

### Division Photo



**First Row:** V. Jain, E. Wall, J. Tamai. **Second Row:** S. Parikh, C. Mehlman, T. Do, D. Bylski-Austrow, A. Crawford

### Division Data Summary

#### Research and Training Details

Number of Faculty	9
Number of Research Fellows	1
Number of Support Personnel	35
Direct Annual Grant Support	\$11,984
Direct Annual Industry Support	\$171,993
Peer Reviewed Publications	14

#### Clinical Activities and Training

Number of Clinical Staff	14
Number of Clinical Fellows	30
Number of Clinical Students	4
Inpatient Encounters	1,555
Outpatient Encounters	32,040

## Faculty Members

**Eric Wall, MD**, Associate Professor ; *Director, Pediatric Orthopaedic Surgery; Director, Orthopaedic Sports Medicine; Director, Orthopaedic Research*

**Research Interests:** Scoliosis and Sports Medicine

**Alvin Crawford, MD**, Professor ; *Director, Spine Center and Fellowship Program*

**Research Interests:** Scoliosis and Neurofibromatosis

**Twee Do, MD, FAAP**, Assistant Professor ; *Director, Neuromuscular Services*

**Research Interests:** Neuromuscular

**A. Atiq Durrani, MD**, Assistant Professor ; *Co-Director of Spine Center; Director of Skeletal Developmental Biology Research Lab*

**Research Interests:** Spine and Bone Tumor

**Charles Mehlman, DO, MPH**, Associate Professor ; *Director, Musculoskeletal Outcomes Research, Pediatric Orthopaedic Resident Education, Brachial Plexus and Co-Director of the Limb Reconstruction Center*

**Research Interests:** Spine Bracing and Evidence-Based Medicine

**Shital Parikh, MD**, Assistant Professor

**Research Interests:** Sports Medicine

**Junichi Tamai, MD**, Assistant Professor ; *Director, Physician Assistant Program*

**Research Interests:** Process Improvement

**Diane Von Stein, MD**, Assistant Professor ; *Co-Director of Limb Reconstruction Center*

**Donita Bylski-Austrow, PhD**, Research Associate Professor ; *Director of Biomechanics Research*

**Research Interests:** Spine Biomechanics

## Clinical Staff Members

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- Lance Bolin, PA-C
- Angela Kramig, PA-C
- Adriana Reinersman, PA-C
- Mary Pam Pfiester, PA-C
- Steven Wurzelbacher, PA-C
- Hillary McClung, PA-C

## Trainees

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- Moh'd Alfawareh, MD, Fellow, UTMB Galveston, TX
- Shannon Antekeier, MD, Fellow, University of Louisville, Louisville, KY
- Clint Basener, DO, PGY-IV, Oklahoma State University Medical Center, Tulsa, OK
- Ali Behboudi, DO, PGY-III, Firelands Regional Medical Center, Sandusky, OH
- Syndhir Belagaje, MD, PGY-II, University of Cincinnati, Orthopaedics, Cincinnati, OH
- Albert Chavanne, MD, Fellow, Medical School at University of Vienna, Austria
- Adam Cote, DO, PGY-IV, Ingham Regional Medical Center, Langsham, MI
- Dennis Cramer, DO, Fellow, Arrowhead Regional Medical Center, Colton, CA
- Chitra Dahia, PhD, Fellow, India Institute of Science of Bangalore, India
- Thad Dean, DO, Intern, Grandview Hospital Medical Center, Dayton, OH
- Rasesh Desai, MD, Fellow, VS Hospital NHL, MMC, India
- Nathan Donaldson, DO, Intern, Grandview Hospital Medical Center, Dayton, OH
- Dave Eichten, DO, Intern, Grandview Hospital Medical Center, Dayton, OH
- Andrew Farber, DO, PGY-III, Peninsula Medical Center, Far Rockaway, NY
- Aaron Florence, DO, PGY-IV, Peninsula Medical Center, Far Rockaway, NY
- Steve Gammon, MD, PGY-II, University of Cincinnati, Orthopaedics, Cincinnati, OH
- Michael Greiwe, MD, PGY-IV, University of Cincinnati, Orthopaedics, Cincinnati, OH
- Joseph Hubbard, DO, PGY-IV, Ingham Regional Medical Center, Langsham, MI
- Viral Jain, MD, Fellow, Medical College Baroda F.F.G. Hospital, Vadovar, India
- Todd Kelly, MD, PGY-IV, University of Cincinnati, Orthopaedics, Cincinnati, OH
- Jason Kinkartz, MD, PGY-II, University of Cincinnati, Orthopaedics, Cincinnati, OH
- Michael Leslie, DO, PGY-IV, Peninsula Medical Center, Far Rockaway, NY
- Kevin Little, MD, PGY-IV, University of Cincinnati, Orthopaedics, Cincinnati, OH
- Taruna Madhav, MD, PGY-IV, University of Cincinnati, Orthopaedics, Cincinnati, OH
- Shahab Mahboubian, DO, PGY-III, Peninsula Medical Center, Far Rockaway, NY
- Robert Marsh, DO, PGY-IV, Ingham Regional Medical Center, Langsham, MI

