ANKLE OSTEOCHONDRAL
ALLOGRAFTS

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ANKLE OSTEOCHONDRAL ALLOGRAFTS

BACKGROUND -

“ORGAN COMPLEX”

FULL THICKNESS CARTILAGE WITH UNDERLYING BONE.

FIRST DESCRIBED BY LEXER 1908.
ANKLE OSTEOCHONDRAL ALLOGRAFTS

BACKGROUND -

LARGE ALLOGRAFTS USED IN TUMOR SURGERY.

SHELL OSTEOCHONDRAL ALLOGRAFTS USED IN OCD AND DJD.
ANKLE OSTEOCHONDRAL ALLOGRAFTS

BACKGROUND -

UNIVERSITY OF TORONTO -

100 KNEES WITH 3.8 YEAR F/U.

75% OVERALL SUCCESS.

MCDERMOTT ET AL., CORR 1984
ANKLE OSTEOCHONDRAL ALLOGRAFTS

BACKGROUND -

UCSD MEDICAL CENTER -

96 KNEES WITH 4.2 YEAR F/U.

74% OVERALL SUCCESS.

BUGBEE AND CONVERY, IN PRESS.
ANKLE OSTEOCHONDRAL ALLOGRAFTS

OBJECTIVE -

CLINICAL OUTCOMES.

POST-TRAUMATIC TIBIO-TALAR DJD.
ANKLE OSTEOCHONDRALE ALLOGRAFTS

PROCEDURE - RECONSTRUCT TIBIO-TALAR JOINT.
BIPOLAR, SHELL OSTEochondral ALLOGRAFTS.
MATERIALS AND METHODS

DONOR TISSUE -

UCSD and Miami Tissue Bank.

Harvested within 24h of death.

Transplanted fresh within 7 days.
MATERIALS AND METHODS

SURGICAL TECHNIQUE -
Size-matched, orthotopic donors.

POST-OPERATIVE MANAGEMENT -
Non-weight bearing for 3 months.
Early ROM program.
INTRA-OP PHOTO
PATIENT DISTRIBUTION

8 patients with post-traumatic DJD.
6 female and 2 male.
One lost to follow-up.
Avg. age at surgery 45 (range 34-67).
FOLLOW-UP

Average 10.8 years
(range 105 - 155 months).
OUTCOMES ANALYSIS

Olerud and Molander Ankle Score - Survey focusing on subjective ankle pain and function.

Short Form-12 (SF-12) Health Survey - Survey to assess overall health
OUTCOMES ANALYSIS

Patient satisfaction -

Patients asked to rate result as excellent, good, fair, or poor.

Would they undergo a similar operation on the other ankle?
## ANKLE SCORE

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Level of Function</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running</td>
<td>Possible</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Impossible</td>
<td>0</td>
</tr>
<tr>
<td>Pain</td>
<td>None</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>While walking on uneven surfaces</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>While walking on even surfaces outdoors</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>While walking indoors</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Constant and severe</td>
<td>0</td>
</tr>
<tr>
<td>Stiffness</td>
<td>None</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Stiffness</td>
<td>0</td>
</tr>
<tr>
<td>Swelling</td>
<td>None</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Only on evenings</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Constant</td>
<td>0</td>
</tr>
<tr>
<td>Stairclimbing</td>
<td>No problems</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Impaired</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Unable</td>
<td>0</td>
</tr>
</tbody>
</table>
# ANKLE SCORE

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Level of Function</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jumping</td>
<td>Possible</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Impossible</td>
<td>0</td>
</tr>
<tr>
<td>Squatting</td>
<td>No problems</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Unable</td>
<td>0</td>
</tr>
<tr>
<td>Supports</td>
<td>No supports</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Taping/wrapping</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Cane or crutch</td>
<td>0</td>
</tr>
<tr>
<td>Work, ADLs</td>
<td>No limitations</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Loss of tempo</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Change to simpler job</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Disabled, strongly impaired</td>
<td>0</td>
</tr>
</tbody>
</table>

**Total Score** 100

Olerud and Molander, CORR 1986.
SF-12 SLIDE
SF-12 SLIDE
RESULTs

ANKLE SCORE -

All patients -

Pre-op avg. 25 (0-50).
Post-op avg. 43 (0-80).
RESULTS

PATIENT SATISFACTION -
How would you rate the result of your procedure?

Excellent 2/7   Good 2/7
Fair 0/7       Poor 3/7

Would you do the same procedure on your other ankle?

Yes 5/7        No 2/7
RESULTS

SF-12 SCORE - PHYSICAL COMPONENT

All patients -

Pre-op avg.  30 (23-46).
Post-op avg. 38 (21-53).
RESULTS

SF-12 SCORE - MENTAL COMPONENT

All patients -

  Pre-op avg.    46 (19-67).
  Post-op avg.  53 (28-62).
J.M. -

Graft fragmentation - 1 year post-op.

Underwent 2nd allograft-Failed.

Successful arthrodesis.
CLINICAL PHOTO
COMPLICATIONS

N.H. -

Talar allograft subluxation.
COMPLICATIONS

N.H. -

Talus repositioned and fixed with Herbert screws.
CLINICAL PHOTO
COMPLICATIONS

N.H. -

Herbert screws backed out.

Screws removed.
COMPLICATIONS

V. R. -

Medial malleolus fracture.

HIV positive.

