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ARTICLE

Comparison of the lower extremity function of patients with foot problems according to the level of kinesiophobia

Sulenur Yildiz[a], Elif Kirdi[a] and Nilgun Bek[b]

[a]Faculty of Physical Therapy and Rehabilitation, Hacettepe University, Ankara, Turkey; [b]Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Lokman Hekim University, Ankara, Turkey

ABSTRACT

Purpose: The presence of kinesiophobia was identified in patients with foot problems. There was no finding of foot functionality according to the level of kinesiophobia in lower extremity problems. The aim of this study was to compare the lower extremity functional status in foot problems with a low or high level of kinesiophobia.

Materials and methods: Evaluated herein were 37 patients with foot problems (plantar fasciitis, hallux valgus, flat foot). Physical and demographic characteristics were recorded. Patients were divided into two groups based on if they had a high or low level of kinesiophobia using the Tampa kinesiophobia scale. Ankle plantar flexor and knee flexor muscles tightness were recorded. The foot posture was evaluated using the Foot Posture Index. Foot-related pain was measured using the Visual Analog Scale Foot & Ankle. The Foot Function Index and the American Orthopaedics Foot and Ankle Foundation Ankle-Hindfoot Scale and Hallux Metatarsophalangeal–Interphalangeal Scale were used to assess the foot function. The general functional status of the lower extremities was evaluated using the Lower Extremity Functional Scale.

Results: Foot function was better in patients with a low level of kinesiophobia ($p < 0.05$). Pain was higher in patients with high level of kinesiophobia than in patients with a low level of kinesiophobia ($p < 0.05$). There was no difference between the groups in terms of foot posture index and muscle tightness ($p > 0.05$). The general lower extremity function was more negatively affected in patients with a high level of kinesiophobia ($p < 0.05$).

Conclusions: Patients with a high level of kinesiophobia presented with more functional problems in the foot and whole lower extremity; hence, function-based rehabilitation and pain coping strategies should be a crucial part of the rehabilitation program at the earliest opportunity.

Abbreviations: TSK-17: Tampa Scale for Kinesiophobia -17; VAS-FA: Visual Analog Scale Foot & Ankle; FFI: Foot Function Index; AOFAS: American Orthopaedic Foot and Ankle Society; LEFS: Lower Extremity Functional Scale

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Fear of movement; foot; function; kinesiophobia; pain

Introduction

Kinesiophobia, which was first reported by Kori et al. (1990), was used to define negative psychological responses after a painful injury as resulting in the avoidance of the movement (Vlaeyen et al. 1995). The avoidance of movement alongside a restriction of activity causes a change from acute pain to chronic pain and leads to a disability consistent with the fear-avoidance model (Zale et al. 2013).

The presence of kinesiophobia has been reported in many conditions in the literature, such as fibromyalgia, whiplash injuries, and neck and lower back pain (Swinkels-Meewisse et al. 2003). Increased disability was observed in patients with elevated kinesiophobia in injuries to the upper and lower extremities (Goldberg et al. 2018). Patients with higher kinesiophobia showed worse functional outcomes after anterior cruciate ligament reconstruction (Houston et al. 2014; Norte et al. 2019). In the same study, it was reported that fear of re-injury and movement decreased the efficacy of rehabilitation (Norte et al. 2019). Decreased function and kinesiophobia were observed in patients with chronic ankle instability when compared with a matched healthy control group (Houston et al. 2014). Although the presence of kinesiophobia was identified in patients with foot and ankle problems, no findings could be found regarding a comparison of foot function according to the level of kinesiophobia in foot problems (Lazzarini et al. 2015; Cotchett et al. 2017). It was hypothesized that individuals who have foot problems with an increased level of kinesiophobia present with a more affected lower extremity functional status. Therefore, the aim of this study was to compare the lower extremity function of patients with foot problems according to the level of kinesiophobia.