- **Richard Owens, MD**, PGY-IV, University of Cincinnati, Orthopaedics, Cincinnati, OH
- **Scott Rainey, DO**, PGY-IV, St. Joseph Health Center, Warren, OH
- **Mario Sablan, DO**, PGY-IV, Peninsula Medical Center, Far Rockaway, NY
- **Steven Sands, DO**, PGY-IV, Oklahoma State University Medical Center, Tulsa, OK
- **Vivek Sharma, MD**, Fellow, GS Medical College and KEM Hospital Program, University of Mumbai, Mumbai, India
- **Ross Sherban, DO**, PGY-IV, Henry Ford Malcomb Hospital, Warren, MI
- **Richard Stanley, DO**, PGY-IV, Henry Ford Malcomb Hospital, Warren, MI
- **Lydia White, MD**, PGY-II, University of Cincinnati, Orthopaedics, Cincinnati, OH

## Significant Accomplishments in FY08

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### Outpatient Clinical Performance Improvement

Performance improvement efforts result in reduced orthopaedic outpatient office visit wait times by an average of 20 minutes per patient.

### New Developments in Spine Growth Implant

A new spine growth implant developed at Cincinnati Children's is undergoing FDA review. If approved, a multi-center trial could begin within the next year to study a new, minimally invasive method of scoliosis correction that does not require a spine fusion. Currently there are no FDA approved devices designed to guide the growth of the spine in children with scoliosis.

### New Developments in ACL Reconstruction for the Young Athlete.

Physicians at Cincinnati Children's developed and presented a new surgical technique of anatomic ACL reconstruction for very young athletes that does not violate the growth plates

## Significant Publications in FY08

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**Wall EJ, Jain V, Vora V, Mehlman CT, Crawford AH: Complication of titanium and stainless steel elastic nail fixation of pediatric femoral fractures. J Bone Joint Surg Am. 2008; 90:1305-13.**

Found superior results with stainless steel flexible nails versus titanium. Has led to reintroduction of stainless steel flexible nails in the US market.

**Okike K, Kocher MS, Mehlman CT, Heckman JD, Bhandari M: Publication bias in orthopaedic research: an analysis of scientific factors associated with publication in the Journal of Bone and Joint Surgery (American Volume). J Bone Joint Surg Am. 2008 Mar;90(3):595-601**

No evidence of publication bias found in top tier orthopaedic journal.

**Vora V, Crawford A, Babekir N, Boachie-Adjei O, Lenke L, Peskin M, Charles G, and Kim Y: A Pedicle Screw Construct Gives and Enhanced Posterior Correction of Adolescent Idiopathic Scoliosis When Compared with Other Constructs. Spine 2007;32(17):1869-1874.**

Found equivalent correction of scoliosis with a cost-effective implant. The article compares a matched series of patients operated by three internationally respected spinal deformity surgeons. These authors were able to demonstrate safe effective correction of scoliosis with implants costing several thousand dollars per patient less than pedicle screws without risk of spinal cord injury. No patient required expensive synthetic or genetically engineered bone graft substitutes and there were no pseudoarthrosis. Their coronal plane correction was better.

## Division Highlights

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### Alvin H. Crawford, MD

**Scoliosis Outcomes Database Registry: A Prospective, Multi-Center Database Registry of the DePuy Spine Harms Study Group.** Comprised of 12 sites and 18 surgeon members to analyze the long-term outcomes of surgical treatment of idiopathic scoliosis of all curve patterns treated by either anterior or posterior procedures.

### Alvin H. Crawford, MD

**Genetic Evaluation for the Scoliosis Gene(s) in Patients with Neurofibromatosis 1 Scoliosis. Consultant.** This study is being conducted by Dr. David Polly at the University of Minnesota. The purpose of this study is to find out if

there is something in these genes that cause spinal deformity in NF1 patients.

#### **Alvin H. Crawford, MD and Eric J. Wall, MD**

**Dual Rod Instrumentation with Limited Fusion for the Treatment of Progressive Early Onset Scoliosis.** This is a Prospective, Multi-center study out of the San Diego Center for Spinal Disorders will evaluate the efficacy and safety of the dual rod technique in achieving and maintaining scoliosis curve correction and allowing additional spinal growth in a larger patient population.

