aebt Asociación Española de Bancos de Tejidos

Gestión de la Autosuficiencia de Tejidos (Módulo II)

Procesamiento de Tejidos

14 - 15 de noviembre 2019
Palma de Mallorca

ONT ORGANIZACIÓN NACIONAL DE TRASPLANTES
GOBIERNO DE ESPAÑA

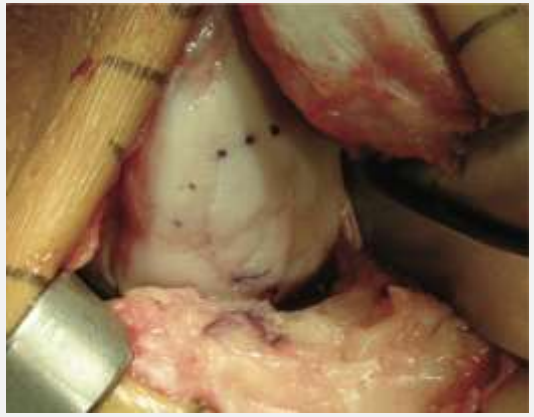
fundació BANC DE SANG I TEIXITS DE LES ILLES BALEARS

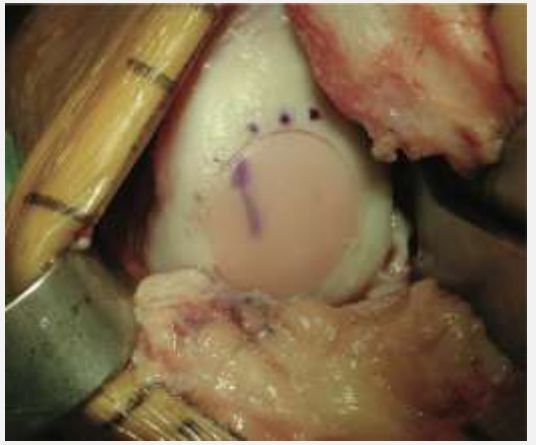
Col·legi Oficial de Metges Illes Balears

INJERTOS OSTEOCONDRALES FRESCOS

Dr. Antoni Gayà
Banc de Teixits
Fundació Banc de Sang i Teixits de les Illes Balears

