Hallux Rigidus

“No Fusion or Floppy Toe Doc!”

Peter Bellezza DPM, MS – PGY3
Swedish Medical Center
Simply Defined

• Arthrosis of the first metatarsophalangeal joint
Epidemiology:

• 1/40 over age 50 y/o (Gould N, 1980)
• Female Gender
• Bilaterality $\rightarrow$ inherited $\rightarrow$ approximately 50% of the time
• Early onset associated with positive family history (Boney & MacNab, 1952)
Etiology

- Trauma (acute, chronic)
  - Turf toe
- Suggested anatomical abnormalities include:
  - Flat MT head
  - Long/short 1st MT
  - Pes Planus
- Metatarsus primus elevatus (controversial)
  - Dorsal elevation of 1st MT in relation to lesser MT
Evaluation

• History
  • Pain and swelling

• PE
  • Restricted dorsiflexion
  • Painful ROM
    • DF – bony impingement
    • PF – stretch of EHL, capsule, synovium
  • Pain along lateral aspect of MTPJ
  • Often nerve irritation secondary to the dorsomedial cutaneous nerve
  • Tinel’s sign (1st WS; DPN)
  • “Dorsal bunion” 2/2 proliferative periarticular bone formation
Radiographic Exam

- A-P
- Lateral
- Oblique
<table>
<thead>
<tr>
<th>Grade</th>
<th>Pain</th>
<th>Decrease ROM (Total)</th>
<th>Radiographs</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Occasional</td>
<td>Mild (&lt; 55 degrees)</td>
<td>Mild spurring; No/slight narrowing</td>
</tr>
<tr>
<td>II</td>
<td>Constant</td>
<td>Moderate (40 degrees)</td>
<td>Mod spur; Narrowing</td>
</tr>
<tr>
<td>III</td>
<td>Constant</td>
<td>Severe (, 20 degrees)</td>
<td>Extensive osteophytes; LB; severe narrowing</td>
</tr>
<tr>
<td>Grade</td>
<td>Dorsiflexion</td>
<td>Radiographic Findings&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Clinical Findings</td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
<td>---------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>0</td>
<td>40°–60° and/or 10%–20% loss compared with the normal side</td>
<td>Normal</td>
<td>No pain; only stiffness and loss of motion on examination.</td>
</tr>
<tr>
<td>1</td>
<td>30°–40° and/or 20%–50% loss compared with the normal side</td>
<td>Dorsal osteophyte is the main finding. Minimal joint space narrowing, minimal periarticular sclerosis, and minimal flattening of the metatarsal head are also seen.</td>
<td>Mild or occasional pain and stiffness, pain at the extremes of dorsiflexion and/or plantar flexion on examination.</td>
</tr>
<tr>
<td>2</td>
<td>10°–30° and/or 50%–75% loss compared with the normal side</td>
<td>Dorsal, lateral, and possibly medial osteophytes giving flattened appearance to the metatarsal head; no more than one fourth of the dorsal joint space is involved on the lateral radiograph; mild to moderate joint space narrowing and sclerosis; sesamoids not usually involved</td>
<td>Moderate to severe pain and stiffness that may be constant. Pain occurs just before maximum dorsiflexion and maximum plantar flexion on examination.</td>
</tr>
<tr>
<td>3</td>
<td>≤10° and/or 75%–100% loss compared with the normal side. There is notable loss of metatarsophalangeal plantar flexion, as well (often ≤10° of plantar flexion).</td>
<td>Same as in grade 2 but with substantial narrowing, possibly periarticular cystic changes, more than one fourth of the dorsal joint space is involved on the lateral radiograph, sesamoids enlarged and/or cystic and/or irregular.</td>
<td>Nearly constant pain and substantial stiffness at the extremes of range of motion but not at the midrange.</td>
</tr>
<tr>
<td>4</td>
<td>Same as in grade 3</td>
<td>Same as in grade 3</td>
<td>Same criteria as grade 3, but there is definite pain at the midrange of passive motion.</td>
</tr>
</tbody>
</table>
Conservative Treatments

• Shoes of Adequate Size
• Shoe modifications to decrease motion
  • Stiff sole shoe
  • Morton’s extension
  • Steel shank w/ rocker bottom
• Orthotic Device
• Taping
• NSAIDs
• Steroid Injections
Operative Management

