



PASIG PERFORMING ARTS

SPECIAL INTEREST GROUP



ORTHOPAEDIC SECTION
AMERICAN PHYSICAL THERAPY ASSOCIATION



APTA
American Physical Therapy Association
The Science of Healing. The Art of Caring.

PASIG MONTHLY CITATION BLAST: No. 125

April 2017

Dear Performing Arts SIG members:

Upcoming conferences! We look forward to providing more programming at conferences in 2017-2018. The next Combined Sections Meeting will be held February 21-24, 2018 in New Orleans, Louisiana. Programming submissions have closed for CSM 2018, but the deadline is approaching fast of June 16th for poster or platform presentations. Please contact Rosie Canizares, our Vice-President and Education Chair with your interest.

Dancer Screening Update! We had a very successful "Young Dancer Screening" meeting at CSM in February 2017. Notes have been sent out to those in attendance and others who requested to be informed. There are opportunities in the minutes for others to be involved. A few of us will be posting our screens to the group in the near future. Please contact Mandy Blackmon at mandydancePT@gmail.com with questions or request for notes from the CSM 2017 meeting.

Fellowship Taskforce Update! The practice analysis re-validation project team is working on final revisions for the upcoming publication of the Description of Fellowship Practice (DFP) for Performing Arts Physical Therapy. The Description of Advanced Specialized Practice (DASP) in Performing Arts Physical Therapy was approved by the ABPTRFE in January 2016. The DFP is currently being reviewed by ABPTRFE. This is the final phase for laying the groundwork for providing current practice guidelines in the sub-specialty area as well as curriculum requirements for Performing Arts PT fellowships.

Interested in a Performing Arts Fellowship? The American Board of Physical Therapy Residency and Fellowship Education (ABPTFRE) has approved the PASIG Description of Specialist Practice (DSP) for the Performing arts as an area of study. We are now working with the ABPTFRE to turn the DSP into a Description of Fellowship Practice (DFP). We anticipate the DFP will be available online by June 2016. This means that sites can begin forming fellowships in dance medicine, music medicine, theater medicine, etc. The PASIG will provide the fellowship criteria for accreditation. Please contact Mariah Nierman Mariah.Nierman@osumc.edu or Laurel Abbruzzese La110@cumc.columbia.edu if interested.

Please welcome our new PASIG board members! There is room for new committee members, and students are welcome to participate. Please refer to the list below for contact information.

Annette Karim, President	2017-2020	akarim@apu.edu
Lori Michener, Orthopaedic Board Liaison	2017-2020	lmichene@pt.usc.edu
Rosie Canizares, Vice President/ Education Chair	2016-2019	Rcc4@duke.edu
Andrea Lasner, Nominating Committee Chair	2015-2018	alasner1@jhmi.edu
Jessica Fulton, Nominating Committee	2016-2019	jessicafultondpt@gmail.com
Brooke Winder, Nominating Committee	2017-2020	brookerwinder@gmail.com
Elizabeth Chesarek, Membership Chair	2016-2018	echesarek@gmail.com
Laura Reising, Research Chair	2016-2018	lbreising@gmail.com
Mariah Nierman, Fellowship Taskforce Chair, Practice Analysis Coordinator	2016-2018	mnierman@orthopedicone.com
Laurel Abbruzzese, Fellowship Chair Asst.	2016-2018	La110@cumc.columbia.edu
Dawn Muci, Public Relations Chair	2016-2018	Dawnd76@hotmail.com
Amanda Blackmon, Dancer Screening Chair	2016-2018	mandydancept@gmail.com
Anna Saunders, Scholarship Chair	2017-2019	annarosemary@gmail.com
Janice Ying, ISC Chair	2017-2019	JaniceYingDPT@gmail.com
Megan Poll, Secretary	2017-2019	meganpoll@gmail.com

Membership: Current PASIG members, please remember to update your membership:

https://www.orthopt.org/login.php?forward_url=/surveys/membership_directory.php

Social Media: For fun PT info and related performing artists info...

1) Facebook page: (closed) so, if you would like to be a part of the group, email me on Facebook: Dawn Doran and let me know you'd like to join.

2) follow PASIG on Twitter: @PT4PERFORMERS

Call for case reports: If you have a brief, clinically-focused case report on a performing arts PT patient, or a clinical commentary, please contact Annette Karim to submit your writing for the next Orthopaedic Physical Therapy Practice Magazine: neoluvsonlyme@aol.com

WE NEED MORE CONTRIBUTORS TO OUR MONTHLY CITATION BLASTS!!!!

Past Monthly citation blasts are available, with citations and EndNote file, listed on the website:

http://www.orthopt.org/content/special_interest_groups/performing_arts/citations_endnotes

TOPICS THAT HAVE BEEN COVERED RECENTLY INCLUDE:

Flexor Hallucis Longus Dysfunction (Current)

Sacroiliac and Pelvic Dysfunction Screening

Gyrotonics ® and Gyrokinesis ® for the Performing Artist

Medial Tibial Stress Syndrome

2nd Tarsometatarsal Joint Injuries in Dancers

Screening Tools for the Young Dancer

Thoracic Outlet Syndrome and Nerve Entrapment in Instrumental Musicians

Plyometric Training in Dancers

HVLAT for Lower Extremity Conditions

Inguinal Disruption

Femoroacetabular Impingement

Hand and Wrist Conditions in Gymnasts

Factors in Optimal Turnout

Achilles Tendinopathy

Biomechanics and Posture in Musicians

Pilates

ACL Injuries in Dancers

Patellofemoral Pain and Dance

Neural Entrapments Found Among Musicians

Stress Fractures of the Foot and Ankle

Dry Needling

Dynamic Warm Up and Stretching

If you are interested in contributing by writing a citation blast or joining the research committee, contact me at lbreising@gmail.com.

