracic spine is most often done with the patient's head positioned under the anode side of the tube. The portion of the beam with more intensity (on the cathode side) is therefore utilized to penetrate the thicker inferior portion of the thoracic cavity. The reverse is true for the anode side. The result is a radiograph with more uniform radiographic density.

Not only does the primary beam expose the image receptor nonuniformly, it also exposes the patient in a similar manner. The patient receives a higher dose in the area of their body nearest the cathode end. Going back to the thoracic spine, the above mentioned patient orientation is not only beneficial for image quality, but it places the patient's thyroid gland (a highly radiosensitive gland) under the area of the beam that is less intense. The same consideration should be used when imaging other parts of the body as well. The purpose of this paper and experiment is to examine how much certain factors affect the magnitude of the anode heel effect. The factors chosen are ones under the direct control of the radiographer; source to image distance, technical factors, and equipment or room choice (within a radiology department). The results are intended to provide insight as to the factors that most heavily influence how pronounced the anode heel effect is and how a radiographer might consider them when imaging a patient.

Methods

An experiment was conducted to test the magnitude of the anode heel effect under various conditions. The variables tested were source to image distance (SID), technical factors selected (mAs and kVp), and the age of the equipment. For the purposes of the test, equipment age was determined based upon the approximate known date of installation. "Room 1" in this experiment was installed in the early 2000's and "room 8" in the late 1980's, making their approximate difference in age between 10 and 15 years. The extent of anode cutoff was measured by noting a difference in the exposure index between two images obtained by utilizing only the anode or cathode half of an exposure field. The equipment used for the experiment produced a sensitivity number (S#), which reflects exposure to the image receptor (IR). Exposure and the S# are inversely related.

First, SID was tested. A lateral projection of the knee was performed using a mannequin. A 10x12 IR was utilized, placed with its long axis perpendicular to the long axis of the table. The central ray was directed at the midpoint of the long edge of the IR nearest the cathode end, and a field size twice the area of the IR was used (refer to figure 3). The resultant exposure utilized only half of the exposure field to irradiate the IR, in this case the anode half. The knee was imaged in room 1 utilizing an SID of 40", technical factors 4 mAs at 70 kVp, and a small focal spot size. The half of the beam not utilized to expose the IR was shielded with a lead apron to absorb any potential scatter radiation. No grid was used. These steps were repeated, changing only which half of the exposure field created the image. The IR's were run through a reader and the S# values and their difference were noted. The above steps were repeated, imaging no part so as to help adjust for slight inaccuracies in positioning of the leg.

All of the aforementioned steps were repeated, maintaining all factors except for SID. Subsequently, an additional four exposures were made and S#'s were recorded utilizing an SID of 72", imaging both a lateral knee and no part at all. Next, the influence of technique was examined. The steps mentioned above to test SID were repeated, but a constant SID of 40" was used and lateral skull projections were performed.

Head Over Heels continued

For this portion of the experiment, the skull and then no part at all was imaged in the same fashion as the lateral knee, but rather than altering SID, a technique of 2 mAs at 55 kVp was used, followed by a technique of 25 mAs at 80 kVp. A small focal spot size was used both times, and the differences in S#'s were again noted.

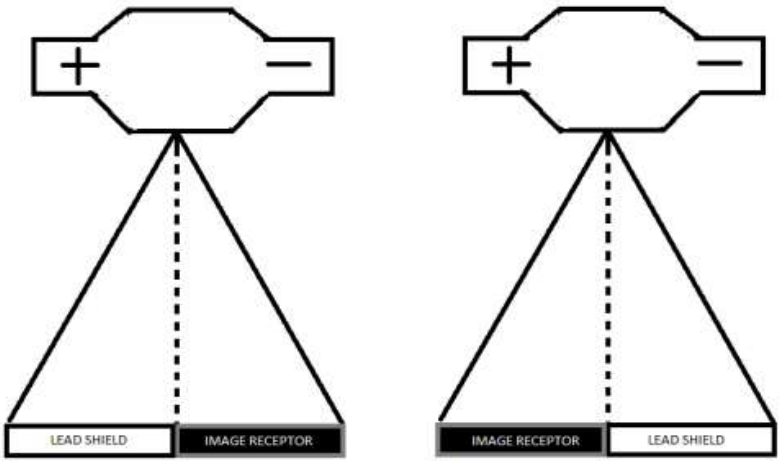


Figure 3 **– Setup for exposures using half of the primary beam.**

Results

The difference in S#'s produced by exposures of the anode half of the primary beam and the cathode half of the beam were obtained and compared for each variable. The older equipment in room 8 produced significantly higher S#'s, suggesting a decrease in tube output.

