Our Unique Position to Serve Those in Need

The Yucatan Crippled Children's Project continues to shape hundreds of participating DPMs.

BY TODD M. CHAPPELL, DPM, CRAIG CLIFFORD, DPM, BYRON L. HUTCHINSON, DPM, AND G. DOCK DOCKERY, DPM

"I will apply, for the benefit of the sick, all measures which are required…"[1] Most everyone who has taken the oath of Hippocrates did so with a dream of serving others, and there are those who dreamt of a service that went beyond the day-to-day routines that many of us follow each day. There are opportunities to step outside of our routines and serve those in need by giving of ourselves and the skills we have dedicated our lives to developing and perfecting; by so doing, our skills grow and our motivation to continue to strive to be better and more skilled is fueled.

On July 4, 1996, Dr. Charles C. Southerland of Barry University in Miami Shores, Florida, led a team of podiatric physicians on a mercy mission to Mérida, Yucatán, México, to perform surgery on disadvantaged crippled children. Dr. Southerland and Co-Founder, Dr. Keith Kashuk, became directors of what was to be called Barry University's Yucatán Crippled Children's Project (YCCP).

Shortly after the initial program began, Dr. G. Dock Dockery, Director of The International Foot & Ankle Foundation (IFAF), was invited to attend and, thereafter, became a vital part of the trips. His experiences motivated continuous involvement in the YCCP, which has since grown to shape hundreds of DPMs by their participation in this service as residents. Eventually, Dr. Byron Hutchinson was also invited to be a part of the Seattle Team. IFAF continues to sponsor a medical team of surgeons and podiatric residents from the NW Podiatric Surgical Residency Consortium (Swedish Medical Center & Franciscan Foot & Ankle Institute) to attend twice yearly, along with surgeons and residents from Barry University and its affiliated residencies in Florida. IFAF also sponsors one of two annual trips for the Northern Colorado Residency Program, with Dr. Daniel Hatch as the Team Leader.

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Collaboration and Coordination

Collaboration and coordination with the Mexican Red Cross Orthopedic Hospital—Cruz Roja Mexicana Hospital de Ortopedia (CRMHO) and the Yucatán Foundation for the Comprehensive Development of the Family—Desarrollo Integral de la Familia (DIF) are what make our efforts continue uninterrupted year after year. Our volunteer physicians and surgeons travel to the Yucatán and screen children with severe and disabling foot and leg disorders in clinics staffed and organized by the DIF. Several children are then scheduled for reconstructive surgery at the local CRMHO and receive post-operative care by the hospital Chief of Staff, Dr. Adolfo Rocha Geded, a pediatric orthopedist from Mérida. IFAF also serves the project by raising money, which it then donates to Barry University for the purpose of funding additional trips, supplies, and equipment for the multi-annual project.

Due to the purpose and location of the trip, the team is exposed to a variety of pathologies, many of which are less common in the United States. The frequency of the trips, four per year, provides a great opportunity for continuity of care and follow-up evaluation. All of the surgeons traveling as part of the YCCP are consistent, and although they do not travel each trip, Dr. Rocha provides dependable peri-operative care and follow-up. Each of the visiting surgeons in the YCCP travel at least twice per year to be in Mérida and work as part of the team serving this community in need. This integration and overlap of surgeons and the team approach to pre-operative, operative

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and post-operative care provide a fertile ground for the best possible care in this underserved community full of lower extremity pathology.

The Evolution of Resources

Progreso, México, is the beginning of our patients' journey with us; this is the location where the evaluation and work-up of potential surgical patients takes place. The DIF clinic in Progreso could be considered the gateway to treatment as part of the YCCP. For each trip, there are approximately 80–100 patients seen by our surgeons and residents, with pathology spanning from common to rare, including paronychia, syndactyly, pediatric pes plano valgus, internal tibial torsion, medial hamstring tightness, sequelae of cerebral palsy and myelomeningocele, talipes equinovarus, osteogenesis imperfect, and multiple epiphyseal dysplasia, just to name a few. The variety and quantity of pathology is extraordinary and the learning opportunity that it provides to residents is invaluable.

All of the supplies needed for the DIF clinic and for the hospital surgeries are collected and transported with us for each trip; they are purchased with donations to Barry University's YCCP and IFAF, as well as donations from the training hospitals of the various participating residencies. The DIF clinical staff prepares the patients' charts and divides doctors into two clinic rooms with three beds in each. A complete history and physical is obtained and any prior medical records are reviewed for each patient. Many of the pathologies simply require conservative management and, over the years, many resources have evolved to serve these particular patients.

