

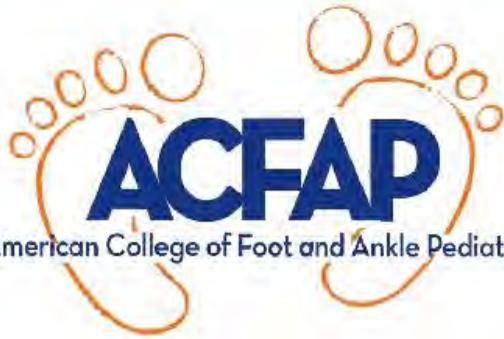
Fall 2016

<http://www.acfap.org>

ACFAP Quarterly

American College of Foot and Ankle Pediatrics





American College of Foot and Ankle Pediatrics

The American College of Foot & Ankle Pediatrics is excited and proud to announce its 3rd Annual ACFAP Pediatric Foot & Ankle Seminar. The Seminar will take place at Atlantic Oceanside Hotel & Conference Center in Bar Harbor, Maine on June 8-10, 2017.

This CME event will feature leading authorities on pediatric foot & ankle conditions. It will cover topics ranging from pediatric H&P, flatfoot, equinus, sports medicine, surgery, and rotational conditions. The meeting will be preceded on Thursday June 8 by a one day national park excursion.

Featured at this meeting will be spectacular Acadia National Park.

At the Conclusion of this meeting, the attendee shall be able to:

- Develop effective Protocols for treating the pediatric patient.
- Effectively evaluate surgical vs. non-surgical options for many common Pediatric foot & ankle pathologies.
- Improve patient outcomes in the pediatric patient for common conditions such as flatfeet, juvenile HAV, and Equinus.

For Conference details or to register online: please go to acfap.org/events.html

Approved for 11.75 CE Contact Hours

No commercial interest provided financial support for this continuing education activity

Lecture Schedule

Friday June 9

7:00-7:45 am	Registration, Breakfast & Visit Exhibitors
7:45-8:00 am	Louis J. DeCaro, DPM Welcome Address
8:00-8:35 am	Louis J. DeCaro, DPM Pediatric Foot Typing
8:35-9:10 am	Paul Dayton, DPM Juvenile HAV & Other Common Surgical Procedures for the Child
9:10-9:45 am	Frank Santopietro, DPM How the Foot Affects the Knee and Hip
9:45-10:20 am	Russell Volpe, DPM Pediatric Precursors of Posterior Tibial Dysfunction
10:20-10:50 am	Visit Exhibitors
10:50-11:25 am	Patrick Agnew, DPM Metatarsus Adductus
11:25-12:00 pm	Ed Harris, DPM Polydactyly
12:00-12:35 pm	Tracey Vlahovic, DPM Plantar Warts, Onychomycosis, Ingrowns, Dermatology in Children
12:35-1:30 pm	Lunch & Visit Exhibitors
1:30-2:05 pm	Nicholas Bolognini, DPM The Clubfoot

Lecture Schedule (cont.)

Friday June 9 (cont.)

- 2:05-2:40 pm **Patrick Deheer, DPM** The importance of Equinus in the Pediatric Foot
- 2:40-3:15 pm **Jason Miller, DPM** Sports Injuries (Traveling Child) - Injuries Normally in Adults, Now in Kids
- 3:15-3:50 pm **John Grady, DPM** Pediatric Sports Fractures
- 3:50-4:20 pm **Break & Visit Exhibitors**
- 4:20-4:55 pm **Marc Benard, DPM** Tendon Transfers Relative to Gait & Biomechanics
- 4:55-5:55 pm **Patrick Deheer, DPM, Michael Graham, DPM & Panel** The Great Flatfoot Debate
- 5:55-6:35 pm **All Speakers Q&A**

Lecture Schedule (cont.)

Saturday June 10

- 7:00-7:45 am **Breakfast & Visit Exhibitors**
- 7:45-8:45 am **Jason Kraus, DPM** The Uniqueness of Treating The Child
- 8:45-9:45 am **Louis J. DeCaro, DPM & Panel** Pediatric Practice Management
- 9:45-10:15 am **Visit Exhibitors**
- 10:15-11:00 am **Matt Werd, DPM & Panel** Taping of the Pediatric Athlete (Workshop)
- 11:00-11:45 am **Nicholas Bolognini, DPM & Panel** Ponsetti Casting (Workshop)
- 11:45-12:30 pm **Nick Pagano, DPM & Panel** Measuring the Child (Workshop)
- 12:30-1:30 pm **Lunch & Visit Exhibitors**

This conference is intended for podiatric physicians and other medical specialties dealing with the pediatric lower extremity. No prerequisite levels of skill, knowledge, or experience required of learners.

This activity has been planned and implemented in accordance with the standards and requirements for approval of providers of continuing education in podiatric medicine through a joint provider agreement between the William L. Goldfarb Foundation as a provider of continuing education in podiatric medicine. The William L. Goldfarb Foundation has approved this activity for a maximum of 8 continuing education contact hours.

In the event of cancellation ACFAP is unable to assume risk or responsibility for the exhibitor's and/or registrants time or expenses should an act of God, government action, disaster, weather or other force beyond ACFAP's control make it inadvisable or impossible to conduct this event. The exhibitor and/or registrant may wish to consider purchasing personal travel insurance to insure their expenses.

Not an ACFAP Member?

Becoming a member of ACFAP for \$150 instantly saves \$150 off the conference registration fee

[Go to acfap.org/membership.html](http://acfap.org/membership.html)

What is ACFAP?

The American College of Foot and Ankle Pediatrics is the American Podiatric Medical Association's only recognized group of experts in the subspecialty of Podopediatrics. As an affiliate clinical interest group, under the APMA, our goal is to educate both our colleagues and the general public on the importance of caring for children's feet.

Mission Statement

The American College of Foot and Ankle Pediatrics strives to disseminate new and advanced information on the latest techniques in pediatric foot and ankle care. This is done through our participation in seminars, lectures, publications and digital media.

What we do

We dispense information to the public on the proper care of their child's feet. We promote commitment to, and excellence in, the medical and surgical management of pediatric foot and ankle pathologies.

For more information please contact:

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Louis J. DeCaro, DPM, President ACFAP

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Presidents Message



Hippocrates once said “The greatest medicine of all is teaching people how not to need it.” That quote for me embodies the very spirit, purpose, and drive of ACFAP. Our primary focus as physicians is to heal, but also we must never lose site of our obligation to prevent. For those of you who have ever heard me lecture, you know I also always draw attention to what I call our “moral obligation.” I believe our “moral obligation” as physicians, especially those who frequently see kids, is to strive for more prevention. I ask you all to help me get this message out. As 2016 wraps up, I look to make 2017 the “year of pediatric education” throughout our profession. Actively suggesting more pediatric education at seminars, filling out conference lecture suggestion forms, and talking to people who organize conferences are ways to advance this cause. Please join me!