- Cheilectomy
- Cheilectomy/Moberg
- Arthrodesis
- Keller procedure
- Soft tissue interpositional arthroplasty
- Total/ Hemi implant arthroplasty
- Cartiva
Operative Management – Controversy

• Comprehensive search of CINAHL, Embase, Medline, Cochrane from inception to 2010
• 69 articles reviewed
• Cheilectomy & phalangeal osteotomy → good for pts w/ stage I & II HR
• Arthrodesis/ arthroplasty → indicated for more severe HR
• Significant heterogeneity in study design, patient characteristics, management methods and outcome assessment

A conclusion on optimal management is not possible

Need standardization

Maffuli et al.
Quantitative review of operative management of hallux rigidus
British Medical Bulletin (2011)
Operative Management – Controversy

- PubMed database review → 135 studies
  - Assigned level of evidence (I-V) = quality
  - Assigned grade of recommendation (A-C, I) = support/refute
- Grade B (fair) → arthrodesis
- Grade C (poor) → cheilectomy, osteotomy, implant, keller, interpositional
- Grade I → cheilectomy with osteotomy

Findings not consistent between studies → no definitive conclusions can be made

McNeil, Baumhauer, Glazebrook
Evidence based analysis of the efficacy for operative treatment of hallux rigidus

Foot & Ankle International (2013)
Hallux Rigidus – What surgery?

• Management of hallux rigidus is dictated by:
  • degree of joint degeneration
  • patient lifestyle
Proximal Phalangeal Osteotomy

• **Moberg Procedure**

• **Indications**
  • Adolescents w/ grade 1
  • Older pt’s w/ grade 1
    • If grade II, add cheilectomy

• **Technique**
  • Osteotomy needs to permit
    • DF 35 degrees (1st MT)
    • 15 degrees (bottom of foot)
Proximal Phalangeal Osteotomy

- Commonly performed with cheilectomy
- Literature evaluating phalangeal osteotomy alone is sparse
- Blyth et al: 14/18 patients w/ good to excellent results 4 years post-op
Cheilectomy

- Indications
  - Grades I and II (pain relief in 93% of pt’s (Geldwart, 1992)
  - Lower success for grade III (29%)
- Extent of dorsal MT head excision
  - Depends on extent of articular damage
  - 25%
  - 30% can lead to subluxation
Surgical Principles - Cheilectomy

- Excision dorsal 20-30% of the metatarsal head
- Remove lateral exostosis
- Obtain 60-80 degrees of dorsi-flexion of MTPJ
- Does not burn any bridges
Decision Making

• Cheilectomy if mainly impingement pain
• Arthrodesis if joint pain due to advanced intra-articular arthrosis
What is NOT Achieved at Surgery

• MTPJ still has underlying arthrosis
• MTPJ may still have pain with stress
• MTPJ will continue to degenerate
Cheilectomy – mild to moderate
<table>
<thead>
<tr>
<th>Study</th>
<th>Grade</th>
<th>Mean Follow-up (mo)</th>
<th>No. of Pts</th>
<th>Good to Excellent Patient Satisfaction (%)</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easley et al(^{15})</td>
<td>Hattrup and Johnson I, II, III</td>
<td>63</td>
<td>52</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Lau and Daniels(^{18})</td>
<td>Hattrup and Johnson II</td>
<td>48</td>
<td>19</td>
<td>87.5</td>
<td>—</td>
</tr>
<tr>
<td>Waizy et al(^{19})</td>
<td>Regnauld 1, 2</td>
<td>96</td>
<td>46</td>
<td>85 (grade 1), 63 (grade 2)</td>
<td>—</td>
</tr>
<tr>
<td>Coughlin and Shumas(^{2})</td>
<td>1–4</td>
<td>115</td>
<td>80</td>
<td>92</td>
<td>55.6% failure for 4 cheilectomy</td>
</tr>
<tr>
<td>Feltham et al(^{20})</td>
<td>Regnauld 1, 2, 3</td>
<td>65</td>
<td>67</td>
<td>91</td>
<td>6% failures</td>
</tr>
<tr>
<td>Nawoczenski et al(^{21})</td>
<td>Coughlin and Shumas 1–3</td>
<td>74</td>
<td>11</td>
<td>91</td>
<td>—</td>
</tr>
</tbody>
</table>
Cheilectomy – advanced disease?
Cheilectomy – advanced disease?
Cheilectomy – advanced disease?
Cheilectomy – Advanced Disease: Literature Review

