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AN ANALYSIS OF GAIT IN NOVICE SPORTS TRAINEES WITH SHINSPLINTS : AN OBSERVATIONAL STUDY

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ABSTRACT

Background: Shin splints is a common overuse injury of the lower extremities affecting a large percentage of sports trainees. In India Incidence of shin splint is more in females (53%) than males (44.7%). Gait can be analyzed using various methods and those methods classified into 2 categories i.e., Qualitative and Quantitative methods Qualitative gait analysis includes visual observation, video-based observation and scales and questionnaires. Three-dimensional(3-D) motion analysis is widely accepted as the gold standard for assessing running biomechanics but, due to its high cost, the utilization of system is limited to selected institutions. A two dimensional (2-D) running gait analysis system, is more affordable for clinical use and practical solution for field research.

METHOD: A total 15 patients were taken by convenient sampling technique, 10 of them met with inclusion criteria and For the 10 people after taking assesment and consent we asseses their gait by Gait On gait analyser machine which is recorded footage by videotaping.

Results: After assesing gait with gait analyser machine, The result of the study, we observed that there is marked changes in their range of motion while walking especially in ankle angles during each event of gait.

Conclusion: This study concluded that there are changes in gait in novice sports trainees with shinsplint due to changes in range of motion while walking especially in ankle angles during each event of gait.

KEYWORDS:

SHINSPLINTS, NOVICE, Gait ON, WIN-TRACK, TECKSCAN, SAI, NTSC, SAAP, TOPS

INTRODUCTION

India has sports history that goes back thousands of years. India first participated in the summer Olympic Games in 1900 [(1)]. Cricket is the most popular sport in India. India's diverse culture and people have influenced the wide variety of sports, with indigenous sports such as kabaddi, kho-kho, mixed martial arts like kalarippayattu of Kerala and Kathi samu in Andhra Pradesh etc., wrestling, and basketball[(2)(3)] .Shin splints is a common overuse injury of the lower extremities affecting a large percentage of sports trainees. In India Incidence of shin splint is more in females (53%) than males (44.7%) [(6,7)]. Shin splints are also known as medial tibial stress syndrome was originally suggested by D. Dez, and quoted by Mubarak et al in, in 1986 Detmer classified posteromedial shin pain as being due to one of these causes are a primary bone fracture, Symptoms adjacent to bone at periosteal junction and Symptoms due to deep posterior compartment syndrome [(8)].

ANATOMICALLY Shin splint may identify as. Pain along the posterior medial aspect of tibia particularly along with the distal two-thirds. The pain may also occur along the anterior lateral aspect of the tibia [(10,11)]. There are mainly `two types a) anterior shin splint which is referred as dysfunction of the anterior leg compartment or surrounding structures b) medial tibial stress syndrome refers as, pain associated to distal two-third of the leg due to exercise [(9).]

Gait is described as a translatory progression of the body as a whole, produced by coordinated, rotatory movements of body segments. In general,in every individual gait occurs in 2 phases. They are swing phase and stance phase. In stance phase events include intal contact,foot flat,heel-off,toe-off and sub phases of stance phase include loading response,mid stance phase and push-off phase.In swing phase events include initial swing, midswing and late swing. Gait can be analyzed using various methods and those methods classified into 2 categories i.e., Qualitative and Quantitative methods Qualitative gait analysis includes visual observation, video-based observation and scales and questionnaires. Quantitative gait analysis includes kinematic analysis, kinetic analysis and EMG analysis [(13 , 15)]

objective measures of assessment of running gait help to understand abnormal biomechanics that may contribute to injury in novice sports trainee. There are different systems available for measuring kinematic data during running. Three-dimensional(3-D) motion analysis is widely accepted as the gold standard for assessing running biomechanics but, due to its high cost, the utilization of system is limited to selected institutions. A two dimensional (2-D) running gait analysis system, is more affordable for clinical use and practical solution for field research. It uses 2 digital cameras to capture motion from all the views (anterior, posterior and lateral). Each view is analyzed by a motion analysis software to obtain information regarding kinematic and kinetic parameters for assessment of biomechanics running. [(13)]

