IP joint Skin Crease Angle of Big toe
As a Predicting Tool for DMAA
In Hallux Valgus Surgery

Kyung Tai Lee, M.D., Young Uk Park, M.D.*, Hyuk Jegal, M.D

KT Lee’s Orthopedic Foot & Ankle Clinic, Seoul, Korea
Department of Orthopedic Surgery, Ajou University Hospital, Suwon, Korea*
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Hyuk Jegal, M.D.

My disclosure is in the Final AOFAS Mobile App.
I have no potential conflicts with this presentation.
Introduction

- Difficult Factors for Bunion Surgery
  Hypermobility, M. adductus, Flatfoot etc

- DMAA
  One of difficult factors affect the surgical results

- Severe Hallux valgus with highly increased DMAA
  Complication such as arthritic change, iatrogenic Hallux varus

- Little known about DMAA except
  Excellent intra-observer reliability
  Rotation affects DMAA
  The more severe, the larger DMAA in HV deformity
Measurement of DMAA

- Intraoperatively compared between anatomic and radiologic DMAA intraoperatively; anatomic DMAA is larger than radiological value

KT Lee et al et al at AOFAS annual meeting 1999
Armaneck et al J Foot Surg. 1986
Bigtoe IP joint skin crease meaning?

Various direction of skin crease in similar deformity
Purpose of this study

To investigate

1) Statistical relationship between IP joint Skin Crease Angle of Big toe and DMAA

2) Possibility of using IP joint Skin Crease Angle as predicting reference of DMAA in Hallux Valgus Surgery in operation
Material & Methods

- From March 2013 to May 2013
- 31 cases (31 patients) of 48 cases
- M:F 2:29
- 54.8 year old

- Moderate to severe Hallux valgus
- Proximal chevron & akin osteotomy

- Check real Photo, simple X-ray and CT scan

PHOTO measurement

Definition
- IP joint skin crease angle
  - Angle between
    1) Perpendicular line to IP joint skin crease
    2) Center line of big toe
      (in WB real photo)

- Radiologic measurement of DMAA
  1) Simple x-ray (weight bearing view):
     DMAA, HVA, IMA, HIPA
  2) CT scan
Result

- **Statistical relationship between DMAA and IP skin crease angle**
  - Radiologic DMAA
  - CT DMAA
  - Strong positive correlation
    \[ \gamma = 0.808, \ p < 0.001 \]
  - Moderately positive correlation
    \[ \gamma = 0.578, \ p < 0.001 \]
  - \[ \gamma = 0.479, \ p < 0.001 \]

- **HVA and IP skin crease angle**
  - Weakly positive correlation
    \[ \gamma = 0.370, \ p < 0.005 \]

- **HIPA and IP skin crease angle**
  - No correlation
    \[ \gamma = -0.078, \ p = 0.678 \]

- **IMA and IP skin crease angle**
  - No correlation
    \[ \gamma = 0.176, \ p = 0.343 \]
Discussion

DMAA measurement: difficult

Anatomical factors

**Inclination**: cavus to flatfoot

Roebinon et al. Foot Ankle Int 2006

**Rotation**

Gokhan CAKMAK et al. AOTT 2013
Vittetoe et al. Foot Ankle Int 1994
Eustace S et al. Skeletal Radiol 1993

**Varus deviation**

Vittetoe et al. Foot Ankle Int 1994

**Aging**

Ahmed G Elsaid et al. Foot Ankle Int 2006

Clinical factors: Observers, Radiological factors

Difficult to measure DMAA exactly
reference points may vary
physician dependent

Radiologic Quality
some radiographs
more difficult to assess than others
manual vs computer-assisted
Discussion

DMAA does has effect on postop. Results?

not always

“rotational proximal crescentic osteotomy performed metatarsals had a lower postoperative DMAA, rather than the expected higher measurements”

Brodsky JW et al. CORR 2006

but, it is important in severe Hallux valgus case

“DMAA was not significant for prediction of the postoperative hallux valgus angle in logistic regression, but was significantly increased in patients with severe hallux valgus.”

Deenik AR et al. BMC Musculoskeletal Disorders 2008
The results of the present study shows moderate positive correlation: IP joint skin crease angle and DMAA could check easily. Little affected by Anatomic, Radiologic factors and observer.

Reference of DMAA in Hallux valgus surgery intraoperatively.
References


