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Osteochondritis Dissecans of the Talus: Composite Cancellous Bone and Morselized Allograft Cartilage Grafting

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Disclosures

The following relationships exist:

- **Philip L. Wilson, M.D.**
  - Educational Support – Plyant Medical
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BACKGROUND

- **Osteochondral Lesions Talus (OLT) has been variously described**
  - **Lateral - Traumatic/Shallow**
  - **Medial – Osteochondritis/Larger & Deeper**
- **Gobbi et al. conducted a level II randomized trial for OLTs and found no difference in outcomes**
  - **Chondroplasty/MFX/OATS**
  - **Average age 30yr.; 2/3 Lateral lesions**
- **International consensus statement**
  - **Debridement and Marrow Stimulation is the recommended treatment for Talar OLT**

Randomized Controlled Trial > Arthroscopy. 2006 Oct;22(10):1085-92.
doi: 10.1016/j.arthro.2006.05.016.

Osteochondral lesions of the talus: randomized controlled trial comparing chondroplasty, microfracture, and osteochondral autograft transplantation

Alberto Gobbi [1], Ramces A Francisco, James H Lubowitz, Francesco Allegra, Gianluigi Canata

Practice Guideline > Foot Ankle Int. 2018 Jul;39(1_suppl):16S-22S.
doi: 10.1177/1071100718779392.

Debridement, Curettage, and Bone Marrow Stimulation: Proceedings of the International Consensus Meeting on Cartilage Repair of the Ankle

Charles P Hannon [1], Steve Bayer [2], Christopher D Murawski [2], Gian Luigi Canata [3], Thomas O Clanton [4], Daniel Haverkamp [5], Jin Woo Lee [6], Martin J O'Malley [7], Hua Yinghui [8], James W Stone [9]; International Consensus Group on Cartilage Repair of the Ankle

BACKGROUND

- **Cystic lesions were found to have worse outcomes at a minimum 2-year follow-up. Therefore, may be better suited for bone grafting or cartilage replacement**
  - **Area more 90.91 mm^2**
  - **Depth greater than 7.56 mm**
  - **Volume beyond 428.13 mm^3**

› Arthroscopy. 2023 Oct;39(10):2191-2199.e1. doi: 10.1016/j.arthro.2023.03.029. Epub 2023 Apr 25.

Concomitant Subchondral Bone Cysts Negatively Affect Clinical Outcomes Following Arthroscopic Bone Marrow Stimulation for Osteochondral Lesions of the Talus

Xiangyun Cheng [1], Tong Su [1], Xiaoze Fan [1], Yuelin Hu [1], Chen Jiao [1], Qinwei Guo [1], Dong Jiang [2]

- **Optimal Treatment TALUS OCD Unclear**

- **No American Academy of Orthopedic Surgeons (AAOS) Clinical Practice Guide (CPG) for treatment of Talar OCD**

PURPOSE

To evaluate patient-reported outcome (PRO) and magnetic resonance imaging (MRI) results following arthroscopic layered cancellous autograft bone and morselized allograft cartilage grafting for OCD of the talus.

METHODS

- IRB-Approved retrospective review
- Single tertiary pediatric sports medicine and orthopedic center
  - 2 surgeons
- Consecutive patients treated for OCD of the talus
  - Jan 2015 – Oct 2022
  - Indicated for symptomatic, unstable lesions
  - Minimum one year follow up
- Demographic and operative data
- MRI
  - Magnetic Resonance Observation of Cartilage Repair Tissue (MOCART) 2.0 score was employed to assess postoperative MRIs.
- Prospectively collected PRO at pre- and post-operative
  - Foot and Ankle Outcome Score (FAOS)

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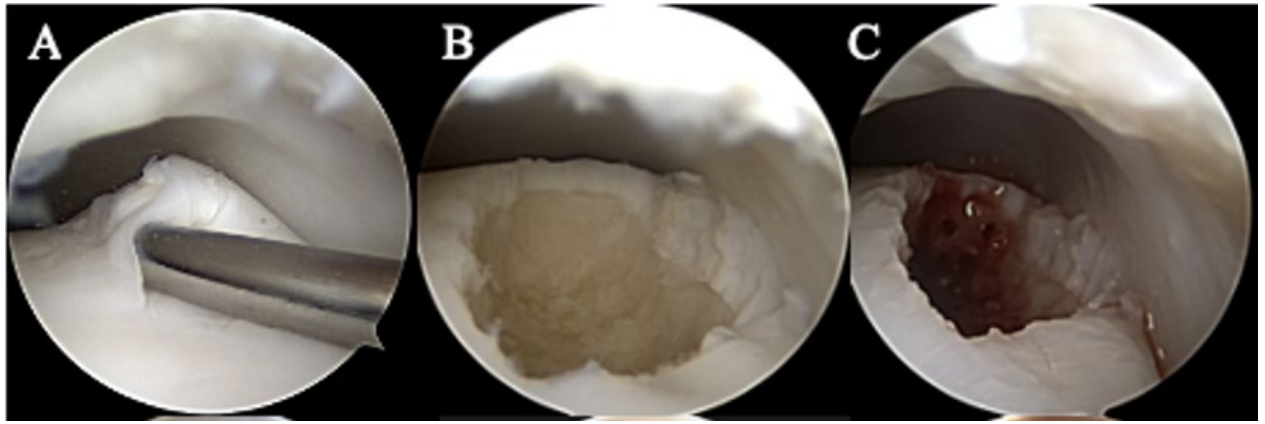
MOCART 2.0 Scoring System

