UNIVERSITY OF IOWA HEALTH CARE

**Department of Orthopaedics and Rehabilitation**

# Posterior Ankle Impingement: It is Not All About the *Os Trigonum*


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# Disclosures

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# Background

The posterior ankle and subtalar joint are difficult to palpate compared to the anterior ankle

A posterior impingement sign on physical examination is not anatomically specific.

*Os trigonum* and trigonal process (Stieda) are common etiologies of posterior impingement that are identified by radiographs, CT, or MRI.

(*Trigonal Impingement*)

# Background

However, these static radiologic tests may not detect associated soft tissue and other bony pathologies due to the dynamic nature of impingement which occurs during ankle motion and loading

Ultrasound is helpful dynamic diagnostic modality but can be limited by the depth of soft tissues in the posterior ankle and subtalar joint

Posterior ankle and hindfoot arthroscopy (PAHA): is an established technique for treating posterior ankle impingement syndrome (PAIS).

# Background

Traditional open treatment may not allow visualization and appreciation of associated pathologies.

PAHA provides dynamic visualization with close to 8X magnification

Provides full visualization of the posterior ankle and subtalar joints.

Range of motion, manipulation and probe examination during PAHA can detect other pathologies beyond os trigonum and trigonal process impingement

# Objective

The primary aim of this study is to **report the incidence** of **associated pathologies** seen with ***os trigonum*** or **Stieda** impingement when treated with **PAHA.**

# Hypothesis

Occurrence of **isolated *os trigonum* or Stieda** process causing PAIS will be **lower** than their prevalence with **associated** other pathologies.

# Methods

## Design

IRB-approved (#201608774)

**Retrospective**

**Comparative study**

University of Iowa

Hospitals

Carver College of Medicine

# Methods

## Sample

Inclusion:

- PAHA for PAIS due to trigonal impingement
- Between January 2011 and September 2016

Exclusion:

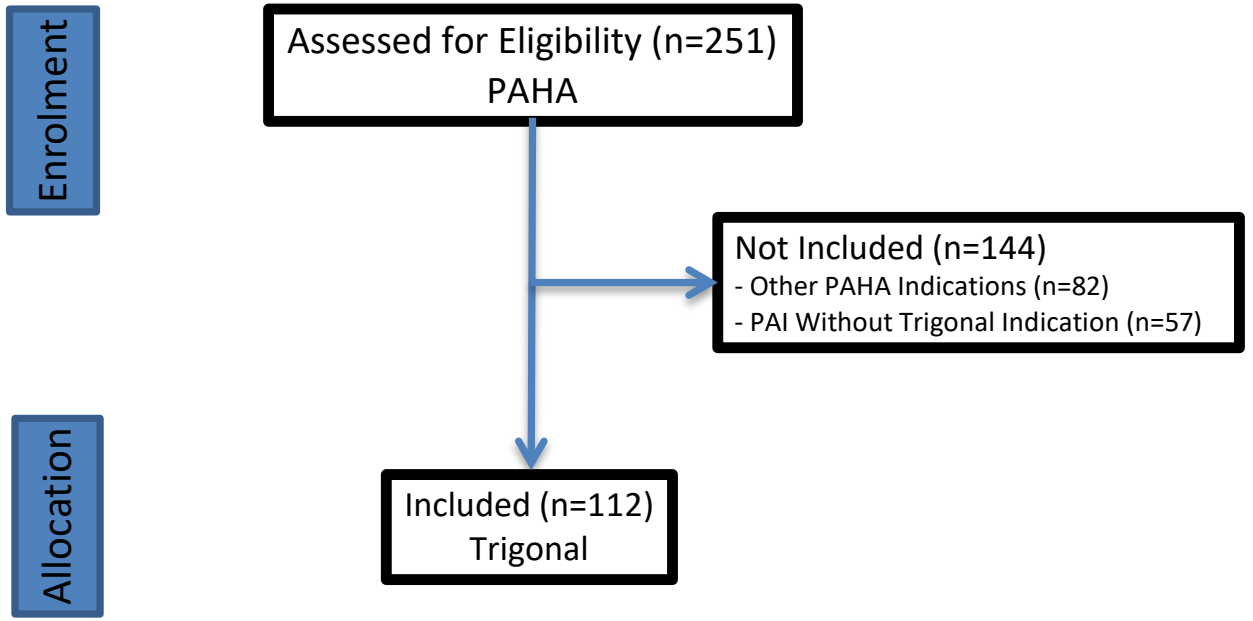
- Concomitant open posterior procedure
- Other indications for PAHA (e.g., OCL, subtalar fusion)
- Other PAIS etiology (e.g., soft tissue impingement)