Material and methods

Patients

Subjects diagnosed with foot problems were recruited from the Orthotic Rehabilitation Unit at the Faculty of Physical

CONTACT Sulenur Yildiz subasisulenur@gmail.com Faculty of Physical Therapy and Rehabilitation, Hacettepe University, Ankara, 06100, Turkey

Therapy and Rehabilitation, Hacettepe University, Ankara, Turkey. Inclusion criteria were being aged 18 years or older; having an orthopaedic diagnosis of common foot problems seen in clinics such as flat foot, hallux valgus, and plantar fasciitis, duration of symptoms at least for eight weeks, presence of foot pain related with the diagnosed foot deformity, capable of walking independently; able to participate in the tests; being a volunteer to participate to the study. Individuals who had any orthopaedic issues, except for foot pathologies or neurologic disorders, the presence of acute lower extremity injuries, and had a history of lower extremity surgery were excluded from the study.

Included in the study were 37 individuals. Ethical approval was obtained from the Hacettepe University, Non-Interventional Clinical Research Ethics Committee (GO 19/339). All of the participants signed informed consent forms.

Methods

The age, sex, height, body weight, and body mass index (BMI) were recorded for each individual. The Tampa Scale for Kinesiophobia-17 (TSK-17) was used to assess the fear and avoidance reactions of the participants related to movement. The test, which consists of 17 questions, is a Likert-type scale that evaluates movement/re-injury fear. The points range between 17 and 68. High scores indicate a higher fear of movement. Patients scoring higher than 37 are considered to have a high level of kinesiophobia. The participants were divided into two groups according to whether they had a high or low level of kinesiophobia (Korri et al. 1990; Yilmaz et al. 2011). The foot postures of the participants were evaluated using the Foot Posture Index, which is a common and simple evaluation method used in the clinics. Talar head palpation, curves above and below the malleoli, calcaneal position (inversion/eversion), talonavicular congruence, medial arch height, and forefoot position (abduction/adduction) were examined in bilaterally while the patient standing relaxed position with double stand. The proper answer was chosen from the scoring sheet and summed up. The foot posture was defined as normal for 0–5 points, pronation for 6–12 points, and supination for −1 to −12 points (Redmond et al. 2006). The Visual Analog Scale was used to evaluate the severity of pain of the individuals. The Visual Analog Scale Foot & Ankle (VAS-FA) was used to evaluate foot-related pain. Participants were asked to mark their pain at rest and activity on a 100-mm horizontal line, 100 indicating maximum pain and 0 indicating no pain at all. The test, which consists of 20 questions, has sub-parameters of pain, function, and other complaints, and a low score obtained from this test indicates that foot-related pain has less effect on functional activities (Richter et al. 2006; Gur et al. 2017). The Foot Function Index (FFI) and the American Orthopaedic Foot and Ankle Society (AOFAS) Ankle-Hindfoot Scale and Hallux Metatarsophalangeal-Interphalangeal Scale were used to assess foot function. The FFI consists of pain, disability, and activity limitation subgroups. In this scale, which has a total of 23 questions, each item is scored numerically between 0 and 10. A higher score indicates more negative impacts (Budiman-Mak et al. 1991; Yalıman et al. 2014). The AOFAS Ankle-Hindfoot Scale and AOFAS Hallux Metatarsophalangeal–Interphalangeal Scale, which have Turkish versions, are a 100-point scoring system that evaluates pain, function, and alignment according to the affected part of the foot. In these scales, 90–100 points are excellent, 75–89 points are good, 50–74 are fair, and less than 50 points indicate poor (Baumhauer et al. 2006; Akbaba et al. 2016; Schneider and Jurenitsch 2016). To determine the functional status of the general lower extremities of the participants, the Turkish version of the Lower Extremity Functional Scale (LEFS) was applied (Citaker et al. 2016). The LEFS is a 5-point Likert scale consisting of 20 questions. In this scale, which ranged from 0 to 80, higher scores represent functionally better conditions (Binkley et al. 1999; Gatchel et al. 2007).

Statistical analysis

The variables were investigated to determine whether or not they were normally distributed using the Kolmogorov–Smirnov test. The variables were expressed as the mean ± standard deviation, frequency, and percentages, as appropriate. The gender distribution of the groups was analyzed using Chi-square test. The Mann–Whitney *U* test was used to compare the non-parametric variables between the groups, while the independent samples t-test was used to compare the parametric variables. Statistical analyses were performed using IBM SPSS Statistics 20.0 (Armonk, NY) software. Statistical significance was accepted as $p < 0.05$.

Results

Of the 37 patients (26 females, 11 males) that had been diagnosed with foot problems, 61 feet were evaluated in the context of the study. The physical and demographic characteristics of the patients according to the groups are outlined in Table 1.