We have been keeping up this mission already. Recently ACFAP was represented at the APMA national meeting in Philly, Heartland meeting in Iowa, and Region 7 in Vancouver, WA. Upcoming, ACFAP will be present at the AAPPM in San Antonio as well as SAM 2017 in Orlando.

As you all know ACFAP 2017 Annual Scientific Meeting has been set for the past several months. We are already receiving registrations. I encourage each and every one of you to plan and register early! This seminar is going to sell out quickly! We are continuing the National Park “tradition” at the Atlantic Oceanside Resort, Acadia National Park, Bar Harbor, ME June 8-10 2017. Once again we will precede the meeting with a group outing in Acadia on the 8th. We have lined up a professional photographer as our tour guide, Mr. Don Toothaker (toothakerphoto.com) who has conducted expeditions in Acadia over 20 times!

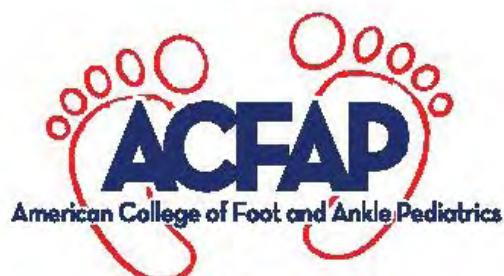
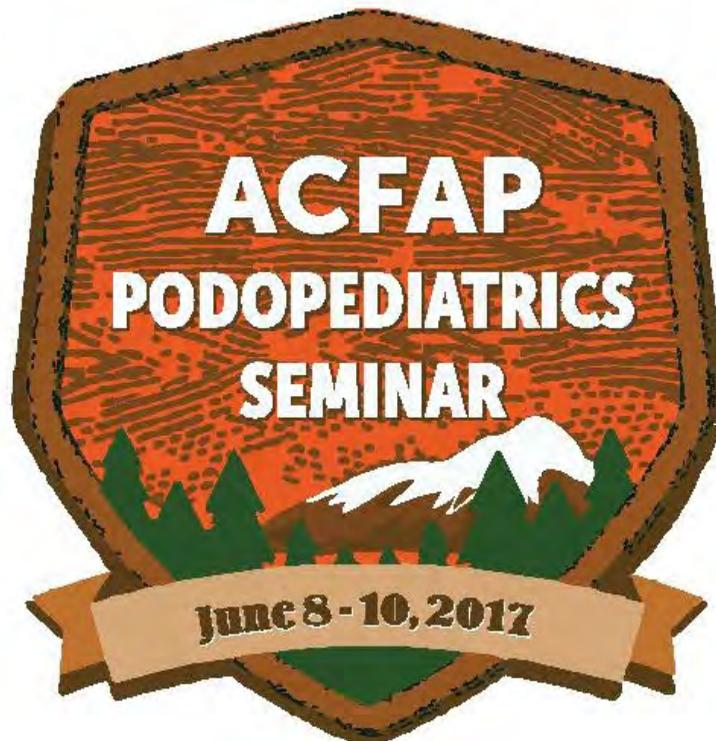
The scientific part of the conference will take place at Acadia National Park on Friday and Saturday June 9-10, 2017. This CME (11.75 CME’s Proposed) event will feature leading authorities on pediatric foot and ankle conditions including Drs. Russell Volpe, Ed Harris, Tracey Vlahovic and many more! It will cover topics both conservative and surgical. As well the seminar will feature new and exciting panels and workshops. There will be a “Flatfoot Debate” consisting of a panel of docs representing surgical, orthotic, and conservative care point of views. Workshops and panels will include Ponsetti casting, practice management, and how to guides to “measuring” the pediatric patient. Please go to our website acfap.org for more information.

Our meetings are designed with two main missions in mind. The first is to educate in a positive environment that is both professional and fun at the same time. The second mission is to forge camaraderie between pediatric foot and ankle specialists and the companies that offer our patients the best and innovative solutions to manage their conditions...and maybe even foster ideas for new procedures, technology and products by putting the best minds together and learning from each other.

Each year the meeting is getting better and better. It really is the “Can’t Miss” meeting of the year, located in one of those “Can’t Miss” spots!

I want to again welcome all past, future, and current members of the American College of Foot and Ankle pediatrics to this new era not only in this organization, but also in the education of pediatric foot and ankle medicine. Thank you to each and every one of you for making this all possible!

Louis J. DeCaro, DPM
President, ACFAP
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is proud to present the

3rd Annual

**ACFAP
INTERNATIONAL
PEDIATRIC FOOT & ANKLE
SEMINAR**

to be held at

**Acadia National Park
Atlantic Oceanside Hotel
& Conference Center
Bar Harbor, ME**

Contact Dermatitis: Considerations in the Pediatric Population

Alecia Y. Williams. DPM, DABPM

The current practice environment has always meant extensively tracking acute allergies. With the advent of the EMR, it has gotten easier to catalog not only the allergies, but the onset of the reaction and the type of the reaction. There are many recognized types of allergenic materials. It is important to recognize any potential reaction in this population as initial sensitization and presenting pathology many now present at an earlier age. It is now recognized that contact sensitization begins in early childhood via exposures such as vaccinations, piercing, topical medications, and cosmetics.¹ It is also important to differentiate its presence as the prevalence of atopic dermatitis in the pediatric population in much of the US is at least 10%.² With an accurate and timely diagnosis comes the ability to quickly treat or refer to the allergist or dermatologist.

CONTACT DERMATITIS OVERVIEW

Contact dermatitis may be divided into three types: allergic, irritant, and photocontact. The vast majority of cases are irritant-induced. This owes itself to repeated exposure in an industrial setting of the adult population. The trigger substance itself directly damages the skin. Allergic contact dermatitis (ACD) is a delayed type hypersensitivity reaction elicited by the contact of the skin with the offending chemical or sensitizer in individuals who have been previously sensitized to it.³ When differentiating the other types of dermatitis, especially atopic, lesions and eruptions about other parts of the body, notably the head, scalp neck, cubital fossa or the popliteal fossa. An acute eruption of ACD can consist of pruritic, erythematous, indurated, scaly plaques and in severe cases may have vesiculation or bullae.¹ Photocontact is involvement of UV light (present in sunlight) and a normally harmless substance on exposed skin. Neither photocontact nor irritant type of dermatitis involve the immune system.⁴ The onset of the dermatitis is within two weeks of exposure to the allergen.

IRRITANT CONTACT DERMATITIS

Solvents, surfactants, cleaners as well as latex are the basis for this type of dermatitis. Solvents used in removing nail products from toes and nails are also a common example. Clinically, the affected area may present with scaling, hyperkeratosis or fissuring. There may be pain, itching or burning along with itching.

