The Emergence of Non-Operative Pediatric Orthopaedists (NOPO) to Increase Access to Orthopaedic Care for Children

Melissa A. Bent, MD[1]; Saji P. Azerf, MD [2]

[1] Children's Hospital of Los Angeles, Los Angeles, CA; [2]University of Wisconsin, Madison, WI

Abstract: Pediatric orthopaedic surgeons (POS) are faced with numerous changes including increased volume of referrals from pediatricians and family medicine physicians who do not feel comfortable managing "primary care orthopaedic conditions." There is an emerging field of medicine, Non-Operative Pediatric Orthopaedics (NOPO), which has grown over the past 15 years. These physicians bridge the respective fields of Pediatrics and Pediatric Orthopaedics by providing the full spectrum of non-operative pediatric orthopaedic care while creating a symbiotic partnership with pediatric orthopaedic surgeons.

Key Points:

- Referral patterns to pediatric orthopaedic surgery are multifactorial and continue to increase.
- Non-operative orthopaedic pediatricians/physicians increase access to orthopaedic care for children.
- There is a unique partnership for pediatric orthopaedic surgeons and pediatricians to expand musculoskeletal care that is different from the physician extender model utilizing PAs and NPs.
- Opportunities exist for growth in this emerging field to be recognized as a valuable partner in the full spectrum of pediatric orthopaedic care and education of general pediatricians and pediatric residents at both local and national levels.

Introduction

The face of pediatric orthopaedic surgery has been changing over the past two decades. According to a 2016 POSNA survey, positive changes include increasing gender diversity, growth, and an increase in case volume.[1] Currently, 18% of active POSNA members are women with a projected increase to 40% by 2025.[2] In 2009, there was a projected shortage of pediatric orthopaedic surgeons by 2020.[3] However, with an increase in applicants and available fellowship positions over the past 8 years; and anticipated retirement of the two thirds of the active POSNA membership over 50, this anticipated shortage in 2020 is no longer concerning. As of 2017, there are 75 pediatric orthopaedic fellowship positions with up to 50 graduates a year.[1]

Other factors impacting the field are increasing case complexity and subsequent sub-specialization.

Challenges to POS include concerns around competition, compensation, electronic medical recordkeeping, trauma call, and maldistribution of the workforce. In the 2014 Workforce Survey of the American Academy of Pediatrics Section on Orthopaedics, only 3% of respondents are in rural areas, and 67% are employed by children's hospitals and/or universities in academic practices.[4] This distribution contributes to barriers in access to care.

What Influences POS Referrals?

Increase in Pediatric Musculoskeletal Visits

Musculoskeletal pain and injuries are one of the most common reasons for acute visits to the emergency department and primary care office.[5, 6] In 2012, more than 19 million children and adolescents received treatment in medical centers, physicians' offices, and hospitals for a musculoskeletal-related condition, as reported from the Healthcare Cost and Utilization Project (HCUP) and Kids' Inpatient Database (KID). The most common reasons for treatment were trauma, pain, and deformity.