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The presence of Dr. Rocha, and his staff locally at the CRMHO, has been a tremendous positive benefit for the patients served by the YCCP. His team is able to provide the local conservative care these patients require. Those patients who do require surgical treatment are catalogued by the DIF staff, and records are sent to Dr. Rocha and the hospital staff at the CRMHO for further evaluation and planning to determine eligibility and the optimal date for their surgical treatment.

Team Effort

In addition to the patients seen in the clinic, there are patients seen by Dr. Rocha and his colleagues who are referred to the YCCP for treatment on subsequent trips, as their pathology is best addressed by the technique of circular external fixation (CEF), which is beyond the capabilities and training of the surgeons in the area. The communication that exists between Dr. Rocha and the YCCP is exceptional and is one of the major reasons this project is such a success. Patient work-up evaluations

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Figure 1: (A) Clinical appearance of inclusion cyst. (B) Pre-operative plan for surgical excision utilizing O-Z skin plasty. (C) Excised mass sent to pathology for examination. (D) Initial closure demonstrating central stitch for approximation. (E) Complete closure and conversion of the O-Z plasty.

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and imaging studies are transmitted to the YCCP for surgical planning in the months prior to the trip. Cases are discussed and surgical plans are put in place. The team effort and inter-professional discussion that goes into planning a proposed surgical correction are of tremendous positive value to the YCCP for the residents, and most importantly for the patients involved; their outcome is tremendously improved due to this interdisciplinary and international approach.

Once the North American medical teams arrive in Mérida, we begin to review the cases planned for day one with the medical team from the CRMHO (including internists, orthopedists, residents, and fellows). This review begins with a comprehensive medical chart review, as well as pertinent imaging collected since their visit in the DIF clinic and their follow-up with Dr. Rocha. The physicians review the surgical plan and take another opportunity for an interdisciplinary discussion. Once the surgical plan is confirmed, the team moves to the pre-operative holding area of the hospital to evaluate the patients clinically, including gait exam, and a final review of the surgical plan and post-operative care with the patients and their families.

The plan is confirmed and a trip to the operating room follows. The surgical cases for that day, sometimes as many as seven or eight, are all performed under the guidance of CRMHO anesthesiologists. This screening and surgical process is repeated on the second day and the surgical team leaves the CRMHO after tremendously growing academically, surgically, and emotionally. The following are just a few of the

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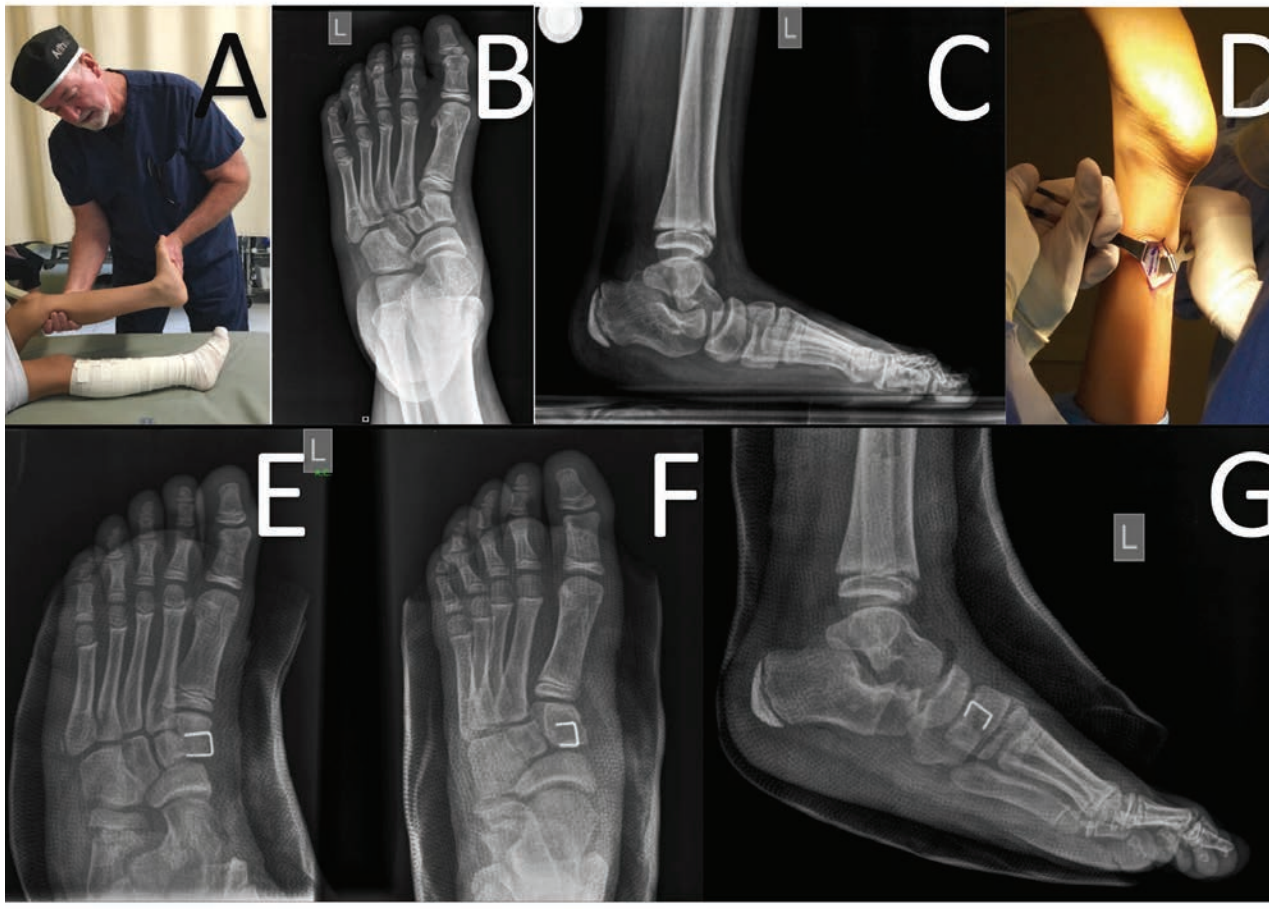