• Cheilectomy appropriate for grades 1-3 if > 50% or more articular surface remains

• Patients with more severe disease or pain during midrange of motion have the lowest satisfaction rates

• Highest need for revision seen in patients with grade 4 disease

• Lower patient satisfaction scores are seen in younger patients due to their higher demand lifestyles
Influence of first ray deformity on cheilectomy outcomes
Influence of first ray deformity on cheilectomy outcomes
Influence of first ray deformity on cheilectomy outcomes
Role of first ray elevation

Horton G, Park YW, Myerson MS. Role of metatarsus primus elevatus in the pathogenesis of hallux rigidus

Foot Ankle Int 20(12), 777-780, 1999
Role of first ray elevation

- 300 feet (100 with hallux rigidus)
- There was no correlation of hallux rigidus with an elevated metatarsal
- BUT in severe grades of hallux rigidus there was a marked increase in metatarsus elevatus

Horton G, Park YW, Myerson MS. Role of metatarsus primus elevatus in the pathogenesis of hallux rigidus

Foot Ankle Int 20(12), 777-780, 1999
Role of first ray elevation

Conclusion:

Hallux Rigidus was not associated with:

- Elevatus
- first ray hypermobility
- a long first metatarsal
- Achilles or gastrocnemius tendon tightness
- abnormal foot posture
- symptomatic hallux valgus
- adolescent onset
- shoe-wear or occupation
Role of first ray elevation

• 275 feet (hallux rigidus, hallux valgus, plantar fasciitis, neuroma)
  • Statistically significant differences between these groups

• A review of the literature and comparison with historical controls reveals that metatarsus primus elevatus exists in hallux rigidus and is greater than that found in hallux valgus, plantar fasciitis, and morton’s neuroma groups

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**Roukis**
Metatarsus primus elevatus in hallux rigidus. Fact or Fiction?

*J. Am Pod Med Ass. 95 (3), 2005*
Metatarsal Osteotomies

- Primary purpose is to manage metatarsus primus elevatus and/or long first metatarsal
- Essentially used to correct an inherent structural problem
• 32 year old female runner
• Jamming of the hallux with toe off
• Pain in MTP joint
• No range of motion in dorsiflexion
Typically NOT recommend
• 52 year old female
• 5 year history of great toe pain
• Range of motion very limited
• Metatarsus elevatus
• Note the length of 1st metatarsal
<table>
<thead>
<tr>
<th>Study</th>
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<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malerba et al(^{36})</td>
<td>Coughlin and Shumas 3</td>
<td>133.2</td>
<td>20</td>
<td>95</td>
<td>5% metatarsalgia</td>
</tr>
<tr>
<td>Demer et al(^{37})</td>
<td>Drago, Oloff, and Jacobs 2, 3</td>
<td>34.4</td>
<td>26</td>
<td>85</td>
<td>3.8% revision; 15.4% complications</td>
</tr>
<tr>
<td>Rees et al(^{38})</td>
<td>Hattrup and Johnson I, II, III</td>
<td>82</td>
<td>89</td>
<td>64</td>
<td>4.5% reoperation; 7.9% complications</td>
</tr>
<tr>
<td>Dickerson et al(^{39})</td>
<td>Dickerson 1, 2, 3</td>
<td>48</td>
<td>32</td>
<td>69</td>
<td>9.3% complications</td>
</tr>
<tr>
<td>Kilmartin(^{40})</td>
<td>Hattrup and Johnson II</td>
<td>29</td>
<td>49</td>
<td>65</td>
<td>11% reoperation; 46% complications</td>
</tr>
<tr>
<td>Phalangeal osteotomy</td>
<td>Hattrup and Johnson II</td>
<td>15</td>
<td>59</td>
<td>54</td>
<td>26% reoperation; 46% complications</td>
</tr>
</tbody>
</table>

**Metatarsal Osteotomies – Literature Review**
Metatarsal Osteotomies

- 4 prospective studies included
- 18.6 mo f/u, 93 feet evaluated
- Mean dorsiflexion 10 degrees
- 27% patient dissatisfaction
- Postoperative complications 31%
  - Revision 15%
  - Metatarsalgia 12%

Can NOT recommend osteotomies for treatment of hallux rigidus

Roukis
Clinical outcomes after isolated periarticular osteotomies of the 1st metatarsal for hallux rigidus: A systematic review