INJERTOS OSTEOCONDRALES



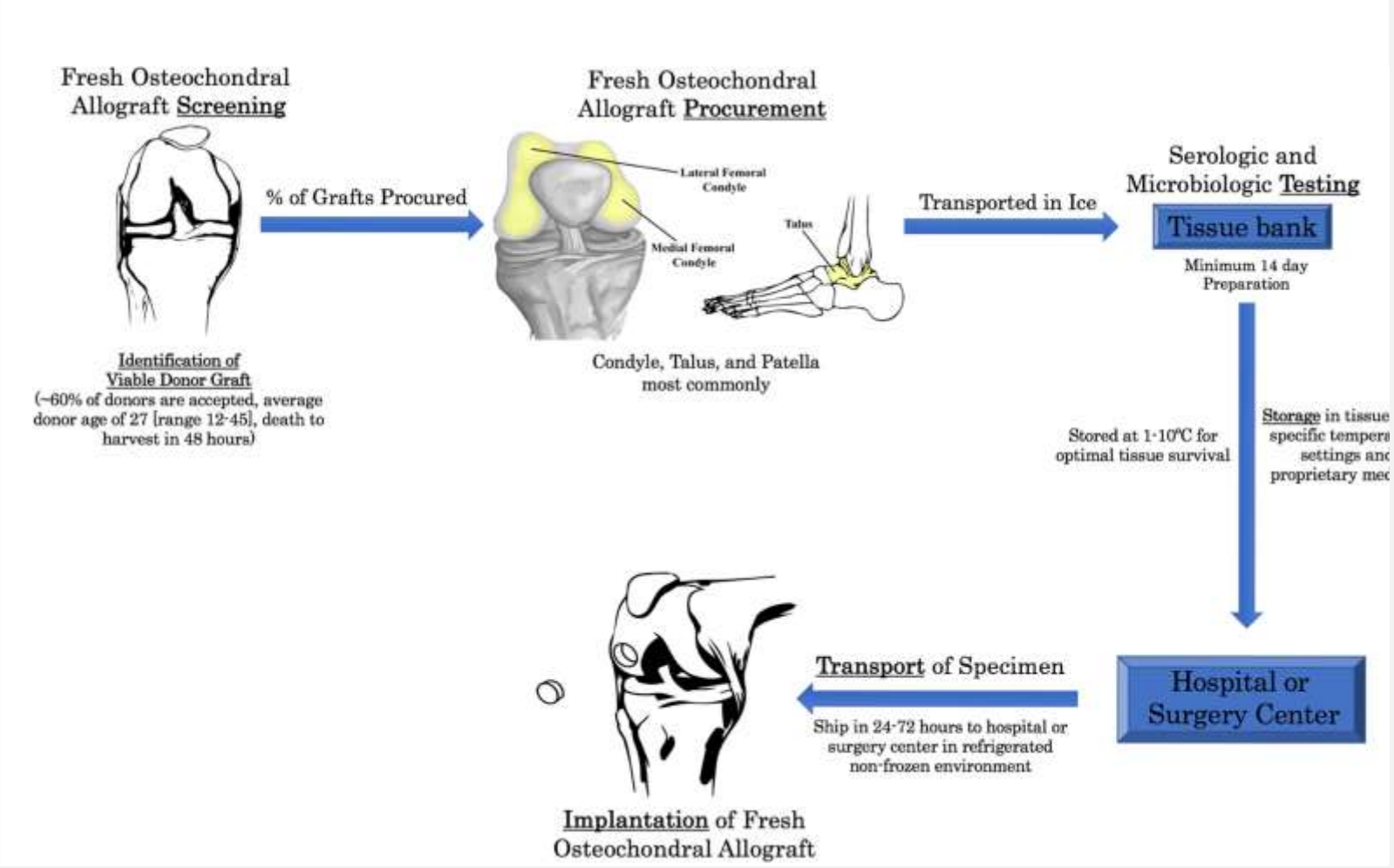


Cell Tissue Bank
https://doi.org/10.1007/s10561-019-09768-5

FULL LENGTH REVIEW

Fresh osteochondral grafting in the United States: the current status of tissue banking processing

Brett Goodfriend · Anthony A. Essilfie · Ian A. Jones · C. Thomas Vangsness Jr.




Spin: -82
Tilt: 0


Spin: 10
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Cell Tissue Bank
https://doi.org/10.1007/s10561-019-09768-5

FULL LENGTH REVIEW

Fresh osteochondral grafting in the United States: the current status of tissue banking processing

Brett Goodfriend · Anthony A. Essilfie · Ian A. Jones · C. Thomas Vangsness Jr.

According to SmartTRAK, market share for the four banks is as follows: JRF 59.9%, MTF Biologics/CONMED 15.3%, LifeNet 14%, and RTI 10.2%, with approximately 4700 fresh grafts distributed in 2018 (BioMedGPS, SmartTRAK Business Intelligence, 2018).

Table 2 Quantitative data from each tissue bank. The four banks have been de-identified to preserve anonymity

Tissue bank	Years of experience	Age of donor		
		Min	Max	Ave
1	9	12	45	31
2	15	12	35	25
3	18	12	35	25
4	10	18	35	27
Average	13.0	13.5	37.5	27.0
SD	4.2	3.0	5.0	2.8