The factor that most overwhelmingly impacted the measured anode heel effect was technique. In fact, the S#'s obtained utilizing the higher technique suggested that the anode heel effect had been effectively eliminated, since no difference in exposure was detected between the anode and cathode sides. This was true for both the lateral skull images and the images with no part. The difference in S#'s varied as much as 290 for the lateral skull at a low technique.

SID had a somewhat surprising effect on anode cutoff. According to Selman (2000), anode heel effect decreases as SID increases (see figure 4). This is because the more divergent portions of the primary beam (therefore, those that are most different in exposure rate) are no longer utilized to expose the IR. Instead, the more uniform, central part of the beam is used. However, in this experiment, the measured anode heel effect increased at 72" versus 40" when imaging the knee. A possible explanation for this is that, at 40", the most divergent portions of the beam were actually collimated off in order to fit the exposure field to the size of the IR. In contrast, at 72", collimation was left almost completely open, utilizing most of the primary beam for the exposure (figure 5 below depicts collimation and the heel effect). Therefore, some of the most intensity-varied portions of the beam were used at 72", perhaps accounting for the increase in measured anode cutoff.

Head Over Heels continued

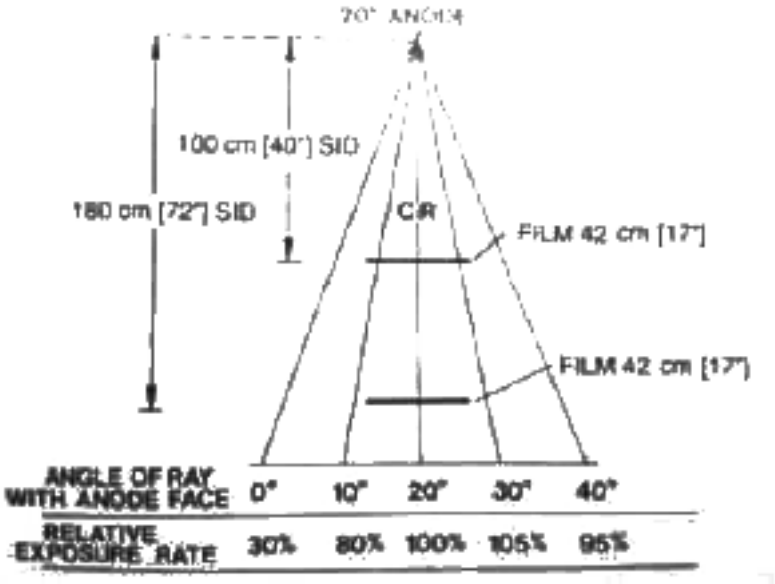


Figure 4 **– Anode heel effect becomes less pronounced as SID increases. Selman (2000) pg. 253**