Figure 2: (A) Clinical examination of equinus demonstrating Silfverskiöld technique. (B-C) AP and lateral pre-operative radiographs demonstrating peritalar subluxation as well as decreased calcaneal inclination and increased Meary's angle. (D) Intra-operative image of open proximally based tongue-in-groove gastrocnemius recession. (E-G) Post-operative radiographs demonstrating corrective osseous procedures to realign the joints of the foot.

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case examples that were encountered by the YCCP this past December and demonstrates the variety of pathology encountered.

Case 1

The first case is a 31-year-old male patient who presented to a local medical office with a plantar callus at the inter-metatarsal region of metatarsal heads two and three. The patient stated that it developed over the past year and was painful with walking and standing. He denied any trauma to the area and did not relate any apparent changes to the appearance of the skin surrounding the area. The patient was treated by a local physician with superficial debridement and application of salicylic acid. During the course of his treatment, the patient related that the area became inflamed, and his provider placed him on a short course of antibiotics which resolved the erythema. However, despite the initial therapy, the painful callused area continued for another six months without any improvement or significant change.

He was then seen by Dr. Rocha, and x-rays were negative for any osseous changes. On exam, it was noted to appear similar to previous exams; however, it was obvious that there was a superficial mass deep to the hyperkeratotic tissue present (Figure 1A). The diagnosis which rose to the top of the differential was an inclusion cyst, and surgical excision was planned. Upon examination in the pre-operative holding area, the patient reported a previous rupture of the lesion the month prior and expression of a thick white viscous fluid. There was no additional drainage at this time and excision was planned with an O-to-Z skin plasty[2] (Figure 1B).

Intra-operatively, full thickness excision was conducted (Figure 1C) and subcutaneous tissue was undermined in order to re-approximate skin edges, converting the circular defect to a Z closure (Figure 1D). Final closure was conducted, ensuring an even distribution of tension on the skin flaps (Figure 1E). The patient was placed in a soft dressing and partial weight-bearing (WB) to