TRIGGERS OF ALLERGIC CONTACT DERMATITIS

Sensitizers come from many different groups of materials: plants, metals, preservatives, rubbers, adhesives, glues, fabric dyes/finishes, and topical preparations. A common sensitizer is found in poison ivy, poison oak, and poison sumac. Nickel is common with jewelry use as is gold, chromium and cobalt. Topical

Table 1. Examples of sensitizing products affecting the Lower Extremity

	Sensitizer
Ankle Bracelet	Nickel, chromium
Tattoo	Nickel, chromium, cobalt
Sandals/Shoes	Chromium leather treatment, Vulcanized rubber/MBT
Socks	Vulcanized Rubber/MBT, dye
Adhesive Bandages, tape	Colophony (rosin)
Nail Polish	Formaldehyde
Pedicure Nail Designs/Artificial Nail	Acrylates
Osseous Procedure Metallic implant	Nickel, Chromium, Cobalt, Iron ⁶



Image 1: Chromate Allergy from Leather Shoe.

Uptodate.com, Courtesy of William L Weston, MD.

medications include gentamicin, neomycin, hydroquinone, and bacitracin. The sensitization can also be enhanced by heat, occlusion, and humidity in the case of shoe gear.⁵ Table 1 shows some examples of common products. Image 1 shows chromium as chromate treatment of leather.

DIFFERENTIAL DIAGNOSES

Other etiologies can strongly mimic dermatitis. Bacterial infections such as Impetigo which is a Staph or Strep infection presents as crusting, yellow lesions mainly occurs in the face, neck and hands. Fungal infections can easily be excluded with skin scraping analysis. Bites from insects ranging from fleas, ticks, bed bugs, spiders, chiggers, ants and mites must also be considered. Scabies has intense itching. Some bites may have a linear distribution. Viral exanthems have a larger skin surface distribution affecting multiple parts of the body much like psoriasis or atopic dermatitis.

TREATMENT

Identification of offending agent is most important for future eruption. Wet cool compresses to affected area. Menthol preparation or calamine lotion may also be effective. Weeping lesions can be alleviated with topical astringents, aluminum acetate or aluminum sulfate under occlusion. Benzocaine and topical

antibiotics with neomycin or bacitracin again should be avoided because they are allergenic. Oral antibiotics are recommended for complicated secondary infection.

SUMMARY

Many products, dressings, bandages, now exclude latex, but there may be other potential sensitizer amongst these products. The key is direct contact and representative distribution on the skin. Humidity, heat and occlusion can enhance the sensitization of rubber contact from either socks or shoes causing the eruption. If topical antibiotics are the cause of ACD and there is an indication for topical antibiotics, Mupirocin has the lowest rate of sensitization.

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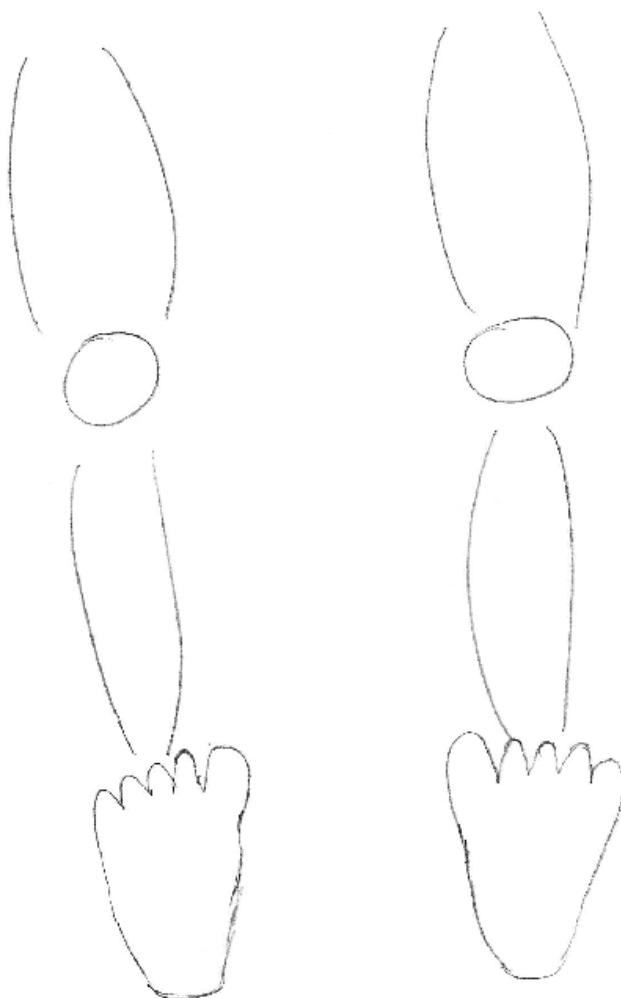
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Dr. Williams is in Private Practice in New York City. She is also board certified by the American Board of Podiatric Medicine.

SIMPLE DIAGRAM FOR DOCUMENTING AND EXPLAINING ROTATIONAL ABNORMALITIES IN CHILDREN

Nicholas Bolognini, DPM

FIGURE 1



One of the most common reasons that parents bring their children into a pediatric podiatrist is because of limb rotational concerns. I find that using a simple diagram helps the parents understand where the pathology is located and what the expectations should be.

It's always important to take a thorough family history first because if the parents have certain alignment issues the children are more likely to inherit them as well. For example, bow legs. However, we must keep in mind the normal development process of the lower extremities and that it is normal to have tibial varum, for example, the first two years of life.

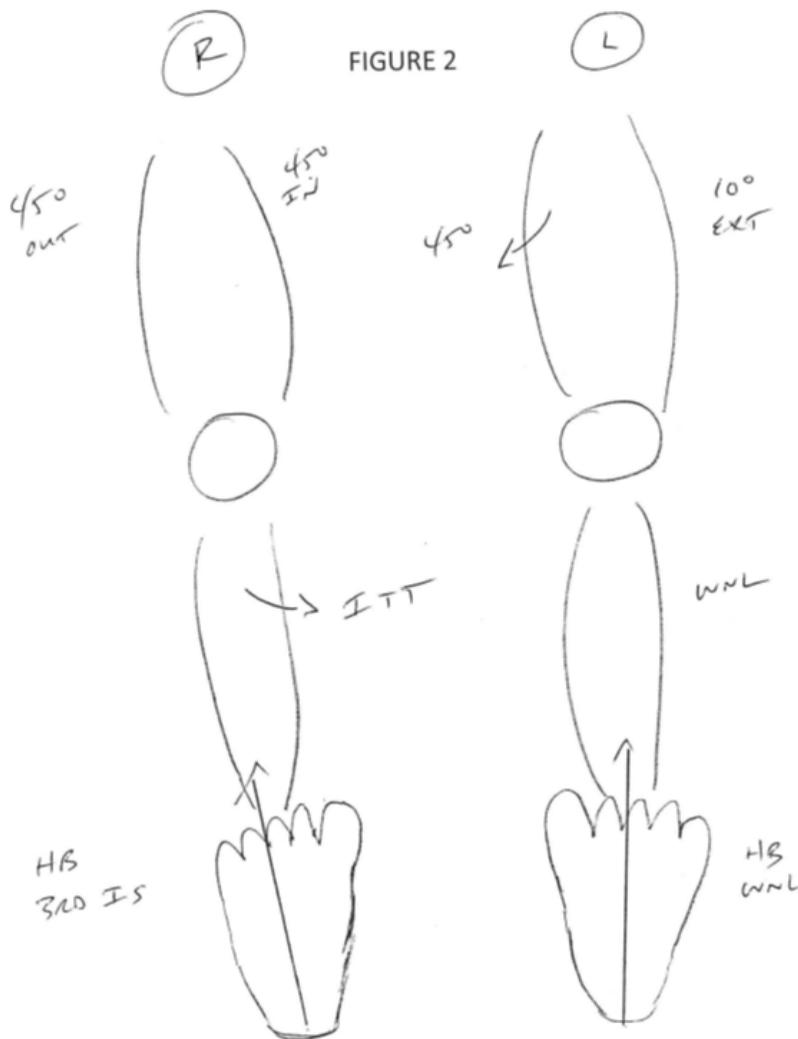
It is well known that normal development of the extremities occurs in an external direction. The tibia, for example, externally rotates with development, up to 6 to 8 years of age. The femurs externally rotate up to around 13 years of age. As such, mild intoeing in these segments improves without treatment in most cases, because of normal ontogeny. There is great controversy over which rotational abnormalities deserve treatment and whether treatment is actually successful. That subject will not be addressed in this article. This article just outlines a simple approach to documenting and explaining where the abnormality exists.