Tibio-talar arthrodesis.
CLINICAL PHOTO
REPRESENTATIVE CASE

History -

M.H. movie stunt pilot and rancher.

Tibial pilon fx.

Ambulation tolerance less than one block.

Unable to fly plane.
Patient-

What can you do about this bum ankle doc?...I can’t take it anymore!
REPRESENTATIVE CASE

Treatment options-

Orthoses/Walking aids.

Tibio-talar arthrodesis.

Total ankle arthroplasty.

Tibio-talar osteochondral allograft.
POST-OP XRAYS
POST-OP XRAYS
POST-OP XRAYS-2YR
POST-OP XRAYS -2YR
PHOTO WITH PLANE
CONCLUSIONS

1. Most patients have improved ankle function and overall health.

2. Most patients are satisfied.
CONCLUSIONS

3. Good results depend on proper graft fit and adequate fixation.

4. Ankle osteochondral allografts are a viable alternative to arthrodesis.
THANK YOU
Photo of UCSD
THANK
YOU
CASE PRESENTATION

PE-

Swelling and warmth.

0 dorsiflexion.

20 painful plantarflexion.
RESULTS

SF-12 SCORE - MENTAL COMPONENT

All patients -

Pre-op avg. 46 (19-67).
Post-op avg. 53 (28-62).

4/7 successful patients.

Pre-op avg. 39 (19-61).
Post-op avg. 55 (52-61).
RESULTS

ANKLE SCORE -

All patients -

Pre-op avg. 25 (0-50).
Post-op avg. 43 (0-80).

4/7 successful patients.

Pre-op avg. 21 (0-50).
Post-op avg. 57 (30-80).
MATERIALS AND METHODS

Post-operative Management -
Non-weight bearing for 3 months.

Early ROM program.
MATERIALS AND METHODS

Patient Selection -

Consecutive patients, regardless of age, gender, race who failed non-surgical treatments for debilitating ankle pain.
COMPLICATIONS

J.M. -

2nd allograft size mismatch.

Tibio-talar arthrodesis.
CASE PRESENTATION

History -

M.H.  67 y/o movie stunt pilot and rancher.
Tibial pilon fx 30 years ago.
Ambulation tolerance less than one block.
Unable to fly plane.

PE -

Swelling and warmth.  0 dorsiflex, 20 painful plantarflex
Objective -

Assess the efficacy and effectiveness of ankle osteochondral allografts in the treatment of post-traumatic DJD.

Study Design -

Reconstruct the tibio-talar joint using shell osteochondral allografts from fresh cadaveric donors.
MATERIALS AND METHODS

Surgical Technique -

Anterior approach to the tibio-talar joint.

Transverse tibial and talar cuts using oscillating saw.

Size-matched, orthotopic donors pressfit vs. Herbert screws vs. PDS absorbable pins.

Post-operative Management -

Non-weight bearing for 3 months.

Early ROM program.
OUTCOMES ANALYSIS

SF-12 -

General health survey to assess effectiveness.

Olerud and Molander Ankle Score -

Survey focusing on ankle pain and function to assess efficacy.

Patient satisfaction -

Patients rate result as excellent, good, fair, or poor.

Would they undergo a similar operation on the other ankle?
<table>
<thead>
<tr>
<th>COMPLICATIONS</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-union</td>
<td>1/7</td>
</tr>
<tr>
<td>Fragmentation</td>
<td>2/7</td>
</tr>
<tr>
<td>Subluxation</td>
<td>1/7 (Talus)</td>
</tr>
<tr>
<td>Fracture</td>
<td>1/7 (medial malleolus)</td>
</tr>
<tr>
<td>Poor graft fit</td>
<td>1/7 (Talus too small)</td>
</tr>
<tr>
<td>Hardware failure</td>
<td>1/7 (Herbert screws backed out, removed).</td>
</tr>
<tr>
<td>Infections</td>
<td>1/7 HIV-pos (donor HIV-neg)</td>
</tr>
<tr>
<td></td>
<td>1/7 Hep C</td>
</tr>
</tbody>
</table>

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MATERIALS AND METHODS

Patient Selection -

Consecutive patients, regardless of age, gender, race who failed non-surgical treatments for debilitating ankle pain.

Donor Tissue -

UCSD and Miami Tissue Bank. Harvested within 24h of death. Transplanted fresh within 7 days.
OUTCOMES ANALYSIS

SF-12 -

General health survey.

Olerud and Molander Ankle Score -

Survey focusing on subjective ankle pain and function.
CONCLUSIONS

1. Preliminary result - Small sample, long-term follow-up.

2. Failure rate 3/7 (42%).

3. Most patients satisfied with result.

4. Patient satisfaction correlates with Ankle Score improvement.

5. Additional patients needed to improve stats.

6. Focal defects vs. diffuse arthropathy.
CONCLUSIONS

5. Patient satisfaction correlates with improvements in the Ankle Score and SF-12 score.

6. Good results depend on proper graft size and adequate fixation.

7. Immune reaction?

8. Diffuse arthropathy vs. focal defects.
RESULTS

SF-12 -

Ankle Score -

Preop avg. 25 vs. Post-op avg. 43.
RESULTS

Patient Satisfaction -

Excellent 2/7       Good 2/7
Fair          0/7       Poor 3/7

Would do same surgery on other ankle 5/7

Failure rate -

Requiring fusion or ankle score worse than pre-op: 3/7 (42%).