



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.75

September 2012

Dear Performing Arts SIG members:

I would like to draw your attention to the change in venue and date for this year's APTA Combined Sections Meeting.

***The 2013 APTA Combined Sections Meeting will be held
January 21-24 in San Diego, CA.***

<http://www.apta.org/csm/>

This month's citation blast looks at current research on focal dystonia in performing artists, in response to a request by one of our members. There are several new studies in regards to upper extremity dystonia among musicians and very few on lower extremity dystonia among dancers. I have also included information on arts research resources from the August blast.

Please consider compiling and contributing a brief summary of Performing Arts-related abstracts for citation blast this year. It's easy to do, and a great way to become involved with PASIG! Just take a look at our Performing Arts Citations and Endnotes, look for what's missing, and email me your contribution!

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

I would like someone to cite research on low back pain in aerialists, and on pelvic floor dysfunction in vocalists, though there are certainly other topics to bring into view, and I welcome your voice.

Educators, researchers, and clinicians, please continue to email me your conference and continuing education information and I will include it in the upcoming blasts.

Best regards,

Annette

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PERFORMING ARTS CONTINUING EDUCATION, CONFERENCES, AND RESOURCES

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 Independent Study Course. *Dance Medicine: Strategies for the Prevention and Care of Injuries to Dancers.*

This is a 6-monograph course and includes many PASIG members as authors.

- Epidemiology of Dance Injuries: Biopsychosocial Considerations in the Management of Dancer Health (MJ Liederbach),
- Nutrition, Hydration, Metabolism, and Thinness (B Glace),
- The Dancer's Hip: Anatomic, Biomechanical, and Rehabilitation Considerations (G. Grossman),
- Common Knee Injuries in Dance (MJ Liederbach),
- Foot and Ankle Injuries in the Dancer: Examination and Treatment Strategies (M. Molnar, R. Bernstein, M. Hartog, L. Henry, M. Rodriguez, J. Smith, A. Zujko),

- Developing Expert Physical Therapy Practice in Dance Medicine (J. Gamboa, S. Bronner, TJ Manal).

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

Annual conference: Philadelphia, PA, June 12-15, 2013

<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)
22nd Annual Meeting, Singapore. October 25 – 28, 2012

<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/>

Annual symposium:

<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>

Focal Dystonia in Performing Artists

Albanese, A., F. Asmus, et al. (2011). "EFNS guidelines on diagnosis and treatment of primary dystonias." *Eur J Neurol* **18**(1): 5-18.

OBJECTIVES: to provide a revised version of earlier guidelines published in 2006. **BACKGROUND:** primary dystonias are chronic and often disabling conditions with a widespread spectrum mainly in young people. **DIAGNOSIS:** primary dystonias are classified as pure dystonia, dystonia plus or paroxysmal dystonia syndromes. Assessment should be performed using a validated rating scale for dystonia. Genetic testing may be performed after establishing the clinical diagnosis. DYT1 testing is recommended for patients with primary dystonia with limb onset before age 30, and in those with an affected relative with early-onset dystonia. DYT6 testing is recommended in early-onset or familial cases with cranio-cervical dystonia or after exclusion of DYT1. Individuals with early-onset myoclonus should be tested for mutations in the DYT11 gene. If direct sequencing of the DYT11 gene is negative, additional gene dosage is required to improve the proportion of mutations detected. A levodopa trial is warranted in every patient with early-onset primary dystonia without an alternative diagnosis. In patients with idiopathic dystonia, neurophysiological tests can help with describing the pathophysiological

mechanisms underlying the disorder. TREATMENT: botulinum toxin (BoNT) type A is the first-line treatment for primary cranial (excluding oromandibular) or cervical dystonia; it is also effective on writing dystonia. BoNT/B is not inferior to BoNT/A in cervical dystonia. Pallidal deep brain stimulation (DBS) is considered a good option, particularly for primary generalized or cervical dystonia, after medication or BoNT have failed. DBS is less effective in secondary dystonia. This treatment requires a specialized expertise and a multidisciplinary team.

