RSNA 2023
LEADING THROUGH CHANGE

THE MEASURE OF TRUTH:

Determining whether absolute values of leg lengths are incorrectly being measured and reported on pediatric teleoroentgenogram leg length studies.

A Clinical Audit

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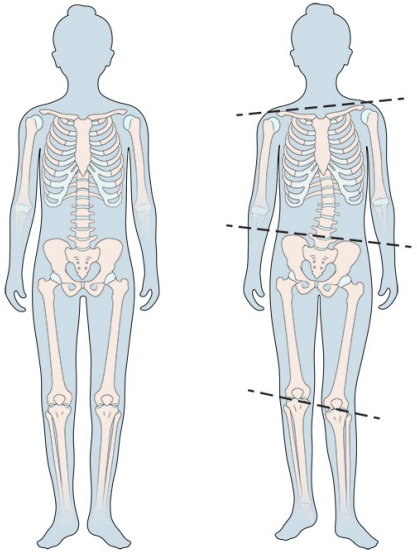
Introduction

- Leg length discrepancies (LLD) are relatively common with only 25 -50% of the general population estimated to have legs of equal lengths
- A LLD > 2 cm is considered clinically significant
- LLD should be diagnosed and managed in childhood to prevent issues with gait, and development of scoliosis and osteoarthrosis
- The ideal method for measurement of leg lengths is via an orthoroentgenogram



Leg length discrepency may cause problems with posture such as tilted shoulders or hips and angled knees that result in limping

Image: Signs of Leg Length Discrepancies. Boston Children's Hospital. https://www.childrenshospital.org/conditions/limb-length-discrepancy. Published 2021. Accessed Sept. 26, 2023

Introduction

- At McMaster Children's Hospital, the protocol for determining leg lengths is with an ***orthoroentgenogram***; yet leg lengths seem to be *reported* on ***teleoroentgenogram*** studies despite these studies being subject to magnification error

- The aim of this clinical audit was to assess whether absolute values of leg lengths are being included in teleoroentgenogram reports

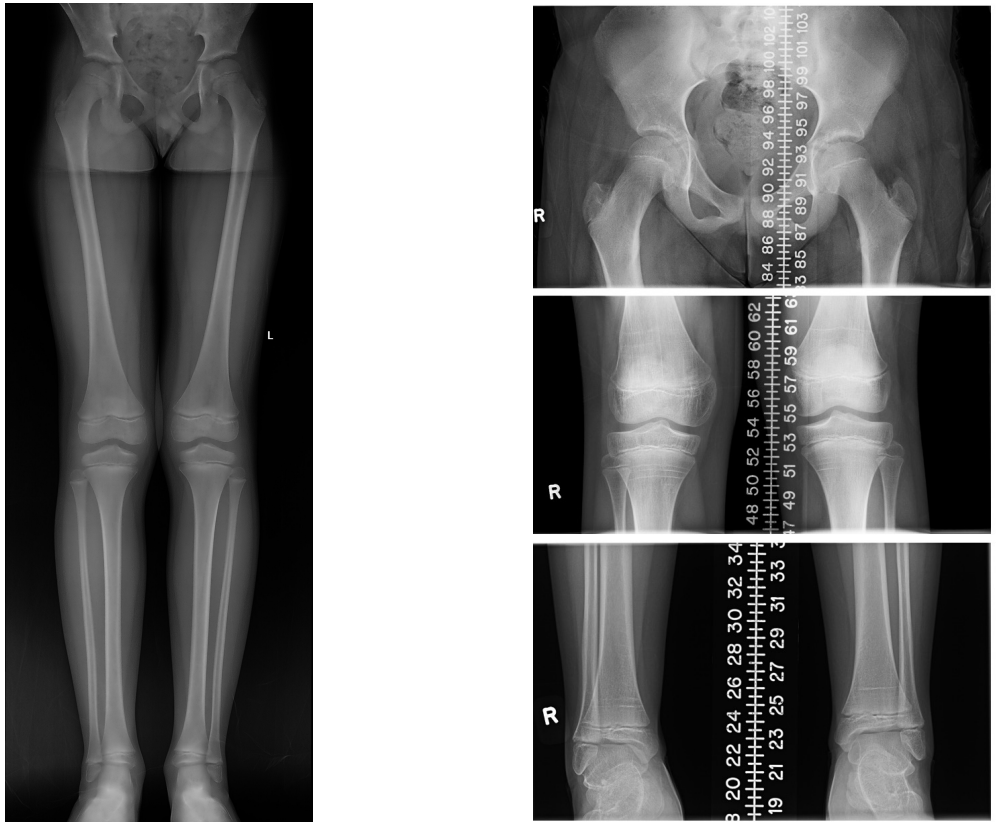


FIGURE 1: Comparison of a ***teleoroentgenogram*** study (*left*) of an 11 year old male to an ***orthoroentgenogram*** study (*right*) of a 10 year old female

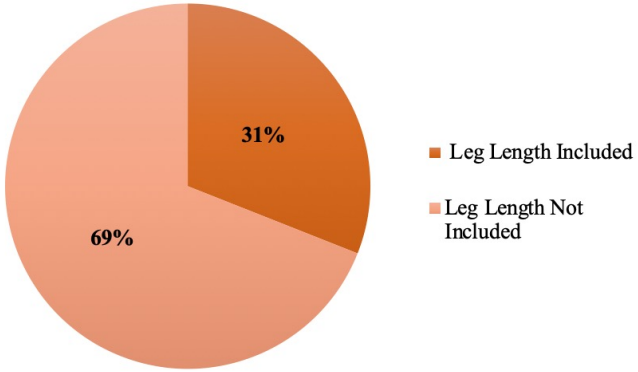
Methods

- Parameters
  - 100 teleoroentgenogram leg length studies from April to May 2022
  - Age <18
- Data collected
  - Patient identification numbers
  - Ages
  - “Yes” or “No” to indicate whether there was inclusion of leg lengths
    - Measurements of leg length for “Yes” category
- Confirmation of magnification error on teleoroentgenogram by adding a ruler on select studies

FIGURE 2:
Teleoroentgenogram study of a 9 year old female with ruler applied

Results

- Demographics:
  - Ages range: 1 to 17 years old
  - Mean Age: 8 years and 3 months
  - 44 females and 56 males
- Leg lengths reported in nearly 1/3 of studies
  - Right leg lengths reported in 31 studies, left leg lengths reported in 30 studies
- One case with > 2 cm discrepancy, considered clinically significant



Results

- Teleoroentgenogram studies ***over*estimated** leg lengths by an average of 1.6 cm
- Greatest overestimation was 2.2 cm
- The older the patient, the greater the overestimation

Discussion

- Audit shows that leg length measurements are not uncommonly (31%) being included in our teleoroentgenogram reports
- Literature has shown teleoroentgenograms can have a magnification error up to 5%, which our data supports
- Significant because has implications for orthopedic management

Recommendations

- On teleoroentgenogram studies, report ***relative*** leg lengths (i.e. percentage difference between legs) as opposed to ***absolute*** leg lengths (in cm or inches) to increase accuracy of radiology reports

- ***Limitations***
  - Small sample size with only preliminary data