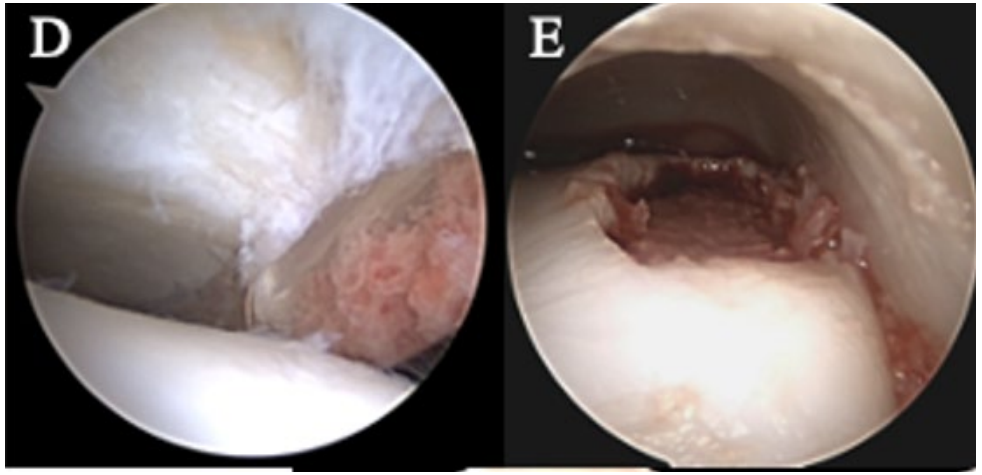
		Points
Variable 1	**Volume fill of cartilage defect**	
	Complete filling OR minor hypertrophy: 100% to 150% filling of total defect volume	20
	Major hypertrophy ≥150% OR 75% to 99% filling of total defect volume	15
	50% to 74% filling of total defect volume	10
	25% to 49% filling of total defect volume	5
	<25% filling of total defect volume OR complete delamination *in situ*	0
Variable 2	**Integration into adjacent cartilage**	
	Complete integration	15
	Split-like defect at repair tissue and native cartilage interface ≤2 mm	10
	Defect at repair tissue and native cartilage interface >2 mm, but <0% of repair tissue length	5
	Defect at repair tissue and native cartilage interface ≥50% of repair tissue length	0
Variable 3	**Surface of the repair tissue**	
	Surface intact	10
	Surface irregular <50% of repair tissue diameter	5
	Surface irregular ≥50% of repair tissue diameter	0
Variable 4	**Structure of the repair tissue**	
	Homogeneous	10
	Inhomogeneous	0
Variable 5	**Signal intensity of the repair tissue**	
	Normal	15
	Minor abnormal—minor hyperintense OR minor hypointense	10
	Severely abnormal—almost fluid like OR close to subchondral plate signal	0
Variable 6	**Bony defect or bony overgrowth**	
	No bony defect or bony overgrowth	10
	Bony defect: depth < thickness of adjacent cartilage OR overgrowth <50% of adjacent cartilage	5
	Bony defect: depth ≥ thickness of adjacent cartilage OR overgrowth ≥50% of adjacent cartilage	0
Variable 7	**Subchondral changes**	
	No major subchondral changes	20
	Minor edema-like marrow signal—maximum diameter <50% of repair tissue diameter	15
	Severe edema-like marrow signal—maximum diameter ≥50% of repair tissue diameter	10
	Subchondral cyst ≥5 mm in longest diameter OR osteonecrosis-like signal	0