Altenmuller, E. and H. C. Jabusch (2009). "Focal hand dystonia in musicians: phenomenology, etiology, and psychological trigger factors." J Hand Ther **22**(2): 144-154; quiz 155.

NARRATIVE REVIEW: Musician's dystonia is a task-specific movement disorder, which manifests itself as a loss of voluntary motor control in extensively trained movements. In many cases, the disorder terminates the careers of affected musicians. Approximately 1% of all professional musicians are affected. In the past, focal dystonia (FD) was classified as a psychological disorder. Over time, the problem was classified as a neurological problem. Although the specific pathophysiology of the disorder is still unclear, it appears the etiology is multifactorial. While there may be a family history, neurophysiological, physical, and environmental factors, trauma and stress contribute to the phenotypic development of FD. This manuscript analyzes the evidence supporting the potential contribution of the emotional brain systems in the etiology of focal hand dystonia in musicians. In addition, the psychological findings from a large descriptive study comparing healthy musicians, musicians with dystonia, and musicians with chronic pain. Information about psychogenic characteristics might be used to modify intervention strategies and music instruction to reduce the incidence of musician's dystonia.

Altenmuller, E. and H. C. Jabusch (2010). "Focal dystonia in musicians: phenomenology, pathophysiology, triggering factors, and treatment." Med Probl Perform Art **25**(1): 3-9.

Musician's dystonia is a task-specific movement disorder that manifests itself as a loss of voluntary motor control in extensively trained movements. Approximately 1% of all professional musicians develop musician's dystonia, and in many cases, the disorder terminates the careers of affected musicians. The pathophysiology of the disorder is not completely clarified. Findings include 1) reduced inhibition at different levels of the central nervous system, 2) maladaptive plasticity and altered sensory perception, and 3) alterations in sensorimotor integration. Epidemiological data demonstrate a higher risk for those musicians who play instruments requiring maximal fine-motor skills. For instruments where workload differs across hands, focal dystonia appears more often in

the more intensely used hand. In psychological studies, musicians with dystonia have more anxiety and perfectionist tendencies than healthy musicians. These findings strengthen the assumption that behavioral factors may be involved in the etiology of musician's dystonia. Preliminary findings also suggest a genetic contribution to focal task-specific dystonia with phenotypic variations including musician's dystonia. Treatment options include pharmacological interventions, such as trihexyphenidyl or botulinum toxin-A, as well as retraining programs and ergonomic changes in the instrument. Patient-tailored treatment strategies may significantly improve the situation of musicians with focal dystonia. Positive results after retraining and unmonitored technical exercises underline the benefit of an active involvement of patients in the treatment process. Only a minority of musicians, however, return to normal motor control using the currently available therapies.

Edwards, M. J., J. Stone, et al. (2012). "Physiotherapists and patients with functional (psychogenic) motor symptoms: a survey of attitudes and interest." J Neurol Neurosurg Psychiatry **83**(6): 655-658.

BACKGROUND: Functional (psychogenic) motor symptoms are commonly encountered in clinical neurology. Physiotherapy has face validity as a treatment for such symptoms and, anecdotally, referral of patients with functional motor symptoms (FMS) to physiotherapy services is common practice by neurologists. Here the authors sought to explore exposure to and attitudes towards patients with FMS among neurophysiotherapists. **METHOD:** The authors used an internet survey to gather information on the knowledge and attitudes of patients with FMS among 1402 members of a UK neurophysiotherapy organisation. **RESULTS:** The response rate was 61%. Most physiotherapists saw patients with FMS, and for 25% of respondents these patients made up over 10% of their workload. Respondents were moderately interested in treating these patients (ranking them sixth out of 10 neurological conditions), but had low self-judged knowledge. Most respondents felt physiotherapy had more to offer patients with FMS, but felt poorly supported by referring neurologists and by inadequate service structures. **CONCLUSIONS:** Neurologists frequently refer patients with FMS to neurophysiotherapy services. Physiotherapists in general are interested in treating such patients and feel physiotherapy to be an appropriate treatment. However, inadequate service structures, knowledge and support from non-physiotherapy colleagues are judged to be barriers to provision of care.