Sincerely,

Laura

Laura Reising, PT, DPT, MS, OCS
Research Chair, PASIG Research Committee
Allegheny Health Network, Wexford Health + Wellness Pavillion
Wexford, PA
Home: lbreising@gmail.com Work: Laura.Reising@ahn.org

PASIG Research Committee members:

Shaw Bronner PT, PhD, OCS, sbronner@liu.edu
Jeff Stenback PT, OCS, jsptocs2@hotmail.com
Sheyi Ojofeitimi PT, DPT, OCS, sojofeit@gmail.com
Susan D. Fain PT, DMA, sfain@ptcentral.org
Brooke Winder, PT, DPT, OCS, BrookeRwinder@gmail.com
Sarah Edery-Atlas, PT, DPT Sarah.Edery-Atlas@nyumc.org (EndNote Organizer)

PERFORMING ARTS CONTINUING EDUCATION, CONFERENCES, AND RESOURCES

Musician Health Series, Janice Ying, PT, DPT, OCS
Glendale Adventist Therapy and Wellness Center, Los Angeles area (Eagle Rock), CA
<http://www.musicianshealthcorner.com/>
Healthy Musician Series - Overuse

Orthopaedic Section Independent Study Course. *20.3 Physical Therapy for the Performing Artist.*

Monographs are available for:

- Figure Skating (J. Flug, J. Schneider, E. Greenberg),
 - Artistic Gymnastics (A. Hunter-Giordano, Pongetti-Angeletti, S. Voelker, TJ Manal),
- and
- Instrumentalist Musicians (J. Dommerholt, B. Collier).

Contact: Orthopaedic Section at: www.orthopt.org

Orthopaedic Section-American Physical Therapy Association,
Performing Arts SIG

http://www.orthopt.org/content/special_interest_groups/performing_arts

Performing Arts Citations and Endnotes

http://www.orthopt.org/content/special_interest_groups/performing_arts/citations_endnotes

ADAM Center

<http://www.adamcenter.net/>

Publications:

<http://www.adamcenter.net/#!vstc0=publications>

Conference abstracts:

<http://www.adamcenter.net/#!vstc0=conferences>

Dance USA

<http://www.danceusa.org/>

Research resources:

<http://www.danceusa.org/researchresources>

Professional Dancer Annual Post-Hire Health Screen:

<http://www.danceusa.org/dancerhealth>

Dancer Wellness Project

<http://www.dancerwellnessproject.com/>

Becoming an affiliate:

<http://www.dancerwellnessproject.com/Information/BecomeAffiliate.aspx>

Harkness Center for Dance Injuries, Hospital for Joint Diseases

<http://hjd.med.nyu.edu/harkness/>

Continuing education:

<http://hjd.med.nyu.edu/harkness/education/healthcare-professionals/continuing-education-courses-cme-and-ceu>

Resource papers:

<http://hjd.med.nyu.edu/harkness/dance-medicine-resources/resource-papers-and-forms>

Links:

<http://hjd.med.nyu.edu/harkness/dance-medicine-resources/links>

Informative list of common dance injuries:

<http://hjd.med.nyu.edu/harkness/patients/common-dance-injuries>

Research publications:

<http://hjd.med.nyu.edu/harkness/research/research-publications>

International Association for Dance Medicine and Science (IADMS)

<http://www.iadms.org/>

Resource papers:

<http://www.iadms.org/displaycommon.cfm?an=1&subarticlenbr=186>

Links:

<http://www.iadms.org/displaycommon.cfm?an=5>

Medicine, arts medicine, and arts education organization links:

<http://www.iadms.org/displaycommon.cfm?an=1&subarticlenbr=5>

Publications:

<http://www.iadms.org/displaycommon.cfm?an=3>

Performing Arts Medicine Association (PAMA)

<http://www.artsmed.org/>

<http://www.artsmed.org/symposium.html>

Interactive bibliography site:

<http://www.artsmed.org/bibliography.html>

Related links:

<http://www.artsmed.org/relatedlinks.html>

Member publications:

<http://artsmed.org/publications.html>

(Educators, researchers, and clinicians, please continue to email your conference and continuing education information to include in future blasts.)

Flexor Hallucis Longus (FHL) Dysfunction

FHL dysfunction occurs most often in the female ballet dancer compared to any other athlete, which is not surprising when you consider the unique physical demands of dance along with the foot and ankle biomechanics and anatomy (Kadel 2006). FHL plays an important role in stabilizing the subtalar joint and the longitudinal arch during dance related activities (Femino, Trepman, Chisholm, et al, 2000). Research by Ferris, Sharkey, Smith and Matthews in 1995 reported that dancers tend to rely on these toe flexor extrinsic muscles during elev e more than the general population, which is helpful to know from an evaluation and treatment perspective. Anatomically, the FHL and FDL have a tendinous slip that connects them that indicates the FHL might also play a role in flexing digits 2-3 in addition to the great toe. For differential diagnosis purposes, articles including FHL disorders complicated by a concomitant os trigonum have been included in this search.

The articles listed below detail current evidence-based guidelines in evaluating and treating FHL dysfunctions. Presentation may include pain at the posterior medial ankle, posterior calf pain, reported "tightness" in the arch or ball of foot, and in extreme cases triggering of the great toe. A thorough evaluation of foot intrinsic and extrinsic strength, posterolateral hip strength, joint mobility, flexibility, balance, gait, dance specific and biomechanical evaluation are essential for diagnosis and a thorough plan of care. If triggering of the great toe is present, surgery is usually indicated if conservative treatment fails. Thus, some research articles pertaining to surgical interventions are also included, as many therapists treat patients postoperatively or may need to refer a patient to an orthopedic surgeon for consultation. If surgical intervention is being considered, I have found it beneficial to be working alongside an excellent foot/ankle surgeon who has experience with the performing arts population.

Laura Reising, PT, DPT, MS, OCS

Allegheny Health Network

Wexford Health + Wellness Pavillion, Wexford, PA

Baan H, Drossaers-Bakkers WK, Dubbeldam R, Buurke JJ, Nene A, van de Laar MA. Flexor hallucis longus tendon rupture in RA-patients is associated with MTP 1 damage and pes planus. *BMC Musculoskelet Disord.* 2007;8:110. doi: 10.1186/1471-2474-8-110

BACKGROUND: To assess the prevalence of and relation between rupture or tenosynovitis of the Flexor Hallucis Longus (FHL) tendon and range of motion, deformities and joint damage of the forefoot in RA patients with foot complaints.

METHODS: Thirty RA patients with painful feet were analysed, their feet were examined clinically for the presence of pes planus and range of motion (ROM), radiographs were scored looking for the presence of forefoot damage, and ultrasound examination was performed, examining the presence of tenosynovitis or rupture of the FHL at the level of the medial malleolus. The correlation between the presence or absence of the FHL and ROM, forefoot damage and pes planus was calculated.

RESULTS: In 11/60(18%) of the feet, a rupture of the FHL was found. This was associated with a limited motion of the MTP1-joint, measured on the JAM ($\chi^2 = 10.4$, $p = 0.034$), a higher prevalence of pes planus ($\chi^2 = 5.77$, $p = 0.016$) and a higher prevalence of erosions proximal at the MTP-1 joint ($\chi^2 = 12.3$, $p = 0.016$), and joint space narrowing of the MTP1 joint ($\chi^2 = 12.7$, $p = 0.013$).