SURGICAL PROCEDURE

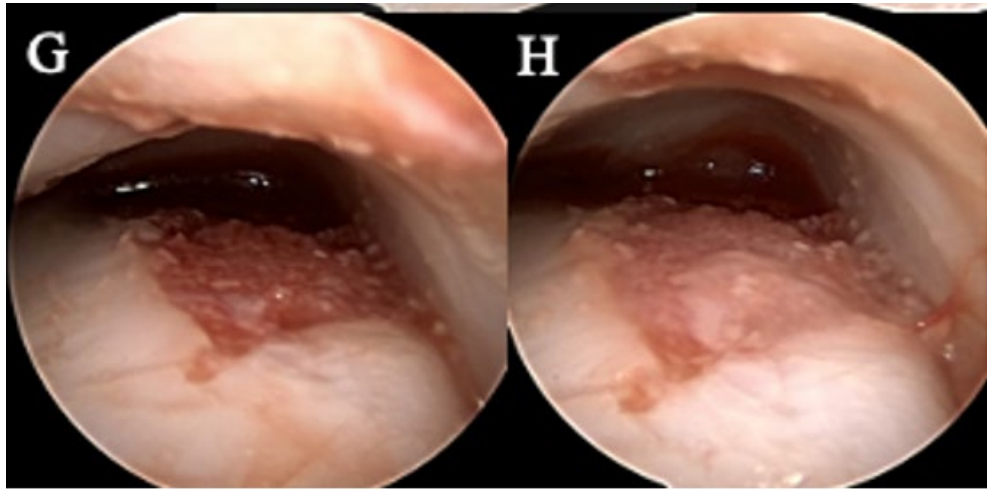
1. Arthroscopic Debridement



2. Cancellous Autograft Delivery



3. Morselized Allograft Cartilage Grafting



(BioCartilage®;Arthrex, Naples, FL)

Post-Operative Protocol

- Non-Weightbearing for 6-8 weeks with ROM at 2 weeks
- Progressive weightbearing & concentric strengthening at 6-8 weeks
- Impact and running at 4-6 months

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RESULTS

- **20 ankles in 18 patients**
  - 14.5 years (10.8-17.9)
  - 61.1% female
- **2 year follow up (1.5 - 4.2 years)**

Lesion Characteristics	
Coronal Width	8.2 ± 1.7 (range, 4.6-11.3)
Sagittal Length	12.8 ± 3.7 (range, 4.4-19.3)
Depth	5.7 ± 1.7 (range, 2.4-9.1)
Lesion Location	
Medial Shoulder	16 (84.2)
Lateral Shoulder	2 (10.5)
Central	1 (5.3)
Cancellous Bone in Progeny	
Yes	13 (68.4)
No	6 (31.6)
Subchondral Cysts	
Yes	6 (31.6)
No	13 (68.4)
Edema	
Yes	19 (100)
No	0 (0)

RESULTS

MRI Characteristics

- **All demonstrated stable lesion filling with incorporated bony elements below the augmented fibrocartilage surface**
- **MOCART scores ≠ patient reported outcomes ($p > 0.05$)**

Postoperative MRI	
Post-op Timing (months)	8.3 ± 4.9 (range, 3.7-23.8)
Total MOCART 2.0 Score	**66.7 ± 15.0 (range, 40-90)**
Categorical MOCART 2.0 Scoring	
Volume Fill	**19.3** ± 1.8 (range, 15-20)
Integration	**13.0** ± 2.5 (range, 10-15)
Surface	5.3 ± 4.0 (range, 0-10)
Structure	4.0 ± 5.1 (range, 0-10)
Signal Intensity	**9.3** ± 2.6 (range, 0-15)
Bony Defect	5.0 ± 5.0 (range, 0-10)
Subchondral Changes	10.7 ± 4.2 (range, 0-20)

RESULTS

Return to Sport

- **81% of patients returned to sport 8.5 ± 2.96 months**

- **No re-operations for graft failure or instability**

Foot and Ankle Outcome Scores				
Domain	Pre-operative	Final Post-operative	% Increase	p-value
ADLs	68.21	94.21	38.1	**< 0.001**
Pain	57.87	89.58	54.8	**<0.001**
Quality of Life	25.69	60.55	135.6	**<0.001**
Sports& Recreation	38.05	76.25	100.4	**<0.001**
Symptoms	63.29	80.80	27.7	**<0.01**

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CONCLUSION

- **Composite grafting technique is an effective strategy for addressing both the osseous and chondral components of the OCD Talus defect with minimal morbidity.**

- **MRI shows stable, near complete lesion fill, with appropriate fibrocartilage contour.**

- **Significant improvement in PROs and high rates of return to sport were achieved following composite grafting to treat talar OCD in adolescent athletes.**

