

Cellphone Technology and Programs for Deformity Surgery

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Disclosures

- None

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Introduction

- Smartphones have increased in popularity over the last 15-20 years
- In the 3rd quarter of 2012 there were 1 billion smartphones used worldwide
- With that has come application (app) technology that exceed 40 billion in 2014 including medical apps
- As of August 2013, there are 169 iPhone iOS apps that pertain to the spine!

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iPhone

- ✦ Generation 4 released in 2010 was the first to include both an accelerometer as well as a gyroscopic sensor
- ✦ Combined data provided detailed and precise information about the device's 6-axis movement in space











Validation of a Scolometer Smartphone App to Assess Scoliosis

Doris J. Franklin, MD*, Christopher Bass, MD† and Peter G. Newton, MD†




- ✦ Initially used to compare against a standard scolometer to judge trunk rotation for evaluation of scoliosis
- ✦ Demonstrated the app's readings were valid and reliable compared to the gold standard device for clinically assessed deformity in scoliosis
- ✦ Cheaper when compared to cost of traditional scolometer (\$45-90)



History

- ✦ Later generations and apps were created to assess scoliosis x-rays for Cobb angle measurements
- ✦ Initially levelling apps were used to assess Cobb angles and then moved on to more spine specific apps over the years

Why use an app for pre-surgical planning?

- ✦ For measuring Cobb angles³⁻⁵
 - ✦ Increased reliability and validity when compared to standard protractor measurements
 - ✦ Less than 2 degree difference both within and between measurers
 - ✦ Equal to or faster when compared to non-cell phone based strategies
- ✦ Can be used on PACS systems as well as hard copies
- ✦ Can be used on non-calibrated digital images



Applications

- ✦ Cobbmeter/Tiltmeter
- ✦ SagittalMeter Pro
- ✦ NuvaLine





Cobbmeter/Tiltmeter

- ✦ 7 observers measured major Cobb angles on 20 pre-op PA AIS patients with protractor and iPhone app
- ✦ iPhone app is an equivalent Cobb measurement tool to the manual protractor
- ✦ Measurement times were 15% less with app compared to protractor





Sagittal Meter Pro



- Must directly place your phone on sagittal x-rays
- Can measure BOTH cervical and lumbar parameters
 - Lumbar
 - PI, PT, SS, L1-S1 lordosis, L4-S1 lordosis
 - Cervical
 - O-C2 angle, C7/T1 slope, C2-7 angle
- Cost = \$10

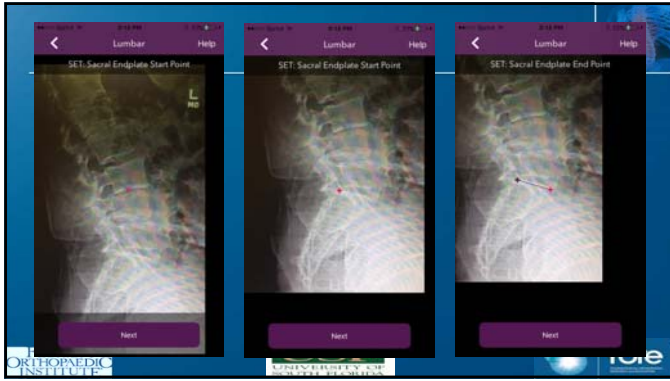


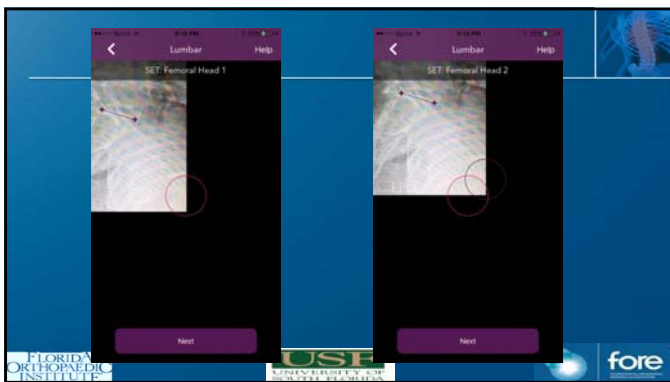
Nuvaline

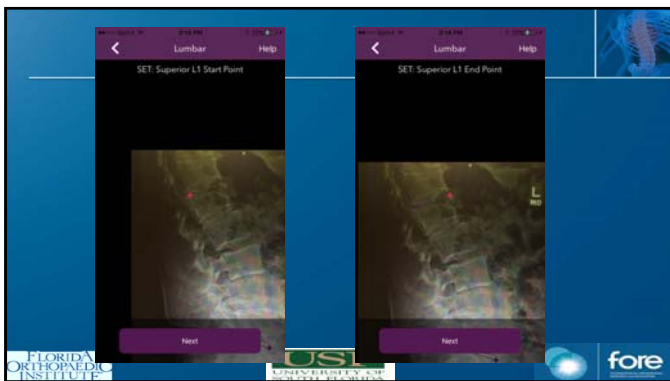
- Measures lumbar pelvic parameters from picture taken of standard lateral x-ray
- Can save and store pre-op/post-op images
- Can be used with intraoperative Nuvasive software
- Cannot download through app store

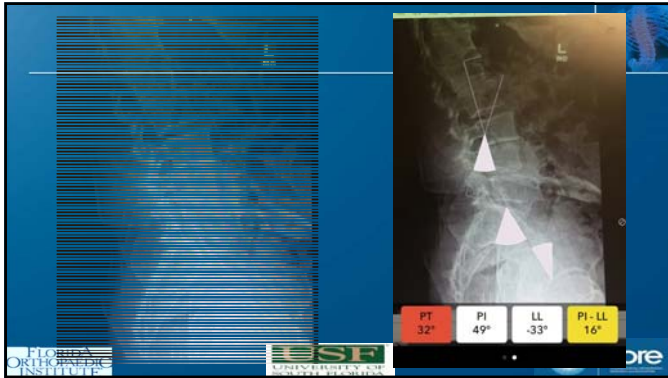














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