Enders, L., J. T. Spector, et al. (2011). "Musician's dystonia and comorbid anxiety: two sides of one coin?" Mov Disord **26**(3): 539-542.

BACKGROUND: Psychological abnormalities, including anxiety, have

been observed in patients with musician's dystonia (MD). It is unclear if these conditions develop prior to MD or if they are psychoreactive phenomena. METHODS: Psychological conditions were studied in 44 professional musicians with MD, 45 healthy musicians, and 44 healthy nonmusicians using the State-Trait Anxiety Inventory (STAI) and NEO Five-Factor Inventory (NEO-FFI). RESULTS: Musicians with MD had significantly higher STAI state and trait anxiety scores than healthy musicians ($P = .009$ and $P = .012$, respectively) and nonmusicians ($P = .013$ and $P = .001$, respectively) and significantly higher NEO-FFI neuroticism scores than healthy musicians ($P = .018$) and nonmusicians ($P = .001$). Duration of dystonia did not correlate with anxiety or neuroticism scores. CONCLUSIONS: Musicians with MD display increased levels of anxiety and neuroticism. The lack of correlation between anxiety and the duration of dystonia suggests that anxiety may not be a psychoreactive phenomenon and is consistent with the hypothesis that anxiety and MD share a common pathophysiological mechanism.

Frucht, S. J. (2009). "Focal task-specific dystonia of the musicians' hand--a practical approach for the clinician." *J Hand Ther* **22**(2): 136-142; quiz 143.
NARRATIVE REVIEW: Watching a concert pianist perform a Chopin etude or a violin soloist perform a Paganini caprice, one cannot help but be awed by the miracle of motor control in man. These "athletes of the small muscles" are susceptible, however, to a condition known as focal, task-specific dystonia (FTSD), a disorder of motor control in which the hands that perform these exquisite maneuvers disobey their master's command. Affected patients offer a unique window to investigate motor learning and aberrant cerebral plasticity. Effective treatments including sensory rehabilitation and botulinum toxin injection offer real hope for symptomatic relief and also afford scientists the opportunity to investigate sensorimotor networks in the normal and abnormal state.

Garcia-Ruiz, P. J., J. del Val, et al. (2011). "Task-specific dystonia of the lower limb in a flamenco dancer." *Parkinsonism Relat Disord* **17**(3): 221-222. (Case report, no abstract)

Kadota, H., Y. Nakajima, et al. (2010). "An fMRI study of musicians with focal dystonia during tapping tasks." *J Neurol* **257**(7): 1092-1098.
Musician's dystonia is a type of task specific dystonia for which the pathophysiology is not clear. In this study, we performed functional magnetic resonance imaging to investigate the motor-related brain activity associated with musician's dystonia. We compared brain activities measured from subjects with focal hand dystonia and normal (control) musicians during right-hand, left-hand, and both-hands tapping tasks. We found activations in the thalamus and the basal ganglia during the tapping

tasks in the control group but not in the dystonia group. For both groups, we detected significant activations in the contralateral sensorimotor areas, including the premotor area and cerebellum, during each tapping task. Moreover, direct comparison between the dystonia and control groups showed that the dystonia group had greater activity in the ipsilateral premotor area during the right-hand tapping task and less activity in the left cerebellum during the both-hands tapping task. Thus, the dystonic musicians showed irregular activation patterns in the motor-association system. We suggest that irregular neural activity patterns in dystonic subjects reflect dystonic neural malfunction and consequent compensatory activity to maintain appropriate voluntary movements.

