



*Supporting Discoveries in Spinal Deformities*

**IISG**  
**HARMS STUDY GROUP**

*Pioneering Research in Spinal Deformities*

# PIONEERING Research in Spinal Deformities

# 2014

## ANNUAL REPORT

# PRESIDENT'S REPORT

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**Dear Friends and Family of the Setting Scoliosis Straight Foundation and Harms Study Group,**

We want to thank you for all of your efforts in helping us make 2014 a very productive and very successful year. In the pages that follow, you will find highlights from this past year that emphasize the progress we have made and the progress we will continue to make in the understanding and treatment of scoliosis.

I want to thank and acknowledge all of our patients who have contributed their outcome data into our registry, which is the fuel for so much of our progress. Without your willingness to contribute, we wouldn't be able to continue advancing the bank of knowledge for those who will be diagnosed with scoliosis in the future. Thank you.

Our research teams continue to apply increasingly sophisticated techniques as we study the complex curvatures of the spine and how they develop in adolescent patients. Three-dimensional imaging methods are changing what we know about spinal deformities, and just as we know that each patient is different and unique, we are now designing treatments to match. As the healthcare industry has shifted its focus to "quality" and "value" of care, the Harms Study Group has increased its focus on these areas as well, and we have led in improvements on several fronts. We have established a best practices guideline to facilitate quicker hospital recovery times following surgery and improved pain management approaches.

The education portion of our mission remains a prominent focus in our work. We have begun work on a textbook focusing on Neuromuscular Scoliosis that we hope will rival the success of our prior textbook on Idiopathic Scoliosis. The long-term surgical and non-surgical outcomes in scoliosis treatments have yet to be fully explored, but as we approach the 20th year of the Harms Study Group, obtaining real data on longer term outcomes is becoming a reality.

While I am incredibly proud of what we have accomplished in 2014, I also realize that our job is never done. There are great strides to be made ahead, and with your support, we will share even more successes in 2015.



Most Sincerely,

A handwritten signature in black ink, appearing to read "Peter Newton".

Peter Newton, MD

President, Setting Scoliosis Straight Foundation

# Table of Contents

<u>Setting Scoliosis Straight Introduction</u>	<u>Harms Study Group Introduction</u>	10
Grateful Patients.....1	HSG Executive Members.....11	
Meet Emily.....2	Research Productivity.....12	
Meet Alexis.....4	Cerebral Palsy Study.....14	
Patient Based Research Initiative.....6	3D Evaluation of AIS.....16	
Patient Education Handbook.....6	Adolescent Idiopathic Scoliosis.....17	
SSSF Board of Directors.....7	2014 Scientific Publications.....18	
SSSF Infrastructure.....8	2014 Scientific Presentations.....19	
Our Volunteers.....9	HSG Core & Associate Members.....20	
	Financial Report.....22	
	Donors of 2014.....23	





# setting SCOLIOSIS straight

*Supporting Discoveries in Spinal Deformities*

The mission of the Setting Scoliosis Straight Foundation is to advance the treatment of scoliosis and spinal deformity for children via research and education.

Advancements in scoliosis treatment take time, resources, and dedication. In 2014, SSS staff devoted their time to ensuring that 2015's fundraising efforts would go above and beyond all previous fundraising drives. In 2015, Setting Scoliosis Straight will host a live gala in honor of twenty years of the Harms Study Group.

Surgeons, patients, and scoliosis supporters will gather to celebrate the path scoliosis patients have walked and the future trails scoliosis treatments will take. Twenty years from now, we plan to look back at 2015 as the year that Setting Scoliosis Straight's fundraising efforts took us to new heights.

*The momentum and progress of the past twenty years of research from the Harms Study Group must continue. Future research will focus on better and safer surgery, easier recovery, and maximizing long term motion, function, and mobility. Let's give all kids a chance at a normal life.*

*- Suken Shah, MD*



# GRATEFUL PATIENTS

## Stacey Goldfarb

Stacey Goldfarb has not had an “easy” experience with her adolescent idiopathic scoliosis treatment. She has endured a total of three surgeries to correct and stabilize her spinal deformity. Despite three surgeries, which invariably lead to the challenge of three recovery periods, Stacey is extremely grateful to the doctors and nurses who cared for her and for the treatment she has received. Now a lawyer, a wife, and a mother of two healthy and beautiful children, Stacey mindfully practices gratitude in her daily life. It was this method of gratitude that brought Stacey and her husband, Jeff, to Setting Scoliosis Straight in 2013. While Stacey’s involvement with Setting Scoliosis Straight began in the form of a generous donation, which she offered as a way to give back to the same research processes that led to her curve correction, Stacey’s impact with Setting Scoliosis Straight didn’t end there. In 2014, Stacey became a member of Setting Scoliosis Straight’s Board of Directors, where she

offered invaluable insight as a past patient and used this insight to help orchestrate the launch of our Patient-Based Research Initiative.

Stacey’s philosophy of gratitude allows her to convey happiness, joy, positivity, and compassion to all those she comes in contact with. We are so grateful that she decided to share her gifts with us as a foundation, and we find her to be a true inspiration!



## Lindsay Gordon



*Lindsay (left) hosting a fundraiser for the Setting Scoliosis Straight foundation.*

On May 21st, Lindsay Gordon, her mother, Robin Gordon, and the residents of Harverford Reserve hosted a fundraiser with author and inspirational speaker, Pat Croce, as a guest. Pat Croce delivered a moving speech, but Lindsay also spoke at the event and shared her personal scoliosis story.