NEED OF THE STUDY:

Shin splints are most common in novice sports players. players with shin splints felt pain around tibia region and they also feel uncomfortable while walking or running. So, the purpose of the study is to observe the analysis of gait with shin splints in novice players

RESEARCH & METHODOLGY:

STUDY DESIGN: This study is designed as observational study

SAMPLE DESIGN: Convenient method of sampling is used to collect sample

STUDY SETTING: GEMS HOSPITAL PHYSIOTHERAPY OUTPATIENT DEPARTMENT

SAMPLE SIZE: 20 patients with shin splints

STUDY DURATION: 3 months

OUTCOME MEASURE:

GAITON GAIT ANALYSER

GaitON'S gait analysis identifies key walking deviations from multiple views and exports all data to a report

INCLUSION CRITERIA

Age:9 to 23 years

Gender: male

Subjects with acute and subacute shin splints

Shin splint without medication

EXCLUSION CRITERIA

Chronic shin splints

Recent lower limb surgeries

Recreational runners

Shin splints with medication

Procedure:

In this study, we took 20 subjects with shinsplints with consent and screened for inclusive and exclusive criteria. We have taken assesment for the subjects who are included in inclusion criteria after taking assesment we observe gait of the each subject in Gait On gait analysis machine which is recorded footage by videotaping.

SAMPLE DATA OF A SINGLE SUBJECT

DATA PRESENTATION IN THE TERMS OF DEVIATIONS

S.NO	PHASES	LEFT		RIGHT	
1		JOINT	MAJOR/MINOR	JOINT	MAJOR/MINOR
		HIP	MAJOR DEVIATION	HIP	MINOR DEVIATION

	INTIAL CONTACT	KNEE	MAJOR DEVIATION	KNEE	MINOR DEVIATION
		ANKLE	MAJOR DEVIATION	ANKLE	MAJOR DEVIATION
	LOAD RESPONSE	HIP	MAJOR DEVIATION	HIP	MAJOR DEVIATION
		KNEE	MAJOR DEVIATION	KNEE	MAJOR DEVIATION
		ANKE	MAJOR DEVIATION	ANKLE	MAJOR DEVIATION
	MID STANCE	HIP	NORMAL	HIP	MAJOR DEVIATION
		KNEE	MAJOR DEVIATION	KNEE	MAJOR DEVIATION
		ANKLE	MAJOR DEVIATION	ANKLE	MAJOR DEVIATION
	TERMINAL STANCE	HIP	NORMAL	HIP	NORMAL
		KNEE	MAJOR DEVIATION	KNEE	MAJOR DEVIATION
		ANKLE	MAJOR DEVIATION	ANKLE	MAJOR DEVIATION
	PRE SWING	HIP	MAJOR DEVIATION	HIP	MAJOR DEVIATION
		KNEE	MINOR DEVIATION	KNEE	MINOR DEVIATION
		ANKLE	MAJOR DEVIATION	ANKLE	MAJOR DEVIATION
	INITIAL SWING	HIP	NORMAL	HIP	MAJOR DEVIATION
		KNEE	MAJOR DEVIATION	KNEE	NORMAL
		ANKLE		ANKLE	NORMAL
	MID SWING	HIP	MAJOR DEVIATION	HIP	NORMAL
		KNEE	MAJOR DEVIATION	KNEE	NORMAL
		ANKLE	MAJOR DEVIATION	ANKLE	MAJOR DEVIATION
	POSTERIOR VIEW MID STANCE		MINOR DEVIATION		MINOR DEVIATION
	ANTERIOR VIEW MID STANCE		MINOR DEVIATION		MAJOR DEVIATION