Martino, D., A. Macerollo, et al. (2010). "Lower limb involvement in adult-onset primary dystonia: frequency and clinical features." Eur J Neurol **17**(2): 242-246.

BACKGROUND AND PURPOSE: Despite the growing number of reports describing adult-onset primary lower limb dystonia (LLD) this entity has never been systematically evaluated in the general population of patients with primary adult-onset dystonia. METHODS: From outpatients with adult-onset primary dystonia attending nine Italian University centres for movement disorders we consecutively recruited 579 patients to undergo a standardized clinical evaluation. RESULTS: Of the 579 patients assessed, 11 (1.9%) (8 women, 3 men) had LLD, either alone (n = 4, 0.7%) or as part of a segmental/multifocal dystonia (n = 7, 1.2%). The age at onset of LLD (47.9 +/- 17 years) was significantly lower than the age at onset of cranial dystonias (57.9 +/- 10.7 years for blepharospasm, and 58.9 +/- 11.8 years for oromandibular dystonia) but similar to that of all the other adult-onset primary dystonias. The lower limb was either the site of dystonia onset (36.4%) or the site of dystonia spread (63.6%). In patients in whom LLD was a site of spread, dystonia seemed to spread following a somatotopic distribution. Only one patient reported a recent trauma involving the lower limb whereas 36.4% of the patients reported pain at the site of LLD. Only 64% of our patients needed treatment for LLD, and similarly to previously reported cases, the most frequently tried treatments was botulinum toxin and trihexyphenidyl. CONCLUSION: The lower limb is an uncommon but possible topographical site of dystonia in adulthood that should be kept in consideration during clinical evaluation.

McClinton, S. and B. C. Heiderscheit (2012). "Diagnosis of Primary Task-Specific Lower Extremity Dystonia in a Runner." J Orthop Sports Phys Ther.

STUDY DESIGN: Resident's case problem. BACKGROUND: A 56 year-old male was referred to physical therapy for analysis of unusual gait first noticed 3 years previously when running. Prior to this evaluation, the patient had seen multiple orthopaedic, sports medicine, and neurological specialists while undergoing repeated and extensive testing. Ten months of testing and treatment including conservative and surgical management

did not provide an explanation for the gait abnormality or result in improvement of the patient's condition. **DIAGNOSIS:** The patient's physical examination was relatively unremarkable considering the severity of the gait abnormality. Distinct abnormalities were apparent with computerized gait analysis and dynamic electromyography, that when combined with the physical examination findings led to a suspicion of the task-specific disorder, runner's dystonia. The patient was referred to a neurologist specializing in movement-related disorders, with a final confirmed diagnosis of primary task-specific dystonia with first onset during running, ie, runner's dystonia. **DISCUSSION:** Idiopathic, task-specific dystonia of the lower extremity is documented as a very rare occurrence, yet increasing trends in running participation may result in a higher incidence of this condition. Improved awareness of runner's dystonia in the present case may have enhanced the clinical decision making process and resulted in more timely and effective treatment solutions. Clinical examination findings including computerized gait analysis and electromyography can aid in the diagnosis of runner's dystonia in conjunction with imaging, blood, and genetic testing. **LEVEL OF EVIDENCE:** Diagnosis, level 4. *J Orthop Sports Phys Ther*, Epub 20 April 2012. doi:10.2519/jospt.2012.3892.

McKeon, A., J. Y. Matsumoto, et al. (2008). "The spectrum of disorders presenting as adult-onset focal lower extremity dystonia." *Parkinsonism Relat Disord* **14**(8): 613-619.

