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Relationship between Pain and Ankle Mobility in Subjects with Haglund Syndrome

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Abstract

Background: Haglund's syndrome is a common painful musculoskeletal condition in adults and increases health problem, causing functional disability in large populations.

Aim of Study: The aim of this cross-sectional correlational study was to investigate relationship between pain and ankle mobility in Haglund syndrome.

Subjects and Methods: Fourteen subjects with Haglund syndrome were included in this study. Their mean ± SD of age, weight, height, and BMI were 46.29±10.00 years, 68.43±10.66Kg, 170 .64±9.23cm, 23 .36±1.49kg/m^2 respectively. They were referred by orthopedic surgeons with a diagnosis of Haglund's syndrome.

All subjects were assessed for ankle dorsiflexion and plantar flexion range of motion using digital goniometer. In addition, subjects in the study were assessed for pain intensity using the Visual Analog Scale (Vas). Correlation between variables in the study group was performed using Pearson's correlation coefficient.

Results: There was negative moderate significant correlation between pain and ankle dorsi flexion (r=-0.532, pl).05), while positive moderate non significant correlation with ankle planter flexion.

Conclusion: Haglund syndrome has a negative effect on ankle dorsiflexion but doesn't affect plantar flexion. Patients with Haglund syndrome experience more affection in pain.

Key Words: Haglund syndrome — Ankle ROM — Digital goniometer.

Introduction

THE ankle joint range of motion (ROM) is an important part of the human kinetic chain, playing an important role in posture balance and gait. It is an intrinsic factor involved in low extremity injury and ankle injury in sports. Decreasing of ankle joint ROM influences many aspects of function and balance. In addition, Ankle is focused primarily on plantar flexion (PF) and dorsiflexion (DF) flexibility and strength. Movement of (PF) and (DF) is necessary to allow optimal force generation and balance strategy execution to decrease fall risk [1].

Overall weakening of the bones, muscles and ligaments increases the incidence of musculoskeletal deformities, not least those affecting the feet. Consequently, this leads to functional limitations, pain, and falls-risk. Appreciating the mechanisms that determine balance will delay these adverse changes that affect postural stability and translates to patient's overall self-reliance and safety **[2].** One of syndromes that cause musculoskeletal deformities is Haglund's syndrome. This is a common painful musculoskeletal condition in adults caused by an exostosis in the posterior superior aspect of the calcaneus. It is associated with a chronic insertional achilles tendinopathy and retrocalcaneal bursitis Caused by altered foot or ankle joint biomechanics , unsuitable footwear or chronic load stress **[3].** Pain is most noticeable and is most usually stated as sharp rather than dull pain, when patients first put their feet on the ground in the morning **[4].**

To the authors' knowledge, none of the studies have investigated the correlation between pain and ankle mobility in patient with Haglund syndrome.

Subjects and Methods

Study design:

Data were obtained for pain, ankle plantar flexion and dorsiflexion ROM, from fourteen subjects diagnosed with Haglund syndrome. The design for this study was cross-sectional correlational study. This study was conducted at the outpatient clinic of Deraya University between February 2023 and August 2023.

Participants:

Fourteen subjects with Haglund syndrome were included in this study. Their mean ± SD of age,

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weight, height, and BMI were 46.29±10.00 years, 68.43±10.66Kg, 170.64±9.23cm, 23.36±1.49kg/ m²respectively. Referred by an orthopedic surgeon with a diagnosis of Haglund syndrome. Patients were included if they had complained of both unilateral and bilateral Haglund syndrome with an age range between 25 and 56 years, a body mass index between 18.5 and 24.9, Pain medially at insertion of tendo-achilles and Palpation of hard, bony prominence [5,6,7,8].

Assessment procedure:

At baseline, the study purpose was explained to eligible participants, and the principal investigator (PI) clearly explained all the items in the informed consent form and addressed any question or concern. The subjects were then asked to sign the informed consent form. After assignment, patients' demographics were collected, and assessments of pain, ankle plantar flexion and dorsiflexion ROM-were performed.

1- Pain Assessment (VAS):

Subjects were assessed for pain using Visual Analog Scale (Vas), which is a self-reported scale and consists of horizontal line usually 10 centimeters long (100mm) presented at the extremes by two verbal descriptors referring to the pain level [9]. Because there are no gradations on the visual analogue scale, it is thought to be more sensitive than scales with intermediate markers [10]. The visual analog scale is a reliable scale but for validity it showed moderate to strong correlation for pain measurement valid and [11,12].

2- Ankle ROM Assessment (Digital Goniometer):

Ankle ROM was evaluated by using Digital Goniometer (Baseline Absolute+Axis@ Goniometers Fabrication Enterprises, Fabrication Enterprises; 2018. — Digital 180 Degree Range, 9 inch Arms, 12-1027) which consists of the integral absolute vertical and horizontal levels, reads 0-185° degrees on liquid-crystal display screen, and has ability to freeze angle measurement; Goniometer exterior is powder-coated steel with inch/cm marks screened onto arms and powered by 9V battery. The absolute axis goniometer eliminates the need to manually score each measurement that decreases the errors [13].

Ethical consideration:

The study has been approved by the Ethical Committee of the Faculty of Physical Therapy, Cairo University, approval number: No: P.T.REC/ 012/004497. The participants signed an informed consent form before data collection. The study was registered on Clinical Trials.gov with the registration number NCT05905952.