CONCLUSION: Rupture of the flexor hallucis longus tendon in RA-patients is associated with limited range of hallux motion, more erosions and joint space narrowing of the MTP-1-joint, as well as with pes planus.

Batista JP, Del Vecchio JJ, Golano P, Vega J. Flexor digitorum accessories longus: importance of posterior ankle endoscopy. *Case Rep Orthop.* 2015; 2015:823107. doi: 10.1155/2015/823107. Epub 2015 Apr 28.

ABSTRACT: Endoscopy for the posterior region of the ankle through two portals is becoming more widespread for the treatment of a large number of conditions which used to be treated with open surgery years ago. The tendon of the flexor hallucis longus (FHL) travels along an osteofibrous tunnel between the posterolateral and posteromedial tubercles of the talus. Chronic inflammation of this tendon may lead to painful stenosing tenosynovitis. The aim of this report is to describe two cases depicting an accessory tendon which is an anatomical variation of the flexor hallucis longus in patients with posterior friction syndrome due to posterior ankle impingement and associated with a posteromedial osteochondral lesion of the talus. The anatomical variation (FDAL) described was a finding during an endoscopy of the posterior region of the ankle, and we have spared it by sectioning the superior flexor retinaculum only. The accessory flexor digitorum longus is an

anatomical variation and should be taken into account when performing an arthroscopy of the posterior region of the ankle. We recommend this treatment on this type of injury although we admit this does not make a definite conclusion.

Boruta PM, Beauperthuy GD. Partial tear of the flexor hallucis longus at the knot of Henry: presentation of three cases. *Foot Ankle Int.* 1997;18(4):243-246.

ABSTRACT: The flexor hallucis longus (FHL) tendon is susceptible to injury along its entire course from the posterior aspect of the ankle to its insertion into the base of the distal phalanx of the great toe. Various lacerations, ruptures, longitudinal splits, and stenosing tenosynovitis have been noted. This report documents three cases of longitudinal split of the FHL at the knot of Henry. The diagnosis of this entity is based solely on history and physical examination. Patients with this problem have experienced either an acute or chronic repetitive hyperextension of the hallux metatarsophalangeal joint. They complain of pain with prolonged walking and running and have tenderness with palpation of the knot of Henry (the anatomical crossover between the FHL and the flexor digitorum longus) about one thumb-breadth lateral to the tuberosity of the navicular. Noninvasive imaging studies, including ultrasound and magnetic resonance imaging, are not helpful in establishing this diagnosis. Surgical treatment includes release of the knot of Henry, debridement and repair of the longitudinal split in the FHL, and excision of the interconnecting tendon between the FHL and the flexor digitorum longus. All three patients presented in this report have obtained long-term satisfactory relief of their symptoms with surgical treatment.

Corte-Real NM, Moreira RM, Guerra-Pinto F. Arthroscopic treatment of tenosynovitis of the flexor hallucis longus tendon. *Foot Ankle Int.* 2012;33(12):1108-1112. DOI: 10.3113/FAI.2012.1108.

BACKGROUND: Tenosynovitis of the flexor hallucis longus (FHL) tendon is a condition typically found in ballet dancers and sometimes in soccer players and is related to chronic overuse. A traumatic cause for this situation, such as an ankle sprain, is considered rare. In case of failure of conservative treatment, the tendon can be surgically released, which is usually done through an open procedure. This article presents the results of an arthroscopic release of the FHL.

METHODS: Twenty-seven patients underwent surgery for FHL tenosynovitis over a period of 18 months. The mean age of the patients was 34 years. All patients related the onset of the condition with an ankle sprain. Eighteen patients were on worker's compensation and five had sport-related accidents. None of the patients was a professional athlete or a ballet dancer. The mean follow-up was 32 months. The outcome was measured with a satisfaction questionnaire and with the American Orthopaedic Foot and Ankle Society

(AOFAS) ankle-hindfoot scoring system.

RESULTS: The mean postoperative AOFAS score was 89 with 70% excellent or good results. Mean satisfaction rate was 4 (range, 0 to 5); 89% of the patients would undergo the procedure again. Twenty-two patients (81%) returned to the same level of activity in work and sports. A complication rate of 18% (five patients) and reoperation rate of 4% (one patient) were found. **CONCLUSION:** Arthroscopic release of the FHL tendon was a valid procedure. It was a minimally invasive surgery that allowed good visualization of the involved structures and yielded good results. This condition can be related to trauma and is not an exclusive disease of ballet dancers or overuse.

Cowell HR, Elener V, Lawhon SM. Bilateral tendonitis of the flexor hallucis longus in a ballet dancer. *J Pediatr Orthop.* 1982;2(5):582-586.

The patient, a ballet student, presented to the Alfred I. duPont Institute at 18 years of age with a chief complaint of being unable to continue dancing, since she could not assume the en-poinde position.

Edama M, Kubo M, Onishi H, Takabayashi T, Yokoyama E, Inai T, Wantanabe H, Nashimoto S, Kageyama I. Anatomical study of toe flexion by flexor hallucis longus. *Ann Anat.* 2016;204:80-85. doi: doi: 10.1016/j.aanat.2015.11.008.

ABSTRACT: Because connections exist between the flexor hallucis longus (FHL) and flexor digitorum longus (FDL), the FHL is surmised to exert a flexion action on the lesser toes, but this has not been studied quantitatively. The objectives of this study have thus been to clarify the types of FHL and FDL connections and branching, and to deduce the toe flexion actions of the FHL. One hundred legs from 55 cadavers were used for the study, with FHLs and FDLs harvested from the plantar aspect of the foot, and connections and branches classified. Image-analysis software was then used to analyze cross-sectional areas (CSAs) of each tendon, and the proportion of FHL was calculated in relation to flexor tendons of each toe. Type I (single slip from FHL to FDL tendon) was seen in 86 legs (86%), Type II (crossed connection) in 3 legs (3%), and Type III (single slip from FDL to FHL tendon) or Type IV (no connection between muscles) in 0 legs (0%). In addition, Type V (double slip from FHL to FDL tendon) was seen in 11 legs (11%), representing a new type not recorded in previous classifications. In terms of the various flexor tendons, the proportion of FHL showing tendons to toes 2 and 3 was high, at approximately 50-70%. Consequently, considering the branching type and proportion of CSA, the FHL was conjectured to not only act to flex the hallux, but also play a significant role in the flexion of toes 2 and 3. These results offer useful information for future clarification of the functional roles of tendinous slips from the FHL.