See Figure 1. This is the blank diagram that I use to explain to the

parents where the rotational issues are located.

Figure 2 is an example of how I mark the diagram during the examination. For example, the Left lower extremity markings indicate that there is left sided femoral anteversion, causing internal positioning (45 degrees of internal rotation available and only 10 degrees of external rotation), and the tibial and foot segments are normal. The right side markings indicate that the rotation in the femoral segment is normal, but, there is tibial torsion present and metatarsus adductus with the heel bisector going through the 3rd webspace.

This has been a simple, but, effective tool for me in my practice to explain rotational pathology to the parents. I feel it helps them understand where the rotational problems are located and can even reassure them, as we explain normal development and which components can improve just with maturity. Clinicians can use it in various ways (exact numbers or not), mark it for frontal plane and/or transverse plane deformities, and use one for sitting and one for lying supine, and, finally, use it as a tool to help follow their improvement, whether treated or just observed over time.



Nicholas Bolognini, DPM
Fellow, American College of Foot and Ankle Pediatrics
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A Case Study: Four limb polydactyly, a combination of simple and complex polydactyly and use of autograft for the correction of longitudinal epiphyseal bracket (delta phalanx)

Dr. Hannah Park, DPM
Dr. Prasad Gourineni, MD

Abstract:

Polydactyly is a common congenital deformity of an extra digit or digits to a hand or foot and occurs commonly with syndactyly. There is a variety of polydactyly depending on the duplication of the all or part of the toe and the presence of bone duplication. In this case study, we present a case presentation of a 11 month old female child who had polydactyly of all four limbs as well as a longitudinal bracketed epiphysis (delta phalanx) causing a hallux varus deformity and syndactyly.

Background:

A 8 month of female with polydactyly of all four limbs presented to our pediatric orthopedic clinic with the mother concern for the child unable to wear

Figure 1 Simple Post axial deformity of the left hand, identical deformity on the right.



normal shoes as well as cosmetic appearance. The child had identical simple post axial polydactyly of bilateral hands (Figure 1) which had no functional ability. However on the lower extremities were two different pre axial deformities. The right foot, the child had a pre axial complex polydactyly deformity with a well formed hallux with syndactylized digits of 2 and 3 and a hallux varus deformity due to a longitudinal bracketed epiphysis (Figure 2A).

The left foot, the child had a pre axial simple polydactyly attached to an enlarged 2nd digit which was also syndactylized to the 3rd digit which also had a hallux varus deformity and longitudinal bracketed epiphysis of the 1st metatarsal (Figure 3A). The pediatrician did not make a diagnosis to what congenital

Figure 2A. Complex pre-axial deformity with a delta phalanx and hallux varus deformity, syndactylized digits of 2 & 3 Right foot





Figure 2 B. After resection of the pre axial polydactyly, osteotome placed in the area for open wedge osteotomy. Irregular shaped delta phalanx noted on the 1st metatarsal of the Right foot.

deformity would be linked with the child's multiple polydactyly deformities and the wide set eyes and enlarged forehead. The child did not have any other medical history or surgeries and there was no family history of polydactyly or other congenital deformities.

Due to the quantity and complexity of the deformities of all four limbs, as well as the necessity of the child needing to wear shoes in the next few months when the child would start walking, decision was made to perform surgery when the patient was 10 months old. The child was put under general anesthesia by the pediatric anesthesiologist and care was made to scrub, prep and drape all four limbs of the patient. No tourniquet was used. Local anesthetic block using Marcaine 0.25% with epinephrine was used to locally block the incision sites.

First attention was drawn to the hands in which two elliptical incision were made at the bases of the extra digit of the hands, bleeding was cauterized using a bovie and the subcutaneous fat was debunked in order to achieve closure. Incision of the hands were closed using chromic suture. This was repeated for bilateral hands without complications. Surgical site was later dressed with antibiotic ointment, xeroform, 2x2 gauze, webril and a light ACE bandage.

Then attention was drawn to the right foot, longitudinal incision was made over the medial aspect



Figure 3A, Complex pre axial polydactyly of the left foot with syndactylized digits of 2 & 3 and a hallux varus deformity with a delta phalanx.

of the foot with an elliptical incision around the pre-axial extra digit. Incision was carried down using a bovie with care to avoid any neuromuscular structures. The extra digit was disarticulated at the base. Care was made to save the extra digit as the bone from the enlarged phalanx was used as autografts. It was noted at the head of the 1st metatarsal that the shaped of the metatarsal was enlarged and curved as it articulated with two halluxus and consistent with a typical longitudinal bracketed epiphysis. The cartilage of the 1st metatarsal medially which articulated on the pre-axial extra digit was carefully removed using a rongeur and curette. Care was made sure not to touch the articulating surface of the 2nd hallux. The syndactyly of the 2nd and 3rd digits were left alone in order to prevent hallux varus recurrence instead of performing the usual modified farmer's procedure.

It was noted that despite the resection of the polydactyly, there was a hallux varus deformity of the 2nd digit on the 1st metatarsal that was coming from a proximal deformity of the longitudinal bracketed epiphysis due to abnormal closure of the epiphysis which had caused decreased in longitudinal growth but continual transverse growth medially. Using a small osteotome, a perpendicular bone cut was made at the proximal 1/3 of the 1st metatarsal and wedged open to correct the varus deformity. A k-wire was inserted from the 2nd digit to the 1st metatarsal with the



Figure 3B: After removal of the polydactyly deformity, the hallux varus deformity and delta phalanx noted.

open wedge osteotomy correction. An autograft from the base of the proximal phalanx of the extra digit was used to also hold the open wedge osteotomy correction and increase bone healing.

