PEDIATRIC ORTHOPAEDIC SOCIETY OF NORTH AMERICA's

Resident REVIEW

CUTTING EDGE ORTHOPAEDIC INFORMATION ENHANCING RESIDENT EDUCATION

January 2009

From the Editor,
Kenneth Noonan, MD

Welcome to the initial Edition of Pediatric Orthopaedic Society of North America's of the "***POSNA Resident Review***" a publication with the dual mission of education and exposure of pediatric orthopaedics to North American Orthopaedic residents. In this edition and in succeeding editions, the editorial board will present educational material in the form of test questions. Items are taken from standardized Tests and answered by our expert panel. In the current edition, six trauma questions from the AAOS Trauma Self Assessment Examination are presented for your study.

In this edition, an overview of pediatric orthopaedics is also presented for your reflection. In future editions of *POSNA Resident Review* the editorial board will present important topics such as economics of Pediatric Orthopaedics and Pediatric Orthopaedic outreach in third world countries to name a few. The members of POSNA hope that this biannual publication will be a valuable resource for study and exposure to pediatric orthopaedics.

Challenging Cases: What Would You Do?

CASE #1

A 4-year-old child suffers an elbow injury depicted in Figures 1a and 1b. The most likely complication resulting from this fracture treated in a cast is:

1. **Elbow stiffness**
2. **Nonunion**
3. **Avascular necrosis**
4. **Varus malunion from overgrowth**
5. **Fishtail deformity**

Your Response: ___

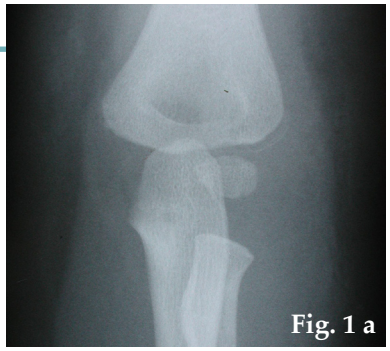

Fig. 1 a

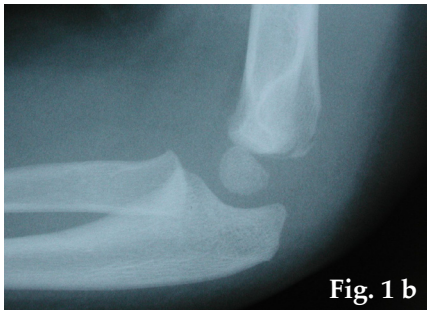

Fig. 1 b

Discussion

The radiographs demonstrate a lateral condyle fracture with 2 mm of displacement. As opposed to other pediatric elbow fractures, lateral condyle fractures have a higher incidence of nonunion. This may be due to minimal metaphyseal bone on the distal fragment, the intra-articular nature of the fracture, or from further displacement when treated conservatively. These fractures with greater than 2 mm of displacement should be treated with reduction and stabilization. Avascular necrosis and fishtail deformity may be seen in very rare cases of lateral condyle fractures. The incidence is certainly less than the rates of nonunion seen in non-operatively treated fractures with greater than 2 mm of displacement. Varus malunion from overgrowth and elbow stiffness are more likely seen in fractures treated operatively.

References

1: Pirker ME, Weinberg AM, Hollwarth ME, Haberlik A. Subsequent displacement of initially nondisplaced and minimally displaced fractures of the lateral humeral condyle in children. *J Trauma.* 2005 Jun;58(6):1202-7.

2: Finnbogason T, Karlsson G, Lindberg L, Mortensson W. Nondisplaced and minimally displaced fractures of the lateral humeral condyle in children: a prospective radiographic investigation of fracture stability. *J Pediatr Orthop.* 1995 Jul-Aug;15(4):422-5.

3: Flynn JC. Nonunion of slightly displaced fractures of the lateral humeral condyle in children: an update. *J Pediatr Orthop.* 1989 Nov-Dec;9(6):691-6

Preferred response: 2.

Continued on page 3

A Personal and Thoughtful Interview with Dr. Alvin Crawford

Briefly describe where you were born and raised and if there were any significant experiences or exposures that led you to consider medicine as a career?

Born in Memphis, Tennessee, I grew up in an unbelievably happy childhood. It was mostly my brother, my sister, and my self being raised by a single parent.