Femino JE, Trepman E, Chisholm K, Razzano L. The role of the flexor hallucis longus and peroneus longus in the stabilization of the ballet foot. *J Dance Med Sci.* 2000;4(3):86-89.

ABSTRACT: The importance of the flexor hallucis longus (FHL) and peroneus longus tendons in the stabilization of the subtalar joint and the longitudinal arch of the foot was demonstrated in 8 fresh-frozen human cadaver foot and ankle specimens. Dissection of the foot was done to transect stabilizing structures including joint capsule and periarticular ligaments of the medial side of the subtalar, talonavicular, navicular-first cuneiform, and first metatarsocuneiform joints; the subtalar ligaments in the sinus tarsi and the lateral capsule of the middle subtalar facet were also transected. The FHL and peroneus longus tendons were isolated and the specimen fixed to a frame. Without any tension on the FHL and peroneus longus tendons, the foot was supple and unstable. With tension applied to the FHL tendon alone, the bony arch of the foot became rigid, with inversion of the subtalar joint, rising of the longitudinal arch, plantar flexion of the forefoot, and slight adduction of the forefoot. With tension applied to the peroneus longus tendon alone, the bony arch of the foot became rigid, with eversion of the subtalar joint, rising of the longitudinal arch, plantar flexion of the forefoot, and abduction of the forefoot. With tension applied to both the FHL and peroneus longus tendons synchronously, the bony arch of the foot rose and became rigid, with plantar flexion and neutral abduction-adduction position of the forefoot. When additional tension was applied to the peroneus longus, the rigid foot assumed a locked position in mild hindfoot eversion and forefoot abduction. These qualitative observations are consistent with the hypothesis that the FHL and peroneus longus are important stabilizers of the foot in dance (demi-pointe and pointe) and soccer (kick), and may provide an explanation for injury of these tendons with these activities.

Ferris L, Sharkey NA, Smith TS, Matthews DK: Influence of extrinsic plantar flexors on forefoot loading during heel rise. *Foot Ankle Intl.* 1995;16:464-473.

ABSTRACT: This investigation studied the effects of simulated plantar flexor muscle activity on forefoot loading using a static cadaver model. Nine cadaver feet were mounted in an apparatus in the heel rise position. Using computer-controlled and pneumatic actuators, forces were simultaneously applied to the tendons of the triceps surae, flexor hallucis longus, flexor digitorum longus, peroneus brevis and longus, and tibialis posterior until 750 N of ground reaction force was achieved, at which time forefoot plantar pressure patterns were captured immediately with a pedobarograph. Second metatarsal bending moments were calculated from strain gauge data collected concurrently. Consecutive loading cycles were performed with sequential elimination of simulated muscle force from each tendon except the Achilles. Loss of simulated flexor hallucis longus activity significantly decreased great toe contact forces and significantly increased forces under the forefoot. Simulated loss of both the flexor hallucis longus and flexor digitorum longus caused significant decreases in contact area, pressure, and force beneath the toes and significant increases in contact area and force

under the forefoot. Bending moments in the second metatarsal were shown to vary directly with peak pressure under the second metatarsal head ($r = 0.801$). These findings demonstrate the load distributing function of the extrinsic plantar flexors during heel rise.

Funasaki H, Hayashi H, Sakamoto K, Tsuruga R, Marumo K. Arthroscopic release of flexor hallucis longus tendon sheath in female ballet dancers: dynamic pathology, surgical technique and return to dancing performance. *Arthrosc Tech.* 2015 Nov 30;4(6):e769-74. doi: 10.1016/j.eats.2015.07.025

ABSTRACT: Stenosing tenosynovitis of the flexor hallucis longus (FHL) tendon is known as a major overuse lesion in female dancers. We describe arthroscopic surgical techniques in relation to the dynamic pathology of the disease. Crepitus and pain on moving the great toe with the ankle in plantar flexion on preoperative examination confirm the diagnosis of FHL stenosing tenosynovitis even if the os trigonum is not evident. The ankle is approached through standard posterolateral and posteromedial portals. A 4.0-mm-diameter 30° arthroscope is used. Soft tissues around the talus are cleared with a motorized shaver and a radiofrequency device. The posterior aspects of the talus, os trigonum, and FHL tendon surrounded by the tendon sheath are visualized. The dynamic pathology of the FHL tendon is well observed on passive motion of the great toe. The prominent bone fragment of the talus is removed and the tendon sheath is cut with a retrograde knife and a motorized shaver from the superior border down to the entrance of the fibro-osseous tunnel. Arthroscopic release of the FHL tendon sheath is a useful and easy method to directly approach the dynamic pathology of FHL tenosynovitis in female ballet dancers.

Grady JF, Boumendjel Y, Nguyen NT, Caldwell A. Transplantation with allograft for rupture of the flexor hallucis longus tendon with subsequent longitudinal tear of the flexor digitorum longus tendon at the master knot of Henry: a case report. *J Am Podiatr Med Assoc.* 2014 Sep-Oct;104(5):508-13. doi: 10.7547/0003-0538-104.5.508.

ABSTRACT: A rare case of closed complete rupture of the flexor hallucis longus tendon with subsequent longitudinal tear of the flexor digitorum longus tendon is reported in a marathon runner. This is also a first case report of flexor hallucis longus transplant with cadaveric posterior tibial tendon allograft. Two minimal incisions distal and proximal to the malleolus allowed for tunneling with urethral dilators to open the tendon sheath for transplantation, avoiding the need for a large incision. Postoperatively, the patient regained active flexion at the interphalangeal joint of the left hallux. Four months after surgery, full range of motion was observed and dynamometric exam revealed 68% of the strength of the contralateral side. The patient was able to resume competitive running after the surgery and performed well in her age bracket.

Halstead J, Tedmond AC. Weight-bearing passive dorsiflexion of the hallux in standing is not related to hallux dorsiflexion during walking. *J Orthop Sports Phys Ther.* 2006;36(8):550-556.

STUDY DESIGN: Case control study.

OBJECTIVE: To explore the validity of the assumptions underpinning the Hubscher maneuver of hallux dorsiflexion in relaxed standing, by comparing the relationship between static and dynamic first metatarsophalangeal (MTP) joint motions in groups differentiated by normal and abnormal clinical test findings.