Of these patients, 17 (14 females, 3 males) (45.9%) were determined to have a low level of kinesiophobia, and 20 (12 females, 8 males) (54.1%) had a high level. Two groups were found similar in case of gender distribution ($p < 0.05$).

Both groups were found to be statistically similar with regards to age, height, weight, BMI, and symptom duration ($p < 0.05$) (Table 1).

The functional status of the feet, which were evaluated using the AOFAS scores, was found to be better in patients with a low level of kinesiophobia ($p < 0.05$). The general lower extremity function measured with the LEFS was found to be more negatively affected in patients with a high level of kinesiophobia ($p < 0.05$). Moreover, the pain, disability, and activity restriction subscales of the FFI were found to be statistically different between the groups ($p < 0.05$) (Table 2).

Kinesiophobia was reported as higher in patients with a high level of pain ($p < 0.05$) (Table 2). Ankle plantar flexor muscle tightness and knee flexor muscle tightness were determined to be different between the groups ($p > 0.05$) (Table 2). There was no statistically important difference

Table 1. Characteristics of the groups.

	Tampa kinesiophobia score <37 (X ± SD)	Tampa kinesiophobia score ≥37 (X ± SD)	*p* Value
Age (year)	34.09 ± 13.98	44.47 ± 13.79	0.065
Height (cm)	1.65 ± 0.04	1.61 ± 0.03	0.328
Weight (kg)	60.02 ± 5.12	58.11 ± 6.09	0.624
BMI (kg/m^2)	27.11 ± 7.09	26.77 ± 5.51	0.337
Symptom duration (month)	29.14 ± 25.49	42.81 ± 30.11	0.375

Table 2. Functional evaluation results of the patients according to the level of kinesiophobia.

	Tampa kinesiophobia Score <37 (X ± SD)	Tampa kinesiophobia Score ≥37 (X ± SD)	*p* Vvalue
AOFAS-Ankle-Hindfoot Score	78.27 ± 12.38	53.63 ± 14.13	0.002*
AOFAS-Hallux Metatarsophalangeal-Interphalangeal Scale	80.88 ± 16.86	65.60 ± 12.85	0.042*
LEFS	66.40 ± 10.28	38.61 ± 16.68	<0.001*
FFI			
Pain	31.25 ± 27.02	56.72 ± 29.25	0.002*
Disability	17.04 ± 18.72	49.04 ± 27.15	<0.001*
Activity Restriction	7.03 ± 10.11	22.85 ± 18.48	<0.001*
VAS-FA	1.55 ± 1.43	5.85 ± 11.91	<0.001*
Ankle plantar flexor tightness (degree)	15.88 ± 8.77	17.33 ± 9.11	0.559
Popliteal angle (degree)	27.27 ± 8.07	23.5 ± 15.45	0.147
Foot posture index	4.03 ± 2.24	4.03 ± 2.22	0.746

*$p < 0.05$; AOFAS: American Orthopaedic Foot and Ankle Society; LEFS: Lower Extremity Functional Scale; FFI: Foot Function Index; VAS-FA: Visual Analogue Scale Foot and Ankle.

between the groups in terms of foot posture index ($p > 0.05$) (Table 2).

Discussion

Kinesiophobia was known as a negative factor in the recovery period of the lower extremity problems (Norte et al. 2019). In this study, the lower extremity function of patients with foot problems was compared in patients with a low and high level of kinesiophobia.

The primary findings of this study revealed that patients with more declined foot function reported a high-level of kinesiophobia. Patient-reported outcome measures, such as regional (FFI, AOFAS Ankle-Hindfoot Scale, or AOFAS Hallux Metatarsophalangeal–Interphalangeal Scale) and global (LEFS) measurements of function were more negatively affected in patients with severe kinesiophobia. The possible negative effects of fear of movement on lower extremity function in people with foot and ankle pain was already known; however, this study also provided evidence regarding the difference in foot function according to the level of kinesiophobia (Lentz et al. 2010). These results supported the interaction between fear of movement and the avoidance of activity. Therefore, patients with a higher level of kinesiophobia presented with a decrease in activity and decline in foot function.