J. Foot Ankle Surg 2010 49 (6), 553-560
Soft Tissue Interpositional Arthroplasty

- **Indication**
  - Grade II and III
  - Elderly, low demand
  - ***Revision***

- **Contraindications**
  - Short 1st MT
  - Metatarsalgia

- **Technique**
  - Cheilectomy
  - 25% proximal phalanx excised w/ transverse osteotomy
  - EHB + capsule sutures to FHB
  - Allograft/ Xenograft
Soft Tissue Interpositional Arthroplasty
Soft Tissue Interpositional Arthroplasty
Soft Tissue Interpositional Arthroplasty
Soft Tissue Interpositional Arthroplasty
Soft Tissue Interpositional Arthroplasty

• Complications
  • Metatarsalgia
  • Cockup toe
  • IP joint stiffness
• Decreased flexor strength
<table>
<thead>
<tr>
<th>Study</th>
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<th>Mean Follow-up (mo)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Berlet et al\textsuperscript{26}</td>
<td>Coughlin and Shumas 3</td>
<td>12.7</td>
<td>9</td>
<td>—</td>
<td>None</td>
</tr>
<tr>
<td>Can Akgun et al\textsuperscript{27}</td>
<td>Coughlin and Shumas 3 or 4</td>
<td>27.2</td>
<td>11</td>
<td>100</td>
<td>None</td>
</tr>
<tr>
<td>Coughlin and Shurnas\textsuperscript{28}</td>
<td>Coughlin and Shumas 4</td>
<td>42</td>
<td>7</td>
<td>100</td>
<td>None</td>
</tr>
<tr>
<td>Lau and Daniels\textsuperscript{18}</td>
<td>Hattrup and Johnson II, III</td>
<td>24</td>
<td>11</td>
<td>73</td>
<td>Hallux weakness, 72.7%; stress fracture, 9%; failure, 9%</td>
</tr>
<tr>
<td>Kennedy et al\textsuperscript{29}</td>
<td>Hattrup and Johnson II, III</td>
<td>38</td>
<td>18</td>
<td>—</td>
<td>6% complications</td>
</tr>
<tr>
<td>Mackey et al\textsuperscript{6}</td>
<td>Late-stage disease</td>
<td>63.6</td>
<td>10</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Schenk et al\textsuperscript{30}</td>
<td>Hattrup and Johnson II/III</td>
<td>16.5</td>
<td>14</td>
<td>77</td>
<td>41% osteonecrosis</td>
</tr>
</tbody>
</table>
Soft tissue Interpositional Arthroplasty– Literature Review

- Difficult to compare studies secondary to different techniques***
- **Variable** increases in AOFAS scores
- **Variable** increase in DF
- **Variable** complications
- Leaving **FHB tendon intact** seems to result in a reduced incidence of metatarsalgia and hallux cock-up
  - Pain levels similar to those patients who undergo FHB release
- Promising procedure but the **research does not demonstrate uniformly excellent results**
MTP / Hemi Joint Arthroplasty

- Cemented non-constrained
  - 50% loosening @ 3.5 years

- Bony ingrowth
  - Some short term success
  - 25% loosening @ 2-5 years
  - Altered/ potentially non-physiological post-operative gait pattern
Long-term studies needed. Most current literature endorses arthrodesis as a better/ more reliable method than arthroplasty.