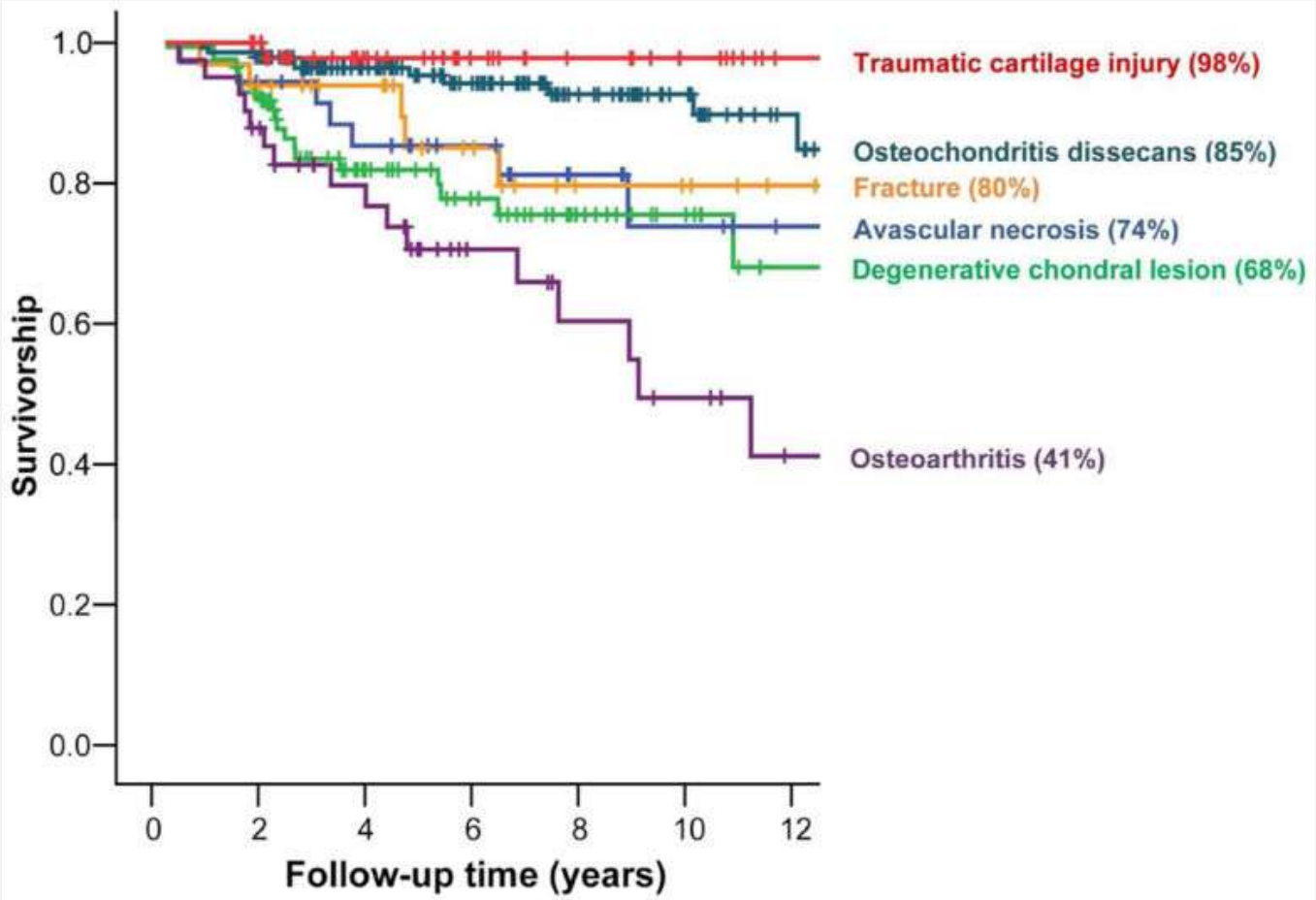
Tissue bank	Storage medium
1	Ham's F-12 medium + fetal bovine serum
2	Fetal bovine serum + antibiotics
3	Chondrogenic media
4	X-Vivo 10 (serum free), tissue media, antibiotics

Tissue bank	Top 3 most requested grafts		
	1st	2nd	3rd
1	Medial condyle	Lateral condyle	Talus
2	Medial condyle	Talus	Patella
3	Medial condyle	Patella	Talus
4	Medial condyle	Talus	Distal tibia

