The Foot 25 (2015) 5–11

Contents lists available at ScienceDirect

The Foot

journal homepage: www.elsevier.com/locate/foot

Prevalence of podiatric conditions seen in Special Olympics athletes: A comparison of USA data to an international population

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ARTICLE INFO

Article history:
Received 10 June 2014
Received in revised form 25 August 2014
Accepted 21 September 2014

Keywords:
Biomechanics
Foot deformities
Special Olympics
Intellectual disabilities

ABSTRACT

Background: Persons with intellectual disabilities frequently have podiatric conditions. Limited information exists on their prevalence in international cohorts of Special Olympics (SO) athletes. Findings from multiple United States (US) venues are compared to those from athletes screened at the 2011 Special Olympics World Summer Games in Athens, Greece (ATHENS).
Methods: Data from Fit Feet screenings from 2096 ATHENS participants was compared to 7192 US participants.
Results: Frequently noted in the ATHENS population were motion restriction in both the ankle and the first metatarsal phalangeal joint (1st MTPJ), pes planus, metatarsus adductus, brachymetatarsia, hallux abducto valgus (HAV), onychomycosis, onychocryptosis, and tinea pedis. ATHENS differed from the US cohort as HAV and restricted ankle joint and 1st MTPJ joint motion was less frequent. Significantly more tinea pedis, xerosis, and hyperhidrosis were present in the ATHENS population.
Discussion/Conclusion: SO athletes have a higher prevalence of podiatric structural conditions compared to the general population, and some vary between ATHENS versus US. Less prevalent in ATHENS was HAV, and restricted motion in both the ankle and 1st MTPJ. This may reflect differences due to varied clinical observers. The higher rates of several dermatological conditions in ATHENS may reflect venue seasonal climate, or social factors.

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1. Introduction

1.1. Special Olympics

As an international nonprofit organization dedicated to empowering individuals with intellectual disabilities to become physically fit, productive and respected members of society through sports training and competition, Special Olympics has become an important resource for society.

1.2. Healthy athletes

Athletes with intellectual disabilities have medical needs and problems that are similar and atypical. The Healthy Athletes Initiative was implemented by the Special Olympics for the purpose of providing health screenings to participating athletes. *Healthy Athletes currently offers health screenings in seven areas: Fit Feet (podiatry), FUNfitness (physical therapy), Health Promotion (better health and well-being), Healthy Hearing (audiology), MedFest (sports physical exam), Opening Eyes (vision) and Special Smiles (dentistry).*

> *Officially launched in 1997, Healthy Athletes organizes its events in a welcoming, fun environment. Its screenings educate athletes on healthy lifestyle choices and identify problems that may need additional follow-up.*
> **reprinted with permission from the Special Olympics web site accessed 12/22/2013.*

1.3. Fit Feet

The Fit Feet Exam is a lower extremity screening evaluation of Special Olympics athletes. The primary areas examined are musculoskeletal, dermatological and biomechanics. The athletes' shoe size versus actual measured foot size is a significant component of the Fit Feet screening event. At the completion of the Fit Feet encounter, education is provided on preventative foot care for the athletes, coaches and family. Abnormal findings result in an appropriate referral, if necessary. The Fit Feet program was developed

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http://dx.doi.org/10.1016/j.foot.2014.09.001
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Table 1
Demographics.

		Athens		USA	
		%	*n*	%	*n*
Gender	Female	39.3	824	40.5	2913
	Male	60.7	1272	59.5	4279
	Total	100.0	2096	100.0	7192
Age (yrs)	Mean	23.1		26.9	
	Range	9.9–65.1		8.0–84.0	

as part of The Healthy Athletes Initiative because persons with intellectual disabilities may experience a higher rate of medical conditions of the lower extremities compared to the general population [1–3]. Many Special Olympics athletes suffer from foot and ankle conditions that negatively impact their daily activities as well as their athletic performance. Foot to shoe mismatch has been identified as a significant issue for many Special Olympics athletes [4].

Although the Fit Feet program has been in existence since 2003, and over 106,000 athletes have been screened worldwide, there have only been two publications that report Fit Feet findings. The first, is a 2011 work on the prevalence of podiatric conditions in a 1580 USA athlete cohort of Special Olympics athletes with the second a study of foot to shoe mismatch and rate of referral in Special Olympics athletes published in 2012 [4,5], In fact, a dermatological study of Special Olympics athletes by Fleischer et al. [6] in 1999 appears to be the only publication that reports on some conditions assessed in the authors' earlier study [5]. This current study updates the most in-depth look at the Fit Feet data to date.