#### **Eric J. Wall, MD and Shital Parikh, MD**

**Is Juvenile Osteochondritis Dissecans a Growth Arrest of the Secondary Ossification Center?** The purpose of this study is to develop an animal model to examine the effects of injury to the secondary growth plate of the distal femur and its potential for causing JOCD. Drs. Tal Laor and Eric Wall of Cincinnati Children's Hospital recently uncovered a positive correlation between abnormalities in the physis around the secondary ossification center of the epiphysis and presence of JOCD. Better insight into the etiology and mechanism of JOCD would likely result in a rationale for both non-operative and operative treatment.

#### **Orthopaedic Research Laboratory; Donita Bylski-Austrow, PhD, David Glos, RAIV, Sherrie Powers, CRC**

**Verified efficacy of spine growth modulation device in independent, FDA-GLP laboratory.** Collaboration: SpineForm.

**Determined mechanism of action of growth modulation device on the structure of tissues and cells of the vertebral growth plate.** Collaboration: CCHMC Pathology

**Defined major differences between human and quadruped model in spine physiological dynamic biomechanics in vivo.** Collaboration: CCHRF Veterinary Services, UC ECE.

**Determined the effect of spine growth modification device on the initial biomechanical properties of the spine.** Collaboration: UC WISE.

**Designed and fabricated system to determine effects of repetitive biomechanical stress overloads on bone growth in the pediatric knee.** Collaborations: CCHRF Vet Services, CCHRF Imaging Research Center, CCHMC Radiology, CCHMC Pathology, UC Orthopaedics, OREF.

#### **Charles T. Mehlman, DO, MPH**

**Bracing in Adolescent Idiopathic Scoliosis Clinical Trial (BrAIST).** A Multi-center site for an NIH funded randomized controlled study to determine the effectiveness of bracing for idiopathic scoliosis.

### **Division Collaboration**

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#### **Collaboration with Orthopaedic Surgery; Human Genetics**

##### **Collaborating Faculty: Alvin H. Crawford, MD; Elizabeth Schorry, MD**

**Spinal Abnormalities in Neurofibromatosis Type1.** NIH funded study based out of the University of Utah.

#### **Collaboration with Orthopaedic Surgery; Human Genetics; Physical Medicine and Rehabilitation; Pulmonary; Neurosurgery**

##### **Collaborating Faculty: Alvin H. Crawford, MD**

**The Spine Center.** Evaluating the effects of scoliotic deformities on pulmonary functions.

#### **Collaboration with Orthopaedic Surgery; Developmental Biology**

##### **Collaborating Faculty: A.A Durrani, MD; Christopher Wylie, PhD**

**Spinal Deformity Related Projects:** Local biochemical regulation of physal growth in a mouse model, spatial and temporal mapping of the various zones of vertebral growth plate delineating the site and mode of action of various locally produced ligands, their receptors, activated pathways and the genes expressed during longitudinal bone growth in a mouse model, identification of the biomechanical and the genetic signal for termination of vertebral growth in a mouse model, correction of spinal deformity by modulation of vertebral growth through delivery of local growth in a rabbit model.

**Intervertebral Disc Projects:** Spatial and temporal mapping of the various ligands, their receptors, activated pathways and the genes expressed in the intervertebral disc during physiological aging in a mouse, effect of removal of nucleus pulposus cells on the annulus fibrosis in the intervertebral disc, use of biological growth factors in



restoration of intervertebral disc.

### Collaboration with Orthopaedics; Hematology/Oncology

**Collaborating Faculty:** A.A. Durrani, MD; Timothy Cripe, MD

**Musculoskeletal Oncology Related Projects:** Expression of vascular markers in aneurysmal bone cysts and their correlation to clinical response and correlation of gene expression to clinical outcome in various sarcomas using the Tumor tissue bank.

### Collaboration with Orthopaedics; Physical Medicine and Rehabilitation; Plastic Surgery

**Collaborating Faculty:** Charles T. Mehlman, DO, MPH & Susan Foad, MPH; Linda Michaud, MD; Kevin Yakuboff, MD

**Brachial Plexus Birth Palsy (BPBP):** Multi-center prospective research study to determine the optimal age for microvascular repair of infants with brachial plexus birth palsy and persistent upper extremity weakness; compare the functional outcome of patients undergoing early microscopic repair versus late reconstructive surgery versus late reconstructive surgery alone; and determine the natural history of neurologic recovery in patients with BPBP.

### Collaboration with Orthopaedics; Radiology; Sports Medicine BioDynamics

**Collaborating Faculty:** Eric J. Wall, MD; Tal Laor, MD; Jon Divine, MD

**MRI Findings of Iliac Crest Apophysitis:** Described MRI Findings of children with iliac crest apophysitis.

### Collaboration with Orthopaedics; Radiology; Sports Medicine BioDynamics; Epidemiology

**Collaborating Faculty:** Eric J. Wall, MD; Kathy Emery, MD; Jon Divine, MD, Tim Hewett, PhD, and Greg Myer, MS; Nick Todd, PhD

**Predictive Model for Healing in Juvenile Osteochondritis Dissecans.** Developed nomogram to predict healing response for children with JOCD to heal after six months of nonoperative treatment. Accepted for publication in top tier orthopaedic journal (JBJS; December 2008).