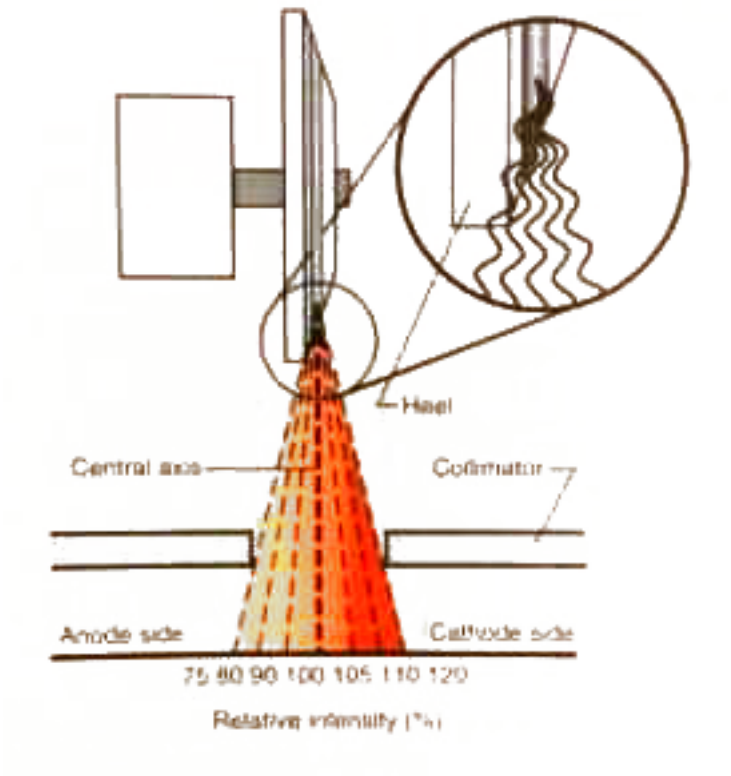


Figure 5 **– The anode heel effect and collimation. Bushong (2013) pg. 115**

Head Over Heels continued

Somewhat remarkably, changing SID from 40” to 72” had exactly the same influence on the measured anode heel effect as going from the newer room 1 to the older room 8 when imaging the lateral knee. The difference in S#’s was 43 at 40” in room 8 and at 72” in room 1. This outcome in general is expected, considering the fact that the S#’s overall were much higher from room 8. As previously noted, this suggests a decrease in tube output and would be somewhat comparable to decreasing technique. This is consistent with the findings that suggested lower techniques experience increased anode cutoff.

Data Obtained

SID Variable

Rm #	SID	Technique	Part	Anode/Cathode	S#	Change in S#
1	40”	4 mAs @ 70 kVp	Lat. Knee	Anode	107	
1	40”	4 mAs @ 70 kVp	Lat. Knee	Cathode	83	24
1	72”	4 mAs @ 70 kVp	Lat. Knee	Anode	288	
1	72”	4 mAs @ 70 kVp	Lat. Knee	Cathode	245	43
1	40”	4 mAs @ 70 kVp	None	Anode	7	
1	40”	4 mAs @ 70 kVp	None	Cathode	4	3
1	72”	4 mAs @ 70 kVp	None	Anode	14	
1	72”	4 mAs @ 70 kVp	None	Cathode	12	2

Technique V ariable

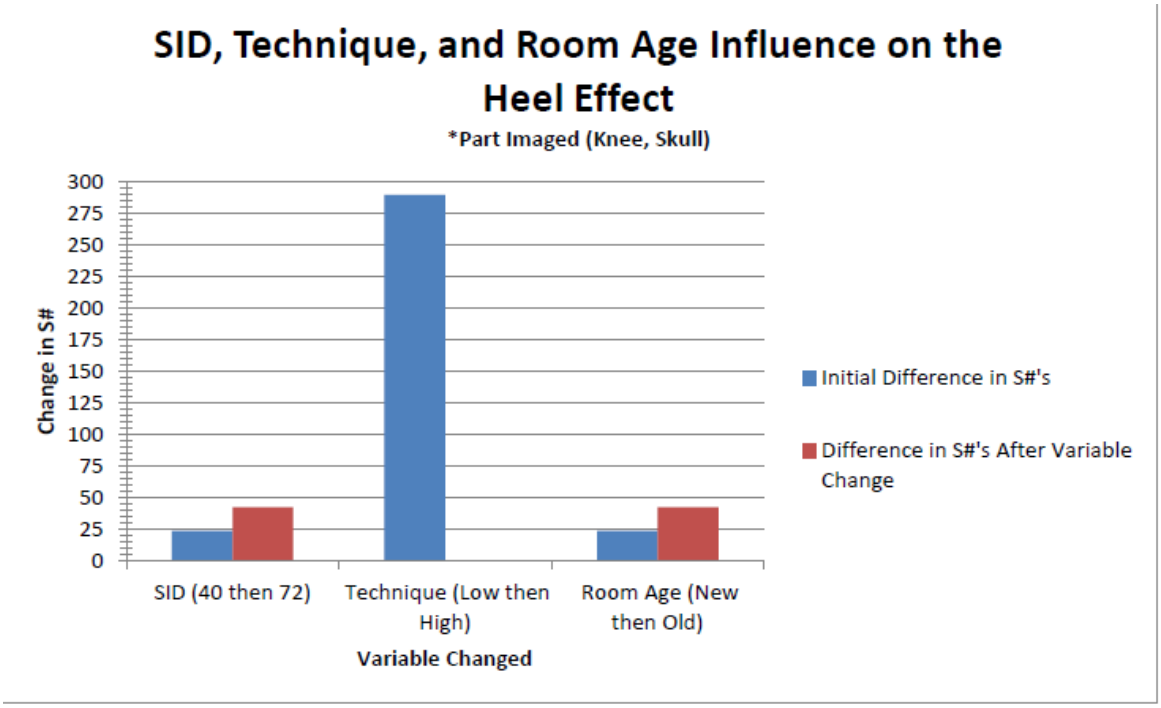
Rm #	SID	Technique	Part	Anode/Cathode	S#	Change in S#
1	40”	2 mAs @ 55 kVp	Lat. Skull	Anode	1122	
1	40”	2 mAs @ 55 kVp	Lat. Skull	Cathode	832	290
1	40”	25 mAs @ 80 kVp	Lat. Skull	Anode	9	
1	40”	25 mAs @ 80 kVp	Lat. Skull	Cathode	9	0
1	40”	2 mAs @ 55 kVp	None	Anode	39	
1	40”	2 mAs @ 55 kVp	None	Cathode	22	17
1	40”	25 mAs @ 80 kVp	None	Anode	2	
1	40”	25 mAs @ 80 kVp	None	Cathode	2	0