DATA PRESENTATION IN THE TERMS OF RANGE OF MOTION

S.N0	ANKLE ANGLE	RIGHT	LEFT	REFERENCE VALUE
1	INITIAL CONTACT	109.8°	101.7	90° to 95°
	LOADING RESPONSE	102.6°	105.5	90° to 96°
	MID STANCE	98.9°	102.9	78° to 86°
	TERMINAL STANCE	93.6°	101.4	76° to 84°
	PRE SWING	115.1°	120.5	99° to 109°
	INITIAL SWING	97.1°	93.1	94° to 104°
	MID SWING	100.5°	109.5	87° to 93°
	KNEE ANGLE	RIGHT	LEFT	REFERENCE VALUE
	INITIAL CONTACT	179.3°	186.1°	168° to 178°
	LOADING RESPONSE	175.6°	177.7°	156° to 165°
	MID STANCE	189.7°	184.9°	168°to 177°
	TERMINAL STANCE	176.9°	177.7°	163° to 171°
	PRE SWING	135.3°	138.7°	136° to 147°
	INITIAL SWING	122.8°	146.6°	116° to 126°
	MID SWING	154.6°	170.0°	146° to 157°
	HIP ANGLE	RIGHT	LEFT	REFERENCE VALUE
	INITIAL CONTACT	(+) 18.5°	(+) 10.6°	(+) 20° to (+) 27°
	LOADING RESPONSE	(+)8.7°	(+) 5.1°	(+) 19° to (+) 26°
	MID STANCE	(-) 11.6°	(-) 4.6°	0° to (-) 6°
	TERMINAL STANCE	(-) 17.2°	(-) 15.0°	(-) 15° to (-) 23°
	PRE SWING	(+) 0.7°	(-) 1.2°	(-) 7° to (-) 15°
	INITIAL SWING	(+) 29.3°	(+) 13.4°	(+) 9° to (+) 17°
	MID SWING	(+) 29.6°	(+) 11.3°	(+) 22° to (+) 30°