BACKGROUND: Limitation of motion at the first MTP joint during gait may be due to either structural or functional factors. Functional hallux limitus (FHL) has been proposed as a term to describe the situation in which the first MTP joint shows no limitation when non-weight bearing, but shows limited dorsiflexion during gait. One clinical test of first MTP joint limitation during standing (the Hubscher maneuver or Jack's test) has become widely used in physical therapy, orthopedic, and podiatric assessments, supposedly to assess for the presence of hallux limitations during gait. The utility of the test is based on an assumption that restriction during the static maneuver is predictive of functional limitation at this joint during gait. Despite a lack of evidence for the validity of such an assumption, the outcome of the static test is often used to infer risk of overuse injury or as an outcome for functional therapy. This paper examines the validity of the assumptions supporting this widely used static test.

METHODS AND MEASURES: First-MTP-joint motion was assessed using an electromagnetic motion tracking system in cases ($n = 15$) demonstrating clinically limited passive hallux dorsiflexion in relaxed standing, and in 15 controls matched for age and gender and demonstrating a clinically normal Hubscher maneuver. Maximum hallux dorsiflexion was measured with the subject non-weight bearing (seated), during relaxed standing, and during normal walking.

RESULTS: Hallux dorsiflexion was similar in cases and controls when motions were measured non-weight bearing (cases mean \pm SD, $55.0^\circ \pm 11.0^\circ$; controls mean \pm SD, $55.0^\circ \pm 10.7^\circ$), confirming the absence of structural joint change. In relaxed standing, maximum dorsiflexion was 50% less in cases (mean \pm SD, $19.0^\circ \pm 8.9^\circ$) than in the controls (mean \pm SD, $39.4^\circ \pm 6.1^\circ$; $P < .001$), supporting the initial test outcome and confirming the visual test observation of static functional limitation in the case group. During gait, however, cases (mean \pm SD, $36.4^\circ \pm 9.1^\circ$), and controls (mean \pm SD, $36.9^\circ \pm 7.9^\circ$) demonstrated comparable maximum dorsiflexion ($P = .902$). There was no significant relationship between static and dynamic first MTP joint motions ($r = 0.186$, $P = .325$).

CONCLUSION: The clinical test of limited passive hallux dorsiflexion in stance is a valid test only of hallux dorsiflexion available during relaxed standing. There is no association between maximum dorsiflexion observed during a

static weight-bearing examination and that occurring at the same joint during walking.

Hamilton WG, Geppert MJ, Thompson FM. Pain in the posterior aspect of the ankle in dancers. Differential diagnosis and operative treatment. *J Bone Joint Surg Am.* 1996;78(10):1491-1500.

ABSTRACT: A retrospective review was performed of the results of operative treatment of stenosing tenosynovitis of the flexor hallucis longus tendon or posterior impingement syndrome, or both, in thirty-seven dancers (forty-one operations). The average duration of follow-up was seven years (range, two to thirteen years). The results were assessed with use of a questionnaire for all patients, and a clinical evaluation was performed for twenty-one patients (twenty-two ankles). Twenty-six operations were performed for tendinitis and posterior impingement; nine, for isolated tendinitis; and six, for isolated posterior impingement syndrome. A medial incision was used in thirty-three procedures; a lateral incision, in six; an anterior and a medial incision, in one; and a lateral and a medial incision, in one. Thirty ankles had a good or excellent result; six, a fair result; and four, a poor result. (The result of the second procedure on an ankle that was operated on twice was not included.) The result was good or excellent for twenty-eight of the thirty-four ankles in professional dancers, compared with only two of the six ankles in amateur dancers.

Hodgkins CW, Kennedy JG, O'Loughlin PF. Tendon injuries in dance. *Clin Sports Med.* 2008;27:279-288.

ABSTRACT: Professional ballet dancers require an extraordinary anatomic, physiologic, and psychologic makeup to achieve and sustain their level of ability and activity. They are subject to a myriad of injuries as a result of the extreme demands of this profession. Tendon injuries are common and often coexist with other pathologies of the bone, ligaments, and psyche. It is critical that the dance doctor not examine the tendon injury in isolation, but rather the cause of the injury, either intrinsic from anatomic malalignment or from external sources, including poor form.

Howard PD. Differential diagnosis of calf pain and weakness: flexor hallucis longus strain. *J Orthop Sports Phys Ther.* 2000;30(2):78-84. doi: 10.2519/jospt.2000.30.2.78

ABSTRACT: Injuries of the flexor hallucis longus (FHL), such as tendinitis and partial rupture of the muscle belly, are most commonly reported in ballet dancers, but rare cases have been reported in other athletes. Involvement of the FHL tendon or muscle belly may occur in ballet dancers because of the repetitive ankle plantarflexion that occurs during pointe work. The FHL tendon may become irritated where it enters the fibro-osseous tunnel on the

posteromedial aspect of the ankle. This tunnel acts as a pulley for the FHL tendon. Irritation in this area can produce fraying, swelling, or nodule formation in the substance of the FHL tendon. It is unusual for nondancers to have an athletic injury of the FHL. In this case problem, a patient is presented who apparently injured the FHL; however, unlike most cases reported in the literature, the patient's symptoms were present in the posterior calf and were not the result of dancing.

Kadel NJ. Foot and ankle injuries in dance. *Phys Med Rehabil Clin N Am.* 2006;17:813-826.

ABSTRACT: Although dancers develop overuse injuries common in other athletes, they are also susceptible to unique injuries. This article reviews common foot and ankle problems seen in dancers and provides some basic diagnosis and treatment strategies.

Kadel NJ. Foot and ankle injuries in dance. *Phys Med Rehabil Clin N Am.* 2014;25(4):81829-844. doi: 10.1016/j.pmr.2014.06.003. Epub 2014 Aug 2.

ABSTRACT: The dancer's foot and ankle are subjected to high forces and unusual stresses in training and performance. Injuries are common in dancers, and the foot and ankle are particularly vulnerable. Ankle sprains, ankle impingement syndromes, flexor hallucis longus tendonitis, cuboid subluxation, stress fractures, midfoot injuries, heel pain, and first metatarsophalangeal joint problems including hallux valgus, hallux rigidus, and sesamoid injuries will be reviewed. This article will discuss these common foot and ankle problems in dancers and give typical clinical presentation and diagnostic and treatment recommendations.