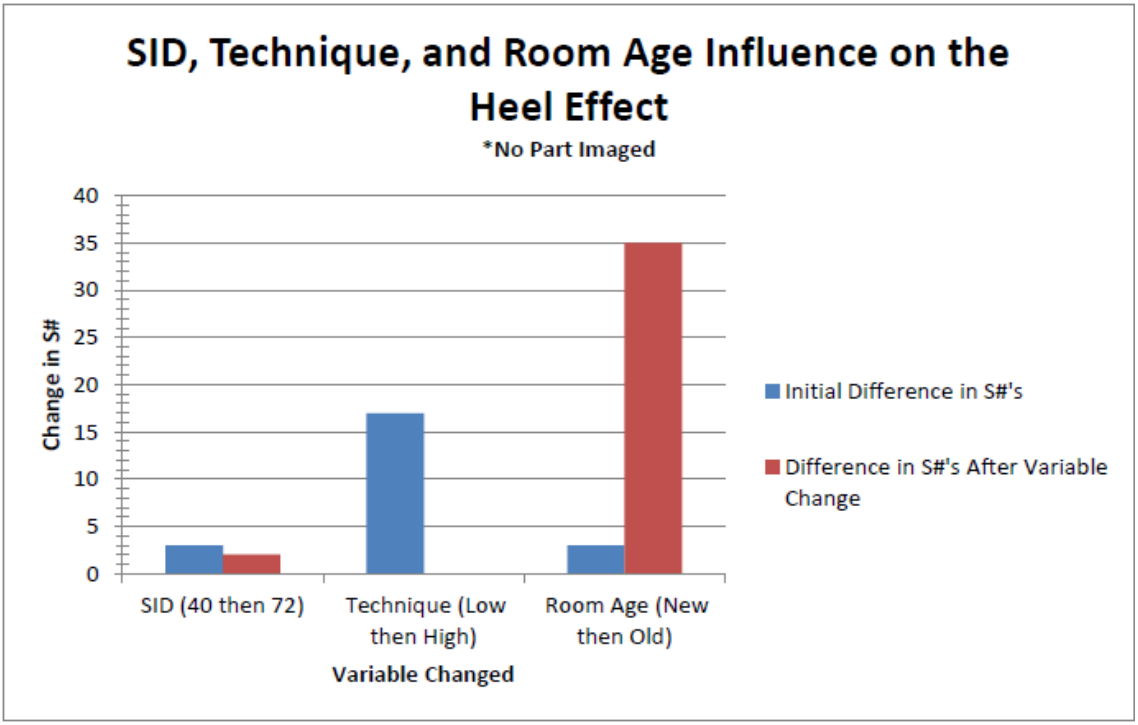
Head Over Heels continued

Room Age Variable

Rm #	SID	Technique	Part	Anode/Cathode	S#	Change in S#
1	40”	4 mAs @ 70 kVp	Lat. Knee	Anode	107	
1	40”	4 mAs @ 70 kVp	Lat. Knee	Cathode	83	24
8	40”	4 mAs @ 70 kVp	Lat. Knee	Anode	148	
8	40”	4 mAs @ 70 kVp	Lat. Knee	Cathode	105	43
1	40”	4 mAs @ 70 kVp	None	Anode	7	
1	40”	4 mAs @ 70 kVp	None	Cathode	4	3
8	40”	4 mAs @ 70 kVp	None	Anode	74	
8	40”	4 mAs @ 70 kVp	None	Cathode	39	35

*Room 8 is the older room





Discussion

The results from this experiment show that there is in fact a quantifiable nonuniformity in the primary x-ray beam due to the anode heel effect. Moreover, there are several technical factors and conditions that influence the extent of the heel effect and are under the direct control of the radiographer. This information has practical use in that a radiographer might be able to better understand what conditions make the heel effect more or less of a factor when considering patient dose and positioning.