Osteochondral Allograft Transplantation in Cartilage Repair: Graft Storage Paradigm, Translational Models, and Clinical Applications

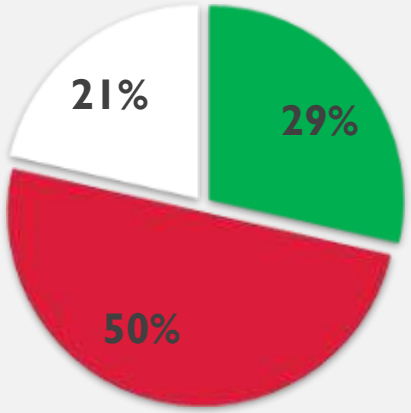
William D. Bugbee, MD[1,2], **Andrea L. Pallante-Kichura, PhD**[3], **Simon Görtz, MD**[2], **David Amiel, PhD**[2], and **Robert Sah, MD, ScD**[2,3]

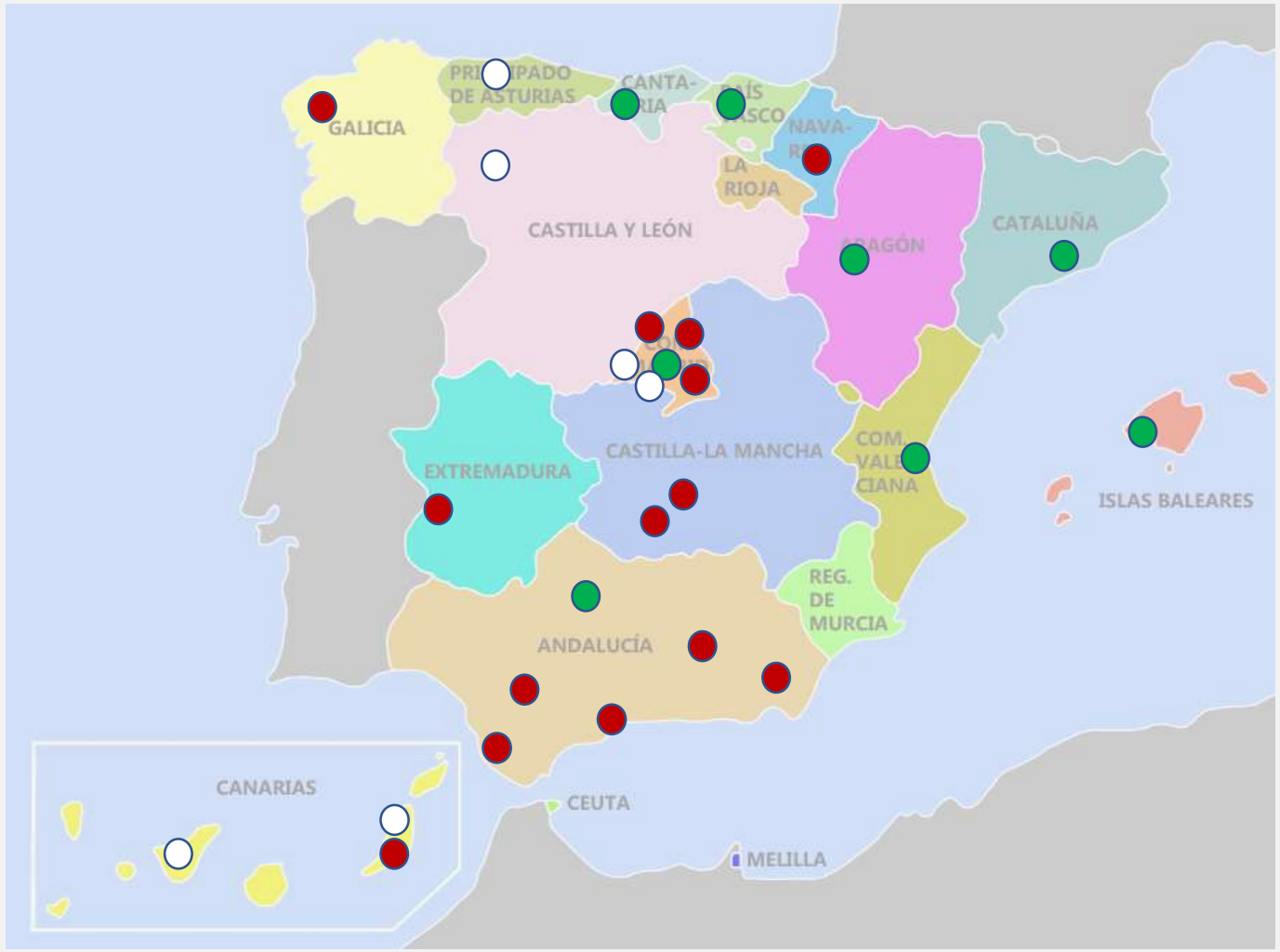
J Orthop Res. 2016 January ; 34(1): 31–38.