In this study, pain levels were noticeably higher in patients with a high level of kinesiophobia. These results confirmed that pain is an important factor in the presence of fear of movement in chronic musculoskeletal problems. As is already known, the primary trigger of kinesiophobia is pain, which is related to injury or re-injury (Korri et al. 1990). Over the long term, catastrophizing cognitions cause a vicious circle of pain, disability, and fear of movement (Vlaeyen et al. 1995). As has been stated in the biopsychosocial explanation of chronic pain, negative thoughts, such as kinesiophobia, contribute to pain and disability; thus, severe kinesiophobia was observed in patients experiencing more pain and disability, similar to the current study (Gatchel et al. 2007). In the literature, kinesiophobia was stated as one of the most effective contributors to disability in patients with foot problems (Lentz et al. 2010).

The fear-avoidance model supported the idea that pain and function were not solely related to physical evaluations of the patients (Vlaeyen and Linton 2012). Foot posture, ankle plantar flexor muscle tightness, and knee flexor muscle tightness as physical measurements were found to be similar between the groups, even though there was a difference in the severity of kinesiophobia. These results were in line with the model and coherent with the literature (Lentz et al. 2009; Altuğ et al. 2016). It has been reported that not pain intensity at rest, but pain intensity during activity was related to kinesiophobia in patients with chronic low back pain (Altuğ et al. 2016). Although gastrocnemius muscle tightness was present in both groups, which has been seen commonly in patients with foot and ankle problems (Hertling and Kessler 2006; Kisner et al. 2017), it was independent of the severity of kinesiophobia. The reason for not finding a significant difference in foot posture between the groups could have been related to the fact that kinesiophobia was not the only result of the presence of pathology; it was mostly related to the effects of the painful experiences on the perception that the patients had about the disease and their response to it (Vlaeyen and Linton 2012). The severity of kinesiophobia could be thought of as independent from the physical measurements of the foot in lower extremity problems.

The limitations of this study were related to the methodology. The level of kinesiophobia in each group could not be investigated over time due to the nature of the study. Cognitive and emotional strategies, in addition to other possible factors that might affect the level of kinesiophobia, could be investigated as well.

These findings highlighted the fact that kinesiophobia cannot be thought of independently from foot function and pain in lower extremity problems. Patients with a high level of kinesiophobia present with more functional problems in the lower extremity. Function-based rehabilitation and pain coping strategies should be a crucial part of the rehabilitation program to prevent further possible negative effects of kinesiophobia.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Sulenur Yildiz http://orcid.org/0000-0001-7441-3463
Elif Kirdi http://orcid.org/0000-0002-0414-703X
Nilgun Bek https://orcid.org/0000-0002-2243-5828

References

Akbaba YA, Celik D, Ogut RT. 2016. Translation, cross-cultural adaptation, reliability, and validity of turkish version of the american orthopaedic foot and ankle society ankle-hindfoot scale. J Foot Ankle Surg. 55: 1139–1142.

Altuğ F, Ünal A, Kilavuz G, Kavlak E, Çitişli V, Cavlak U. 2016. Investigation of the relationship between kinesiophobia, physical activity level and quality of life in patients with chronic low back pain. J Back Musculoskelet Rehabil. 29:527–531.

Baumhauer JF, Nawoczenski DA, DiGiovanni BF, Wilding GE. 2006. Reliability and validity of the american orthopaedic foot and ankle society clinical rating scale: a pilot study for the hallux and lesser toes. Foot Ankle Int. 27:1014–1019.

Binkley JM, Stratford PW, Lott SA, Riddle DL. 1999. The lower extremity functional scale (lefs): scale development, measurement properties, and clinical application. North American Orthopaedic Rehabilitation Research Network. Phys Ther. 79:371–383.

Budiman-Mak E, Conrad KJ, Roach KE. 1991. The foot function index: a measure of foot pain and disability. J Clin Epidemiol. 44:561–570.

Citaker S, Kafa N, Kanik ZH, Ugurlu M, Kafa B, Tuna Z. 2016. Translation, cross-cultural adaptation and validation of the Turkish version of the lower extremity functional scale on patients with knee injuries. Arch Orthop Trauma Surg. 136:389–395.

Cotchett M, Lennecke A, Medica VG, Whittaker GA, Bonanno DR. 2017. The association between pain catastrophising and kinesiophobia with pain and function in people with plantar heel pain. The Foot. 32: 8–14.