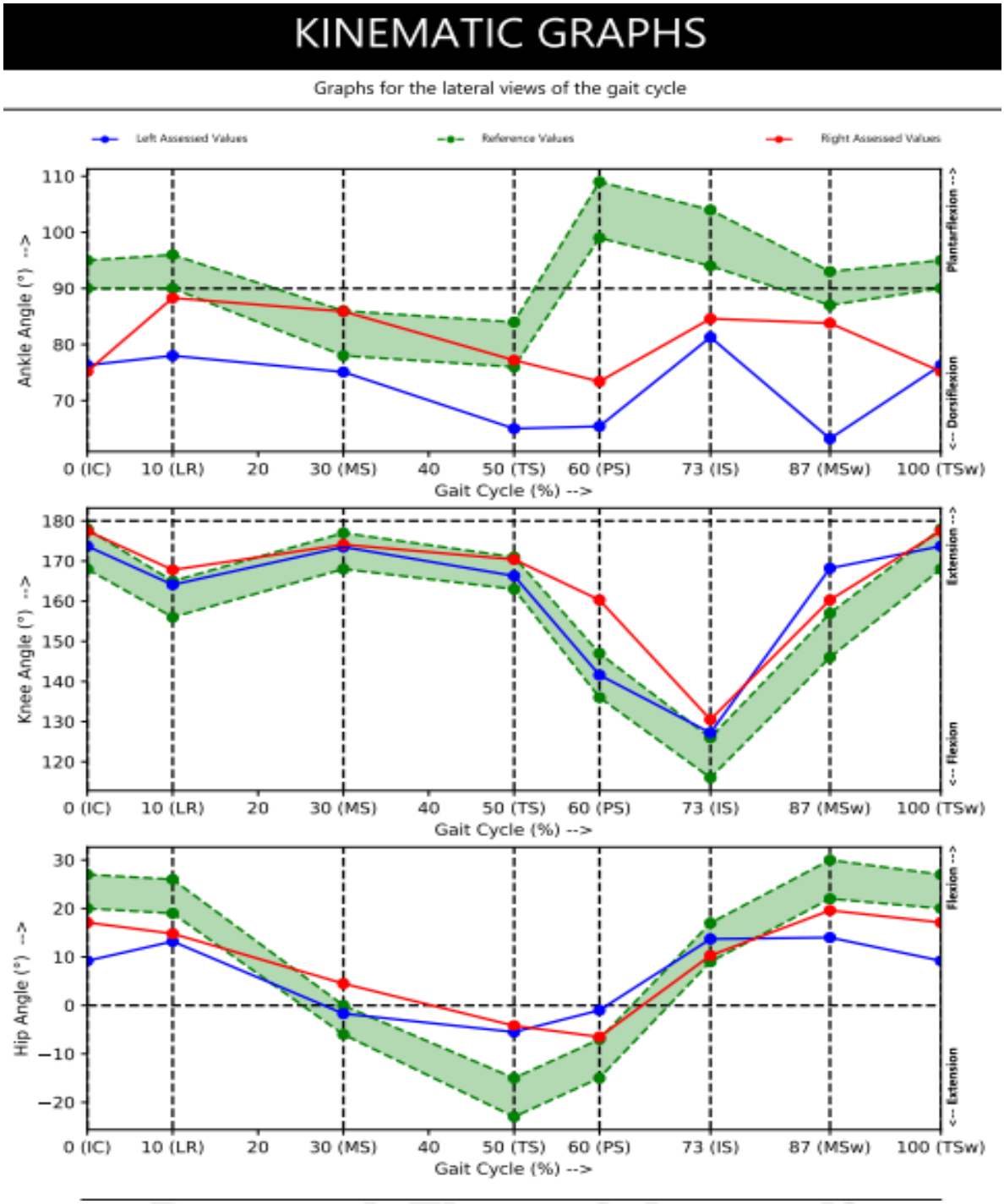
POSTERIOR VIEW

	REAR FOOT ANGLE	RIGHT	LEFT	REFERENCE VALUE
	MIDSTANCE	(+) 3.4°	(+) 4.4°	(+) 2° to (+) 6°
	PELVIC DROP MID STANCE	(-) 1.3°	(+) 6.8°	0° to (+) 5°

ANTERIOR VIEW

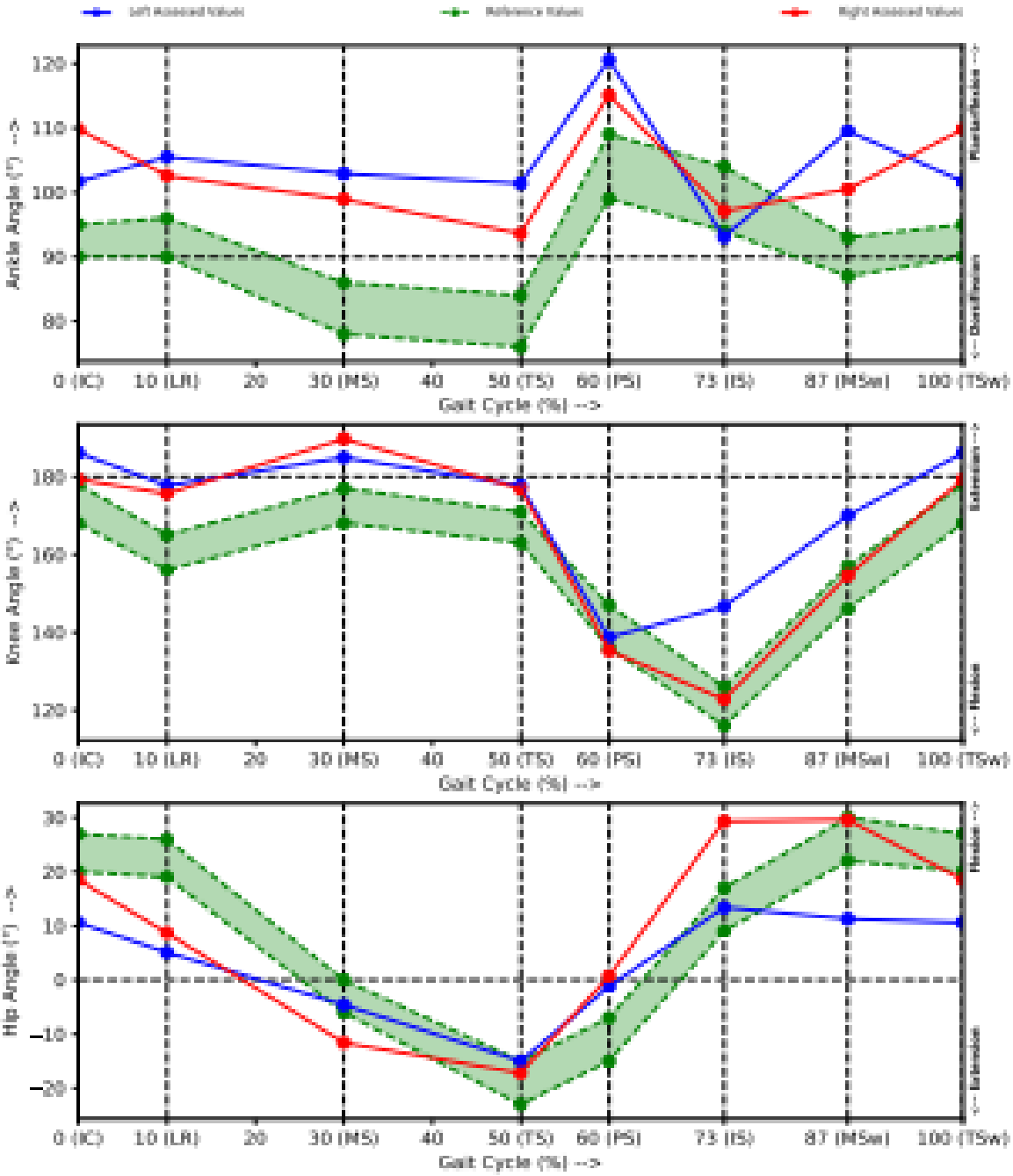
	KNEE Ab/adduction	RIGHT	LEFT	REFERENCE VALUE
	MID STANCE	(+) 7.7°	(+) 2.1°	0°