# Methods

## Sample

Initially: 251 patients

Screening Flow Diagram




After exclusions:

- **112 trigonal impingement patients**
  - Mean age: 30.5 (12-70)
  - BMI: 29.93 (SD 9.23)

# Methods

## Procedures

Surgeries were performed by three fellowship-trained orthopedic foot and ankle surgeons who were experienced in PAHA

Posterior scope

- 4.0-mm
- 30° scope
- Standard paramedian portals

# Methods

## Outcomes

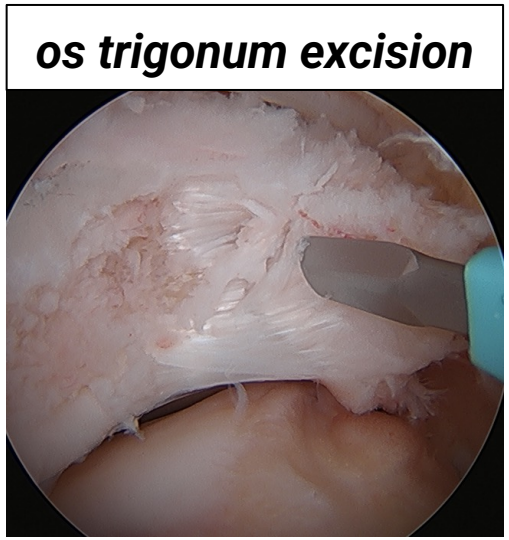
Data collected:

- Postoperative diagnosis
- Arthroscopic findings
- Type of impingement
- Location of the disorder
- Associated procedures
- Anatomical etiologies.

# Methods

Trigonal impingements were allocated:

- *os trigonal*
- Stieda




Subgrouped:

- Isolated
- With other impingement lesions
- Presence or absence of FHL disorders including:
    - stenosis, tenosynovitis, impingement from os/trigonal bone

# Methods

## Statistical Analysis

Differences between groups with isolated trigonal impingement and those with associated pathologies:

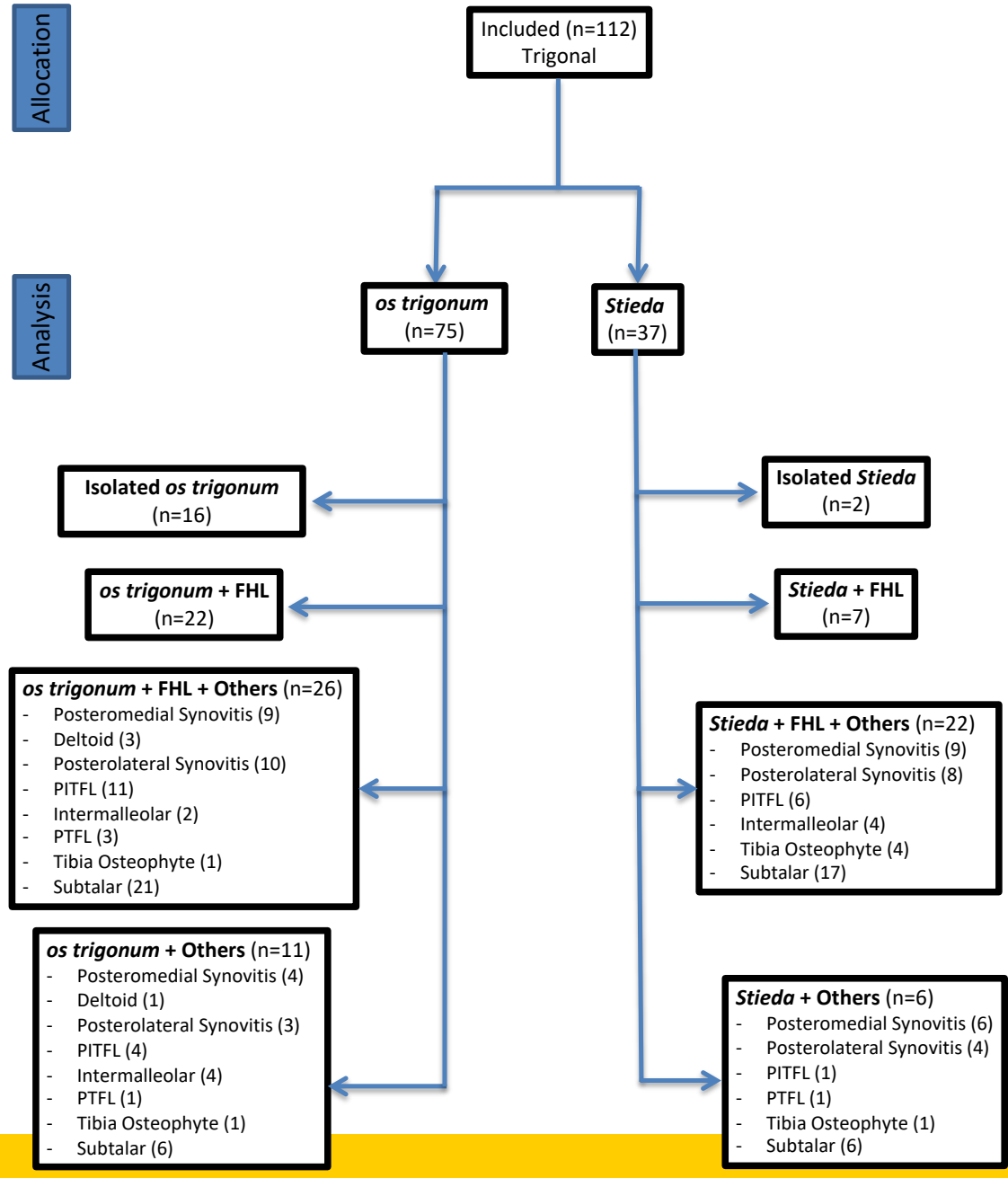
- Distribution comparison.

Comparisons between subgroups:

- Wilcoxon test

# Results

- 112 cases of trigonal impingement
  - 75 *os trigonum*
  - 37 Stieda (trigonal) process
- Isolated trigonal disorders:
  - 16% (n=18)
- Associated pathologies
  - Mode of 3 (1-5) additional
  - 41%: 3 or more



# Results


**Associated diagnosis**

- Flexor hallucis longus (FHL) disorders:
  - 68%
- Subtalar impingement:
  - soft tissue +/- bone
    - 44%
- Posterior inferior tibiofibular ligament – transverse band (tPITFL):
  - 19%.

- When FHL disorders were not considered:
  - 58% of cases had associated pathologies

# Results

## Subgroup analysis

- Significant differences in subgroups:
    - FHL
        - 29% *os trigonum* | 18% Stieda (**p<0.001**)
    - FHL and others
        - 34% *os trigonum* | 59% Stieda (**p=0.046**)
    - other pathologies
        - 14% *os trigonum* | 16% Stieda (**p=0.025**)

# Conclusion

The primary hypothesis was confirmed:

Isolated impingement due to *os trigonum* or Steida (trigonal) process was ***less frequent*** than combined impingements

Our study described a **high prevalence** of **associated pathological** structures involved with a **trigonal** disorder leading to **PAIS** in a large cohort.

Trigonal bone (*os trigonum* or Stieda) was found to cause impingement in **isolation** in a small proportion of cases **(16%)**.

# Conclusion

Even when the **FHL is removed** from the equation, **58%** of the total patients still presented **other associated** impingement pathologies.

This should alert surgeons when considering removing trigonal impingement especially with an open approach.

**Open approaches** may **limit the visualization** and **assessment** of **associated** posterior ankle and subtalar patho-anatomy, thus possibly **overlooking** concomitant causes of PAIS.

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# Thank You

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