My first to exposure to the medical field specifically muscular skeletal was in the 2nd grade. There was an exam given in which the highest score would be given a free ticket to the afternoon football game at the high school. I was able to get the ticket, however there were issues. In a rush to get home on time, I took off from the stadium paying no attention to cars or traffic and as a result I underwent a rapid deceleration of my running speed by an automobile. I was hit by a car, rendered unconscious and taken to the city hospital. A patella fracture and a concussion was the extent of my injuries. I recovered from that very well and had no other exposure to the medical profession.

An interesting thing occurred in my sophomore year in high school. I tested out of high school and was the recipient of a Ford foundation scholarship to college. However, because of our financial straights, I was not able to attend. Upon graduating high school, I attended Tennessee State University, majoring in music. After my freshman year, I went into physics which allowed me to have an unstructured curriculum in science. At my brother's suggestion, I decided to apply to medical school.

Briefly describe where your college and medical school training was and what extracurricular activities did you participate in during this training period.

After 3 years at Tennessee State University, I was accepted into Meharry Medical College. At that time (1960), I would not have been able to attend the University of Tennessee College of Medicine based on pigment alone. Because the finances were much more acceptable to attend the state university than Meharry Medical College, which was a private medical school, I applied to the University of Tennessee College of Medicine and was accepted as the first American of African descent in a south eastern conference medical school.

Did you serve in the military as a physician?

During my sophomore year, I entered the US Navy senior medical student program which allowed for me to spend vacations on active duty in the US navy as well as to receive pay for my entire senior year. I also received a National Medical Sloan Foundation grant while in medical school to further help unload financial responsibilities. One of my navy tours of duty during my sophomore year in medical school was in the fall of 1962 at Bethesda Naval Hospital. I remained in the navy on active duty and reserve for approximately 33 years and retired as a senior captain.

Where did you do your residency and fellowship training and with whom did you train that would be considered notable?

I started my residence at the Boston naval hospital in Chelsea, Massachusetts. The orthopaedic residency was only 3 years at that time and after my first year, I did rotations at the Massachusetts General Hospital as well as the Boston City Hospital. During that time, my commanding officer, Dr. John Howard saw fit to recommend me for completion of my training in the combined Harvard Program. Subsequently, I was an Aufranc fellow with Dr. Otto Aufranc who was a pioneer in cup or mold arthroplasty of the hip, the predecessor to total joint arthroplasty. He has to be one of

Dr. and Mrs. Alvin Crawford

the most significant figures that I ever worked for or worked with. His teachings of handling tissue and his surgical expertise, based on knowledge of the anatomy has never left me to this day. Following my residency I was accepted as a fellow at the Boston Children's Hospital under Arthur Pappas. Arthur Pappas was a hard working pediatric orthopedist, very knowledgeable and one of the last of the Bill Greene disciples. Dr. Greene, considered by northerners to be the father of pediatric orthopaedics was actually around at the time of my fellowship but had very little involvement in the program. At the end of my fellowship, Dr. John Hall came to Boston. Although I had a very brief personal interaction and experience with him, I've since gotten to know him very well and he has been a very strong mentor in helping me to develop my career.

Following my fellowship, I was assigned to the naval hospital San Diego. Possibly one of the most unique experiences in my life. I was able to develop a pediatric orthopaedic service at a very, very young age. We had pretty much of a draw for the entire western half of the United States. John Anthony "Tony" Herring who had been a junior resident under me was a Berry Plan deferred resident with an obligation to the military. We were able to convince the commanding officer at San Diego that he would be extremely valuable in a setting up of the pediatric orthopaedic service and as a result Tony came in and we spent two wonderful years together. It was during that time that I received the Orthopaedic

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CASE #2

A 9-year-old boy falls from a scooter and suffers the injury in Figure 2. After closed reduction and cast immobilization, the most likely complication that can result is a:

1. **Growth arrest of the distal ulna**
2. **Growth arrest of the distal radius**
3. **Compartment syndrome**
4. **Radio-ulna synostosis**
5. **Entrapment of the EPL tendon**

Your Response: ___

Discussion

The radiographs demonstrate a fracture of the distal radius and ulna physis. The most likely complication will be growth arrest of the distal ulna. In contradistinction to physis fractures of the radius (growth arrest incidence <5%); the incidence of growth arrest in the ulna is between 30 and 40%. And entrapment of the EPL tendon and cross union between the two bones is extremely rare.