Conversely, other Healthy Athletes disciplines such as dental, hearing and vision have been well researched identifying numerous findings in their respective Special Olympics cohorts [7–21]. This current study has a larger US cohort and compares results to an international group of Special Olympics athletes.

The objective of this study is to analyze 2096 of these exams conducted at the Athens 2011 World Summer Special Olympics Games and compare them to 7192 exams from 2007 to 2011 conducted at Fit Feet exams in the United States and then: (1) better determine the prevalence of a variety of selected podiatric conditions in the Special Olympics athlete, (2) identify opportunities for helpful intervention, (3) provide knowledge to clinicians so that they may be prepared to evaluate and treat those with intellectual disabilities (4), identify inherent weaknesses in the data gathering process, some that can be improved upon such as better standardization and definition of clinical findings and uniformity of clinician training as well as those that are ingrained to the process such as the diversity of clinicians both in professional training and worldwide venues.

2. Methods

2.1. Participants

As noted in Table 1, 2096 Special Olympics athletes were screened by trained Fit Feet professionals at the Special Olympics World Summer Games held in Athens, Greece. 1272 were male and 824 were female with an age range of 9.9–65.1 and a mean age of 23.1. Additionally, 7192 athletes from multiple USA games were examined at a variety of individual state competitions 2007–2011 [7192]. The USA cohort consisted of 4279 that were male and 2913 that were female with an age range of 8.0–84.0 and a mean age of 26.9.

3. Lower extremity screening process

Many, but not all, abnormalities screened for in a complete podiatric exam are performed at the venue of the athletic competition. Select podiatric findings are evaluated. Others, like vascular and neurologic status are not evaluated. Those providing exams for the athletes vary as per venue. At the US venues, screening exams were performed by students in U.S. Colleges of Podiatric Medicine, Faculty of U.S. Colleges of Podiatric Medicine and/or volunteer practicing podiatrists, usually in the community the Fit Feet venue is held in. Clinical supervision and training is carried out by Special Olympics Fit Feet Clinical Directors. In the Athens games, screeners included all of the above as well as students in local physiotherapy programs, faculty of these programs, and practicing physical therapists. At world games such as Athens, supervision and training is by Global Clinical Advisors, Regional Clinical Advisors and selected Clinical Directors from multiple countries.

3.1. Biomechanical and gait findings

This portion of the Fit Feet exam includes a non-weight bearing pedal joint range of motion evaluation as well as gait assessment. Because gait evaluation data was significantly limited in the Athens cohort, only the range of motion of the ankle and first metatarsal joint will be reviewed and compared. Currently, Fit Feet does not have a standardized definition for what is considered restricted, hypermobile or normal when considering joint range of motion. The determination is based on the clinicians' gross assessment.

3.2. Structural findings

The Fit Feet exam includes weight bearing and non-weight bearing determinations while evaluating several structural findings. Structural conditions evaluated for included: pes planus, pes cavus (also sometimes known as hollow foot) and metatarsus adductus. Additionally, examinations for brachymetatarsia, hallux abducto valgus and tailor's bunion were conducted. As noted above for range of motion assessment, exams are brief, gross screenings and do not use any objective criteria. The structural findings are based on presence or absence according to clinicians' determinations.

3.3. Dermatological findings

Dermatological conditions included in this analysis were further divided into nail findings and general dermatological findings.

3.3.1. Nail pathology

Subsequent clinical nail findings were clinically assessed for presence or absence. Diagnosis was made on clinical grounds without laboratory confirmation. Although the opportunity for data collection on each nail was present to the clinician, practical considerations led the authors to choose to present nail findings on the hallux only. Assessment for onychomycosis and onychocryptosis was performed.

3.3.2. General dermatology

Dermatological findings addressed clinically included tinea pedis, verruca, xerosis, and hyperhidrosis.

3.4. Data recording and institutional approval

Clinicians performing the Fit Feet exam (usually Fit Feet Clinical Directors) documented their findings on software specially designed for the Healthy Athletes initiative. The raw data for this study was provided to the authors by Patrick Nunan, DPM – Global Clinical Advisor and Amy Shellard, Acting Director of Research and Evaluation, Special Olympics International. Data was analyzed using Excel (Microsoft Office Professional Plus 2010). Approval for

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