BACKGROUND: Uncommonly, adult-onset dystonia is confined to one lower extremity. We sought to characterize the clinical spectrum associated with the presenting phenotype of lower limb dystonia including foot torsion. **METHODS:** Retrospective computer search of the Mayo Clinic Medical Records Linkage System (1996-2006). Inclusion criteria were (1) a principal, initial diagnosis of monomelic lower extremity dystonia with foot torsion; (2) no neurologic findings outside of the affected limb; (3) age-onset > 18 years. Prospective data were sought from apparent idiopathic cases. **RESULTS:** We identified 36 patients (31 females) presenting with monomelic lower limb dystonia including foot torsion. Onset was usually subacute or insidious (32 patients); mean symptom duration was 28.8 months (range, 1-96), age-onset 47.5 years (range, 21-77). After a mean follow-up of 3.1 years, causes were identified in over half, including 5 with parkinsonism. Other treatable etiologies included psychogenic dystonia (3 patients) and stiff-limb syndrome (2 patients). Post-traumatic dystonia was diagnosed in 10 patients and consistently manifested as fixed, painful foot torsion, in contrast to the action-induced dystonia in 5 parkinsonism cases, and 10 of 14 patients with primary lower limb dystonia. Imaging identified the cause in only 1 patient (ischemic stroke) and was negative in the single patient with pyramidal signs.

CONCLUSIONS: Adults presenting with monomelic lower limb dystonia with foot torsion often have an identifiable cause, sometimes treatable, including Parkinson's disease (diagnosed with levodopa trial) or immune-mediated stiff-limb syndrome. Post-traumatic dystonia was the single most frequent cause and proved difficult to treat. Unlike certain other series of such patients, psychogenic dystonia was an uncommon clinical diagnosis.

Mestre, T. A., A. E. Lang, et al. (2012). "Associated movement disorders in orthostatic tremor." *J Neurol Neurosurg Psychiatry* **83**(7): 725-729.

INTRODUCTION: Orthostatic tremor is a rare tremor syndrome triggered exclusively by standing, with pathognomonic neurophysiological features. More recently, it has been suggested that orthostatic tremor can present either in isolation (pure orthostatic tremor) or associated with other movement disorders (orthostatic tremor-plus). The present study aims at expanding the knowledge concerning orthostatic tremor associated with other movement disorders. METHODS: A retrospective case review of the clinical and neurophysiological data of patients diagnosed with orthostatic tremor. RESULTS: Median age of onset was 61 years with a median diagnostic delay of 4.5 years. Orthostatic tremor-plus accounted for eight cases (30.8%). The associated movement disorders were Parkinson's disease (n=1), parkinsonism (n=1), progressive supranuclear palsy (n=1), restless leg syndrome (n=1), multifocal action tremor (n=2), pathological proven dementia with Lewy bodies (n=1) and focal dystonia of the arm (n=1). There were no significant differences between primary orthostatic tremor and orthostatic tremor-plus in demographics, clinical presentation of orthostatic tremor, findings in neurophysiological studies and response to treatment. In the majority of cases (n=18, 72%), there was a progressive and disabling course with refractoriness to medical therapy without significant differences between pure orthostatic tremor and orthostatic tremor-plus. CONCLUSION: One of the largest series on orthostatic tremor is presented and the second only focused on additional movement disorders. A progressive course was found, with increasing disability associated with orthostatic tremor. Dementia with Lewy bodies and task specific arm dystonia are reported for the first time as associated movement disorders.

Rosenkranz, K., K. Butler, et al. (2008). "Sensorimotor reorganization by proprioceptive training in musician's dystonia and writer's cramp." *Neurology* **70**(4): 304-315.