OBTENCION DE TEJIDO OSTEOCONDRAL EN LOS BANCOS DE TEJIDOS EN ESPAÑA

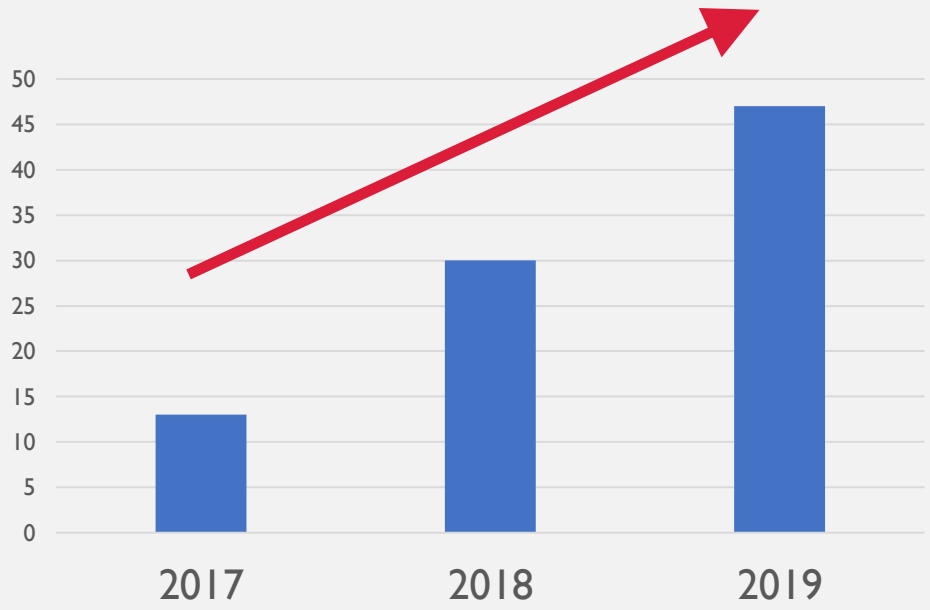
- Obtienen
- No obtienen
- NS/NC





INJERTOS OSTEOCONDRALES EN ESPAÑA 2017-2019

Tejidos suministrados	2017	2018	2019
Cóndilo	1	1	1
Astragalo	7	20	32
Hemimeseta con menisco	3	1	4
Rotula-Tróclea	0	1	0
	1	2	0
	1	3	6
	0	2	1
	0	0	3
	13	30	47



OBTENCION DE TEJIDO OSTEOCONDRAL

Obtención de tejido osteocondral	
Tras solicitud especifica	8
Según características del donante	2