## Mentions in Consumer Media

- [Eric J. Wall, M.D. - Pack Safety Should Be on Back-to-School Lists: Orthopedic doctor offers tips on how to choose and use the proper backpack.](#) Health.USnews.Com , Web Site
- [Eric J. Wall, MD - Every Day Ergonomics- Avoid backpack attacks.](#) Disney Family.com , Web Site

## Division Publications

1. Crawford AH, Herrera-Soto J. [Scoliosis associated with neurofibromatosis](#) . *Orthop Clin North Am.* 2007; 38: 553-62, vii.
2. Herrera-Soto JA, Lewis R, Nosir HR, Crawford AH. [The use of multiple anchors for the treatment of idiopathic scoliosis](#) . *Spine.* 2007; 32: E517-22.
3. Lonner BS, Newton P, Betz R, Scharf C, O'Brien M, Sponseller P, Lenke L, Crawford A, Lowe T, Letko L, Harms J, Shuffelbarger H. [Operative management of Scheuermann's kyphosis in 78 patients: radiographic outcomes, complications, and technique](#) . *Spine.* 2007; 32: 2644-52.
4. Stevenson DA, Viskochil DH, Schorry EK, Crawford AH, D'Astous J, Murray KA, Friedman JM, Armstrong L, Carey JC. [The use of anterolateral bowing of the lower leg in the diagnostic criteria for neurofibromatosis type 1](#) . *Genet Med.* 2007; 9: 409-12.
5. Foad SL, Mehlman CT, Ying J. [The epidemiology of neonatal brachial plexus palsy in the United States](#) . *J Bone Joint Surg Am.* 2008; 90: 1258-64.
6. Mehlman CT, Bishai SK. [Tibial nails for femoral shaft fractures in large adolescents with open femoral physes](#) . *J Trauma.* 2007; 63: 424-8.
7. Mehlman CT, Koepplinger ME. [Hyphenated history: the Sever-L'Episcopo procedure](#) . *J Pediatr Orthop.* 2007; 27: 533-6.
8. Okike K, Kocher MS, Mehlman CT, Bhandari M. [Industry-sponsored research](#) . *Injury.* 2008; 39: 666-80.
9. Okike K, Kocher MS, Mehlman CT, Heckman JD, Bhandari M. [Publication bias in orthopaedic research: an analysis of scientific factors associated with publication in the Journal of Bone and Joint Surgery \(American Volume\)](#) . *J Bone Joint Surg Am.* 2008; 90: 595-601.
10. Shea KG, Scanlan KJ, Nilsson KJ, Wilson B, Mehlman CT. [Interstate variability of the statute of limitations for medical liability: a cause for concern?](#) . *J Pediatr Orthop.* 2008; 28: 370-4.
11. Srivastava AK, Mehlman CT, Wall EJ, Do TT. [Elastic stable intramedullary nailing of tibial shaft fractures in](#)

[children](#). *J Pediatr Orthop*. 2008; 28: 152-8.

12. Hebert KJ, Laor T, Divine JG, Emery KH, Wall EJ. [MRI appearance of chronic stress injury of the iliac crest apophysis in adolescent athletes](#). *AJR Am J Roentgenol*. 2008; 190: 1487-91.
13. Lebolt JR, Wall EJ. [Retroarticular drilling and bone grafting of juvenile osteochondritis dissecans of the knee](#). *Arthroscopy*. 2007; 23: 794 e1-4.
14. Wall EJ, Jain V, Vora V, Mehlman CT, Crawford AH. [Complications of titanium and stainless steel elastic nail fixation of pediatric femoral fractures](#). *J Bone Joint Surg Am*. 2008; 90: 1305-13.

## Grants, Contracts, and Industry Agreements

### Grant and Contract Awards

### Annual Direct / Project Period Direct

#### Mehlman, C

##### Bracing in Adolescent Idiopathic Scoliosis

National Institutes of Health (University of Iowa)

R01 AR 052113

09/01/06 - 08/31/11

\$11,894 / \$45,242

#### Current Year Direct

**\$11,984**

### Industry Contracts

#### Crawford, A

DePuy AcroMed

\$ 19,703

#### Durrani, A

Synthes Spine

\$ 17,500

Medtronic Sofamor Danek

\$ 60,000

DePuy Spine

\$ 74,790

#### Current Year Direct Receipts

**\$171,993**

**Total \$183,887**