OBJECTIVE: The sensorimotor organization (SMO) of the motor hand area is abnormal in focal hand dystonia and likely contributes to symptom manifestation. In healthy subjects SMO is changed by training with proprioceptive stimulation. Here we test whether similar interventions reverse the abnormal SMO in musician's dystonia and writer's cramp. If so, they could be developed for therapeutic application. METHODS: In six

non-musicians, six professional musicians, six patients with musician's dystonia, and six patients with writer's cramp, SMO was explored by measuring changes in short-interval-intracortical-inhibition (SICI) during short periods of hand muscle vibration before and after two training types: AttVIB, involving attention to 15 minutes vibration of the abductor pollicis brevis (APB); and AttIndex, involving attention to subtle cutaneous stimulation of the index finger. RESULTS: In healthy non-musicians, baseline SMO is spatially differentiated: SICI is reduced in projections to the vibrated, but enhanced to the non-vibrated muscles. Here AttVIB increased and AttIndex reduced the effect of subsequent APB-vibration on SMO. In healthy musicians, baseline SMO is less differentiated. AttVIB reinstated a more differential SMO pattern while AttIndex attenuated the effect of APB vibration. In focal hand dystonia, SMO is completely dedifferentiated. AttVIB tended to restore a more differential SMO in musician's dystonia but not in writer's cramp while AttIndex failed to induce any changes in both groups. CONCLUSION: The intervention effect depends on the pre-interventional sensorimotor organization (SMO). In focal hand dystonia, particularly in musician's dystonia, it is possible to retrain an abnormal SMO toward a more differential pattern, which has potential implications for therapy.

Rosset-Llobet, J., V. Candia, et al. (2009). "The challenge of diagnosing focal hand dystonia in musicians." *Eur J Neurol* **16**(7): 864-869.

BACKGROUND AND PURPOSE: To most clinicians, medical problems in musicians, particularly those concerning focal hand dystonia, constitute an unfamiliar domain difficult to manage. The latter can importantly influence diagnostics and the course of treatment. The purpose of this study was to enlighten the issue and to identify possible problems in diagnosing musicians' cramp within the Spanish medical community. METHODS: We used a brief questions' catalog and clinical histories of 665 musicians seen at our clinic for performing artists. We analyzed patients' diagnosis records in 87 cases of focal hand dystonia (13.1%). In so doing, we surveyed previous diagnoses and diverse treatments prescriptions prior to referral to our clinic. RESULTS: Referrals came primarily from orthopaedists and neurologists. The 52.9% arrived at our clinic without a diagnosis or a suspicion of suffering from focal dystonia. The most frequently attempted diagnoses other than musicians' dystonia included nerve compression, tendonitis and trigger fingers. Commonly prescribed treatments included rest, various surgical procedures, physiotherapy and oral anti-inflammatory medication. CONCLUSIONS: This data depicts the diagnostic challenges of medical professionals may encounter when confronted with musician's focal dystonia.

Rosset-Llobet, J., S. Fabregas-Molas, et al. (2012). "Drummer's lower limb dystonia." *J Neurol* **259**(6): 1236-1237.

(Case report, no abstract)

Schmidt, A., H. C. Jabusch, et al. (2011). "Phenotypic spectrum of musician's dystonia: a task-specific disorder?" *Mov Disord* **26**(3): 546-549.

BACKGROUND: Musician's dystonia (MD) is traditionally considered a sporadic and task-specific movement disorder. **METHODS:** The phenotypic spectrum of the disorder was studied in 116 patients suffering from MD including videotaping. **RESULTS:** Based on the movement disorders observed, we categorized our patients into two different groups: (i) 65 patients with isolated MD, that is only present when playing the instrument and (ii) 51 patients with MD and one or more additional features of primary dystonia independent of MD (complex MD). Patients with a positive family history of movement disorders had an increased risk to develop complex MD [odds ratio = 4.80; 95% confidence interval: 1.94-11.92; $P = 0.001$]. **DISCUSSION:** In previous studies, we recently identified 22 relatives with different types of movement disorders in the families of 28 MD patients. Taken together, our results further support a genetic contribution to MD with a broad individual and familial phenotypic spectrum consisting of MD, other dystonias and even other, non-dystonic movement disorders.

Schneider, S. A., M. J. Edwards, et al. (2006). "Adult-onset primary lower limb dystonia." *Mov Disord* **21**(6): 767-771.