Data analysis:

Descriptive statistics was conducted for presentation of data. Mean and standard deviations for continuous variables and percentage for categorical ones. Pearson Correlation Coefficient was conducted to determine the correlation between variables. The level of significance for all statistical tests was set at $p<0.05$. All statistical tests were performed through the statistical package for social sciences (SPSS) version 25 for windows. (IBM SPSS, Chicago, IL, USA).

Results

A total of fourteen participants with Haglund syndromecompleted the study. Subjects' characteristics were demonstrated in Table (1). Their mean age, weight, height and BMI were 46.29±10.00 years, 68.43±10.66Kg, 170.64±9.23cm, 23.36±1.49 kg/m^2 respectively. The Shapiro-Wilk test revealed a mixture of normal and non-normally distributed variables, but after visual examination of the histograms and QQ plots, non-parametric tests were more appropriate to conduct. Pearson's correlation coefficient was used to investigate the correlation between the tested variables and showed the following: Table (1).

Table (1): Basic characteristics of participants.

	Subjects with Haglund's syndrome
	Mean ± SD
Age (years)	46 .29±10 .00
Weight (kg)	68 .43±10 .66
Height (cm)	170.64±9.23
BMI (kg/m^2)	23 .36±1 .49
Sex, n (%):	
Females	9 (64%)
Males	5 (36%)
Dominant side, n(%):	
Right side	13 (93%)
Left side	1 (7%)
Smoking, n(%):	
Smokers	3 (21%)
Nonsmokers	11 (79%)

SD: Standard deviation.
* Correlation is Significance atp-value s0.05.
** Correlation is significance at p-value s0.01.

A- *Relationship between pain, ankle ROM in Haglund's syndrome:*

The correlations of VAS was negative moderate significant correlation with ankle dorsiflexion *(r=* —0.532, p=0.05), positive moderate non significant correlation with ankle planter flexion Table (2).

Table (2): Correlation between pain, ankle ROM in Haglund's syndrome.

	Ankle dorsiflexion	Ankle planter flexion
VAS	—0.532*	0.427
Ankle dorsiflexion		—0.474
Ankle planter flexion		

Abbreviations: VAS: Visual Analogue Scale.
* Correlation is Significance at p-value s0.05.
** Correlation is significance atp-value s0.01.

Discussion

In this study, we analyzed the difference in ankle dorsi flexion and plantar flexion **ROM** between subjects with Haglund syndrome and age matched normal control. The result suggests that subjects with Haglund syndrome exhibit more pain, decrease in dorsi flexion **ROM,** while plantar flexion **ROM** does not seem to be affected. The result of this study may help clinicians dealing with Haglund syndrome in designing proper treatment programs for their patients, this in turn can improve overall quality of life.

The result showed that there was a significant decrease in dorsiflexion **ROM** of subjects with Haglund's syndrome compared with control group (p=0.001). The mean value ± SD of dorsi flexion **ROM** in subjects with Haglund's syndrome was 13.45±3.38 degrees and in control group was 18.56 ±3.73 degrees with a mean difference of —5.11 degrees. The muscle and tendon may also play an important role in passive range of motion. It has been shown that increased muscle stiffness (i.e., resistance to stretching) can contribute to reduced **ROM** and impaired function **[14].** In addition to these contractile structures, non-muscular structures (e.g., nerves and fasciae) can limit passive ankle dorsiflexion **ROM.** Reduced ankle dorsiflexion **ROM** has been associated with increased injury risk in both acute and overuse injuries to the ankle joint and surrounding tissues (e.g., sprains, Achilles tendinopathy, patellar tendinopathy, and general lower extremity pain [15]. Also, the result suggested there was no significant difference in planter flexion **ROM** between subjects with Haglund's syndrome and control group, that may be due to the achilles tendon not be impingement and compressed on the calcaneal spur of Haglund deformity during plantarflexion as in dorsiflexion.

Limitations:

1- The small sample size may limit the generalizability of the findings of this study. It is likely that if we had used a bigger sample size, our results would have been different.
2- Since we only kept in touch with the participants at the time of assessment only, we were unable to assess the long-term results.
3- The method used for assessment of ankle **ROM** using a digital goniometer may have been subjected to examiner's bias.

Conclusion:

Haglund syndrome has a negative effect on ankle dorsiflexion while, no effect on plantar flexion. Patients with Haglund syndrome experience more affection in pain.

Source of funding:

The study was not funded by any organization or entity.

Conflict of Interests:

Authors declare no potential conflicts of interests.

Author contribution:

The authors contributed equally to the study.

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العلاقة بين الألم وحركة الكاحل لدى الأشخاص المصابين بمتلازمة هاغلوند

الهدف من البحث: إكتشاف اذا كان هناك علاقة بين الألم وحركة الكاحل لدى الأشخاص المصابين بمتلازمة هاغلوند.

طريقـة البحـث: تم إجراء هـذا البحث على أربعه عشرمريضاً يعانون من متلازمة هاجلوند و١٤ شخص مطابقاً للعمر. كان متوسط أعمارهم ٣٩,٣٩ ± ٧,٧٥ سنة.

نتائج البحث: ابرزت نتائج هذا البحث وجود تاثير بالسلب على نطاق حركة العطف الظهرى للكاحل بينما لم توجد أى تاثير على نطاق حركة العطف الأخمصى فى الكاحل.

الاستنتاجات: متلازمة هاجلوند تؤثر بالسلب على مدى حركة العطف الظهرى بالكاحل كما ان المرضى الذين يعانون من هذه المتلازمة يشعرون بمزيد من الألم.