References

1: Vanheest A.
Wrist deformities after fracture.
Hand Clin. 2006 Feb;22(1):113-20.
2: Cannata G, De Maio F, Mancini F, Ippolito E.
Physeal fractures of the distal radius and ulna: long-term prognosis.
J Orthop Trauma. 2003 Mar;17(3): 172-9; discussion 179-80.
3: Ray TD, Tessler RH, Dell PC.
Traumatic ulnar physeal arrest after distal forearm fractures in children.
J Pediatr Orthop. 1996 Mar-Apr;16(2):195-200.

CASE #3

A 10-year-old boy injures his knee playing foot ball (Figure 3). The optimal method of initial treatment is:

1. **Closed reduction and casting**
2. **Flexible nailing**
3. **Blade plate fixation**
4. **Anatomic reduction and smooth pin fixation with supplemental casting**
5. **Open or closed reduction and screw fixation**

Your Response: ___


Fig. 3

Discussion

Salter I fractures of the distal femur are quite unstable, as such closed reduction and cast immobilization can be expected to have high rates of re-displacement. Optimal treatment consists of open or closed reduction and smooth pin fixation. Screw fixation may increase rates of growth plate injury and the supplemental casting is required to ensure fracture stability. Blade plate or flexible nail fixation will be challenging to apply and not necessary.

References

1: Flynn JM, Skaggs DL, Sponseller PD, Ganley TJ, Kay RM, Leitch KK.
The surgical management of pediatric fractures of the lower extremity.
Instr Course Lect. 2003;52: 647-59. *Review.*
2: Thomson JD, Stricker SJ, Williams MM.
Fractures of the distal femoral epiphyseal plate.
J Pediatr Orthop. 1995 Jul-Aug;15(4):474-8.
3: Edwards PH Jr, Grana WA.
Physeal Fractures About the Knee.
J Am Acad Orthop Surg. 1995 Mar;3(2):63-69.

Preferred response: 4.


Fig. 2

4: Aminian A, Schoenecker PL.
Premature closure of the distal radial physis after fracture of the distal radial metaphysis.
J Pediatr Orthop. 1995 Jul-Aug;15(4):495-8.

Preferred response: 1.

CASE #4

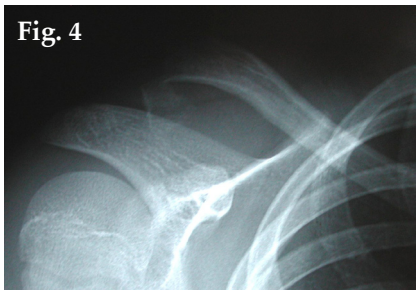
Fig. 4

A 12-year-old boy falls from a bicycle. Radiographs of his injured shoulder are seen in Figure 4. The optimal method of treatment is:

1. **Suture of the corococlavicular ligament**
2. **Temporary plate fixation across the AC joint**
3. **Immobilization in a shoulder spica cast**
4. **Sling immobilization**
5. **Reduction and temporary intramedullary fixation across the AC joint**

Your Response: ___

Discussion

The radiographs demonstrate a distal clavicle fracture. In children a periosteal sleeve will remain attached to

Continued on page 5

A Career in Pediatric Orthopaedic Surgery

by the Pediatric Orthopaedic Workforce Committee

BOTH CHALLENCING AND REWARDING

During their careers as doctors, pediatric orthopaedic surgeons typically appreciate great professional and personal satisfaction that comes from the many different ways in which they positively affect the lives of their patients. A master craftsman, the pediatric orthopaedic surgeon corrects so many different musculoskeletal deformities by a variety of treatment methods. More often than not, the outcome of the pediatric orthopaedic surgeon's interventions in childhood effects a lifetime improvement in the quality of function for the patient. Young patients are so very resilient. Following a successful orthopaedic intervention, they often return seeking additional care in hopes of addressing new or ongoing disabling musculoskeletal deformities. Such successes in the care of musculoskeletal pathology of the young patient encourages the surgeon. Long term relationships develop through the management of these patients. Given our high degree of work satisfaction, we typically become very committed/involved to our work and our patients.