The lower extremity is affected infrequently in adult-onset primary dystonia in contrast to childhood-onset dystonia, which typically begins in the foot. When dystonia affects the foot in an adult, it is usually on a secondary basis. We present findings on 17 patients (11 women, 6 men; average age of onset 48.4 years; average time to diagnosis 2.7 years) with adult-onset primary foot dystonia. Prior to diagnosis, most patients underwent extensive testing and treatment, including unnecessary surgeries. Only the left lower extremity was involved in 8 patients, only the right in 7, and both in 2. The most common patterns were plantar flexion of all toes and inversion of the foot, typically activated with standing or walking. Only 2 patients had dystonia elsewhere. There was a family history of possible dystonia in 2 patients. One of five tested for DYT1 was positive, in the absence of a family history. One of eight patients treated with levodopa experienced mild improvement. Six of eight treated with botulinum toxin improved. No patient has been observed to have a secondary cause of dystonia. The prognosis, with regard to progression or spread to other body parts, has been favorable. Although uncommon, foot dystonia on a primary basis, not due to DYT1, can begin in adulthood. In this series of patients, the diagnosis was often not recognized, leading to extensive and unnecessary testing and treatment and emphasizing the need for wider recognition.

Sheean, G. (2007). "Restoring balance in focal limb dystonia with botulinum toxin." Disabil Rehabil **29**(23): 1778-1788.

Focal task-specific dystonia of the hand is rare in the general population, where it usually manifests as writer's cramp, but seems relatively common among musicians. The disability may be so severe as to prevent writing altogether or to end a professional musician's career. The cause is usually unknown but it is thought to be primarily a basal ganglia disorder with dysfunction of cortical-striatothalamic-cortical circuits. Abnormalities have been found in cortical movement preparation, intracortical inhibition, sensory and motor maps, and patterns of cortical activation during movement. Much evidence supports disordered processing of sensory information with disturbed sensorimotor integration. Underlying this may be maladaptive neural plasticity mechanisms. Treatment is difficult. Oral medications are generally ineffective and have troublesome side-effects. Intensive rehabilitation techniques based on neural plasticity theory show promise but are rarely available and are time-intensive. Botulinum toxin injections appear to be effective in writer's cramp and musician's dystonia, at least initially; long-term benefit is less common. Despite definite improvement, some patients abandon treatment because the gain is insufficient for meaningful function: this is particularly so for musicians. Much of the benefit from botulinum toxin injection comes from simply reducing muscle overactivity through muscle paralysis, restoring balance to motor control. However, some evidence suggests that botulinum toxin injections can produce transient improvement in some of the various cortical abnormalities described, probably through alteration of sensory input from the periphery, by direct and indirect means. These changes in cortical function might be usefully combined with those brought about by sensorimotor retraining programs, but such studies are awaited.

Thenganatt, M. A. and S. Fahn (2012). "Botulinum toxin for the treatment of movement disorders." Curr Neurol Neurosci Rep **12**(4): 399-409.

After botulinum toxin was initially used to treat strabismus in the 1970s, others started using it to treat movement disorders including blepharospasm, hemifacial spasm, cervical dystonia, spasmodic dysphonia, and oromandibular dystonia. It was discovered that botulinum toxin can be an effective treatment for focal movement disorders with limited side effects. Over the past three decades, various formulations of botulinum toxin have been developed and the therapeutic use of these toxins has expanded in movement disorders and beyond. We review the history and mechanism of action of botulinum toxin, as well as describe different formulations available and their potential therapeutic uses in movement disorders.

Vecchio, M., G. Malaguarnera, et al. (2012). "A musician's dystonia." Lancet
379(9831): 2116.
(Case report, no abstract)

Please remember to update your orthopaedic section profile, thank you!
https://www.orthopt.org/surveys/membership_directory.php