Edad límite	
35 años	1
40-45 años	1
45 años	4
45-50 años	2

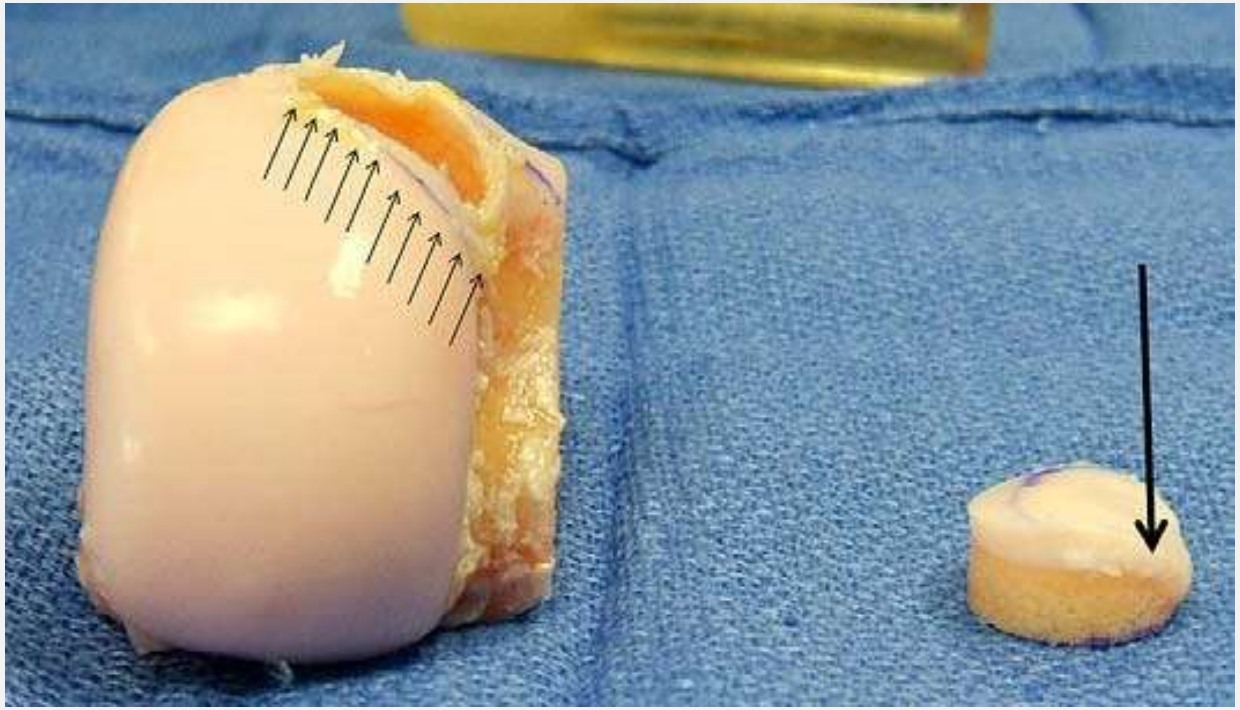
PIEZAS OSTEOCONDRALES OBTENIDAS

Pieza anatómica obtenida	
Cóndilo femoral	8
Rotula	3
Astrágalo	6
Hemimeseta con menisco	2
Tróclea femoral	1
Según solicitud	2

Tiempo		
Extracción-Banco	1-4 horas	7
	24 horas	1
Banco-Procesamiento	12-24 horas	7
	NS/NC	1

PREPARACIÓN/SELECCIÓN INJERTO OSTEOCONDRAL

- Es aconsejable tener en cuenta que las medidas antropometricas del donante se asemejen a las del receptor.
- Durante la preparación del aloinjerto, es importante hacer una coincidencia precisa con el cóndilo receptor. Particularmente en defectos parcialmente no contenidos, es importante hacer coincidir bien la curvatura (flechas negras) con el receptor para evitar hundir el injerto.