Kirane YM, Michelson JD, Sharkey NA. Contribution of flexor hallucis longus to loading of the first metatarsal and first metatarsophalangeal joint. *Foot Ankle Int.* 2008;29(4):367-377. doi: 10.3113/FAI.2008.0367.

BACKGROUND: A recent clinical study suggested that restrictive tenosynovitis of the flexor hallucis longus (FHL) may play an important causative role in hallux rigidus. The goals of this research were to assess normal function of the FHL and the effect of restricted FHL gliding on the loading of the hallux metatarsophalangeal joint (MTPJ). We hypothesized that proximal displacement of the FHL would increase the forces carried by the FHL tendon, causing increased loading of the first metatarsal and MTPJ. MATERIALS AND METHODS: Dynamic simulations of the stance phase of walking were created by loading 5 non-embalmed, non-paired cadaver lower extremities (2 male, 3 female; mean age, 69; range, 56 to 75) in the Robotic Dynamic Activity Simulator (RDAS). The RDAS recreates lower leg motion and muscle activity based on kinematic and electromyographic data of healthy subjects. FHL tendon forces and excursions were measured for the

entire stance phase of gait. Bone strains in the mid-shaft of the first metatarsal were recorded and used to derive the in situ forces and moments imposed on the metatarsal and the hallux MTPJ.

RESULTS: Under force-feedback control, FHL excursion averaged 6.57 (+/- 3.13) mm during gait. When the FHL was held 2-, 4-, and 6-mm proximal to the mid-point of normal excursion to simulate progressive stenosis, the forces in the FHL tendon, first metatarsal and first MTP joint were progressively, and significantly, increased ($p < 0.05$).

CONCLUSION: These findings support the hypothesis that progressive fibrosis at the FHL myotendinous junction can cause increased loading of the hallux MTPJ, thereby leading to hallux rigidus.

Kirane YM, Michelson JD, Sharkey NA. Evidence of isometric function of the flexor hallucis longus muscle in normal gait. *J Biomech.* 2008;41(9):1919-1928. doi: 10.1016/j.jbiomech.2008.03.040

ABSTRACT: Studying mechanics of the muscles spanning multiple joints provides insights into intersegmental dynamics and movement coordination. Multiarticular muscles are thought to function at "near-isometric" lengths to transfer mechanical energy between the adjacent body segments. Flexor hallucis longus (FHL) is a multiarticular flexor of the great toe; however, its potential isometric function has received little attention. We used a robotic loading apparatus to investigate FHL mechanics during simulated walking in cadaver feet, and hypothesized that physiological force transmission across the foot can occur with isometric FHL function. The extrinsic foot tendons, stripped of the muscle fibers, were connected to computer-controlled linear actuators. The FHL activity was controlled using force-feedback (FC) based upon electromyographic data from healthy subjects, and subsequently, isometric positional feedback (PC), maintaining the FHL myotendinous junction stationary during simulated walking. Tendon forces and excursions were recorded, as were the strains within the first metatarsal. Forces in the metatarsal and metatarsophalangeal joint were derived from these strains. The FHL tendon excursion under FC was 6.57 +/- 3.13 mm. The forces generated in the FHL tendon, metatarsal and metatarsophalangeal joint with the FHL under isometric PC were not significantly different in pattern from FC. These observations provide evidence that physiological forces could be generated along the great toe with isometric FHL function. A length servo mechanism such as the stretch reflex could likely control the isometric FHL function during in vivo locomotion; this could have interesting implications regarding the conditions of impaired stretch reflex such as spastic paresis and peripheral neuropathies.

Kolettis G, Micheli LF, Klein JD. Release of the flexor hallucis longus tendon in ballet dancers. *J Bone Joint Surg Am.* 1996;78(9):1386-1390.

ABSTRACT: Thirteen female ballet dancers had an operative release of the flexor hallucis longus tendon because of isolated stenosing tenosynovitis, and the results were reviewed after a mean duration of follow-up of six years and six months (range, two to ten years). All of the patients danced at the advanced or professional level, and all had failed to respond to non-operative management. The mean age of the patients at the time of the operation was twenty years (range, thirteen to twenty-six years). Symptoms, which included pain and tenderness over the medial aspect of the subtalar joint, had been present for a mean of six months (range, two to twelve months) preoperatively and were exacerbated by jumping and by attempts to perform en pointe work. Crepitus was present in six patients, and triggering was present in three. No patient had evidence of a symptomatic os trigonum. Postoperatively, all patients participated in a formal physical-therapy program for a mean of nine weeks (range, four to thirteen weeks). All patients returned to dancing, within a mean of five months (range, two to nine months), and eleven reached a level of full participation in dancing without restriction. At the time of the most recent follow-up, all patients noted improvement compared with the pre-operative condition. Eight patients were professional ballet dancers, four were students at advanced ballet schools, and one had stopped performing ballet for reasons unrelated to the tenosynovitis of the flexor hallucis longus. In addition, two of the students had decided not to pursue careers in dancing because of persistent, but greatly diminished, symptoms. No complications were noted in this series. We concluded that an operative release of the flexor hallucis longus is effective for the treatment of isolated stenosing tenosynovitis in female ballet dancers who place high demands on the foot and ankle and for whom non-operative treatment has failed.

Lamata Ituria M, Lison Torres A, Bento Gerard J, Guilen Montijano F. Bilateral stenosing tenosynovitis of the long flexor of the great toe in a dancer: apropos of a bilateral case [Article in French]. *Rev Chir Orthop Reparatrice Appar Mot.* 1988;74(2):190-2.

ABSTRACT: The aim of this article is to draw attention to an uncommon lesion associated with classical Spanish ballet dancing - an activity with both artistic and competitive sporting influences. The lesion is characterised by a clicking great toe and pain in the region posterior to the medial malleolus, together with inability to point the toes. An analysis is made of the literature and of the treatment used in a bilateral case.

Lereim P. Trigger toe in classical-ballet dancers. *Arch Orthop Trauma Surg.* 1985;104(5):325-326.

ABSTRACT: Classical ballet involves extreme physical demands on the body--in part, strains beyond the physiological limits. Balance on the tips of the toes en pointe means extreme plantar flexion of the ankle and first toe in the

weight-bearing position. We have treated two cases of stenosing tendovaginitis of the flexor hallucis longus tendon. A 22-year-old male dancer had been suffering from pain on the postero-medial aspect of the ankle at weight bearing for 6 months, when bilateral locking of the great toe going from en pointe to the neutral position occurred. At operation a fusiform thickening of the tendon of the flexor hallucis longus was found. After partial excision of the tendon sheath and partial incision of the retinaculum the tendon moved freely in its groove. Six months postoperatively the patient was free of symptoms. The second case was a 17-year-old female professional dancer with unilateral trigger toe. A similar surgical procedure was performed and the symptoms disappeared. Once the condition is known, the diagnosis is easy. Surgical excision of stenosing structures is the treatment of choice.