VARIETY/LOGISTICS OF PRACTICE

The broad scope of practice of a pediatric orthopedic surgeon includes treating musculoskeletal deformities/pathologies secondary to a variety of etiologies across a wide age range (infants, children and adolescents/young adults). Pediatric orthopaedics provides unique challenges on a daily basis. Pediatric orthopaedic surgeons have the potential to do surgery on many different body areas. In our daily practice we typically utilize a wide range of treating options including manipulation, casting, bracing, as well as surgery in providing definitive comprehensive care for our patients. We indeed are orthopedic surgical generalists for our patients. The variety of our encounters and the ongoing evolution of treatment technique provides us with the opportunity for potential mastery in dealing with challenging musculoskeletal pathologies. As in any trade, expertise comes from practice; we accept more complex challenges as we acquire greater surgical skills. There has been remarkable evolution/refinement in surgical technique in all areas of pediatric orthopaedic surgery. For many, specialization within pediatric orthopaedic surgery has occurred over the course of our careers. Current possibilities for sub-specialization in pediatric orthopaedic surgery includes spine, upper extremity, lower extremity, foot, neuromuscular, sports, joint preservation and surgical oncology to name a few.

PRACTICE SETTINGS AND OPPORTUNITIES

Both the clinical setting and practice profile of the pediatric orthopaedic surgeon in North America is quite variable. Many practice as part of a group of orthopaedic surgical subspecialists either in private practice or as the Orthopaedic Department of a university. Others practice in groups of pediatric orthopaedic surgeons, again possibly in private practice, or as part of an Orthopaedic Department or perhaps as a full-time employee at a system of hospitals (unique to pediatric orthopaedic surgery). Many pediatric orthopaedic surgeons select solo practice in either large or small communities. Pediatric orthopaedic surgeons understandably often are closely associated with a children's hospital. The children's hospital professional staff both encourages and enables caregivers to provide not only state of the art, but often new and innovative treatments for many of the numerous pathologies for which we provide care. Many of the possible practice settings for the pediatric orthopedic surgeon provide an appropriate setting for both teaching clinical and/or basic science research.

There is not a subspecialty certification process for pediatric orthopaedic surgery although most practicing pediatric orthopaedic surgeons have completed at least one year of fellowship training. Accreditation of fellowships is voluntary and is supervised by the Accreditation Council for Graduate Medical Education(ACGME). Typically, the pediatric orthopaedic surgical fellowship interview selection process occurs in the Fall. Potential candidates must be in at least their PGY4 year of orthopaedic training. There are many more pediatric orthopaedic fellowship positions than applicants to fill them. Currently, there is no formal matching program for pediatric orthopaedic surgery. During the interview process for fellowships in pediatric orthopaedic surgery and upon completing your fellowship, you will find that orthopaedic surgeons are in great demand throughout North America. Many practice opportunities will be available to you in all of the above described practice settings.

CASE #4, *continued*

the intact corococlavicular ligament. As such remodeling can be expected. Therefore nonoperative treatment with a sling is preferred. Surgical treatment is not necessary, and a shoulder spica cast offers no advantage over simple sling.

References

1: Bishop JY, Flatow EL. Pediatric shoulder trauma. *Clin Orthop Relat Res.* 2005 Mar;(432):41-8. Review.

Preferred response: 4.

CASE #5

A 9-year-old child injures her ankle on a skateboard and suffers a tibia and fibula fracture (Figure 5a and b). She undergoes open reduction in internal fixation. Follow-up radiographs 1.5 years later (Figure 5c and d), demonstrate:

1. **Growth arrest of the fibula**
2. **Growth arrest of the tibia**
3. **No sign of growth arrest**
4. **Early arthritis of the ankle**
5. **Loosening of the implant**

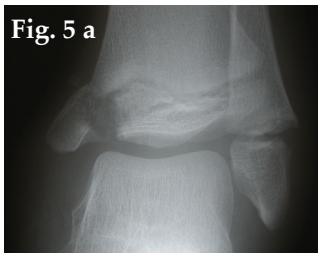
Fig. 5 a


Fig. 5 b

Discussion

Intra-articular pediatric ankle fractures need to be anatomically reduced in order to decrease the incidence of post traumatic arthritis, as well as growth arrest. Salter Harris III fractures of the distal tibia has a high rate of

CASE #5, *continued*

growth arrest secondary to the crush mechanism, which causes the fracture. In this patient, symmetric growth arrest lines are present in the distal tibia suggesting symmetric growth of the growth plate. The fibula growth plate is opened and is present at the level ankle mortise. No sign of growth arrest, angular deformity or early osteoarthritis is seen.