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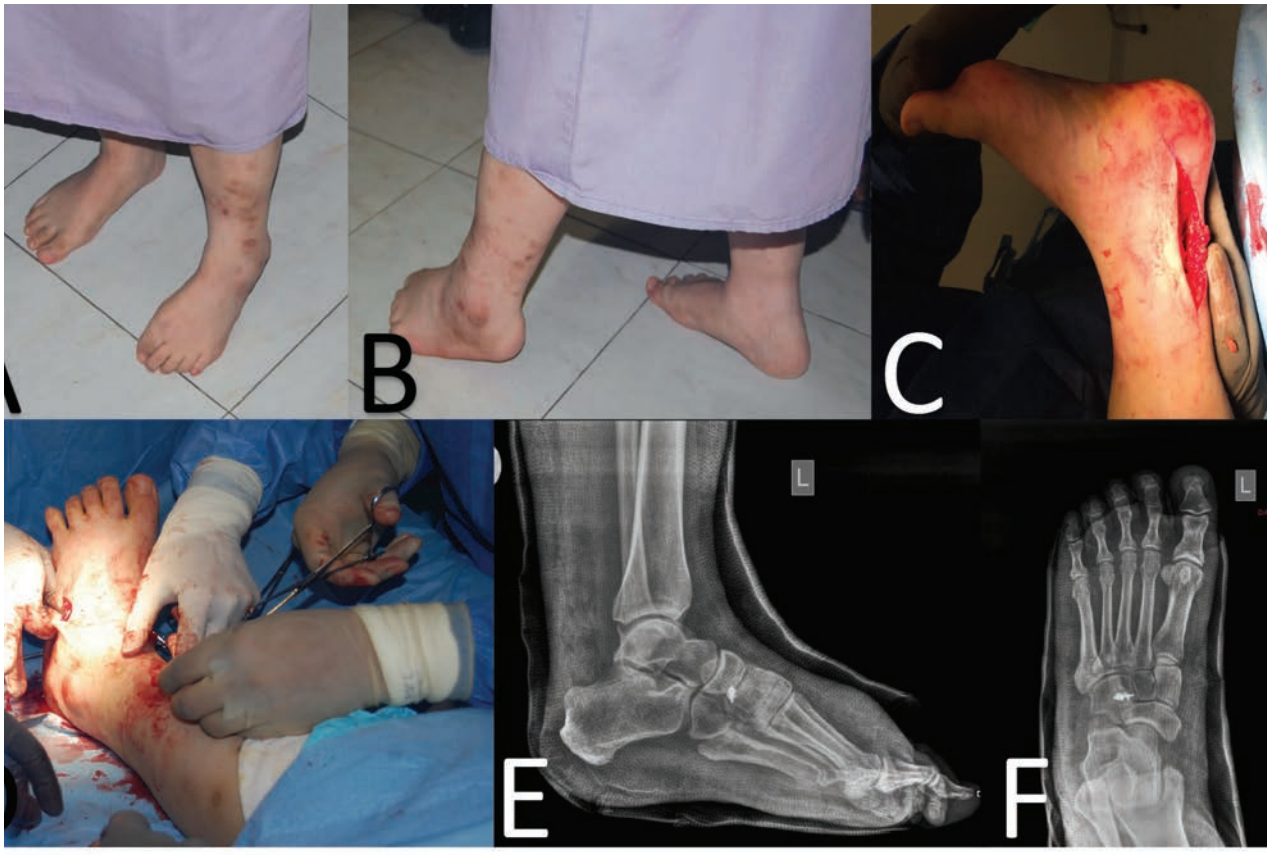

Figure 3: (A-B) Clinical images demonstrating equinovarus attitude of the foot and ankle. (C) Intra-operative image of open sagittal sliding tendo-Achilles lengthening and FHL tenotomy. (D) Intra-operative image demonstrating posterior tibial tendon transfer. (E-F) Immediate post-operative radiographs demonstrating good correction in each plane of the deformity.

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the heel until suture removal at approximately three weeks.

Case 2

The second case involves a common pathology encountered by the YCCP teams each trip. We see symptomatic pediatric pes plano valgus in various stages of management but most cases follow a similar course and surgical plan. This case involves a six-year-old female patient with bilateral flexible pes plano valgus which did not respond to conservative measures and was now bothering her at all times, including with minimal to no activity. This particular case involved a patient with gastrocnemius equinus as a component of her overall deformity, as demonstrated by the Silfverskiöld test (Figure 2A). Clinically, the patient demonstrated a markedly everted calcaneus with a medial talar bulge and "too many toes" sign. Additional to the clinical findings, it was noted on the WB radiographs (Figure 2B-C) that there was significant flattening of the medial longitudinal arch and medial talar subluxation with decreased calcaneal inclination angle. All other congenital, osseous, and suprastructural mechanical causes of her deformities were ruled out, resulting in a surgical plan consisting of a proximally based tongue-in-groove gastrocnemius recession (Figure 2D), tibial corticocancellous autograft harvest for the Evans procedure, and if necessary, concluding with a Cotton procedure. As bilateral feet were involved, the patient's family elected to undergo left foot correction due to its increased symptomatology. Immediate post-operative radiographs (Figure 2E-G) demonstrate good correction in each plane of the deformity, and subsequent WB radiographs will be important to evaluate sustained correction once WB is tolerated.