Luk P, Thordarson D, Charlton T. Evaluation and management of posterior ankle pain in dancers. *J Dance Med Sci.* 2013;17(2):79-83.

ABSTRACT: Posterior ankle pain is a common complaint in dancers. There are multiple structures in the posterior ankle that have the potential to be the source of pain. The objective of this article is to review several of the most common causes of posterior ankle pain: peroneal tendon subluxation, posterior impingement syndrome secondary to a painful os trigonum, posterior talus osteochondritis dissecans, flexor hallucis longus tendinopathy, and posterior tibial tendinopathy. For dancers, we offer typical clinical presentations of these disorders to increase awareness and provide guidance regarding when to seek professional medical attention. For medical personnel who are responsible for optimizing dancers' health and training, we include a discussion of pertinent physical exam findings, diagnostic imaging options, non-operative and operative management, as well as surgical suggestions and postoperative rehabilitation guidelines.

Nihal A, Goldstein J, Haas J, Hiebert R, Kummer FJ, Liederback M, Trepman E. Toe flexor forces in dancers and non-dancers. *Foot Ankle Int.* 2002; 23(12): 1119-1123.

ABSTRACT: Toe flexor force (hallux and second toe) was determined in the right and left feet of 24 dancers and 29 non-dancers (sitting and standing positions) using a commercially-available pressure sensor connected to a voltmeter. For the hallux and second toe combined (all trials combined), average toe flexor force was slightly greater for dancers than non-dancers (dancers, 7 ± 4 N; non-dancers, 6 ± 4 N; $p < 0.049$). For dancers and non-dancers combined (all trials), the average toe flexor force of the hallux was more than twice that of the second toe (hallux, 9 ± 4 N; 2nd toe, 4 ± 1 N; $p < 0.0001$); average toe flexor force was slightly greater in standing than sitting positions (standing, 7 ± 4 N; sitting, 6 ± 3 N; $p < 0.0001$); and the average toe flexor force was slightly greater for the right than left foot (right, 7 ± 4 N; left, 6 ± 4 N;

p<0.012). The average toe flexor force was greatest for the first repetition and slightly decreased for the second and third repetitions (first repetition, 7±4 N; second and third repetitions each, 6±4 N; p<0.0013). Toe flexor force measurement may potentially be applicable to clinical practice as a guide to rehabilitation after injury or as a screening parameter for readiness to advance dance or other athletic training, performance, or competition.

Oloff LM, Schulhofer SD. Flexor hallucis longus dysfunction. *J Foot Ankle Surg.* 1998; 37(2): 101-109.

ABSTRACT: Nineteen consecutive cases of flexor hallucis longus stenosing tenosynovitis that underwent operative tenolysis from September 1994 to December 1996 were retrospectively reviewed. This is classically a disorder of ballet dancers, and to a much lesser extent, running athletes. The patients were primarily nonathletic, male, and middle-aged. The mean symptom duration was 20 months, multiple physicians had been encountered, and misdiagnosis was common. Patients presented with overlapping signs and symptoms of flexor hallucis longus tendinitis, plantar fasciitis, and tarsal tunnel syndrome. A cross-reference of patients with posteromedial ankle pain, medial arch pain, and/or a positive Tinel's sign revealed that 14 (74%) and 6 (32%) feet had two of three, or all three signs, respectively. Magnetic resonance imaging and tenography proved valuable in establishing the correct primary diagnosis. Nonoperative protocols were unsuccessful. Flexor hallucis longus tenolysis was successful in each case with a mean return to regular activity at 9 weeks. Flexor hallucis longus stenosing tenosynovitis may be more prevalent than reported and should be a diagnosis of inclusion among all patient populations who present with posterior ankle, medial arch, and/or tarsal tunnel symptoms.

Ogut T, Ayhan E. Hindfoot endoscopy for accessory flexor digitorum longus and flexor hallucis longus tenosynovitis. *Foot Ankle Surg.* 2011;17(1):e7-9. doi: 10.1016/j.fas.2010.07.001.

ABSTRACT: We present a case report involving the flexor digitorum accessorius longus (FDAL) tendon which travels through a fibro-osseous tunnel together with the flexor hallucis longus (FHL) tendon, causing a stenosing tenosynovitis. The patient was admitted with posteromedial ankle pain and diagnosed clinically as FHL tenosynovitis. We found two tendons in the tunnel during hindfoot endoscopy. The stenosis was relieved by endoscopic debridement. After the operation, we checked the MRI images and observed two tendons. We concluded that the accessory tendon was the FDAL. Two years later the patient was admitted with the same symptoms. We excised the FDAL muscle and the patient's symptoms resolved. The FDAL muscle is a cause of FHL tenosynovitis. Because of its variability and mostly asymptomatic nature, it may not be noticed it on an MRI scan. Hindfoot

endoscopy is a safe tool for the diagnosis of this condition and curative treatment is afforded by excision of the FDAL muscle.

Pass G, Hofstaetter SG, Treib K. Symtomatic os trigonum with irritation of the flexor hallucis longus tendon – arthroscopic management via a dorsal approach [Article in German]. *Sportverletz Sportschaden*. 2015;29(1):53-55. doi: 10.1055/s-0034-1399093. Epub 2015 Feb 24.

ABSTRACT: Therapy-resistant pain in the region of the medial malleolus in the presence of an os trigonum is suggestive for irritation of the flexor hallucis longus tendon. Two patients were treated by arthroscopy in the prone position via a dorsal approach; the os trigonum was removed and the tendon released. Under the conditions of blunt dissection, dorsal arthroscopy of the os trigonum is a safe and expedient operation in our toolbox. After two weeks of partial load-bearing with 2 crutches, pain-free full load-bearing is already possible and after 3 weeks the patients can return to work.

Rowley KM, Jarvis DN, Kurihara T, Chang Y, Fietzer AL, Kulig K. Toe flexor strength, flexibility and function and flexor hallucis longus tendon morphology in dancers and non-dancers. *Med Probl Perform Art* 2015; 30(3):152–156.