The data obtained suggests that lower techniques tend to result in a more prominent heel effect. Therefore, for exams that utilize lower techniques, a radiographer might be more considerate of positioning. For example, imaging the femur uses a technique that is significantly lower than exams that image the spine. A radiographer might position the patient in a way that places the reproductive organs away from the cathode end of the tube. This is typically how the exam is performed, but if it were done portably, the radiographer might take extra care to position the patient and tube as such.

There is research indicating that patient dose is higher on the cathode end of the tube at higher techniques as well. Fung and Gilboy (2000) showed that reproductive organs can receive doses up to 17% higher when imaging the lateral lumbar spine with the patient's head toward the anode rather than the cathode. Likewise, the disparity was as much as 27% in the anteroposterior projection. While image quality should be of importance, younger patients and those with a body type that does not necessitate extra penetration near the gonads might be positioned in a reverse fashion so as to minimize exposure to those areas.

Head Over Heels continued

In addition, there is evidence that certain methods are being explored and utilized that help to minimize the effect of anode cutoff on image quality. Nascimento, Frère, and Germano (2008) have described an automatic process in digital mammography that uses a logarithmic correlation method to eliminate around 94% of the heel effect in the resultant image. Examples such as this support the notion that anode cutoff can be made minimally impactful on the ultimate quality of an image and patient dose and positioning can be more heavily considered.

SID and equipment age can also be considered in the same way. Although the results for SID were surprising (as described in the results section) they should be considered legitimately because collimation is adjusted in the same manner when taking x-rays; more of the primary beam is collimated away at a smaller SID. The results suggest a radiographer should be more conscious of the heel effect at a greater SID. Practically, this could be considered when taking portable chest x-rays at 72". The anode end could be directed superiorly so as to limit exposure to the thyroid gland, for instance. Radiographers would want to do this anyway to direct the cathode end at the thicker portion of the thorax. According to the data, radiographers should also be more mindful of increased anode cutoff in older rooms and similar precautions could be taken.

This experiment was limited in a few ways. Firstly, the portion of it concerned with technique changes used a constant, small focal spot size. This maintained technique as the only changing variable, but a radiographer would in fact change to a larger focal spot size at higher techniques when making exposures. It would be interesting to see how focal spot size impacted the heel effect, independent of and with changes in technique. In addition, this experiment only looked at exposing non-gridded IR's. Similar to the focal spot issue, a radiographer would be more likely to use a grid at a higher technique. The effect (if any) of a grid on measured anode cutoff would be another interesting topic for future research.

To conclude, the anode heel effect can be made more or less impactful on primary beam uniformity depending upon certain factors. Some of these factors are under the radiographer's control and, if the relationship between them and anode cutoff is well understood, he or she can position a patient accordingly. Improved technology and post-processing has decreased the heel effect's influence on image appearance. This allows flexibility for radiographers to be more concerned with protecting the patient from excess radiation, while continuing to produce diagnostically sufficient radiographs.

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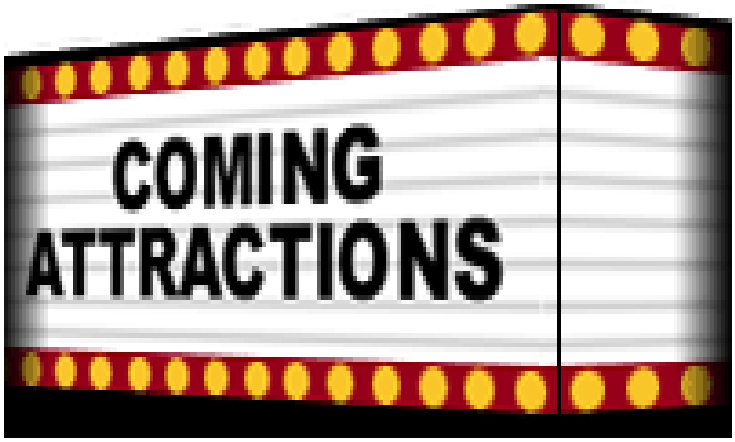

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- In the Spotlight – the next president of MoSRT
- The winning technologist scientific essay
- What happened at the ASRT in Orlando
- Who's who on the Board of MoSRT

And more!

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