Then lastly attention was drawn to the left foot in which the complex pre axial deformity was resected using 2 elliptical incisions at the 2nd digit and a longitudinal incision was elongated on the medial aspect of the foot in order to correct the hallux varus deformity and longitudinal bracketed epiphysis of the 1st metatarsal. The enlarged curved 1st metatarsal had made it impossible for the longitudinal growth of the 1st metatarsal causing a worsened hallux varus deformity than the contralateral foot. Using a small osteotome, a perpendicular bone cut was made at the proximal 1/3 of the 1st metatarsal and wedged open to correct the varus deformity. A k-wire was inserted from the 2nd digit to the 1st metatarsal with the open wedge osteotomy correction. Another autograft from the base of the proximal phalanx of the right foot extra digit was used to also hold the open wedge osteotomy correction and increase bone healing.

Then the surgical sites were copiously flushed and closed subcutaneously using vicryl and then simple interrupted sutures with chromic. Surgical site was applied with antibiotic ointment, xeroform, 2x2 gauze,



Figure 4A: Immediate post op, right foot

webril, and a posterior splint was applied with an ACE bandage which was worn about 6 days.

Pt returned after 6 days for surgical incision site check which was clean and without infection to all four limbs. Hand incision sites were simply dressed with bandaids. Then an above knee soft cast with webril was applied to bilateral legs to be worn for 3 weeks.

Discussion:

Polydactyly is a deformity of an extra digit or digits to a hand or foot and occurs commonly with syndactyly. There is a variety of polydactyly depending on the duplication of the all or part of the toe and the presence of bone duplication. The extra digit may also articulate with a partial or completely duplicated metatarsal which may have a “Y” or “T” shape to articulate with the toe. A simple polydactyly consists of an extra digit of soft tissue only, whereas a complex polydactyly consists of an extra digit with bone. Pre-axial polydactyly occurs when the extra digit occurs on the medial side of the foot (9% occurrence) which commonly occurs with longitudinal bracketed epiphysis. Central polydactyly occurs especially when there is a partially formed 4th metatarsal (6% occurrence) and syndactyly or synchondrosis of the of the digit occurs with the 5th proximal phalanx. Post-axial polydactyly



Figure 4B: Immediate post op right foot

occurs when the extra digit occurs on the lateral side of the foot (85% occurrence).¹

Longitudinal bracketed epiphysis is rare growth disorder known as the “delta phalanx” of the metatarsal in which the epiphysis and the physis connect on the medial side on the 1st metatarsal causing the diaphysis and the normal proximal epiphysis to be connected with a distal pseudopiphysis (1). The abnormal connection causes the lateral diaphysis with an epiphysis to continue to grow causing a wide metatarsal with a varus deformity of the hallux, causing a triangular or “C” shaped epiphyseal plate (2). The deformity most commonly occurs at the 1st metatarsal and is commonly associated with a hallux varus deformity, pre-axial polydactyly, syndactyly, clubfoot, apert’s syndrome, and poland’s syndrome . No conservative treatment is available however the resection of the longitudinal bracketed epiphysis with the preservation of normal proximal epiphysis and the distal pseudo epiphysis with soft tissue release for the hallux varus deformity and resection of the pre-axial polydactyly is a surgical treatment with good results and low to no reoccurrence rates (1)(3)(4). In our case we also performed as opening wedge osteotomy with autograft insertion to correct the hallux varus deformity with temporary fixation with a k-wire. This wire would be removed after 3 weeks.

We presented an interesting case study of a 10 month old female with polydactyly of all four limbs that was surgically treated. Resection of polydactyly depending on whether it is a simple verses complex deformity as well as the presence of a longitudinal bracketed epiphysis causing a hallux varus deformity and the



Figure 5: Immediate post op left foot

presence of syndactyly were all part of the equation of the surgical treatment plan for this patient.

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The Mass Effect of a Lipoblastoma: A Pediatric Tumor Case Report

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Sarah Daigle DPM

Rachel Balloch DPM, AACFAS

I. Introduction

Lipoblastomas are rare, benign tumors of embryonic or immature adipose tissue, separated by connective tissue septa of various thicknesses, with focal myxoid.^{1,2} These neoplasms are found almost exclusively in infancy and in early childhood, and account for less than 1% of all childhood neoplasms.³ Diagnosis occurs before 3 years of age in 90% of cases, and 40% of cases are diagnosed in the first year of life.⁴ Lipoblastomas often present as an asymptomatic, rapidly enlarging, soft lobular mass on the extremity.³ Most

lipoblastomas occur in the superficial tissues of the arms and legs, but also arise in the head, neck, parotid gland, eyelid, tonsillar fossa, mediastinum, and retroperitoneum regions.⁵ Although these tumors are benign, they can have a significant mass effect, including displacement of bones and compression of soft tissues. There is a slight male predominance with a predilection for the left side of body.^{1,4,5} This paper reports a case of lipoblastoma found in the plantar left foot of a 2-year old male.



Figure 1: Gross pictures of the left foot in this 2yo male patient



Figure 2: AP Xray, Left foot

Figure 3: Lateral Xray, demonstrating indiscriminate soft tissue mass in plantar left foot

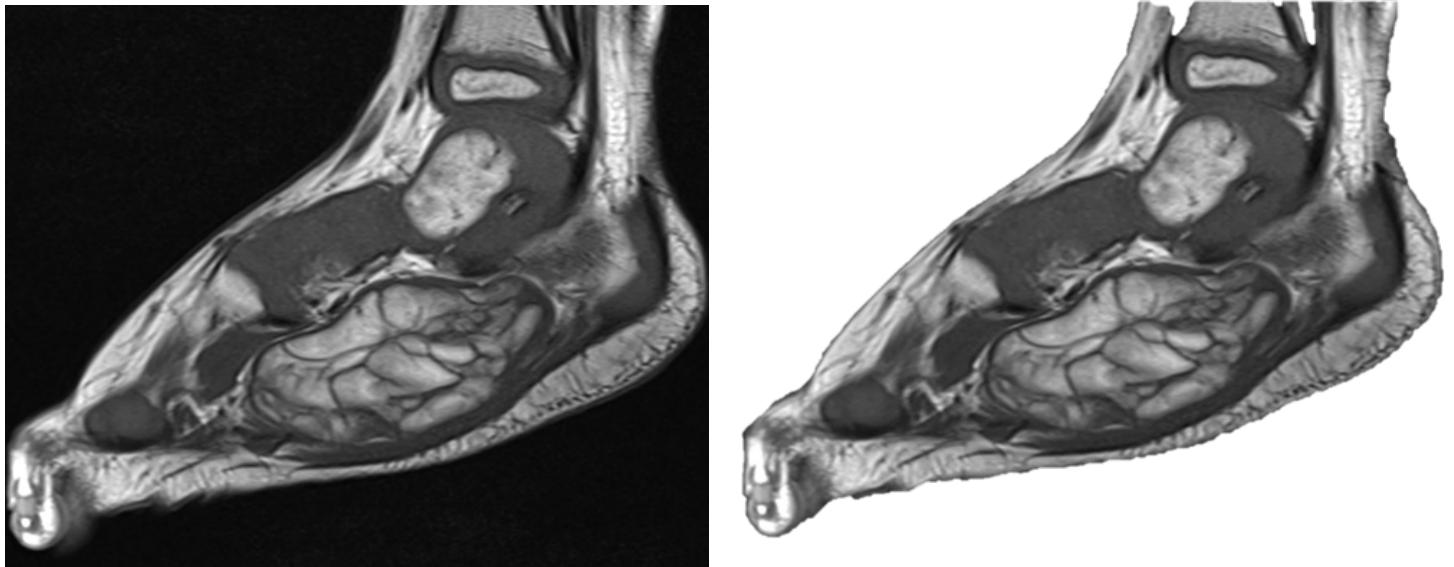


Figure 4: T1 Sagittal view demonstrates hyperintense internal fat signal with multiple internal septations measuring up to approximately 1.4mm in thickness. This finding is centered along the quadratus plantae muscle along the plantar aspect of the midfoot and extends posteriorly along the plantar medial aspect of the calcaneus to the level of the sustentaculum

