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 osteoarthritis
• The ideal method for measurement of leg lengths is via an orthoroentgenogram

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 *overestimated* 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.