Case 3

The third case involves a 40-year-old woman who had a cerebrovascular accident affecting the right hemisphere five years prior, resulting in muscle weakness of the left upper extremity and spastic hemiparesis of the left lower extremity. Upon exam, one can note the dynamic spasticity of the deep posterior muscle group causing a reducible equinus deformity at the ankle, as well as concurrent spasticity and flexion of the long flexors (Figure 3A-B). There is also notable dynamic spasticity of the posterior tibial tendon, causing an equinovarus attitude to the left foot and ankle with WB. Due to these reducible deformities and the relative absence of radiographic evidence

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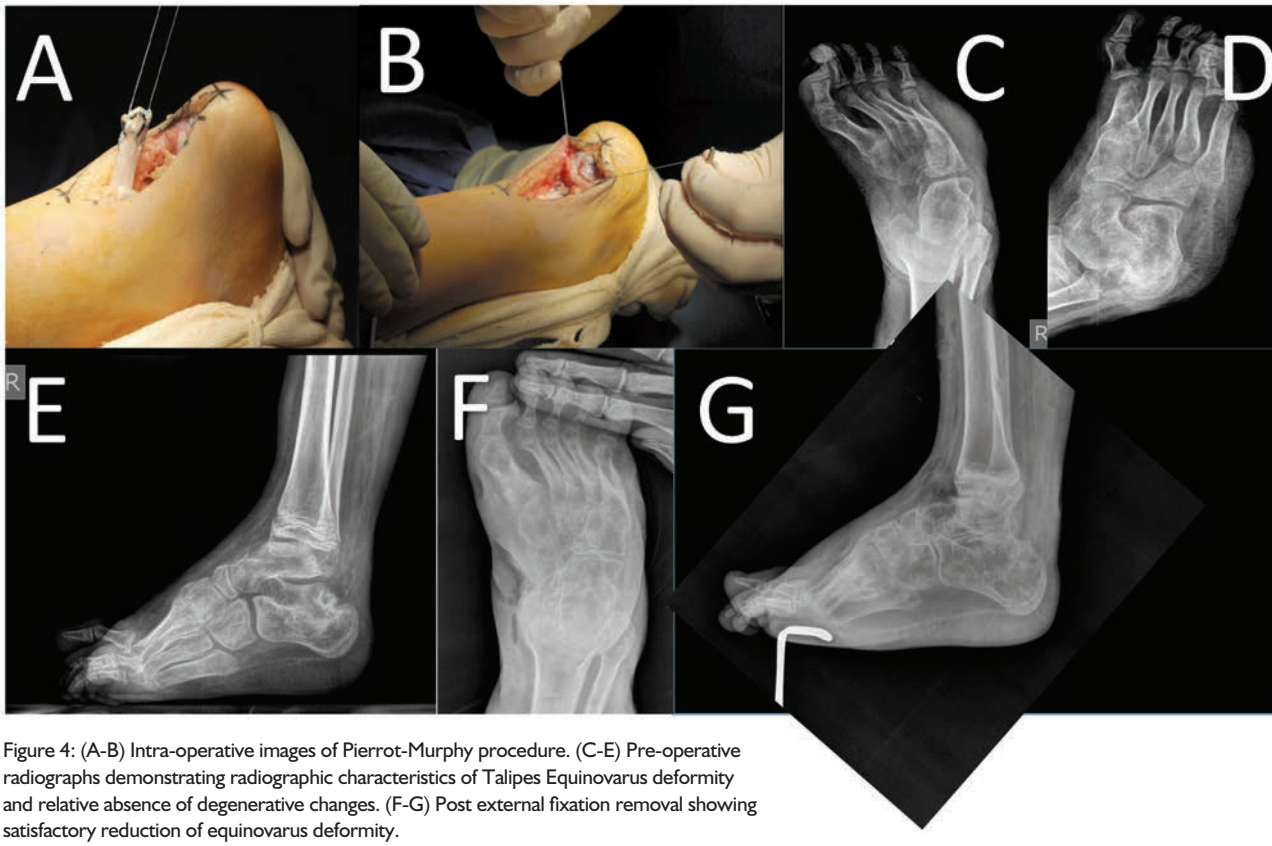

Figure 4: (A-B) Intra-operative images of Pierrot-Murphy procedure. (C-E) Pre-operative radiographs demonstrating radiographic characteristics of Talipes Equinovarus deformity and relative absence of degenerative changes. (F-G) Post external fixation removal showing satisfactory reduction of equinovarus deformity.