In one night, over \$8,000 was raised to support the work of Setting Scoliosis Straight! We are incredibly grateful for Lindsay’s bravery and her compassion. We want to thank Lindsay, her mother, and all of the Pennsylvania residents who attended this special event and donated their time and money to helping children who live with scoliosis thrive.

# PATIENT STORY

## Emily Bloomfield

In 2010, I was thirteen years old and in the eighth grade. My life was going smoothly until I played a field hockey game one day after school. During the game, I twisted my knee, and as a result, I had to see an orthopedist. Surprisingly, the doctor was unable to find anything wrong with my knee, but he did find a problem with my back. I was referred to a specialist, and I had x-rays of my back taken at the Spine Center in Nemours A.I. DuPont Hospital for Children. During my appointment, **Dr. Shah** informed me that I had idiopathic scoliosis, which is an abnormal curvature of the spine that occurs with no known cause. Dr. Shah explained that I had two curves, and I could clearly see from the x-ray that my spine resembled a backwards “S.” My curves were fifty-seven and fifty-five degrees, and this meant that a spinal fusion surgery would be the best option for my future health. After finding out that I needed to have spine surgery, my everyday life suddenly came to a screeching halt.

Once my parents and I made the decision to move forward with the procedure, the next few months were filled with the impending surgery and recovery as my only focus. It seemed to be all I could think about. My uncertainty and fear consumed me, and I began to imagine all of the worst possible outcomes. Fortunately, my parents

were there for me every step of the way. They reassured me again and again that I was in a very capable surgeon’s hands and that they would be there for me through every part of my hospital stay and recovery. On the morning of my surgery, I was incredibly anxious, but once I talked to Dr. Shah and the nurses, I felt I could handle what was coming.

Both my hospital stay and my recovery were really tough. The nurses at Nemours were awesome, and they did their best to keep me comfortable, but the physical therapy was especially difficult. Still, I pushed myself every day while I was in the hospital. During my recovery time at home, I became slightly frustrated. I couldn’t do most things for myself, but my parents and my grandmothers helped me with everything that I needed.







*Emily and her surgeon Dr. Suken Shah*



*Emily and her mom*

In February, Emily Bloomfield held a fundraiser for Setting Scoliosis Straight at Buffalo Wild Wings. Emily and her supporters were able to raise over \$500 for our foundation.

I was out of school for quite a while, but my friends were really supportive. They took time out of their school days to write me cards and letters, and they brought me small gifts and snacks to get me through my long days at home. Without the love and support of my family, my friends, and my teachers, I don't think I would have made it through my recovery. However, I had tons of support, and I made it through.

My spinal fusion helped me grow into a bigger person, mentally and physically—I gained over two inches! Despite that fact that it was a long, emotional, and painful journey, I am glad I endured all of it. Without my surgery, I wouldn't be the healthy individual I am today, and I wouldn't be the healthy individual I'm going to become as I grow older. I truly value and appreciate Dr. Shah's guidance and expertise.

Being a participant in a scoliosis research study helps me feel connected to the Spine Center at A.I. DuPont, and it has motivated me to do more to help others who have scoliosis. As part of my senior project, I organized a fundraiser in my town to benefit the Setting Scoliosis Straight Foundation, and it was a great success. The fundraiser was my way of giving back to those who helped me through my scoliosis journey and helping future scoliosis patients.

*“Grateful Patients are Setting Scoliosis Straight’s greatest success stories. Our Grateful Patients are patients who have triumphed over their own adversity and found away to help others through difficult times. We are grateful for our Grateful Patients!”*

# PATIENT STORY

## Alexis Yavorsky

**F**“Find joy in every journey.” This mantra is inscribed on a plaque that hangs by my door. I reflect on it every day. It was given to me by my godmother following my AIS Surgery, during the hard months of recovery, to remind me that adversity is a gift. Every challenge presents an opportunity for growth in character – fortitude, self-confidence and compassion. I grew in all the above, plus four vertical inches, and I would not change it for the world. This philosophy has helped navigate my life and, for me, it has been a ten year journey. My AIS Surgery (July 5, 2004) and my journey with scoliosis (since age eight) was one that tested to me my core, but it also shaped me into the person I am today. For that, I am eternally grateful.

Following my ten year follow up appointment this year, I was asked to share my story in the SSS Annual Report. The 2014 Annual Report provides a time for reflection on the many intimate questions, research findings, and quantitative data that shape the reality of an individual and their spine after AIS Surgery. For many patients who have been a part of or have been touched by the research of the Harms Study Group, it has been a journey of long-term follow up. For the surgeons

and medical partners, it has been a journey to apply that research towards propelling technology forward and aligning findings to the betterment of those with the condition. For me, the journey is close to home. My scoliosis is deeply rooted in the genetics of my family tree. From my mother down to my maternal great-grandmother, it is a stark reality. In looking back, there are still questions that affect our future and they are being successfully addressed through long-term follow up. As a result, the data collected can provide a lens for both immediate and lifelong predicative models for conditions such as late onset infection and disc degeneration. The results are promising, in that the risks outweigh the benefits. The vastness of the unknown is shrinking and the boundaries are more tangible.







In looking beyond these questions and toward the horizon, I cannot help but feel a shared sense of pride and accomplishment. In 2014, I personally accomplished a feat that I never imagined could be possible after AIS Surgery. I climbed the Mountaineer's Route of Mount Whitney, conquering the last vestiges of physical limits that I had placed on myself. Gone are the days of vulnerability. I have been given the opportunity to be a part of the solution, to tap into a limitless future. By participating in such studies, we have proven the long-term success of AIS Surgery and can effectively project a better outcome for individuals after scoliosis.