Changing Pediatric Workforce

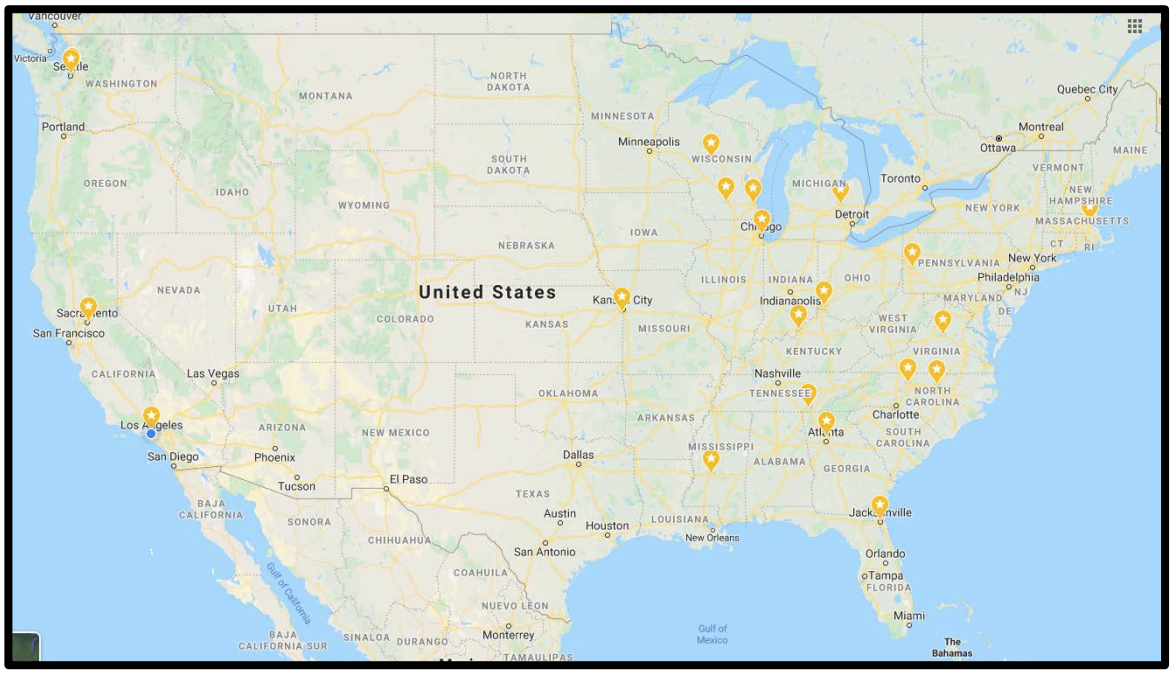
A statement issued by the AAP Advisory Committee to the Board on Education in 2008 reports that "the current pediatric workforce is not meeting the primary care, subspecialty, or surgical needs to provide quality health care for our country's children. Key factors include the geographic maldistribution of physicians, an increase in the number of medically complex children, and an increasingly diverse patient population."[6] In a survey from 1999-2007, there has been a reported increase in the pediatric subspecialty referral rate.[7] They identified an increase in parental or physician preference for referral and insurance's policies accounting for the increasing referrals. Primary care physicians have numerous challenges, including decreasing reimbursement and increasing time constraints. The pediatric workforce is now more than 70% female, with many opting for part-time practice. Reduced trainee duty hours also impact the abrupt transition to acclimate to a busy practice.[8]

Lack of Pediatric Resident Training in Musculoskeletal Medicine

Another factor influencing referral patterns is related to deficiencies in exposure and training. The American Academy of Pediatrics Annual Survey of Graduating Residents 2019 reported that 35-40% of pediatric residents entered primary care over the past decade.[9] While recognition of the increasing presentation of musculoskeletal conditions is important to clinical practice, many graduating pediatric residents have identified orthopaedics as one of the areas with which they are least comfortable. Based on a 2011 survey of graduating pediatric residents, orthopaedics was one of the most frequently identified content deficiencies.[10] Existing musculoskeletal curricula in pediatric residencies is variable and scarce in both quantity and quality. One pediatric resident respondent reported that for pediatric orthopaedics, "I felt like I didn't get enough to even educate myself. I just don't know where to start."[10] Delay in recognition of diagnosis and timing of referrals can have a significant impact on patient outcomes. For example, there are an average of 17 weeks from symptom onset to diagnosis of SCFE, which can dramatically impact patient morbidity and increased surgical risk.[11,12] Lack of basic musculoskeletal skills such as splinting is also an area of concern. Recently, it was reported that 93% of splints placed by ED or urgent care centers were deemed inappropriate.[13] This leads to a higher risk of skin and soft tissue complications found in 40% of patients in the study.

There have been marginal efforts to promote musculoskeletal education and exposure to general orthopaedics in medical schools by creating new curricula.[14,15] Other residency programs, such as family medicine, have tried to increase musculoskeletal exposure through mandatory sports medicine rotations.[16] Piazza et al. reported a required structured 4-week immersion orthopaedic elective had a greater impact on short-term knowledge assessment and confidence.[17]

Figure 1. Directory of Current Non-operative Pediatric Orthopaedic Physicians Across the United States



California
Children's Hospital of Los Angles: Melissa Bent, MD
Shriner's North California, Sacramento: Fatema Iqbal, MD