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References

1. Edmonds EW, Polousky J. A review of knowledge in osteochondritis dissecans: 123 years of minimal evolution from Konig to the ROCK study group. Clin Orthop Relat Res. 2013;471(4):1118-1126.
2. Green WT, Banks HH. Osteochondritis dissecans in children. J Bone Joint Surg Am. 1953;35-A(1):26-47; passim.
3. König. Ueber freie Körper in den Gelenken. Deutsche Zeitschrift für Chirurgie. 1888;27:90-109.
4. Bruns J, Habermann C, Werner M. Osteochondral Lesions of the Talus: A Review on Talus Osteochondral Injuries, Including Osteochondritis Dissecans. Cartilage. 2021;13(1_suppl):1380S-1401S.
5. Ghahremani S, Griggs R, Hall T, Motamedi K, Boechat MI. Osteochondral lesions in pediatric and adolescent patients. Semin Musculoskelet Radiol. 2014;18(5):505-512.
6. Letts M, Davidson D, Ahmer A. Osteochondritis dissecans of the talus in children. J Pediatr Orthop. 2003;23(5):617-625.
7. Johnson MA, Park K, Talwar D, Maguire KJ, Lawrence JTR. Predicting Outcomes of Talar Osteochondritis Dissecans Lesions in Children. Orthop J Sports Med. 2021;9(11):23259671211051769.
8. Masquijo JJ, Allende F, Carabajal M. Ankle Morphology and Juvenile Osteochondritis Dissecans (JOCD) of the Talus: Is There an Association? An MRI Study. J Pediatr Orthop. 2021;41(2):e147-e152.
9. Berndt AL, Harty M. Transchondral fractures (osteochondritis dissecans) of the talus. J Bone Joint Surg Am. 1959;41-A:988-1020.
10. Kay RM, Tang CW. Pediatric foot fractures: evaluation and treatment. J Am Acad Orthop Surg. 2001;9(5):308-319.
11. Lahm A, Erggelet C, Steinwachs M, Reichelt A. Arthroscopic management of osteochondral lesions of the talus: results of drilling and usefulness of magnetic resonance imaging before and after treatment. Arthroscopy. 2000;16(3):299-304.
12. Marlovits S, Striessnig G, Resinger CT, et al. Definition of pertinent parameters for the evaluation of articular cartilage repair tissue with high-resolution magnetic resonance imaging. European journal of radiology. 2004;52(3):310-319.
13. Obey MR, Hillen TJ, Broughton JS, Smith MV, Goldfarb CA. Magnetic Resonance Imaging Assessment of Cartilage Appearance Following Marrow Stimulation of Osteochondritis Dissecans of the Humeral Capitellum. J Hand Surg Am. 2023;48(4):409 e401-409 e411.
14. Chambers HG, Shea KG, Anderson AF, et al. Diagnosis and treatment of osteochondritis dissecans. J Am Acad Orthop Surg. 2011;19(5):297-306.
15. Schreiner MM, Raudner M, Marlovits S, et al. The MOCART (Magnetic Resonance Observation of Cartilage Repair Tissue) 2.0 Knee Score and Atlas. Cartilage. 2021;13(1_suppl):571S-587S.
16. Espinoza C, Ellis HB, Wilson P. Arthroscopic delivery of cancellous tibial autograft for unstable osteochondral lesions in the adolescent knee. Arthrosc Tech. 2014;3(3):e339-342.
17. Azam MT, Yu K, Butler J, et al. Validation of the Foot and Ankle Outcome Score (FAOS) for Osteochondral Lesions of the Ankle. Foot Ankle Int. 2023;44(8):745-753.
18. Roos EM, Roos HP, Lohmander LS, Ekdahl C, Beynnon BD. Knee Injury and Osteoarthritis Outcome Score (KOOS)--development of a self-administered outcome measure. J Orthop Sports Phys Ther. 1998;28(2):88-96.
19. Gobbi A, Francisco RA, Lubowitz JH, Allegra F, Canata G. Osteochondral lesions of the talus: randomized controlled trial comparing chondroplasty, microfracture, and osteochondral autograft transplantation. Arthroscopy. 2006;22(10):1085-1092.
20. Casari FA, Germann C, Weigelt L, Wirth S, Viehofer A, Ackermann J. The Role of Magnetic Resonance Imaging in Autologous Matrix-Induced Chondrogenesis for Osteochondral Lesions of the Talus: Analyzing MOCART 1 and 2.0. Cartilage. 2021;13(1_suppl):639S-645S.
21. Valderrabano V, Miska M, Leumann A, Wiewiorski M. Reconstruction of osteochondral lesions of the talus with autologous spongiosa grafts and autologous matrix-induced chondrogenesis. Am J Sports Med. 2013;41(3):519-527.
22. Gottschalk O, Altenberger S, Baumbach S, et al. Functional Medium-Term Results After Autologous Matrix-Induced Chondrogenesis for Osteochondral Lesions of the Talus: A 5-Year Prospective Cohort Study. J Foot Ankle Surg. 2017;56(5):930-936.