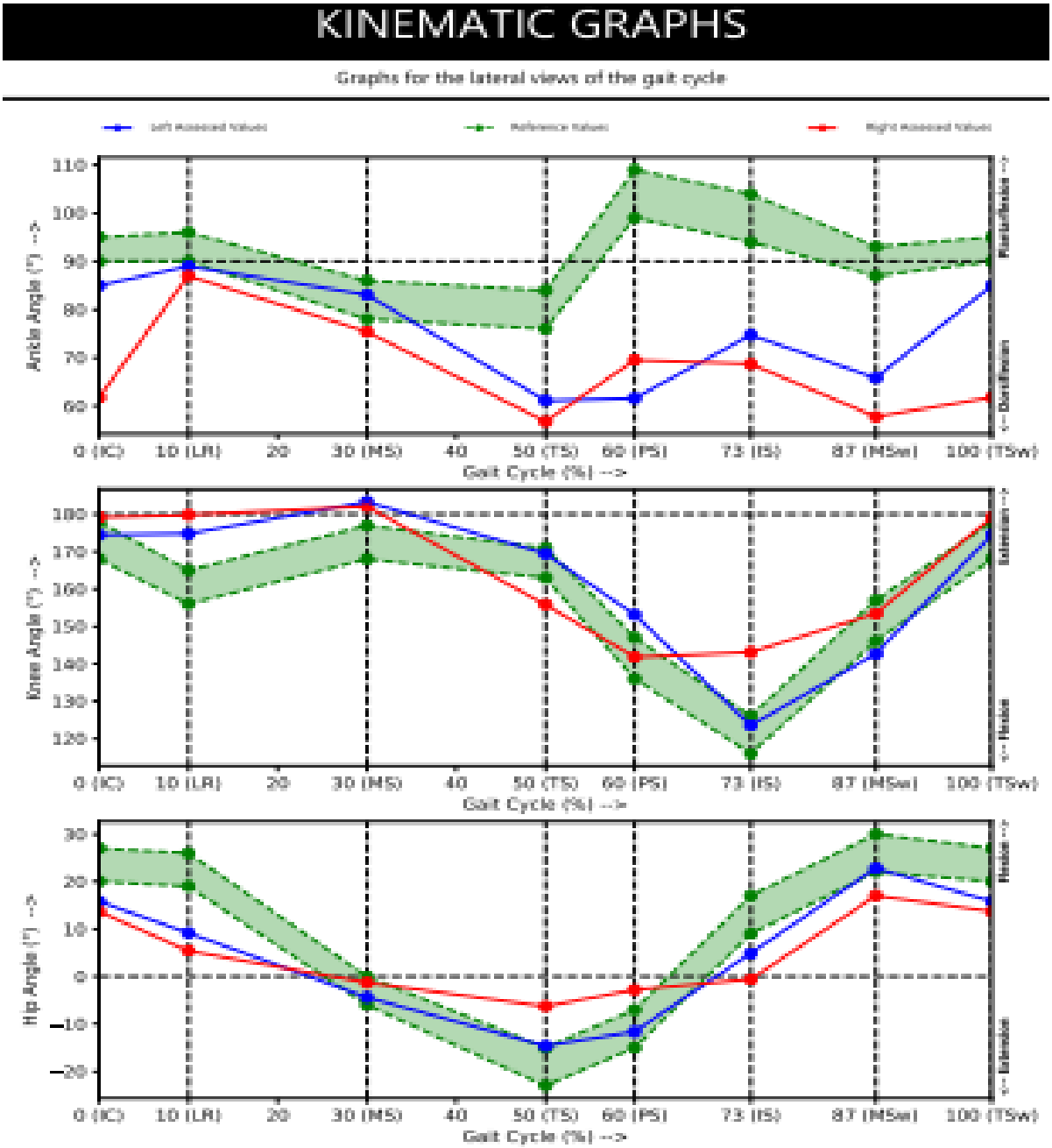
RESULTS :