In just a decade, the landscape of the field has changed. There are still mountains to ascend, in order to reach a higher understanding, but what we are learning is enough to stand at a vantage point. There is even hope for surgical treatment without limits on spinal mobility. That in itself is astonishing. I am happy and honored to be connected with HSG. Their twentieth anniversary is being celebrated as I celebrate my own tenth anniversary! It is a year to celebrate the crossing of thresholds, both personal and aggregate.

# PATIENT BASED RESEARCH INITIATIVE



This program aims to develop research studies based on specific questions that are important to patients with scoliosis.

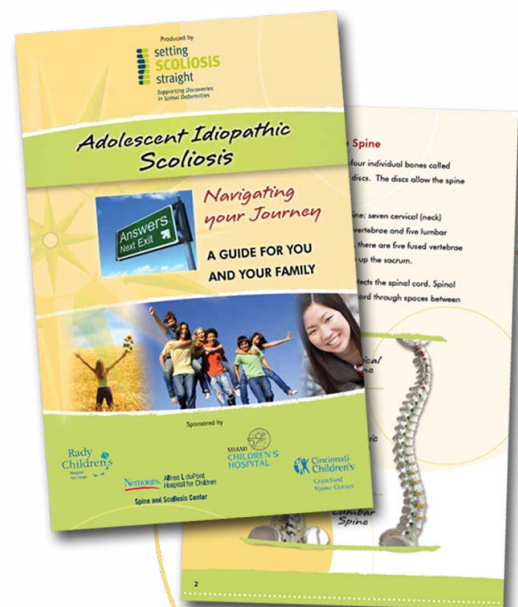
This developmental shift from surgeon-based-research to patient-based-research is beneficial as patients and parents of patients afflicted with scoliosis are the key partners in all research. Setting Scoliosis Straight is proud to lead this charge by assembling a group of patients from across the US to assist in submitting

key clinical questions for potential research studies. Comparative analysis between surgeon and patient submissions, and relative ranking of importance, will help elucidate priorities and identify areas in need of increased patient education.

## PATIENT HANDBOOK

It is hard to believe that over 20,000 copies of the patient education handbook have been distributed to patients all over the world. Our dwindling supply of printed copies is an opportunity for Setting Scoliosis Straight and the members of the Harms Study Group to put their heads together and brainstorm vital updates to include in the second version of the handbook which will go to print in early 2015. We plan to print 15,000 copies of the updated English version and 5,000 of the updated Latin Spanish version. The updates will also be distributed to our colleagues in Turkey, China, and Spain, so versions in each respective language can be updated as well. In addition, 2015 will bring our

fifth language translation of this handbook: French. We are grateful for our colleagues at Montreal St. Justine who are helping us make this handbook available to French speaking patients all over the world!



# SETTING SCOLIOSIS STRAIGHT BOARD OF DIRECTORS



Peter Newton, MD  
Chairman/ President



Dave Clements, MD  
Treasurer



Michelle Marks, PT, MA  
Secretary



Harry Shufflebarger, MD



Amer Samdani, MD



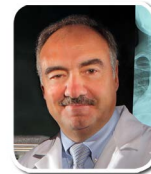
Baron Lonner, MD



Suken Shah, MD



Randy Betz, MD



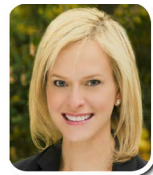
Tom Errico, MD



Robert Stone



Alvin Crawford, MD



Stacey Goldfarb



Kevin Sayar



Stacey Stevens

We would like to offer a thank you to Sally Lynch-Bedell for the time, talent, and expertise she brought to Setting Scoliosis Straight as a board member from 2012—2014. Her valuable patient-centric views complimented the composition of the SSS board and helped guide our foundation, compelling us to grow in both our empathy and our optimism for all patients living with spinal deformities. We wish Sally the best in all future endeavors.

*Serving on the Setting Scoliosis Straight Board of Directors was an honor and a privilege. As a patient, I felt especially connected to the mission of the organization, and I commend the work that the foundation continues to do. The SSS Board of Directors is comprised of stellar leaders in the spinal community, and I have the utmost faith in their ability to continue to make strides to help those affected with spinal deformities.*



Sally Lynch

- Sally Lynch





# INFRASTRUCTURE

Setting Scoliosis Straight's team is committed to excellence in research quality and productivity.

Our core staff performs central data coordination which includes obtaining Internal Review Board approval, tracking Informed Consents, acquiring images, measuring x-rays,

and performing data QA. They also oversee project management, database management, and site management. Additionally, the infrastructure manages foundation finances, site contracts, and foundation development.