II. Case Report

Our patient is a 2-year-old male who presented, with his parents, to the Emergency Department for a mass to his left foot which was affecting his gait. The mass was mobile and soft to palpation without fluctuance or tenderness. It was not pulsatile in nature and did not trans-illuminate. The mass involved the entire plantar arch (Figure 1).

An X-ray was obtained which showed a soft tissue mass on the lateral view with otherwise normal os-

seous development. There was no mass effect to the bones (Figures 2 and 3). An ultrasound was performed which revealed a multi-lobulated, well-circumscribed mass, without intra-mass blood flow. The patient underwent conscious sedation and received an MRI which revealed a multi-lobulated, solid, soft tissue mass. The mass measured 5.4cm x 2.7cm x 2.4cm, and was centered along the plantar, medial aspect of the calcaneus and cuboid, extending distally within the plantar aspect of the midfoot, to the level of the bases of the metatarsals (Figures 4 and 5). The radiologist noted that a mass effect was exerted upon the

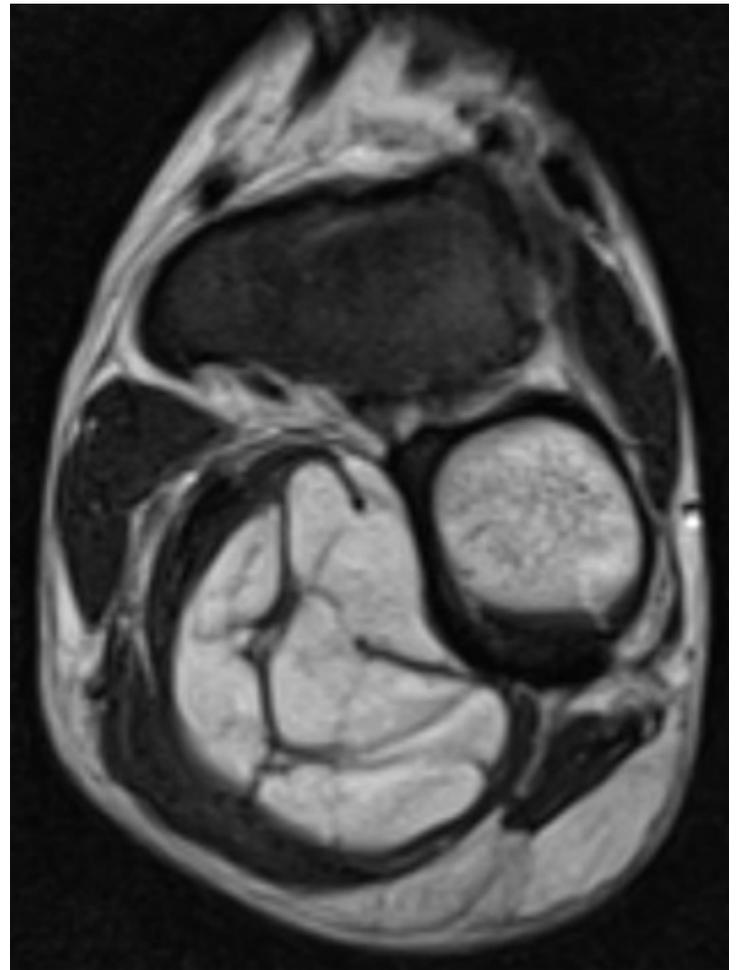
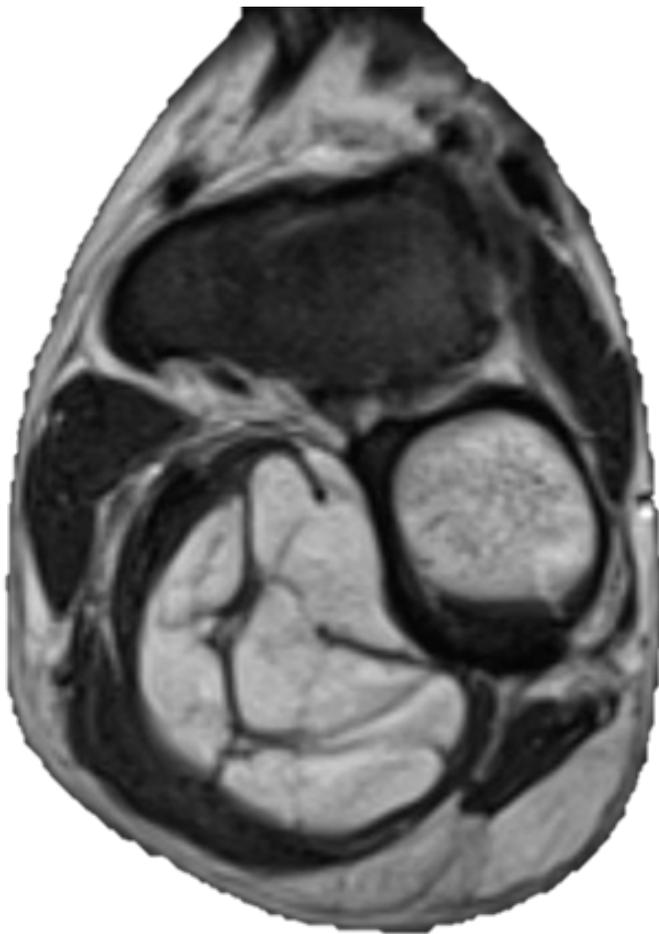


Figure 5: T2_TSE FS Short Axis Coronal with no significant soft tissue edema surrounding this well-circumscribed mass. No other focal regions of abnormal soft tissue enhancement

Figure 6: Intraoperative gross picture showing the mass within the plantar arch. Notice the flexion of the digits secondary to the mass effect.



flexor digitorum and flexor hallucis longus tendons. On physical exam, this was seen with flexible flexion contracture of the toes.

The final impression of the MRI was that of a lipoblastoma. An atypical lipoma was felt to be less likely due to the prominence and number of internal septations within the mass as well as the patient's demographic. A liposarcoma was also felt to be less likely due to the young age of this patient and lack of significant surrounding soft tissue edema adjacent to the mass. It was felt that complete excision would be the most beneficial treatment to prevent further mass effect and potential foot deformity.