Georgia
Children's Hospital of Atlanta: Robert Montero, MD

Illinois
Ann and Robert Lurie Children's Hospital:
Rebecca Carl, MD

Florida
Nemour's Jacksonville: Laura Stunja, DO

Kansas
Mercy Children's Kansas City: Natalie Stork, MD;
James Weihe, MD

Massachusetts
Boston Children's Hospital: Claire White, MD;
Megan Hannon, MD

Michigan
Hurley Medical Center: Stacy Frye, MD

Mississippi
University of Mississippi Medical Center:
Catherine Zimmerman, MD

North Carolina
UNC Chapel Hill: Vinay Narotam, MD
Wake Forest: Matt Ravish, MD

Ohio
Cincinnati Children's Hospital Medical Center:
Sheila Chandran, MD

Pennsylvania
Allegheny Health Network Pittsburg:
Cathleen McGonigle, DO

Tennessee
Children's Hospital at Erlanger Chattanooga:
Merritt Adams, MD

Washington
Seattle Children's Hospital: Thomas Jinguji, MD

Wisconsin
Marshfield Clinic: Jacob Lonsdale, MD
University of Wisconsin-Madison: Blaise Nemeth, MD
University of Wisconsin-Milwaukee: Alicia Zolkoske, MD

Virginia
University of Virginia: Leigh Ann Lather, MD

With the intersection of decreased residency duty hours, inadequate musculoskeletal training during residency, and increasing primary care practice demands, it is not surprising that many increased POS referrals do not require evaluation or treatment by POS. It has reported that 47-65% of referrals to the POS are "inappropriate" based on AAP referral guidelines.[18,19] With regard to timing of referrals, 96.5% of follow-up visits recommended by the emergency department (ED) were premature, which led to 53% of patients at a tertiary center requiring a subsequent visit to complete their clinical care. [20] Forty-seven percent were considered primary care conditions.

Historical Perspective

In the past, pediatric orthopaedic surgeons who no longer operate but wanted to continue clinical practice provided non-operative pediatric orthopaedic care. One example is Paul Caskey, MD, who was previously the Chief of Staff at the Shriners Hospital for Children-Spokane and has transitioned to non-operative care in 2017 in his home state of Wisconsin. Retired surgeons bring decades of pediatric orthopaedic surgical experience and can remain active in medical education teaching and research. These individuals treat a variety of common pediatrics orthopaedic issues and provide insight into surgical techniques and approaches to junior faculty and residents.

Primary Care Sports Medicine was the first to partner with orthopaedic practice to take care of non-surgical issues related to injury and athletes. What began as a small group in the late 1970s and early 1980s led to establishing fellowships in the mid-1990s and board-certified sub-specialty with national and international programs. The Sports Medicine board certification specifications focus mainly on injury with fracture management, but there is variability within the scope of practice for other pediatric orthopaedic conditions. These physicians do not necessarily provide the full spectrum of pediatric orthopaedic care.

NOPO Fellowship Training

The increasing volume of pediatric orthopaedic conditions that require non-operative care has inspired the creation of Non-Operative Pediatric Orthopaedic (NOPO) fellowships.

In 2004, the University of Wisconsin Madison started one of the first fellowship NOPO programs. Nine UW graduates have obtained positions partnering with POS at academic orthopaedic centers; many are highly ranked according to *U.S. News and World Report*. These specialists have an inherent role in screening and treating patients, as well as the education of patients, primary care providers, and trainees. NOPOs increase access to care by reducing the waitlist for orthopaedic clinics and broaden geographic scope through outreach clinics. A handful of other fellowship programs have emerged in the past decade, including Children's Orthopaedics of Louisville, KY; Nemours Children's in Jacksonville, FL; and Boston Children's Hospital, MA. Other institutions have trained a local pediatric resident for their own program.

The Evidence for Increasing NOPO Care

There have been different models to deal with the issue of increased referral volume. One has been the physician extender model through nurse practitioners and physician assistants. The Pediatric Orthopaedic Practitioner Society (POPS) has grown from 47 members in 2000 to 130 members in 2014. These providers are valuable partners in the delivery of pediatric orthopaedic care, yet many parents and providers prefer an initial referral to an MD. Many NOPO's have an established relationship with the general pediatric community and pediatricians may feel more comfortable speaking to those who they regard as their colleagues as opposed to a busy orthopaedic surgeon. Leigh Ann Lather, a non-operative pediatric orthopaedic physician at the University of Virginia states, "We function independently, have training as a physician in a population we are used to caring for and are able to boost reputation through academics and research efforts."