## STAFF:

Sierra Abate, MSTOM – Research Assistant

Amy Bartley, BA – Assistant Developer/ QA Manager

Jon Marie Basel – Contracts & Finance Administrator

Tracey Bastrom, MA – Statistician

Noreen Gaynor – Administrative Assistant

Harvey Ly, BS – Webmaster/Assistant Developer/ Central & Backlogs X-ray Measurer

Michelle Marks, PT, MA – Research and Executive Director

Maty Petcharaporn, BS – SD Team Manager/  
Co-Research Director

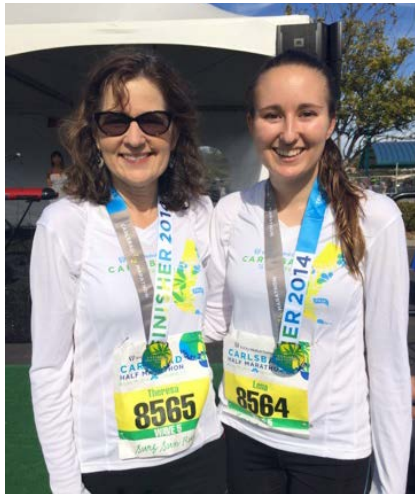
Evan Xanthos BS, MS – Research Assistant



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# VOLUNTEERS

## Theresa Chesnut



My daughter Lena was diagnosed with scoliosis when she was very young. Lena's scoliosis progressed over the years and finally her doctor, Dr. Peter Newton, said surgery was needed. Lena had spine surgery in July of 2010. The surgery was painful, and the recovery was challenging, but today Lena is doing extremely well. She's attending the University of Arizona, and she just recently passed her Physical Readiness Test with Navy ROTC. Thank you, Dr. Newton!

Both Lena and I hope that research someday finds a way to prevent or cure scoliosis. It's this hope that motivates me to volunteer. I appreciate all of the work Setting Scoliosis Straight accomplishes, and I am happy to be a part of it.

## Eve & Diana Moll

While Eve Moll is one of our Grateful Patients, together she and her mother, Diana Moll, make an awesome mother-daughter volunteer team! Here you can see the two of them putting the finishing touches on gifts for our 20th Anniversary Gala. These takeaway gifts are smaller representations of the large print Eve donated to our gala's silent auction, and thanks to this team's dedication, each gala attendee will leave our celebration with a gift inspired by Eve!

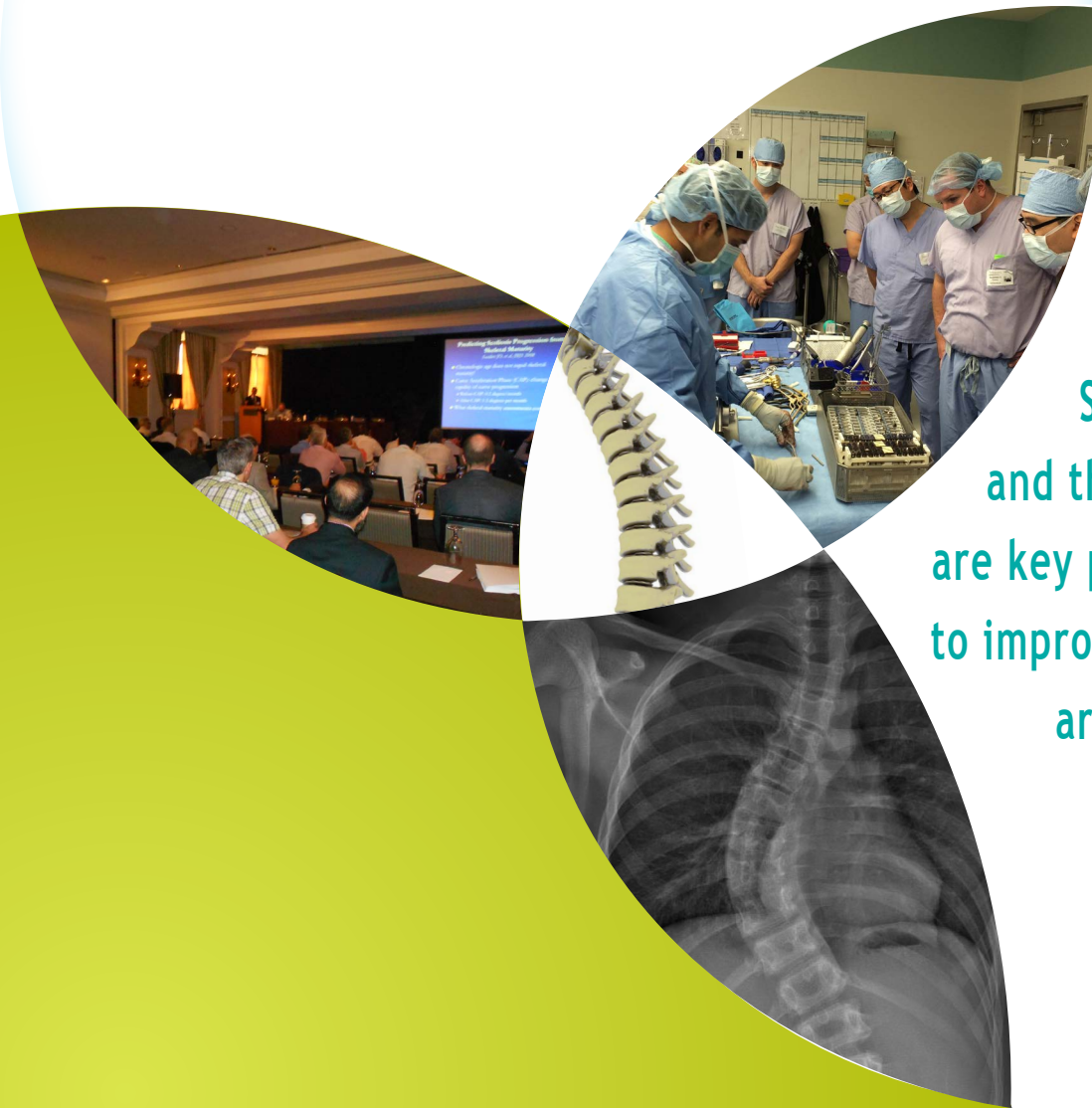


# HSG HARMS STUDY GROUP

*Pioneering Research in Spinal Deformities*

The Harms Study Group (HSG) is a worldwide cohort of surgeons who perform comprehensive, multi-center prospective research studies focused on pediatric spinal deformity. The Harms Study Group is the premier multi-center research group for pediatric spinal deformity, with nearly twenty years of productivity.

