Jumping and Stabilization Techniques in Collegiate Athletes with and without Genu Varum

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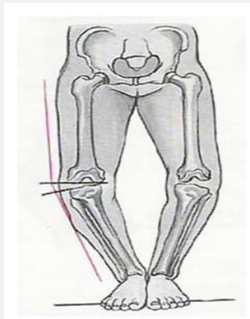
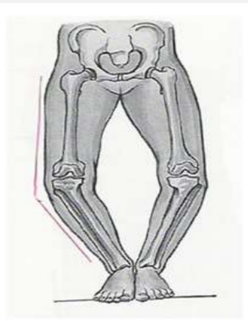
This project makes no effort to suggest generalizability. Instead, it was designed to demonstrate competency using lab equipment, capacity to integrate knowledge with application, and understand the scientific method.

INTRODUCTION

- Genu Varum is a condition in which people's legs display a bowed shape (Letfatkar, et. al., 2018)
  - Commonly found in infants due to cramped position in the womb
  - No treatment necessary for infants
  - Legs typically straighten out between 12 and 18 months of age
- No known prevention for bowlegs (Hinterwimmer, et al., 2014)
- Causes of Genu Varum (Sinsurin, et al., 2016):
  - Bone fractures that have not healed properly
  - Abnormally developed bones
  - Lead poisoning
  - Fluoride poisoning
- Common forms of treatment (Sinsurin, et al., 2016):
  - Braces
  - Special shoes
  - Casts
  - Surgery to correct bone abnormalities



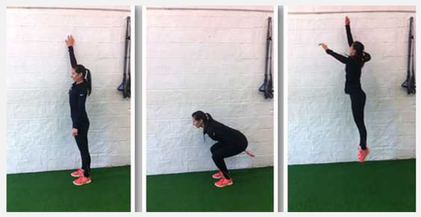
In ligamentous laxity note lat.Widening Of knee joints



In Blount angulation at med.tib metaphysis

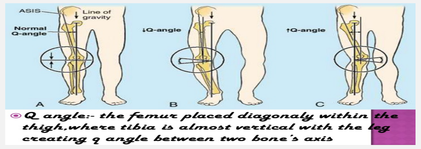
INCLUSION CRITERIA

- Diagnosed with Genu Varum or considered healthy
  - Determined by physician
  - Genu Varum participants must have more than 3 cm between medial epicondyles of the femur
- No injuries within the last year
  - No past lower leg injuries
  - No knee surgeries
- Able to perform a Sargent jump test without pain
- Collegiate athletes
- Must be able comprehed common English commands to understand protocol
- Willingness to complete the test to the best of their abilities



PURPOSE STATEMENT

- The purpose of this study was to examine if there are differences in stabilization times between healthy individuals and those with Genu Varum
- Research questions:
  - Will participants with Genu Varum take longer to stabilize after jumping and landing?
  - Will fatigue over the length of the test cause the time differences between the two groups to decrease?
- It is hypothesized that participants with Genu Varum will take longer to stabilize after jumping and landing



METHODS

Criteria
- Collegiate Athletes
- No history of injuries in the past year
- Informed consent

Warm-up
- 10 minute warm-up
- Stretches focused on warming up leg and hip muscles

Research Design
- Quantitative study: descriptive and explanatory results
- 5 Sargent jumps performed (one minute rest between jumps)
- Stabilization time recorded 300 ms before and after landing using force plate

Post- test
- Participants rated fatigue level before and after test
- Data collected

Data Analysis

Video recording analyzed using Dartfish technology
Average times for each group calculated and compared
Created figures and tables

REVIEW OF LITERATURE

- Lack of studies conducted on Genu Varum individuals since most cases are only found in children (Letfatkar, et. al., 2018)
- Tests on Genu Varum participants commonly have them perform running, jumping or lateral shuffling to test the physical side effects (Hinterwimmer, et al., 2014)
- Knee complications and hip injuries are common issues for people with this condition (Rabin, Einstein, and Kozol, 2018)
- Jumping technique is altered for people with Genu Varum (Wright, Arnold, Ross, 2016)
  - Places added stress on the outside of the knees
- Fatigue plays a major role in altering one's ability to maintain technique while landing (Tamura, et al., 2016)
- Muscle control also factors into one's ability to stabilize after landing (Sinsurin, et al., 2016)

DISCUSSION

- A major limitation came from the lack of kinematic evaluation of joint movements
  - Would have provided a stronger conclusion on effects of Genu Varum
- Another limitation was a possibility for errors when measuring and recording muscle activity levels
  - Electrodes may have been placed improperly or in a wrong location
- Future research could examine the affects using more accurate technology
  - High tech instruments that would determine precise landing and stabilization times
- A longitudinal study using the same participants could determine if jump-landing practice would alter the stabilization times for each group and decrease the gap between Genu Varum and healthy individuals

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