According to the Children's Hospital Association, orthopaedics has one of the highest wait times for clinic appointments among surgical specialties, with an average of 3.3 weeks. [21] In New Zealand, the impact of clinical wait times with the addition of one NOPO has been studied. During a 6-month period, a total of 155 new patient referrals were seen and nearly 50% of these referrals accounted for all non-urgent referrals. Prior to the addition of a NOPO, referrals were seen within 19 weeks, which went down to 8 weeks after the addition of the nonsurgical provider. Families reported high levels of satisfaction.[22]

The addition of a NOPO keeps surgeons in the operating room doing what only a surgeon can do. They are especially helpful in multidisciplinary clinics where volume of patients is low, but the time commitment is high. These include multidisciplinary spina bifida clinics, metabolic bone disease, neuromuscular disease, cerebral palsy and spasticity clinics, and genetics. Since there is a shortage of pediatric physical medicine and rehabilitation physicians, a NOPO who is comfortable with prescribing and managing braces in these clinics is useful.[23]

The POSNA Practice Management Committee has shown that close to 30% of recent POS graduates from pediatric orthopaedic fellowship programs are completing a second fellowship. The NOPO physicians serve as a great resource for general orthopaedic triage and can provide subsequent referral for subspecialty surgery while maintaining high-quality care.

A recent NOPO Workforce Survey in 2019 was distributed to 21 non-operative pediatric orthopaedic physicians and 12 responded (response rate of 57%). All the respondents were practicing pediatric orthopaedists providing direct patient care, with an average of 7.4 half-day clinic sessions per week. The average relative value units (RVU) per half-day clinic generated per year was noted to be 3800 units (range 1800-5300 units) from seven respondents, although time in clinic varied. The average annual pay was $190,000 (range $150,000 to $250,000). Monthly new patients seen by these physicians are reported to be 90-150 patients. [24]

From an educational perspective, NOPOs have a unique role in providing pediatric orthopaedic education to a diverse array of trainees, physicians, nurses, and other allied health professionals. They teach a broad range of trainees, primary care physicians, and other allied health providers at their respective institutions. They have served as lecturers and co-course directors for the American Academy of Pediatrics (AAP) Musculoskeletal Bootcamp, which is a clear link to the mission of improving the musculoskeletal education of primary care providers. There is an opportunity for research in medical education, clinical care, and practice management within this model.

The Future

Increasing the awareness for a career as a NOPO to pediatric trainees is essential to grow training programs to expand national reach. This will require an expanded role of NOPO in leadership roles in the AAP and POSNA. There may be value in combining curricula from NOPO and Primary Care Sports Medicine fellowships into a combined fellowship that can manage any pediatric musculoskeletal need. We know of two NOPO who are also board certified in Primary Care Sports Medicine and who offer the complete spectrum of musculoskeletal non-surgical care while shaping their own practice based on the needs of the community and their POS partners. Formal training, board certification, and standardization of training and practice scope are yet to be determined for the future.

Summary

NOPO physicians expand access and over the last 15 years, this specialty has grown. The next steps will be to further partner on a national level with POSNA leadership, expand awareness and reach to pediatric trainees, and continue efforts to educate and empower primary care providers to advance the musculoskeletal care of children.

NOPO/POS Spotlight

Children's Mercy Kansas City
Natalie Stork, MD
Richard Schwend, MD

Natalie Stork, MD

What led to your interest in NOPO?
During residency, I spent time in both sports medicine and orthopaedics and realized my interest in musculoskeletal medicine. Somewhat serendipitously, I was made aware of the NOPO fellowship in Wisconsin as I started to develop a vision for my own passion in musculoskeletal medicine. This ultimately included completing a Pediatric Non-operative Orthopaedic fellowship as well as a Primary Care Sports Medicine Fellowship.

How long have you been at the current practice?
I have been in practice for about 5 ½ years. I was very fortunate to find a combined position, Pediatric Non-operative Orthopaedics and Pediatric Sports Medicine with the Department of Orthopaedics and Musculoskeletal Medicine at Children's Mercy Hospital in Kansas City, MO.