Through comprehensive, multi-center prospective research studies, questions regarding treatment approach and techniques, to achieve desired outcomes, are studied. All research is done with a commitment to be internationally recognized for the highest quality published research on new spinal deformity surgery techniques.



Setting  
Scoliosis Straight  
and the Harms Study Group  
are key partners in the mission  
to improve scoliosis treatment  
around the globe.





# EXECUTIVE MEMBERS



**Professor Jürgen Harms, M.D.**  
Chief of Spine Surgery at Klinik Heidelberg Germany; Founding Member of The Harms Study Group



**Peter O. Newton, M.D.**  
Chief of the Orthopaedic Division and the Scoliosis Service at Rady Children's Hospital in San Diego, California; Clinical Professor of Orthopaedic Surgery at the University of California, San Diego; Primary Coordinator for The Harms Study Group; SSSF Board Member



**Randal R. Betz, M.D.**  
Spine surgeon, The Institute for Spine & Scoliosis, Lawrenceville, NJ, Professor of Orthopaedic Surgery at Temple University School of Medicine; Founding Member of The Harms Study Group; SSSF Board Member



**Harry Shufflebarger, M.D.**  
Director, Division of Spinal Surgery, Department of Orthopedic Surgery, Miami Children's Hospital, Miami, Florida; SSSF Board Member



**Amer F. Samdani, M.D.**  
Director of the Spine Service at Shriners' Hospital for Children, Philadelphia, Pennsylvania; SSSF Board Member



**Michelle C. Marks, PT, M.A.**  
PT, MA: Research/Executive Director, Setting Scoliosis Straight Foundation; SSSF Board Member



**David Clements, M.D.**  
Professor of Orthopaedic Surgery and Neurosurgery, Cooper Medical School of Rowan University; Attending Surgeon, Shriners Hospital for Children-Philadelphia Unit; Founding Member of The Harms Study Group; SSSF Board Member

*“Being a part of HSG has allowed me to be mentored by and learn from the leaders in the field of scoliosis. From our discussions as a group we hear different perspectives on solving a particular problem, which when taken together, often result in a solution.”*

*- Amer F. Samdani, M.D.*

# RESEARCH PRODUCTIVITY

Year	Podium Presentations*	Poster Presentations*	Manuscripts Published^
2010	28	26	6
2011	27	34	14
2012	23	27	12
2013	22	16	14
2014	29	16	13

\*Total at AAOS, POSNA, IMAST, SRS, AACPDM, AAP, NASS; ^ in total peer reviewed journals

The Setting Scoliosis Straight Foundation and The Harms Study Group are strongly committed to educating others about adolescent spinal deformity. By sharing our research findings with health care providers and surgeons at international medical conferences and in international scientific journals, we can impact and improve the level of care for children with spinal deformities across the entire globe.

In 2014, The Harms Study Group presented a total of forty-five podiums and posters at medical conferences, and our members had a total of thirteen manuscripts published in scientific journals.



# 2014

## HSG Research Highlights

### Post-Operative Spinal Motion

#### **The Effect of Time after Surgery and Fusion Length on the Motion of the Unfused Lumbar Segments in Adolescent Idiopathic Scoliosis**

*This prospective study of 259 AIS patients assessed intervertebral motion in unfused segments of the spine. The impact of length of follow-up and length of fusion have on residual motion within the spine was compared. Length of follow-up did not effect residual motion, but longer fusions resulted in a significant increase of motion in unfused lumbar levels of the spine. This study found that unfused lumbar segments of the spine absorb the motion intended for the entire lumbar spine. This finding emphasizes the importance of limiting fusion levels whenever possible as shorter fusions allow motion to be distributed more evenly.*

#### **The Motion Sparing Benefits of Selective Thoracic Fusion for Adolescent Idiopathic Scoliosis**

*In this prospective study, the motion in the unfused distal segments in patients who had a shorter “selective” thoracic fusion was evaluated with attention to residual lumbar curve magnitude. In 136 patients, summed motion in the unfused segments and motion at the apex of the residual curve did not correlate with residual lumbar curve deformity. The motion sparing benefits of selective thoracic fusion was supported by the finding of unchanged mobility from any residual lumbar deformity.*

### Long Term Follow-up

#### **An Increasing Risk of Late Onset Infection in the Years after AIS Surgery**

*With data taken from a prospectively collected multi-center database, it was shown that the incidence of late infection a year after the initial surgery was 2.25%. However, the predicted probability of late infection increased with time to as high as 4.8% at ten years. More research is needed to reduce this risk.*

#### **Radiographic Markers of Disc Degeneration Following Surgery for Adolescent Idiopathic Scoliosis: a Ten Year Follow-up Evaluation**

*X-ray findings of disc degeneration were assessed in a 10 year follow-up study of operative AIS patients. Radiographs were assessed weeks after surgery then again at 2, 5, and 10 years after surgery. The earlier time points exhibited less degeneration; however, longer follow-up revealed increasing signs of degeneration. Investigation of the clinical implications of these findings is planned.*





# CEREBRAL PALSY STUDY

In 2008, The Harms Study Group launched a Prospective Study of Scoliosis in Children with Cerebral Palsy (CP), led by primary investigator, **Paul Sponseller, MD**, from Baltimore.