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of arthritic changes to the foot or ankle, it was determined to perform an open sagittal sliding tendo-Achilles lengthening (TAL), as well as a flexor hallucis longus (FHL) tenotomy at the myotendinous junction, in order to reduce all deforming forces in the sagittal plane (Figure 3C). This was followed by posterior transfer of the posterior tibial (PT) tendon to the cuboid, via the intraosseous membrane, to finalize reduction of the primary deforming force in the frontal plane (Figure 3D). Immediate post-operative radiographs (Figure 3E-F) demonstrate good correction in each plane of the deformity. Following a period of non-WB, early active motion should demonstrate reduction of deforming forces due to spasticity and adequate correction of deformity.

Over the course of the next four and a half months, correction was achieved, at which time the CEF was removed.

Case 4

The fourth case involves a 14-year-old male patient who was born with myelomeningocele and associated clubfoot deformities, bilaterally. The myelomeningocele was surgically treated at the age of four months and a posteromedial release of his left foot was conducted at the age of three years. Three years later, in 2007, he was diagnosed with a tethered cord and had subsequent spinal surgery, as well as an additional left foot surgery, which included recession of the posterior tibial tendon and transfer of the tibialis anterior to the lateral cuneiform with a closing wedge cuboid osteotomy. Prior to his presentation to Dr. Rocha in 2009, he had no treatment of the right foot. His presentation at the age of eight was due to a plantar ulcer beneath the fifth metatarsal head, which had been present for four months.

There was no frank radiologic evidence of deep infection at this time, and the ulcer was treated successfully. As evidenced by the plantar ulcer, the equinovarus deformity of the right foot required surgical correction to avoid the problematic sequelae of potential re-ulceration and infection. The patient therefore underwent a staged correction by first undergoing a Pierrot-Murphy[3-4] procedure (Figure 4A-B) in May of 2012 at the age of 11 years in an attempt to offload the forefoot and reduce the power of the Achilles tendon. This procedure was followed ten months later by application of a CEF and gradual correction of equinovarus deformity due to the reducibility of the deformity and relative absence of degenerative changes

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Figure 5: (A-C) Radiographs demonstrating progressive erosion of 5th metatarsal. (D-E) Immediate post-operative radiographs following excision of infected bone and placement of antibiotic coated beads.

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as evidenced by pre-operative X-rays (Figure 4C-E).

Over the course of the next four and a half months, correction was achieved, at which time the CEF was removed (Figure 4F-G). The patient's course was uneventful over the following eight months until he returned with a superficial wound underlying the 5th metatarsal head, similar to two years prior. This wound was treated successfully with proper footgear modification and local wound treatment; but over the next 17 months, there was evidence of progressive osteomyelitis of the 5th metatarsal that started at the neck and progressed to involve the metatarsophalangeal joint and traveled proximally toward the base (Figure 5A-C). His most recent treatment was partial excision of the 5th ray, with placement of antibiotic coated beads and syndactylization of the 4th and 5th digits (Figure 5D-E). Evidenced in this case are some of the inherent challenges faced by the patients served by the YCCP. For this young patient, it started with poor access to specialized healthcare and knowledge of the negative outcomes of inappropriate footgear or lack thereof. However, sometimes even with education, access to care for these patients has many barriers, including financial, social, religious, or simply geographic.

Case 5

The fifth and final case review is of a male patient with cerebral palsy and spastic diplegia who initially presented to the YCCP at the age of four years. At this time, the patient and his family were heavily dependent upon a wheelchair, despite his fledgling ability to ambulate with walker assistance. Following examination of his deformities, including a thorough gait examination, a determination was made as to the muscle group involvement and differentiation of spasticity versus contracture of each group. After sufficient preparation, the patient underwent multilevel surgery at the age of five years, including bilateral adductor and hamstring tenotomies (Figure 6A-B). Following a period of casting and then physical therapy, the final level of contracture was addressed at six years of age with bilateral Pierrot-Murphy procedures (Figure 6C-D). An additional period of casting and physical therapy were conducted. After completing treatment and allowing full recovery, the patient is an independent ambulator and returns to the clinic each trip to share his successful story and