ABSTRACT: Tendinopathy of the flexor hallucis longus (FHL), colloquially referred to as “dancer’s tendinitis,” is a common condition in dancers and attributed to high demand on this muscle in positions of extreme ankle plantarflexion and metatarsophalangeal (MTP) flexion and extension. Despite such a high prevalence, there has been little research into preventative or nonsurgical interventions. As a means to identify potential targets for prevention and intervention, this study aimed to characterize toe flexors in dancers by measuring strength, flexibility, function, and FHL tendon morphology. Dancers ($n=25$) were compared to non-dancers ($n=25$) in toe flexor isometric strength, first MTP joint range of motion, foot longitudinal arch flexibility, balance ability, endurance during modified heel raises without use of the toes, and FHL tendon thickness, cross-sectional area, and peak spatial frequency. Significant differences were found in functional first MTP joint extension (dancers 101.95° , non-dancers 91.15° , $p<0.001$), balance ability during single-leg stance on the toes (dancers 11.43 s, non-dancers 5.90 s, $p=0.013$), and during modified heel raises (dancers 22.20 reps, non-dancers 28.80 reps, $p=0.001$). Findings indicate that dancers rely on toe flexors more than non-dancers to complete balance and heel raise tasks. Efficacy of using this modified heel raise task with the toes off the edge of a block as a means to train larger plantarflexors and as a nonsurgical intervention should be studied in the future. Improving interventions for FHL tendinopathy will be impactful for dancers, in whom this condition is highly prevalent.

Rungprai C, Tennant JN, Phisitkul P. Disorders of the flexor hallucis longus and os trigonum. *Clin Sports Med.* 2015;34(4):741-759. doi: 10.1016/j.csm.2015.06.005. Epub 2015 Jul 23.

ABSTRACT: Os trigonum syndrome with disease of the flexor hallucis longus tendon, so-called stenosing flexor tenosynovitis, is a common cause of posterior ankle impingement. Conservative treatment is the recommended first line of treatment, with secondary treatment options of either open or arthroscopic os trigonum excision with flexor hallucis longus retinaculum release. The arthroscopic approaches have gained popularity in the past decade because of less scarring, less postoperative pain, minimal overall morbidity, and earlier return to activities. However, comprehensive understanding of the anatomy of the posterior ankle is crucial to warrant successful outcomes and minimizing complications.

Sammarco GJ, Cooper PS. Flexor hallucis longus tendon injury in dancers and nondancers. *Foot Ankle Int.* 1998;19(6): 356-362.

ABSTRACT: Thirty-one cases of flexor hallucis longus injuries in 26 patients were treated over a 16-year period (1977–1993). Groups were divided into dance-related injuries (group I) and other causes (group II). The two groups were compared with regard to age, activity, duration of symptoms, operative findings, histopathology, and postoperative time to resumption of full activities. Twenty-seven cases required surgery for unsuccessful nonoperative treatment. In group I, 71% of patients had a partial longitudinal tear of the flexor hallucis longus compared with 30% in group II. Another common finding was isolated tenosynovitis (21% in group I and 53% in group II). Eight cases had magnetic resonance imaging (MRI) evaluations before surgery. Clinical correlation was found to be an important factor in interpreting the MRI. Dancers tended to have symptoms for a longer period of time before seeking treatment than did nondancers. Follow-up was 19.2 months for dancers and 25 months for nondancers. Surgical correction of tenosynovitis, pseudocyst, and tendon tear yielded good or excellent results in 14 of 15 dancers and 9 of 11 nondancers. Surgical treatment of tendon tears and other pathologic tendon conditions gave consistently good results in patients with refractory flexor hallucis longus disease.

Schulhofer SD, Oloff LM. Flexor hallucis longus dysfunction: an overview. *Clin Podiatr Med Surg.* 2002;9(3): 411-418, vi.

ABSTRACT: Whereas acute and chronic injuries of the tibialis posterior, peroneal and Achilles tendon are frequently encountered, disorders of the flexor hallucis longus tendon are often overlooked, which may contribute to chronic pain and disability. Patients with stenosing tenosynovitis of the flexor hallucis longus tendon frequently present with overlapping signs and symptoms of flexor hallucis longus tendinitis, plantar fasciitis and tarsal

tunnel syndrome, which the authors collectively refer to as "flexor hallucis longus dysfunction." A keen awareness of the presenting signs and symptoms and use of ancillary MR imaging and FHL tenography will assist the practitioner in recognizing this commonly misdiagnosed condition.

Theodore GH, Kolettis GJ, Micheli LJ. Tenosynovitis of the flexor hallucis longus in a long-distance runner. *Med Sci Sports Exerc.* 1996;28(3):277-279.

ABSTRACT: Chronic inflammation of the flexor hallucis longus (FHL) tendon can result in stenosing tenosynovitis. This condition has been well documented in ballet dancers. It usually presents as posteromedial ankle pain, worsened by plantarflexion activities. Although conservative therapy benefits most patients, some recalcitrant cases may require surgical intervention. This is the first case report that describes the occurrence of this condition in a runner with an anomalous flexor hallucis longus muscle.

Theodoropoulos JS, Wolin PM, Taylor DW. Arthroscopic release of flexor hallucis longus tendon using modified posteromedial and posterolateral portals in the supine position. *Foot (Edinb).* 2009;19(4):218-221. doi: 10.1016/j.foot.2009.02.002. Epub 2009 Mar 10.

ABSTRACT: The flexor hallucis longus (FHL) is a known site of pathological conditions. FHL stenosing tenosynovitis presents as posterior medial ankle pain or great toe discomfort and is often associated with a catching sensation of the great toe. There are a wide variety of open procedures for the treatment of FHL stenosing tenosynovitis.

OBJECTIVE: Arthroscopic treatment may circumvent some of the complications associated with open surgical treatment of the hindfoot.

METHODS: Arthroscopic surgery was completed in the supine position using modified posteromedial and posterolateral portals. A 70 degrees arthroscope allowed for circumferential evaluation of the ankle through the posterolateral portal including the subtalar areas and the entire FHL tendon for release using basket forceps and a 3.5mm shaver.

RESULTS: This method allows for decompression of the FHL from the entrance of the fibro-osseous tunnel to the knot of Henry. Active and passive range of motion of both the ankle and toes was encouraged postoperatively. The patient returned to sporting activity 6 weeks after surgery.

CONCLUSIONS: Endoscopic treatment of the FHL stenosing tenosynovitis is presented as an alternative to an open surgical procedure; it may reduce wound complications and may allow for an earlier return to sport.

