Comparison of joint hypermobility, balance, muscle strength, muscle length among collegiate recreational players with and without flatfoot

Niketh Madhu[1], Ganesh B.M[2], Prateek Srivastav[3]

Department of Physiotherapy, Manipal College of Health Professions, MAHE ,Manipal

Paper ID : MRCHS117

INTRODUCTION

- Flatfoot is characterized by collapsed medial longitudinal arch, and pronation of the feet.
- Flatfoot can lead to anatomical deficits in feet and whole lower limb.
- These anatomical defects can further cause muscular, biomechanical and balance issue.
- Flatfoot can cause higher injury incidence in athletes as the physical demands of athletes are much higher than non athletic individuals.
- The early detection of flatfoot and its related factors can help in injury prevention of an athlete

OBJECTIVES

To compare joint hypermobility, balance, muscle strength and muscle length among collegiate recreational athletes who have flatfoot and who does not have flatfoot

MATERIALS AND METHODS

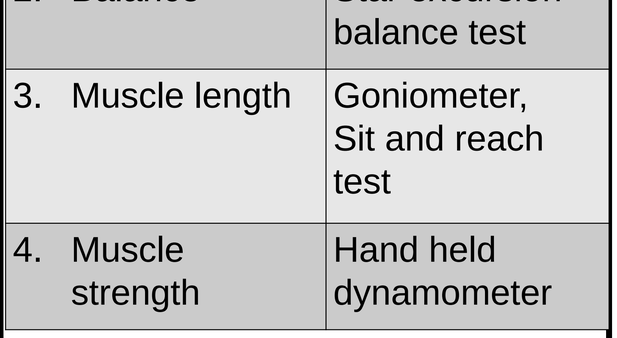
- Study design: Cross sectional observational
- Outcomes:

1. Joint Hypermobility	Beighton score
2. Balance	Star excursion balance test
3. Muscle length	Goniometer, Sit and reach test
4. Muscle strength	Hand held dynamometer

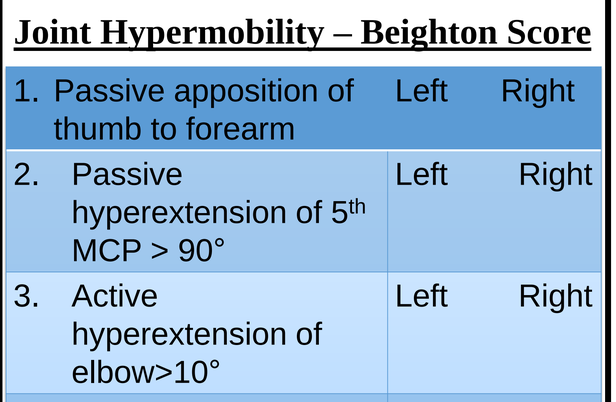
Joint Hypermobility – Beighton Score

1. Passive apposition of thumb to forearm	Left	Right
2. Passive hyperextension of 5th MCP > 90°	Left	Right
3. Active hyperextension of elbow>10°	Left	Right
4. Active hyperextension of knee > 10°	Left	Right
5. Ability to flex spine placing palms to floor without bending knees	Left	Right

Star Excursion Balance test



Muscle length measurements



Muscle Strength measurements

RESULTS

The study results shows that

Outcomes	P Value
1. Joint Hypermobility	(0.875)
2. Balance	(0.001)
3. Muscle length	
❖ Hip flexors	(0.457)
❖ Hamstrings	(0.070)
❖ Gastrocnemius	(0.212)
❖ Plantar flexors	(0.081)
❖ Dorsiflexors	(0.030)
❖ Invertors	(0.126)
❖ Evertors	(0.078)
4. Muscle strength	
❖ Hip flexors	(0.967)
❖ Hamstrings	(0.744)
❖ Calf	(0.305)
❖ Planar flexors	0.067)
❖ Dorsiflexors	(0.202)
❖ Invertors	(0.233)
❖ Evertors	(0.001)

- There is a statistical significance seen in star excursion balance test indicating a reduced balance in flatfoot recreational athletes.
- Muscle strength of evertors shows statistical significance in recreational athletes with flatfoot.

CONCLUSIONS

- The results of the study found that there is a reduced muscle strength in evertor muscle of foot in athletes with flatfoot
- Our study showed significant effect on balance among athletes having flatfoot
- The study also shows a higher navicular drop causing flatfoot, which may interfere with the lower limbs kinematic chain and result in biomechanical issues that make it difficult for the foot to maintain body balance
- These factors may have a potential influence on force generation in lower extremities and may hamper overall athletic performance.

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