A curvilinear, lazy S incision was determined to be most appropriate, as this could easily be extended proximally, as the MRI indicated extension of the mass

Figure 7: Intraoperative gross picture after the mass was removed. Notice the normalization of the digits into a rectus position.



to the level of the sustentaculum tali. This would also allow adequate exposure medial to lateral. The large mass was well encapsulated, and without abnormal protrusions into the surrounding tissues. The mass was sent to pathology whose assessment was a multi-lobulated, lipomatous neoplasm with myxoid changes compatible with a benign lipoblastoma (Figures 9 and 10). The patient's postoperative healing after 2 weeks is shown in Figure 11. In a two year old child, a plantar incision has its risks, including scar formation. Despite the activity level relayed by the mother, the plantar incision healed without incident or dehiscence. We used 4-0 monocryl to avoid suture removal in a child.

III. Discussion

Adipose tumors are not common in children, accounting for only 6% of pediatric soft tissue lesions.⁴ There has been multiple case reports regarding these tumors,

Figure 8: Soft tissue mass measuring 5.3 x 3.1 x 2.1 cm gray-pink to tan well encapsulated smooth soft tissue

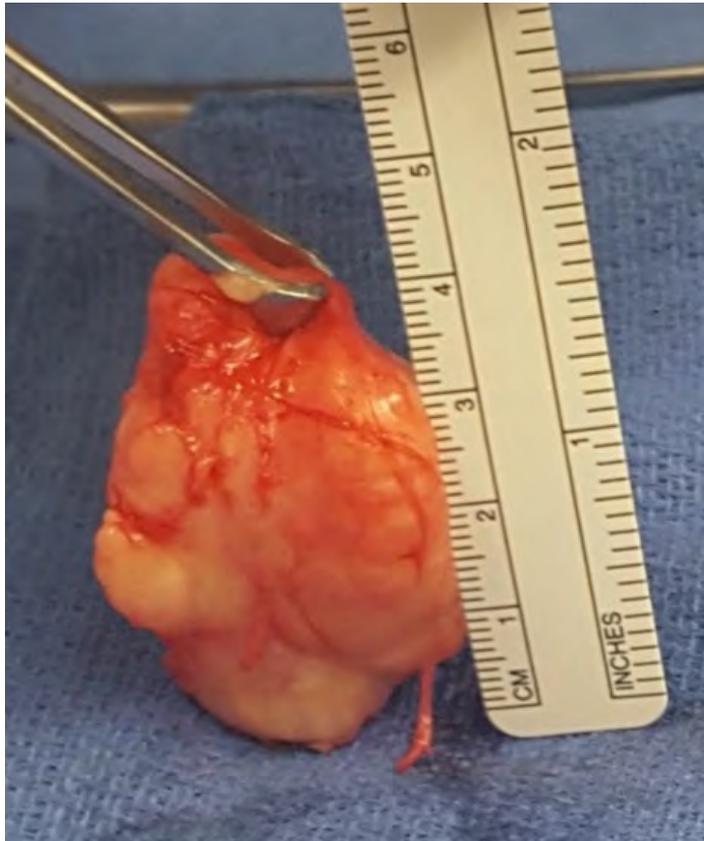


Figure 9: Lobular configuration with fibrous bands. H&E Stain, Magnification 20X

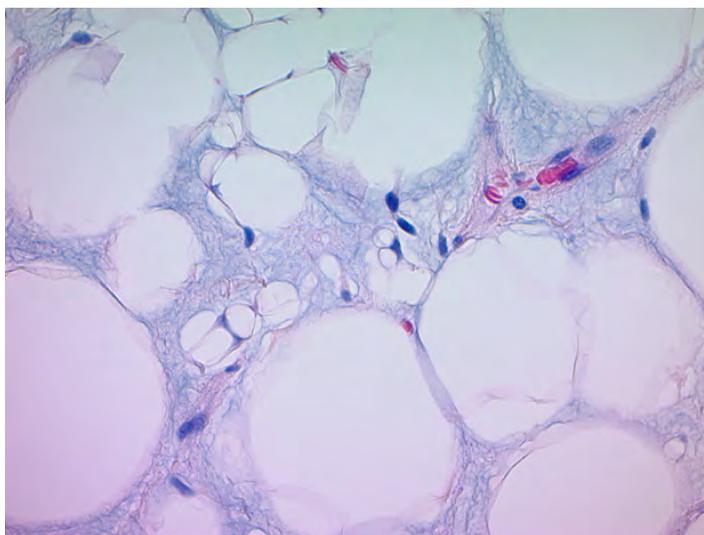
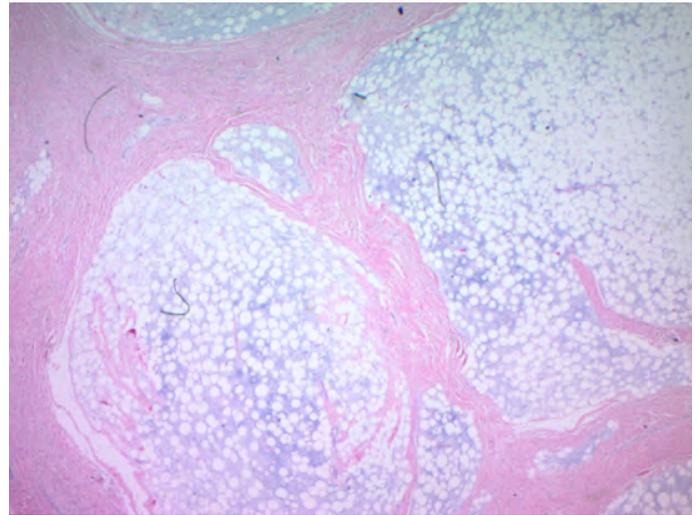


Figure 10: Adipocytes in different phases of maturation including lipoblasts (arrows). H&E stain, Magnification 400X

and to the best of our knowledge, only 12 cases of lipoblastomas of the foot have been documented. The time to diagnosis is critical, as there have been varying defects as sequela to the mass effect of these tumors. Although radiographs are limited, plain films are indicated initially for evaluation of the osseous structures, and can often show a radiolucent component of the soft tissues. In a case presented by Syed, A. et al in 2007, the swelling of the mass resulted into scalloping and thinning of the metatarsals due to its pressure effect.² Kamal et al depicted a lipoblastoma of the leg revealing no mass effect, but rather a periosteal thickening of the fibula.³

Any suspicion of a neoplasm, especially in the pediatric population, warrants a CT or MRI. In this case, we felt an MRI would be appropriate given that the mass was only involving soft tissue, as confirmed by x-ray and ultrasound. Typically, lipoblastomas are hypointense on T1 and hyper-intense on T2.⁴ The two most common appearances of lipoblastoma in MRI are a well-defined fatty mass and circumscribed soft tissue lesion embedded within large masses of fatty tissues.³ Our patient had this fatty mass deep to the quadratus plantae muscle.