## HSG Research Highlights

### Goals and Indications for Surgery in Severe Pediatric Scoliosis Related to Cerebral Palsy

*Dr. Pat Cahill assessed the indications and goals of surgery reported by surgeons and compared them to the reported goals and indications from the patient caregivers. Surgeons and caregivers both reported the potential for improved sitting ability most often as an indication for surgery.*

### In Patients with CP Sitting Tolerance Improves after Surgery

*Dr. John Asghar found that preoperative sitting tolerance is significantly lower in patients requiring fusion for their Cerebral Palsy (CP) scoliosis than it is in a non-operative control group. Following surgical correction, the fused patients exhibit significant improvement at two years follow-up.*

### Restoring Sagittal Balance Improves Clinical Outcomes for Non-Ambulatory Cerebral Palsy Patients with Spinal Deformity

*Dr. Suken Shah revealed that in a population of nonambulatory children with cerebral palsy and spinal deformity, restoration of sagittal balance was associated with improved transfers, overall function, and higher caregiver satisfaction.*

109  
non-operative  
patients

Our research sites  
have enrolled CP patient  
since 2008. All patients  
are followed for two  
years from their  
surgery or  
baseline visit.

388  
operative patients



### **S1 Screws Are a Useful Adjunct to Iliac Screws in Long Paralytic Fusions to the Sacrum**

*Dr. Harry Shufflebarger found that the addition of S1 screws to iliac screws in neuromuscular fusions improves radiographic results in patients with Cerebral Palsy who underwent long posterior spinal fusion.*

### **Long-Term Follow up of Deep Surgical Site Infection after Spinal Fusion in Cerebral Palsy: Recurrence Rare, but Lower Health Related Quality of Life**

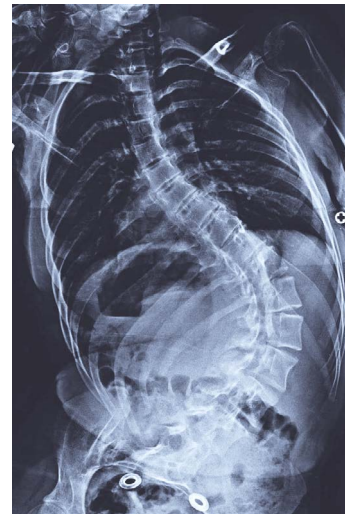
*Dr. Paul Sponseller found that deep surgical site infection after posterior spinal fusion in Cerebral Palsy has sustained resolution with prompt operative care. However, health related quality of life scores remain significantly lower than in patients without infection.*

### **The Pros and Cons of Operating Early vs Late in the Progression of CP Scoliosis**

*Dr. Burt Yaszay investigated the range of magnitude of curve deformity for the treatment of CP scoliosis and found that it varies considerably (40-144°). He demonstrated that operating on curves greater than 90° increased risks.*

### **PA X-ray of Cerebral Palsy Patient With Scoliosis**

Pre-Operative



Post-Operative



# 3D EVALUATION OF AIS

## The “3D Sagittal Profile” in Adolescent Idiopathic Scoliosis: Loss of Thoracic Kyphosis Revealed

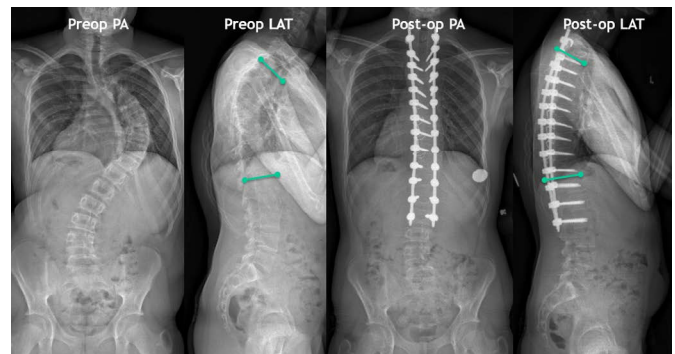
*Dr. Peter Newton* investigated the 3D sagittal profile of patients with adolescent idiopathic scoliosis (AIS) compared to an unaffected cohort and found a loss of thoracic kyphosis in both primary thoracic and primary lumbar curves as compared to non-AIS adolescents.



The spine on the right shows the significant loss of thoracic kyphosis in major thoracic AIS. This measurement of true 3D sagittal analysis requires a segmental assessment of each vertebrae.

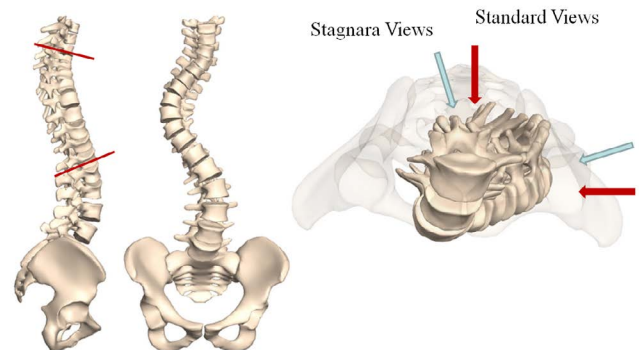
## 3D Analysis—The Truth About the “Hypokyphosing Effect of Pedicle Screws” in AIS

*Dr. Peter Newton* found that thoracic pedicle screws do not lordose the spine, per se. The thoracic spine in AIS is segmentally hypokyphotic (if not lordotic) especially at the apex, which can only be measured by a segmental 3D analysis. Posterior instrumentation with thoracic pedicle screws in this series of patients was associated with an average increase in thoracic kyphosis.