What has been the most rewarding aspect of your job?
I find the variety of interactions with patients, residents, students, athletic trainers, nurses, cast techs, orthotists, physical therapists, surgeons, and physicians cumulatively very rewarding. I find the diversity of medical conditions that present to clinic rewarding. Also, being able to provide treatment for congenital, acquired, chronic and acute conditions; and developing both long and short-term relationships with patients and families. I personally find the treatment of clubfeet very rewarding. During initial visits with the new parents, I enjoy addressing general pediatric concerns with the musculoskeletal treatment for clubfeet with the Ponseti method.

What are the advantages of your practice/role?
Working at a large children's hospital that has every pediatric medical and surgical specialty available has provided numerous advantages, including unique opportunities for growth as a young faculty, easy collaboration with specialists within pediatric orthopaedics, as well as specialists throughout general pediatrics and other pediatric subspecialists.

How is the partnership between you and your surgical colleagues?
From the time that I interviewed for a faculty position, the Department has been very supportive and encouraging of the position, which has allowed for opportunity to build my own niche. I feel very fortunate to have the honor to work with a great group of colleagues, both surgical and nonsurgical. We have a rather diverse and large group made up of 10 orthopaedic surgeons, two pediatric hand surgeons, five primary care sports physicians, and now two Non-operative Pediatric Orthopaedic physicians. With the size and diversity of our group, I think we have a rather robust and mutual relationship between all physicians, surgical and nonsurgical, in treating a variety of musculoskeletal conditions.

Where is the future of NOPO heading?
I have seen the field grow rather significantly in the short amount of time I have been in practice, with multiple new fellowships being created. I think a number of Non-operative Orthopaedic physicians would agree, we hope to see continued growth and interest in the field.

Rick Schwend MD

Past POSNA President and Department Chair

How was this opportunity created?

Much of what we do as pediatric orthopaedic surgeons is non-operative. Compared to adult surgeons, much less surgery comes out of a clinical encounter. In 2012, we published a study that showed that almost half of the conditions we see in pediatric orthopaedics is primary care, and only 7% of cases need surgery.

This tells us that the vast majority of cases in a pediatric orthopaedic practice do not need an orthopaedic surgeon to manage. There is no evidence that we, as pediatric orthopaedic surgeons, necessarily do a better job with the non-operative aspect of practice. There also comes a point that to handle the volume of work, it makes no sense to hire more orthopaedic surgeons who need enough volume of operative cases to stay competent. Non-operative physicians can handle the workload much better. Our hospital agreed with this and approved creation of the program.

What kind of patients does the NOPO physician see in your practice?

NOPO sees patients less likely to need surgery. However, these patients are not necessarily less complex, since the NOPO needs to make a diagnosis when it may not be clear, understand natural history, understand all the psychosocial aspects, and develop relationships while seeing through treatment plans. In my specialty of pediatric spine, they must understand diagnosis, growth, bracing, natural history, pain management, rehab, etc.

What are the advantages of a NOPO physician?

For me, NOPO works as a colleague, a source of surgical referrals, works with me in the spina bifida clinic to evaluate patients, and provides an opportunity to share cases and discuss interesting problems.

Is there any financial benefit?

For me, I don't need to see such high-volume of non-operative patients, which frees me up to see patients needing surgery. I don't have greater RVU, but I do have a better quality of life. I am on salary, so the salary does not change. I can get home at a reasonable hour. There is less risk for burnout.

What are the challenges?

There aren't really any challenges. It can take a little more time with NOPO new to the practice since they need mentoring and time discussing cases, often in the middle of my own clinic. There is not much of an issue, and in the long term this is a good thing.

What is your advice to pediatric orthopaedic surgeons considering hiring a NOPO physician?

Hire a colleague you get along well with. Also, it's good if they are highly capable so they are pushing you to learn and progress.

What is the difference between a NP/PA model and the NOPO/Pediatric Orthopaedic Medicine Physician?

It is different. Having an APRN, the roles are clearly different. APRN is assisting the physician. With the NOPO model, the relationship is one of colleagues who are equal in terms of training and responsibilities. Mutual respect is important for both, but there is much more independence with the NOPO model.

Additional Links

https://posna.org/Resources/Fellowships/Non-operative-Orthopaedic-Pediatric-Fellowships

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