Gatchel RJ, Peng YB, Peters ML, Fuchs PN, Turk DC. 2007. The biopsychosocial approach to chronic pain: scientific advances and future directions. Psychol Bull. 133:581–624.

Goldberg P, Zeppieri G, Bialosky J, Bocchino C, van den Boogaard J, Tillman S, Chmielewski TL. 2018. Kinesiophobia and its association with health-related quality of life across injury locations. Arch Phys Med Rehabil. 99:43–48.

Gur G, Turgut E, Dilek B, Baltaci G, Bek N, Yakut Y. 2017. Validity and reliability of visual analog scale foot and ankle: the Turkish version. J Foot Ankle Surg. 56:1213–1217.

Hertling D, Kessler RM. 2006. Management of common musculoskeletal disorders: physical therapy principles and methods. Philadelphia (PA): Lippincott Williams & Wilkins.

Houston MN, Van Lunen BL, Hoch MC. 2014. Health-related quality of life in individuals with chronic ankle instability. J Athl Train. 49: 758–763.

Kisner C, Colby LA, Borstad J. 2017. Therapeutic exercise: foundations and techniques. Philadelphia (PA): Fa Davis.

Korri S, Miller R, Todd D. 1990. Kinesiophobia: a new view of chronic pain behaviour. Pain Manage. 3:35–43.

Lazzarini PA, Hurn SE, Fernando ME, Jen SD, Kuys SS, Kamp MC, Reed LF. 2015. Prevalence of foot disease and risk factors in general inpatient populations: a systematic review and meta-analysis. BMJ Open. 5: e008544.

Lentz TA, Barabas JA, Day T, Bishop MD, George SZ. 2009. The relationship of pain intensity, physical impairment, and pain-related fear to function in patients with shoulder pathology. J Orthop Sports Phys Ther. 39:270–279.

Lentz TA, Sutton Z, Greenberg S, Bishop MD. 2010. Pain-related fear contributes to self-reported disability in patients with foot and ankle pathology. Arch Phys Med Rehabil. 91:557–561.

Norte GE, Solaas H, Saliba SA, Goetschius J, Slater JV, Hart JM. 2019. The relationships between kinesiophobia and clinical outcomes after acl reconstruction differ by self-reported physical activity engagement. Phys Ther Sport. 40:1–9.

Redmond AC, Crosbie J, Ouvrier RA. 2006. Development and validation of a novel rating system for scoring standing foot posture: the foot posture index. Clin Biomech (Bristol, Avon). 21:89–98.

Richter M, Zech S, Geerling J, Frink M, Knobloch K, Krettek C. 2006. A new foot and ankle outcome score: questionnaire based, subjective, visual-analogue-scale, validated and computerized. Foot Ankle Surg. 12:191–199.

Schneider W, Jurenitsch S. 2016. Normative data for the american orthopedic foot and ankle society ankle-hindfoot, midfoot, hallux and lesser toes clinical rating system. Int Orthop. 40:301–306.

Swinkels-Meewisse E, Swinkels R, Verbeek A, Vlaeyen JW, Oostendorp RAB. 2003. Psychometric properties of the Tampa scale for kinesiophobia and the fear-avoidance beliefs questionnaire in acute low back pain. Man Ther. 8:29–36.

Vlaeyen JW, Kole-Snijders AM, Boeren RG, Eek H. 1995. Fear of movement/(re)injury in chronic low back pain and its relation to behavioral performance. Pain. 62:363–372.

Vlaeyen JW, Linton SJ. 2012. Fear-avoidance model of chronic musculoskeletal pain: 12 years on. Pain. 153:1144–1147.

Yalıman A, Şen Eİ, Eskiyurt N, Budiman-Mak E. 2014. Ayak fonksiyon İndeksi'ni plantar fasiitli hastalarda türkçe'ye çeviri ve adaptasyonu. Turk J Phys Med Rehabil. 60:212–222.

Yilmaz ÖT, Yakut Y, Uygur F, Ulug N. 2011. Tampa kinezyofobi ölçeği'nin Türkçe versiyonu ve test-tekrar test güvenirliği. Fizyoter Rehabil. 22: 44–49.

Zale EL, Lange KL, Fields SA, Ditre JW. 2013. The relation between pain-related fear and disability: a meta-analysis. J Pain. 14:1019–1030.