KINEMATIC GRAPHS

Graphs for the lateral views of the gait cycle





DISCUSSION

This study aimed to observe the gait of the people who are having shinsplints from past 3 months with GaitON Gait anlyser machine. Three-dimensional gait analysis is now commonly used in research as a tool.

After screening inclusion and exclusion criteria,10 novice sports players were included between the age between 9 to 23 years. For the 10 people after taking assesment and consent we asseses their gait by Gait On gait analyser machine which is recorded footage by videotaping.

A number of factors may contribute to the increased stress and traction on the posterior medial aspect of the tibia. These include excessive pronation, training errors, shoe design, surface type, muscle dysfunction, fatigue and decreased flexibility. Other risk factors that have been reported include female sex, higher body mass index, greater internal and external rotation of the hip, increased calf girth, and a history of previous stress fractures or use of orthotics. (13)

Flatfoot individuals are generally presented with decreased range of motion compared normal foot, flatfoot is a condition triggered by several reasons like neurological or muscular restrictions, ligament laxity,joint laxity. [Joel marouvo et al (2021)].flatfoot individuals would use hip adductor muscles and internal rotator muscles compared to normal foot individuals[Myoung-kwon kim et al(2014)]. he dorsiflexion of ankle joints and calf flexibility are essential elements for daily activities, such as gait and sports activities, it has been shown that muscle tightness of the calf leads to a decrease in the range of motion for dorsiflexion, and the resulting pain and decreased performance can cause changes in the gait pattern[Jeonhyeong lee et al (2019)]

Shinsplints were identified as a major cause of lowerleg pain among sports persons.This study didn't found any significant association with socio-demographic characteristics of this study such as gender, age, etc.. and also life style related factors such as smoking, maintenance of diet plan and water intake.(4)

In our study we observed that there is change in gait pattern of novice sports players with shinsplints and marked changes in range of motion during gait in swing and stance phase in lateral, posterior and anterior view.Three-dimensional gait analysis is now commonly used in research as a tool.we observed more marked changes in ankle angle during each event of swing and stance phase due to pain and muscle spasm at tibialis anterior muscle and in the terms of deviations we observed major deviations in lateral veiw initial contact,loading response and midstance due to marked increase in the range of motion during gait and minor deviations in preswing and initialswing with slight increased angles and also minor deviations in posterior view and anterior view in mid stance.In the individuals with flatfoot there more marked deviantions than normal foot individual.

In this study we observe that there is marked changes in range of motion especially in ankle angles during each event of gait phases. The changes mainly occurred due to pain and stiffness at tibialis anterior muscle.

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