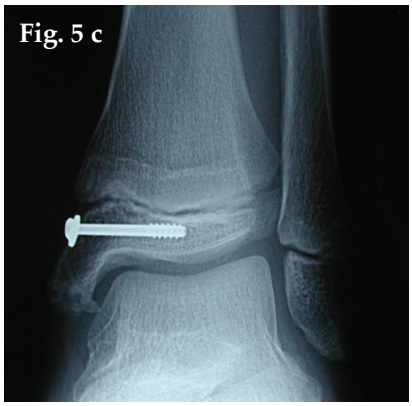
Fig. 5 c


Fig. 5 d

References

1: Flynn JM, Skaggs DL, Sponseller PD, Ganley TJ, Kay RM, Leitch KK. The surgical management of pediatric fractures of the lower extremity. *Instr Course Lect.* 2003;52:647-59.
2: Kay RM, Matthys GA. Pediatric ankle fractures: evaluation and treatment. *J Am Acad Orthop Surg.* 2001 Jul-Aug;9(4):268-78.
3: Sullivan JA. Ankle and foot injuries in the pediatric athlete. *Instr Course Lect.* 1993;42:545-51. Review.

Preferred response: 3.

CASE #6

A 15 year old boy feels a pop and knee pain after an awkward landing during a basketball game (Figure 6). The most significant complication that may ensue from closed treatment is:

1. **Genu recurvatum**
2. **Quadriceps contracture**
3. **Anterior compartment syndrome**
4. **Persistent anterior knee pain**
5. **Weakness**

Your Response: ___

Discussion

Tibial tubercle fractures result from tensile forces generated by the quadriceps mechanism, usually during eccentric loading. Excessive amounts of bleeding may occur due to damage of a perforating vessel in this area. This bleeding can lead to anterior compartment syndrome. Growth arrest and deformity is unlikely in this 15-year-old boy who has little remaining growth left.

Great care is needed to diagnose and treat compartment syndrome regardless of method of fixation.


Fig. 6

References

1: Pape JM, Goulet JA, Hensinger RN. Compartment syndrome complicating tibial tubercle avulsion. *Clin Orthop Relat Res.* 1993 Oct;(295):201-4.
2: Edwards PH Jr, Grana WA. Physeal Fractures About the Knee. *J Am Acad Orthop Surg.* 1995 Mar;3(2):63-69.

Preferred response: 3.

2009 POSNA Specialty Day
Las Vegas, Nevada
Saturday, February 28, 2009

The Pediatric Orthopaedic Society of North America is excited to announce the 2009 AAOS-POSNA Specialty Day. The title of this years meeting is ***To the Peak of Limb Reconstruction for a View to the Future: A POSNA/LLRS Summit.***

Las Vegas, Nevada

Morning highlights include a symposium entitled Stem Cells in Pediatric Orthopaedics: Bench to Bedside. We are fortunate to gather some of the world's experts on stem cell research in both orthopaedic and non-orthopaedic fields and who will give us a view of the future clinical applications in our field. This will be followed with updates in the medical and surgical management of Osteogenesis Imperfecta, Trauma, and Image Guidance. A further symposium on slipped capital femoral epiphysis will update us on when to pin both hips as well as a discussion on the approach to the severe acute on chronic slips by two international leaders in hip research; Professors Ganz and Weinstein.

In the afternoon session we are excited to join resources with the Limb Lengthening and Reconstruction Society and present a Summit on the correction of pediatric limb deformity. In concert with Jim McCarthy, Program Chairman for the LLRS; the POSNA Education Committee has organized an exciting, comprehensive and state of the art collection of presentations from world authorities such as Drs. Paley, Grill and Foster. Topics include optimal methods to correct the limbs in patients with challenging deformity as well as new methods and implants for limb lengthening. Other experts will guide us through their approach to the frequent complications that accompany these methods.