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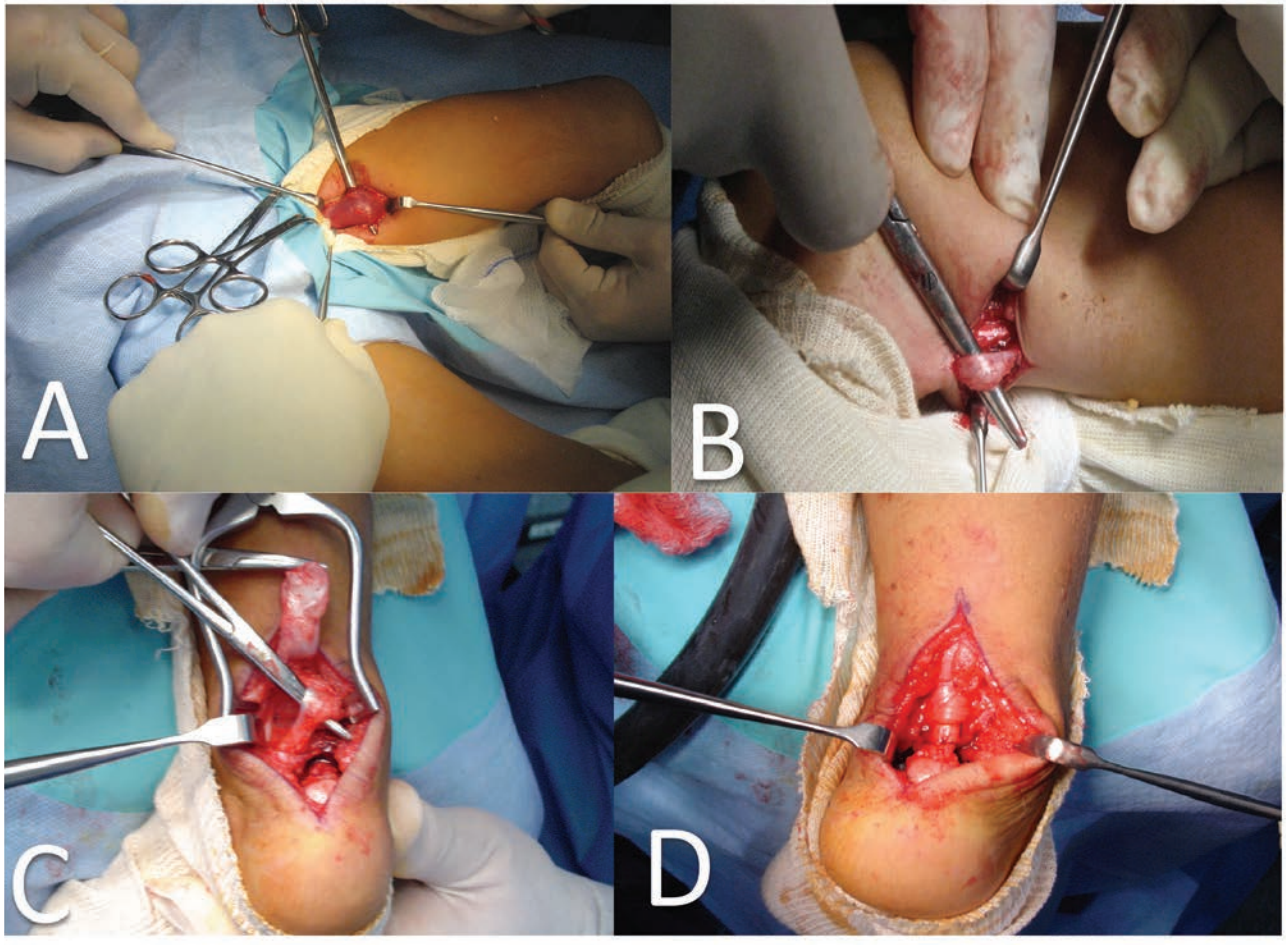

Figure 6: (A) Intra-operative images depicting adductor tenotomy. (B) Intra-operative images depicting hamstring tenotomy. (C-D) Intra-operative images depicting Pierrot-Murphy procedure as final step in correction of spasticity.

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positive attitude with all of us at the YCCP.