Histopathology is the gold standard in establishing the final diagnosis.³ The adipose tissue shows a maturational spectrum, which includes univacuolated lipo-

Table 1: Differential Diagnoses^{1,2,7,8,10,11}

DDX LE Tumors	Age/Affected Body Part(s)	Histology
Lipoblastoma	Occurs typically w/in first 3 yrs of life Wide anatomic distribution w/ predilection for extremities	Lobulated w/ connective tissue septa containing mature and immature adipose tissue Connective tissue septa and myxoid mesenchymal tissue No nuclear atypia PLAG1 gene rearrangement, located on chromosome 8q12
Myxoid Liposarcoma	Occur age 10+ Peak 50-65 yrs Predilection for extremities and retroperitoneum	Similar histology to lipoblastoma but may also have larger myxoid component, cellular atypia and nuclear hyperchromasia w/ high mitotic count No PLAG1 gene rearrangement
Primitive myxoid mesenchymal tumor of infancy	First year of life Wide anatomic distribution	Homogenous oval to spindled mesenchymal cells in myxoid background; No lipoblasts Open chromatin; Indistinct nucleoli w/ mild atypic No PLAG1 gene rearrangement
Lipoma	Occurs at any age Peaks 40+ yrs Wide anatomic distribution	Well encapsulate lobules of adipose tissue Thin, fibrous capsule Gene rearrangements involve chromosomes 6, 12, and 13
Lipofibromatosis	Pediatric Wide anatomic distribution w/ predilection for hands and feet	Abundant adipose tissue traversed by bundles of spindled fibroblast-like cells Well organized fibroblastic element within septa May involve S-100 protein in the spindled element
Fibrous Hamartoma of Infancy	First 2 years of life Axilla, inguinal region, and proximal extremities	Poorly circumscribed; Fibro-fatty component w/ primitive mesenchymal cells Spindled fibroblastic cells, varying amounts of collagen, nodular aggregates of immature stellate-shaped and spindled cells in myxoid matrix, and mature univacuolated adipocytes
Calcifying Aponeurotic Fibroma	First decade of life Strong predilection for hands and feet	Nodular foci with calcification and cartilage formation Small epitheloid fibroblasts in corded array and lack of defined fatty elements
Juvenile (Infantile) Fibromatosis	Pediatric Wide anatomic distribution w/ predilection for muscles of head/neck, shoulders, upper arm and thigh	3 subtypes: mesenchymal, fibroblastic, and desmoid variants Morphologically diverse, composed of fibroblast-like cells with histological differences attributed to pt age and level of maturation

blasts, signet ring cells, multivacuolated lipoblasts, and mature adipocytes. Mature adipocytes typically are centrally located while, at periphery, immature myxoid and stellate mesenchymal cells are seen.⁶ The mature and immature adipose tissues are typically separated by connective tissue septa of varying thickness, seen in Figure 10 from our patient's histopathology slides. The observation of myxoid stroma is more prominent in infants.⁴

Definitive treatment is complete surgical excision.^{1,8} Lipoblastomas are considered biologically benign and grow locally, which can lead to a significant mass effect. Fortunately for our patient, the mass effect was only affecting the flexor tendons which we feel will resolve now that the tumor has been excised. Local recurrences are reported in 9% to 25% of cases with no metastases reported in the literature.^{2,3,5}

It is important to be aware of the differential diagnoses and understand the importance of early diagnosis and treatment. Table 1 exhibits a breakdown on pertinent



Figure 11: 2 weeks postoperative healing with Monocryl in place. No signs of dehiscence.

differentials to consider. A sense of urgency is imperative when working with the pediatric population. Our patient was seen in the emergency department, obtained an MRI, and was taken to surgery within a two week timeframe. Fortunately, this tumor is of benign nature. We educated the parents about the risk of recurrence and follow up is to be scheduled accordingly.

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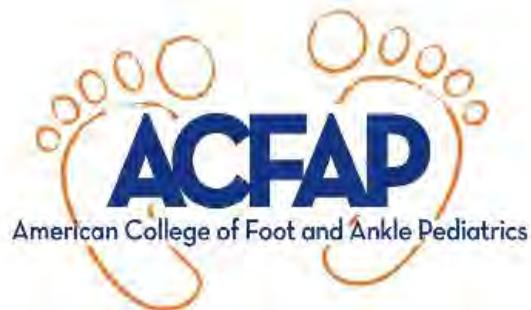
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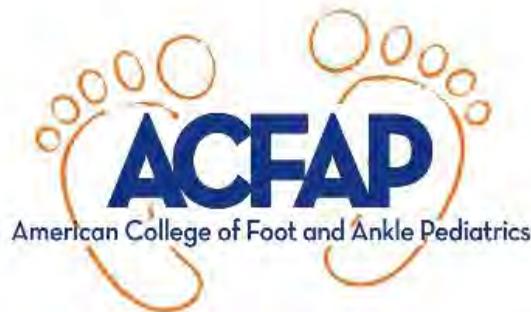
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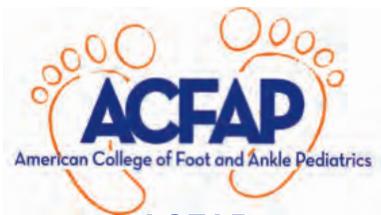
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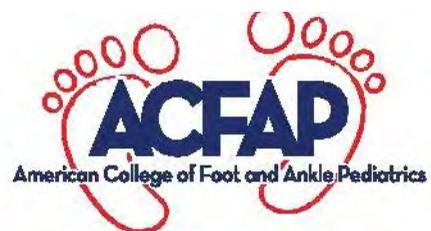
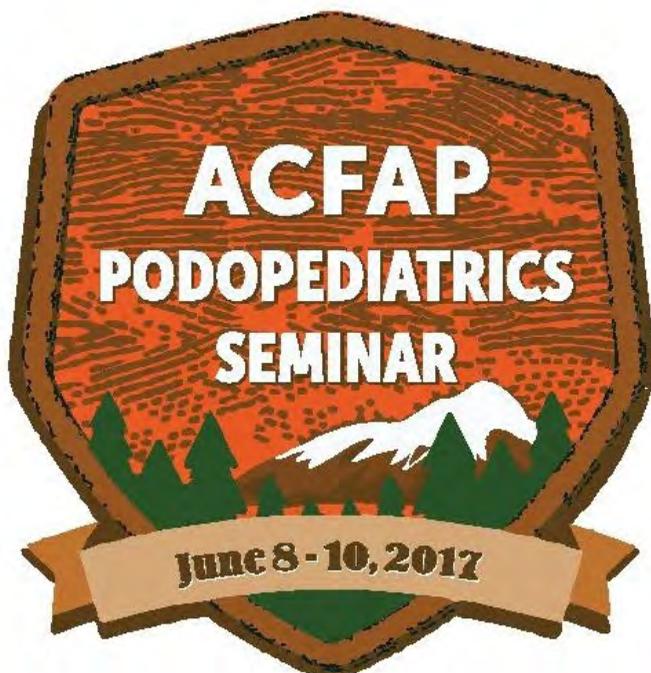
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