## A Three-Dimensional Analysis of Apical Lordosis Correction – The Role of the Ponte Osteotomy

The role of Ponte Osteotomies (PO) in correcting the apical lordosis of Adolescent Idiopathic Scoliosis (AIS) was demonstrated in a research study by *Dr. Peter Newton*, in which he analyzed 3D reconstructed images of 120 thoracic AIS patients scanned by EOS Imaging. The average increase in kyphosis achieved was 4-5° per level. More kyphosis was restored when more osteotomies were performed.



Scoliotic sagittal plane curvature with rotation of each vertebrae out of the standard sagittal plane.



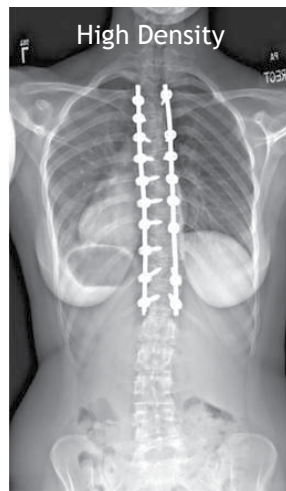
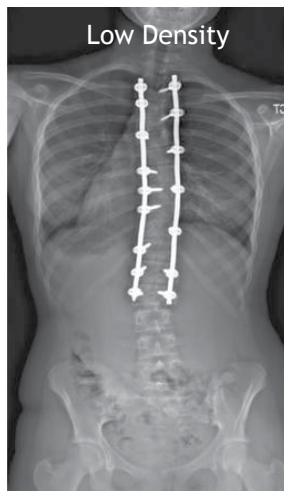
# AIS

## Factors Predicting When L3 is Not Distal Enough for an “Ideal” Result in thoracolumbar (Lenke 5) Curves

*Dr. Burt Yaszay found that the measurement of preop L3 translation was the most important predictor of success, with an L3 translation less than 3.5 cm being a potential threshold for selecting L3 as the end instrumented vertebra when choosing between L3 or L4 as and the distal end vertebrae for a thoracolumbar (Lenke 5) curve.*

## Higher Implant Density Does Not Result in Increased Curve Correction or Improved Clinical Outcomes in Adolescent Idiopathic Scoliosis

*Dr. Suken Shah found that there was no clinical or radiographic difference between high density and low density screw constructs in AIS. Should these results be further validated across many patients, curve patterns and long term outcomes, they would suggest that it is safe to use fewer pedicle screws. Additionally, this technique requires less surgical time, may have fewer complications (risks of malposition and bleeding), and has a lower cost.*



## Implementing a Dashboard Reporting Tool Improves Surgeon Performance and Patient Outcomes

*Dr. Ron Lehman found that the use of a Dashboard reporting tool to track performance resulted in “real-time” information that allowed surgeons to compare their outcomes with other surgeons performing the same operations. Tracking and reporting the variations resulted in over 60% of surgeons improving their operative times and decreasing blood loss in just one year. These reports provide valuable information that will ultimately reduce variation, advance quality and improve patient outcomes.*



# 2014 SCIENTIFIC PUBLICATIONS

1. Gaurav A, **Lonner B**, Toombs C, Sponseller PD, Samdani A, Betz RR, Shah SA, Newton PO. Preoperative Pulmonary Function in Patients with Operative Scheuermann's Kyphosis. *Spine Deform* 2(1):70-5, 2014.
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3. Carreau JH, Bastrom T, Petcharaporn M, Schulte C, Marks M, Illes T, Somoskeoy S, **Newton PO**. Computer-Generated, Three-Dimensional Spine Model from Biplanar Radiographs: a Validity Study in Idiopathic Scoliosis Curves Greater than 50 Degrees. *Spine Deform* 2(2):81-8, March 2014.
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# 2014 SCIENTIFIC PRESENTATIONS



## AAOS

2 podiums  
4 posters

## POSNA

5 podiums  
3 posters

## SRS

13 podiums  
7 posters

## IMAST

9 podiums  
2 posters



# CORE MEMBERS



Core members make significant contributions to the main studies of the group. Membership is by invitation of the Executive Committee. The five surgeon members of the Executive Committee are also Core Members of the HSG.



**Baron Lonner, M.D.**

Scoliosis Associates  
New York, New York



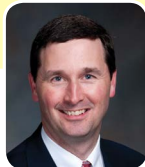
**Firoz Miyanji, M.D.**

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**Patrick J. Cahill, M.D.**

Shriners Hospital for Children  
Philadelphia, Pennsylvania



**Jack Flynn, M.D.**

Children's Hospital of Philadelphia  
Philadelphia, Pennsylvania



**Lawrence Lenke, M.D.**

St. Louis Children's Hospital  
St. Louis, Missouri



**Suken A. Shah, M.D.**

Alfred I. DuPont Hospital for Children  
Wilmington, Delaware



**Burt Yaszay, M.D.**

Rady Children's Hospital  
San Diego, California



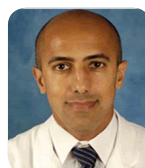
**Paul Sponseller, M.D.**

Johns Hopkins Hospital  
Baltimore, Maryland



**Hubert Labelle, M.D.**

St. Justine's Montreal Hospital  
Montreal, Canada



**John Asghar, M.D.**

Miami Children's Hospital  
Miami, Florida



**Stefan Parent, M.D., Ph.D.**

St-Justine Montreal Hospital  
Montreal, Canada

**HSG**  
**HARMS STUDY GROUP**  
*Pioneering Research in Spinal Deformities*



# ASSOCIATE MEMBERS

Associate Members, some of whom have served as Core Members, participate by contributing follow-up data on previously enrolled patients or by contributing patients to prospective studies.