Conclusion

The YCCP strives to provide equivalent care to those patients we serve in the Yucatán Peninsula and in our own practices. This goal has been achieved frequently but often times there is simply a lack of resources and barriers to getting those resources to Mexico to provide this care; thankfully this is happening less and less. As we continue to improve our ability to obtain and transport resources to Mexico, each trip improves, along with our patients' outcomes. As is the case in most situations in life and practice, the more resources you have access to, the better potential outcomes you will achieve.

Despite the challenges above, this past December was a tremendous success once again. The opportunity that was ours to serve others in need was met as we applied our training and surgical skills in the treatment of various lower extremity pathologies. The variety of pathology, as well as the surgical methods employed to correct pathology, are diverse and exemplify the broad-based training required to adequately treat all abnormal conditions of the foot, ankle, and leg.

In continuing to review the Hippocratic Oath we must remember, "I will not be ashamed to say 'I know not', nor will I fail to call in my colleagues when the skills of another are needed for a patient's recovery."[1] Regardless of our training, each of us can fulfill our oaths to benefit the sick by doing our best to be experts in our chosen specialty. We can employ all the measures required by recognizing when our training and skills are simply not sufficient for our patients' needs and refer them to a colleague. As we work together and openly recognize that our passions and our training are not identical, we will serve our patients better and continue to work as a team to treat pathology of the foot, ankle, and leg. The YCCP is an example of professionals trying their best to serve their patients with the resources and knowledge they possess. This is the approach which those first members of the YCCP took on their travels to the Yucatán. Now we continue to increase in our ability and advance-

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IFAF's team from the YCCP trip. Front: Mathew Johnstone, Larissa Rolim, Jodee Brown, Jose Melos; Back: Todd Chappell, Chad Seidenstricker, Keith Kashuk, Dock Dockery, Byron Hutchinson, Craig Clifford, Pedro Fernandez Luna, Alejandro Burgos, Ralph Ramos, Ravinder Reddy

About IFAF

IFAF is a nonprofit educational organization, established in 1979, dedicated to providing the highest level of continuing medical education programs in exciting venues around the world; offering state-of-the-art workshops in ankle arthroscopy and lower extremity reconstructive surgery (Seattle Lower Extremity Surgical Symposium); supporting humanitarian efforts and training through work with Barry University's Yucatan Crippled Children's Project; creating the first open access, peer-reviewed international journal of foot and ankle medicine and surgery, the Foot and Ankle Online Journal (FAOJ.org); and providing increased revenue to help support continuing education and research for the Northwest Podiatric Residency Consortium (Swedish and St. Francis Podiatric Surgical Residency Programs) in Seattle, Washington. www.internationalfootankle.org •

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Regardless of our training, each of us can fulfill our oaths to benefit the sick by doing our best to be experts in our chosen specialty.

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ments in our techniques in order to better serve the needs of the people there. It is in giving of ourselves to benefit the lives of others that we truly grow and develop the skills that matter most. **PM**

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Dr. Chappell is currently Chief Resident at the Franciscan Foot & Ankle Institute in Federal Way, Wa. He is a graduate of the New York College of Podiatric Medicine and member of the Pi Delta National Podiatric Honor Society. He is an upcoming fellow of the Silicon Valley Reconstructive Foot and Ankle Fellowship—Palo Alto Medical Foundation.

Dr. Clifford is on the Advisory Board of the International Foot & Ankle Foundation for Education and Research as well as Editor of the Foot and Ankle Online Journal. He is the Director of Research at the Franciscan Foot & Ankle Institute at St. Francis Hospital, Federal Way, WA

Dr. Hutchinson is a member of the Board of Directors of the American College of Foot & Ankle Surgeons and Past President of the American Board of Foot & Ankle Surgery. He is the Medical Director of Foot & Ankle Services at Franciscan Health System in Tacoma, WA and the Residency Director at the Franciscan Foot & Ankle Institute at St. Francis Hospital in Federal Way, WA. He is the Lead Surgeon of the Yucatán Crippled Children's Project in Merida,Yucatán, Mexico.

Dr. Dockery is Editor-in-Chief of the Foot and Ankle Online Journal and Author of over 144 scientific and medical articles and chapters including the Color Atlas and Text of Forefoot Surgery, Cutaneous Disorders of the Lower Extremities, Color Atlas of Foot & Ankle Dermatology, and Lower Extremity Soft Tissue & Cutaneous Plastic Surgery. He is the Founder and Director of Scientific Affairs of the International Foot & Ankle Foundation in Edmonds, Washington.