Please join us in Las Vegas in 2009 for POSNA Specialty Day. Elvis may be gone, but in addition to the outstanding program, an encore presentation by Click and Clunk the Ortolani Brothers is sure to entertain.

POSNA Annual Meeting
April 29 - May 2, 2009 – Boston, Massachusetts

Make your plans now to attend the 2009 POSNA Annual Meeting, April 29-May 2, 2009 at the award winning Marriott Copley Place in Boston, Massachusetts. Centrally located in the Back Bay District, the Boston Marriott Copley Place hotel is within minutes of area attractions, culinary treasures and great entertainment. Known as "America's Walking City," Boston has something within walking distance for everyone.

But let's not forget about Education while you are here. The One Day Course, *"Adolescent Idiopathic Scoliosis - Understanding the Deformity and Current Treatment,"* chaired by Peter Newton, MD is sure to be outstanding. The program committee, chaired by Dan Sucato, MD promises to organize an exceptional program which will include eight breakout sessions on Thursday afternoon.

There's something for everyone in Boston, so consider bringing your family and staying a few days afterwards to explore all that this vibrant city has to offer.

Dr. Alvin Crawford

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Research and Education Foundation Shands traveling fellowship in 1972. This fellowship allowed me to visit all of the major pediatric centers in the continental United States as well as the Toronto hospital for sick children, Sick Kids at the time was easily the most renowned, aggressive center for pediatric orthopaedics, with Salter, Bobechko, Rang, Carroll, Gillespie, etc in attendance. I was also able to visit the Hospital for Sick Children at Great Ormond Street under the direction of Dr. George Lloyd Roberts. During this fellowship, I was able to meet Dr. Albert Shands himself at the Alfred Dupont Institute. His successor, G. Dean McEwen and I developed an instant rapport. I spent six months at the Alfred DuPont Institute to perform clinical research. It was there that Dr. McEwen assigned me the clinical condition of neurofibromatosis and my life has not been the same since that day, but then that's another story. I also met Mirhan "Myke" Tachdjian, one of the most unforgettable figures that I have ever known and perhaps the person most responsible for allowing me to be exposed to the international world of pediatric orthopaedics at a very early age. "Myke" had started the pediatric orthopaedic symposium in Chicago. It was a setting that one would have to experience to believe. This 10-day pediatric orthopaedic symposium with sessions that lasted somewhere between 8 am and 10 pm was taught by an international, respected cast, so unique in that it was truly international. At that time, the American Academy of Orthopaedic Surgeons had not sponsored this type of international educational format. This symposium was later taken over by Chad Price who has nurtured it to become the Pediatric Orthopaedic Society of North America's International Pediatric Orthopaedics Symposium today.

When and how did you become interested in orthopaedics as a specialty?

In my senior year in medical school, I realized that I did not have the desire or mental fortitude to care for the chronically sick and ill. I was interested in an active lifestyle and finding a specialty that would allow me to make people better. It was then that I found out that orthopaedic surgeons tended to be a good bunch of humans. They were fairly jovial and had the attitude of attempting to make life and people happier. I took to orthopaedics like a duck to water.

Who (and how) stimulated you to consider a career as a children's orthopaedist?

It was at the Children's Hospital, Boston that I realized the unbelievable feeling one gets when a little child thanks you for allowing them to get back to playing and doing the things he or she likes to do. I also realized that a child had a pretty straightforward agenda. Their agenda was to get back into play action just as soon as possible. If they felt you were warm, kind and friendly, then you had made a friend that would last essentially forever. It was not a desire that I've ever looked back on, I fell in love with pediatric orthopaedics and continue that love and enthusiasm today.

What aspect(s) of caring for children do you find most rewarding?

The most rewarding aspects of caring for children have been the personality changes that I have seen in children following resolution of whatever their perceived or real muscular skeletal problems are. Possibly the deepest reward is a child with an ostogenic sarcoma who 5 years following a resection is alive and well and is able to live a fairly normal life. Also, nothing comes close to the joy that I've seen in young girls following correction of their scoliotic deformity.

How have you come to deal with challenging parents of your patient's? What tips do you have for us?