**Alvin Crawford, M.D.**

Cincinnati Children's Hospital  
Cincinnati, Ohio

**Christopher Reilly, M.D.**

British Columbia Children's Hospital  
Vancouver, British Columbia, Canada

**Daniel J. Sucato, M.D.**

Texas Scottish Rite Hospital for Children  
Dallas, Texas

**Dennis Wenger, M.D.**

Rady Children's Hospital  
San Diego, California

**Jean-Marc Mac-Thiong, M.D.**

Ste-Justine Hospital.

**Jean Ouellet, M.D., FRCSC**

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**Lynn Letko, M.D.**

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Karlsbad Germany

**Mark Abel, M.D.**

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**Michael Kelly, M.D.**

Washington Univeristy School of Medicine  
Washington

**Michael O'Brien, M.D.**

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**Peter Sturm, M.D.**

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Cincinnati, Ohio

**Ronald A. Lehman, Jr., M.D.**

Washington University School of Medicine  
St Louis, Missouri

**Stewart K. Tucker, M.D., FRCS**

Royal National Orthopaedic Hospital  
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**Salil Upasani, M.D.**

Rady Children's Hospital  
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**Tom Errico, M.D.**

NYU Hospital for Joint Diseases  
New York, New York

*"The HSG allows the most creative minds and skilled surgeons involved in pediatric scoliosis treatment to dream about what the future might hold for their patients...and then go gather the information to validate their innovations and solutions. Scoliosis care is advanced by this collaborative group at a rate that would not be possible without it."*

- Peter O. Newton, M.D.

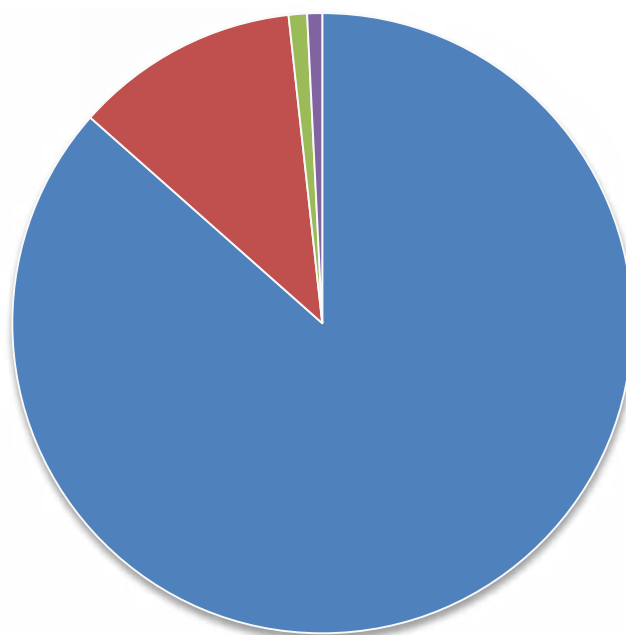
# FINANCIAL REPORT

Fiscal Year 2014

## Revenue and Support

■ Research & Consulting	\$1,210,907
■ Sponsorships & Contributions	\$164,043
■ Educational & Merchandise Income	\$13,419
■ Interest Revenue	\$10,919

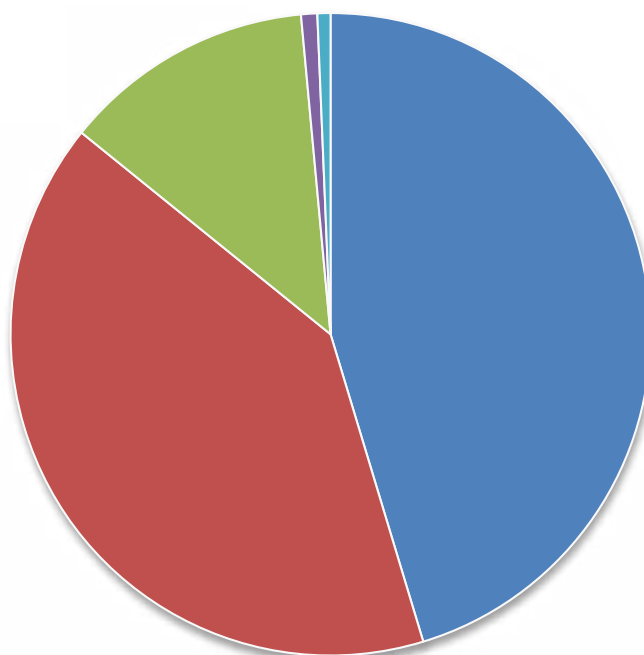
**\$1,399,288**



## Functional Expenses

■ Research Site Reimbursements	\$573,964
■ Research Coordination	\$512,662
■ Management & General	\$160,811
■ Educational Material	\$10,305
■ Fundraising	\$8,322

**\$1,266,064**





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Setting Scoliosis Straight and The Harms Study Group would like to acknowledge the critical research grant support received from:

***DePuy Synthes Spine, the Orthopaedic Research and Education Foundation, the Scoliosis Research Society, DePuy Synthes Spine Canada, and EOS imaging.***

Our mission to advance care for patients with spinal deformities worldwide has been greatly enhanced by their support of our shared goals. We are very appreciative of their support, and we thank them all!

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