<table>
<thead>
<tr>
<th>Study</th>
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<th>Mean Follow-up (mo)</th>
<th>No. of Pts</th>
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<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brewster et al(^{31})</td>
<td>—</td>
<td>34</td>
<td>29</td>
<td>41</td>
<td>19% complications</td>
</tr>
<tr>
<td>Ess et al(^{32})</td>
<td>—</td>
<td>24</td>
<td>10</td>
<td>80</td>
<td>30% phalangeal radioluency, plantar subluxation and mal-alignment component issues</td>
</tr>
<tr>
<td>Pulavarti et al(^{8})</td>
<td>Hattrup and Johnson III</td>
<td>47</td>
<td>32</td>
<td>77.6</td>
<td>5.5% revision, lucency lines in 33%</td>
</tr>
<tr>
<td>Gibson and Thomson(^{22})</td>
<td>Roukis 1–4</td>
<td>24</td>
<td>27</td>
<td>47</td>
<td>16.7% revision; 28.3% pain or revision</td>
</tr>
<tr>
<td>Study</td>
<td>Grade</td>
<td>Mean Follow-up (mo)</td>
<td>No. of Pts</td>
<td>Good to Excellent Patient Satisfaction (%)</td>
<td>Complications</td>
</tr>
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<td>--------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Konkel and Menger</td>
<td>Hattrup and Johnson II/III</td>
<td>66</td>
<td>10</td>
<td>85</td>
<td>100% subsidence and lucencies, 10% metatarsalgia</td>
</tr>
<tr>
<td>Raikin et al</td>
<td>Coughlin and Shumans 3, 4</td>
<td>79.4</td>
<td>20</td>
<td>57</td>
<td>24% failure; 38% plantar cutout from prosthesis</td>
</tr>
<tr>
<td>Konkel et al</td>
<td>Hattrup and Johnson III, IV</td>
<td>72</td>
<td>23</td>
<td>88</td>
<td>95.6% lucencies at the base of the implants; 68% recurrence of dorsal osteophytes</td>
</tr>
<tr>
<td>Ronconi et al</td>
<td>Coughlin and Shumans 3</td>
<td>26.4</td>
<td>21</td>
<td>76</td>
<td>47.6% dorsal subluxation</td>
</tr>
<tr>
<td>Taranow et al</td>
<td>Coughlin and Shumans 2, 3</td>
<td>33.6</td>
<td>23</td>
<td>82</td>
<td></td>
</tr>
</tbody>
</table>
Hemi joint arthroplasty – Literature Review

• Most studies have:
  • short term follow up
  • Inconsistent data on pain, function, patient satisfaction, complications and revisions

• Ronconi et al (2011) demonstrated 23.8% patient dissatisfaction

• Research demonstrates that hemi implant no better than total implant alone

Recommend this procedure be limited to patients with low-moderate demand activities
Silicone Implants

- Long term failure rates: 57-74%
- Complications
  - Implant failure due to repetitive loading
  - Silicone synovitis due to foreign body reaction
  - AVN
  - Infection
  - Metatarsalgia
  - Delayed wound healing
  - Recurrent deformity
  - Bony proliferation
  - Decreased mobility
  - Fracture
  - Osteolysis
  - Recurrent pain
Cartiva
Cartiva

- Single construct implant
- Composed of polyvinyl alcohol (40%) and saline (60%)
  - Biocompatible & low protein absorption $\rightarrow$ decreases cell adhesion
  - Crosslinking yields an inert, viscoelastic, lubricating biomaterial
- Mechanical properties similar to human cartilage
  - High water content
  - Coefficient of friction similar to cartilage
  - High compressive modulus $\rightarrow$ resistant to compression/ shear forces in both knee & first MTP joint
Cartiva

• Survivor ship
  • Wear resistant $\rightarrow$ no debris $\rightarrow$ no macrophage activation
    • No inflammatory mediators causing bone resorption or implant loosening

• Metabolic characteristics
  • No systemic irritation in over 10 years of clinical use
  • Synthetic material therefore carries no risk of disease transmission
Cartiva – Before and After

• Damaged cartilage is replaced with a new Cartiva bearing surface → “bumper”

• Burns no bridges?:
  • Minimal bone resection?
  • No shortening
Cartiva

- Level I prospective, randomized, non-inferiority study
- Fusion control
  - 2:1 randomization
- 202 patients treated
  - Grades 2, 3 and 4
- 12 sites in UK and Canada
- Outcomes of pain, function and safety
- 24 month follow up

Baumhauer et al
Prospective, Randomized, Multicentered Clinical Trial Assessing Safety and Efficacy of a Synthetic Cartilage Implant vs 1st MTPJ arthrodesis in advanced HR

Foot & Ankle international (2016)
2-year Median VAS pain

Substantial reduction in pain with demonstrated durability at 2 years

MCID ≥ 30%
2-year Median FAAM Sports Score

- Significant improvement in foot function

MCID ≥ 9

+168%
2-year Median Range of Motion

Fusion has no motion

N = 130

+50%
## Subsequent Surgical Interventions

<table>
<thead>
<tr>
<th>Subsequent Surgical Intervention</th>
<th>Cartiva Safety (N = 152)</th>
<th>Fusion (N = 50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removal</td>
<td>9.2% (14)</td>
<td>8% (4)</td>
</tr>
<tr>
<td>Reoperation</td>
<td>0.7% (1)</td>
<td>0</td>
</tr>
<tr>
<td>Revision</td>
<td>0.7% (1)</td>
<td>6% (3)</td>
</tr>
<tr>
<td>Supplemental Fixation</td>
<td>0.7% (1)</td>
<td>0</td>
</tr>
<tr>
<td><strong>OVERALL</strong></td>
<td><strong>11.2% (17)</strong></td>
<td><strong>12% (7)</strong></td>
</tr>
</tbody>
</table>