CONSERVACIÓN DE PIEZAS LAS OBTENIDAS

POE	
Bibliografía	7
Validación	2
NS/NC	1

Medio de transporte/Conservación	
Ringer-Lactato	3
M199	1
SF	1
HBSS	1
DMEM	2

Contenedor		
Bote	7	
	Macopharma	3
	Medfor	3
	NS/NC	3
Bolsa	1	

CONSERVACIÓN DE LAS PIEZAS OBTENIDAS

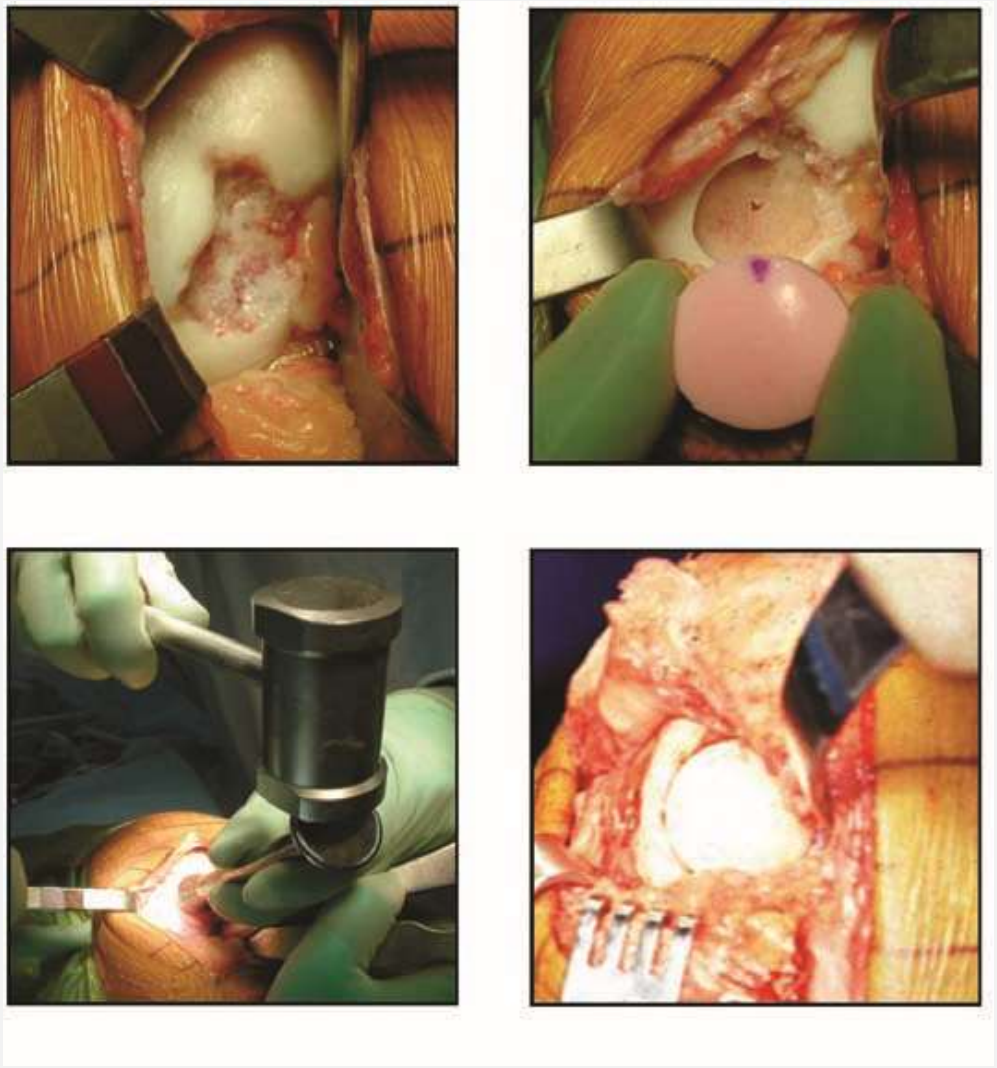
Suplemento de suero		
SI	3	
	Suero autólogo	2
	Suero AB alogénico	1
	NS/NC	1
NO	5	