It is often been said in pediatric orthopaedics one loves the patient and hates the parent. The challenging parent is involved in an entangled fabric, the

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2009 AAOS-POSNA SPECIALTY DAY

Saturday, February 28, 2009

"To the Peak of Limb Reconstruction for a View to the Future: A POSNA/LLRS Summit"

ONLINE REGISTRATION at: www.aaos.org

2009 POSNA ONE DAY COURSE

Wednesday, April 29, 2009

"Adolescent Idiopathis Scoliosis: Understanding the Deformity and Current Treatment"
Peter Newton, MD-Program Chair

2009 POSNA ANNUAL MEETING

Thurs., April 30 - Sat., May 2, 2009

Dan Sucato, MD-Program Chair

8 Special Afternoon Breakout Sessions

ONLINE REGISTRATION at: www.POSNA.org

Dr. Alvin Crawford

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matrix of which is sometimes indefinable. The child is the love object of all of the players, but sometimes because of interpersonal relationships the agendas change; as a result the parent occasionally seeks relief by perhaps being a little unbending to the care team. I am so straightforward to parents regarding all aspects of the disease and our approach to it. My answer remains the same, the old philosophy: When all else fails, tell the truth…becomes paramount. I mention the importance of being truthful to the child and how well they appreciate it; I feel that the same is the responsibility of the treating physician to the parent.

When the situation becomes interminable it is time to call a friend and make them aware of the problems that are going on with the parents as far as the care is concerned make every effort to assist in a transition.

Dr. Crawford enjoying his other love, music.

Your have obviously led a balanced life, academic excellence, clinical excellence, great family life and yet you have maintained your outside interest. What tips do you have for young doctors wanting to lead a balanced life?

I would say that the primary force that has allowed my life to be balanced is having my wife to select me as her husband. I think that her demeanor, her ability to be there for the children when I wasn't there and to keep me involved in their life throughout their childhood has been phenomenal and I owe so much to her. My tips for your young doctors are to have a passion for your work and a passion for your family and cherish your life with someone who is receptive to how you reconcile and balance family and work.

In your 30+ year career what trend in pediatric orthopaedics has been the most positive to be a part of?

The trend in orthopaedics that has been the most positive to be a part of is the innovative approach to spinal deformity. To see the enormous stretch of technology through the Harrington rod, Cotrel-Dubousset instrumentation, universal systems and now pedicle screws has just been unbelievable. The continuing approach to improving the safety of spinal correction via halo-femoral traction releases, video assistance thoracoscopic releases, complete and partial vertebral column resections, and most recently minimal access surgery all within a 40 year span is extremely rewarding. One must add to this the advances in the technology of assessing continuous instantaneous safety of the spinal cord while performing these complex procedures is extremely satisfying. The most positive aspect of my career thus far has been being selected to lead the Scoliosis Research Society, the premier international surgical organization for spinal deformity problems in humans.

In the same time period what challenges exist that still need to be conquered?

The challenges that exist that need to be conquered have to do with access to care. Number one is to make pediatric orthopaedics available to all humans regardless of their financial status. All humans include underserved nations, underserved humans in all parts of the world. POSNA is reaching out at this time and I think we're getting the education piece and in a lot of situations providing on hand supplementation of care to underserved areas.

What are future challenges for pediatric orthopaedics?

The future challenges to pediatric orthopaedics will have to do with how to manage and manipulate muscular skeletal conditions. Molecular genetics will give us a lot of insight as to how to possibly manipulate the DNA and RNA of these conditions. However, knowing the genes don't always make the problem less challenging, I have a particular involvement in neurofibromatosis. The concept of Axial Biotech determining how the genetic makeup of an individual would predict whether or not their scoliosis was going to be progressive or remain dormant throughout their active childhood is exciting.

The future challenges of pediatric orthopaedics also have to do with manpower. Fewer surgeons are going into pediatric orthopaedics than almost any other specialty in orthopaedic surgery.

Why should a young surgeon consider pediatric orthopaedics as a career?

I would think the primary reason for a young surgeon to consider pediatric orthopaedics as a career would be first an immense love for children and wanting to make them better. But more so, someone who would like a tremendously self fulfilling life. For the young surgeon who identifies and characterizes these goals, I can state that there is possibly no more gratifying, fulfilling career than that of a pediatric orthopaedic surgeon.

The years in medicine have been so good to me that I've been making a conscious effort to give back. I feel that giving back of either financial resources, my time and what ever expertise cognitively or surgically to my successors to be the appropriate way to end my career.