- **Low and comparable** rate of subsequent surgeries
- No implant **infection** or **inflammatory reaction**, or **mechanical failures**
- No implant wear upon inspection of removed implants
Critiques

- **Extensive** exclusion criteria:
  - Additional ipsilateral LE pathology
  - Previous cheilectomy
  - Inflammatory arthropathy
  - Gout
  - OCD > 1 cm
  - Deformity of first ray

- No mention of **functional base line** of these patients
  - Can the implant last in an athlete?

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**Baumhauer et al**
Prospective, Randomized, Multicentered Clinical Trial Assessing Safety and Efficacy of a Synthetic Cartilage Implant vs 1st MTPJ arthrodesis in advanced HR

*Foot & Ankle international (2016)*

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**Can we use this implant in the patient with significant 1st ray deformity or in the athlete?**
Critiques

- Grade 2 disease?
  - Many subjects with grade 2 disease included in the study
  - Better served with joint sparing procedure?

- No defined etiology of OA disease/ HR pathology in the paper

**Baumhauer et al**
Prospective, Randomized, Multicentered Clinical Trial Assessing Safety and Efficacy of a Synthetic Cartilage Implant vs 1st MTPJ arthrodesis in advanced HR

*Foot & Ankle international (2016)*
Cartiva

• Level IV prospective case series

• **Purpose:** Eval 5 year outcomes of patients who received 1st MTP joint cartiva implants from the Baumhauer RCT

• 27 patients (21 F; 6 M)
  • Mean age 56.1
  • Mean BMI 27.1
  • Mean F/u: 5.4 years

• ROM of MTP measured, VAS recorded, SF-36, FAAM sports scale, ADL subscale recorded

**Daniels et al.**
Midterm Outcomes of Polyvinyl Alcohol Hydrogel Hemiarthroplasty of the First MTP Joint in Advanced Hallux Rigidus

*Foot & Ankle international (2017)*
Cartiva

• Results

  • 1st MTPJ ROM maintained in 5 year group compared to 2 year data from Baumhauer RCT
  • Statistically significant improvements in VAS, SF-36, FAAM sports, ADL subscales compared with pre-operative assessments
  • Radiographs of 23/27 available @ 5 yrs
    • No changes in position
    • No implant loosening
    • No implant subsidence
    • No implant wear
    • 2/23 developed cysts in proximal phalanx; 0/23 in metatarsal head → no revisions
  • 1/27 converted to arthrodesis

Daniels et al.
Midterm Outcomes of Polyvinyl Alcohol Hydrogel Hemiarthroplasty of the First MTP Joint in Advanced Hallux Rigidus

Foot & Ankle International (2017)
Guidewire
Reamer
- 1cm diameter
- 8 mm in depth
- Implant 2mm prominent

- Need initial conservative cheilectomy
- Dorsal bone stock
Insertion device
Cartiva in first ray deformity?

• No research present in the literature discussing cartiva implantation with concomitant first ray deformity

• Most patients with symptomatic HR will have concomitant HAV and HV interphalangeus deformities

• Some foot and ankle experts state these deformities should be corrected prior to implantation of Cartiva if there is concomitant symptomatic HR
Cartiva in first ray deformity?

- Case 1
  - 65 y/o F
  - Pain in R 1\textsuperscript{st} MTP

- Exam
  - Osteophytes
  - Mid-arc pain
  - HV interphalangeus
  - Mild HAV

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Cartiva in first ray deformity?

• Case 1
  • Akin
    • Realign the toe
  • Change biomechanics (EHL/FHL)
    • Change the way 1st MTP is loaded
    • In theory provide more pain relief?

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Cartiva in first ray deformity?

• Case 2
  • 83 y/o F
  • Pain in R 1\textsuperscript{st} MTP

• Exam
  • Osteophytes
  • Mid-arc pain
  • HAV

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Cartiva in first ray deformity?

• Case 2

• Procedures performed:
  • Cartiva
  • Short SCARF (avoid implant)
  • Akin

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