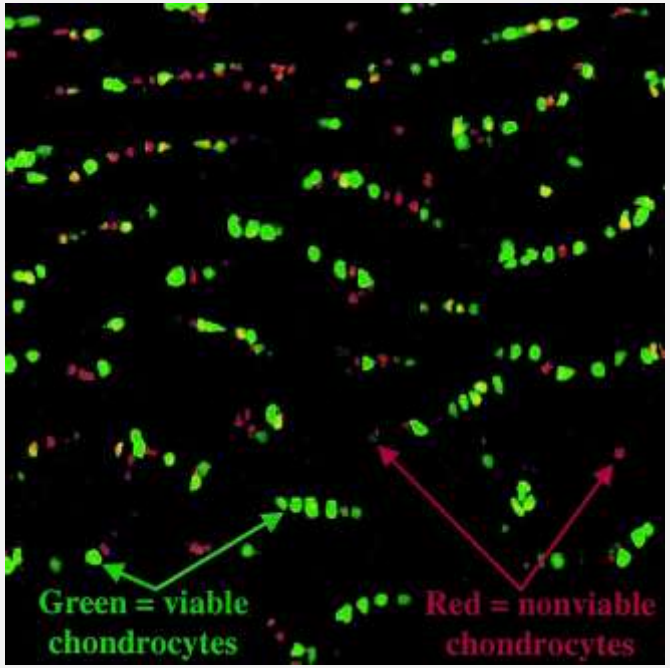
Temperatura de conservación	
4° C	5
31° C	1
37° C	2

Duración máxima conservación	
14 dias	4
21 dias	2
25 dias	1
28 dias	1

Recambio de medio	
NO	2
2-3 dias	3
5 dias	1
7 dias	1
NS/NC	1

VIABILIDAD DE LOS CONDROCITOS





Importance of Donor Chondrocyte Viability for Osteochondral Allografts

James L. Cook,*†‡ DVM, PhD, James P. Stannard,‡ MD, Aaron M. Stoker,† PhD, Chantelle C. Bozynski,† DVM, MS, Keiichi Kuroki,† DVM, PhD, Cristi R. Cook,† DVM, MS, and Ferris M. Pfeiffer,†‡ PhD
Investigation performed at the Department of Orthopaedic Surgery, University of Missouri, Columbia, Missouri, USA

Am J Sports Med published online February 26, 2016
DOI: 10.1177/0363546516629434

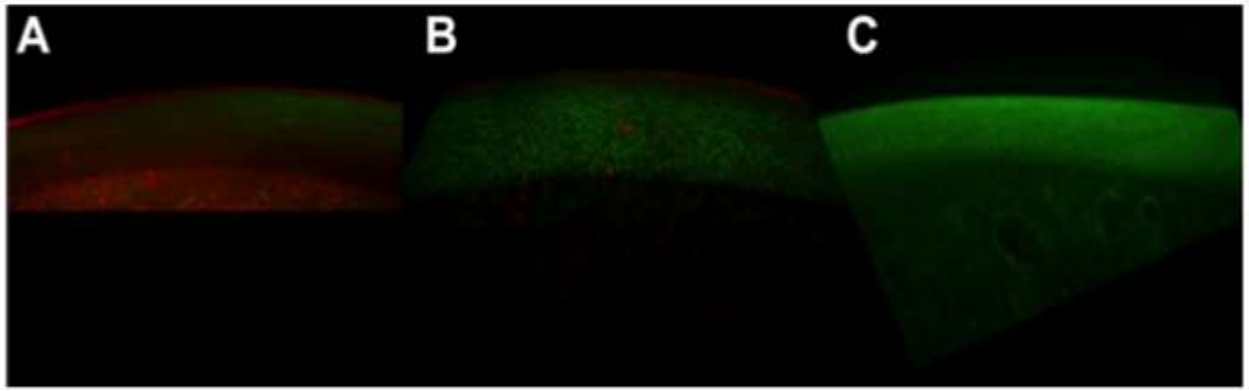
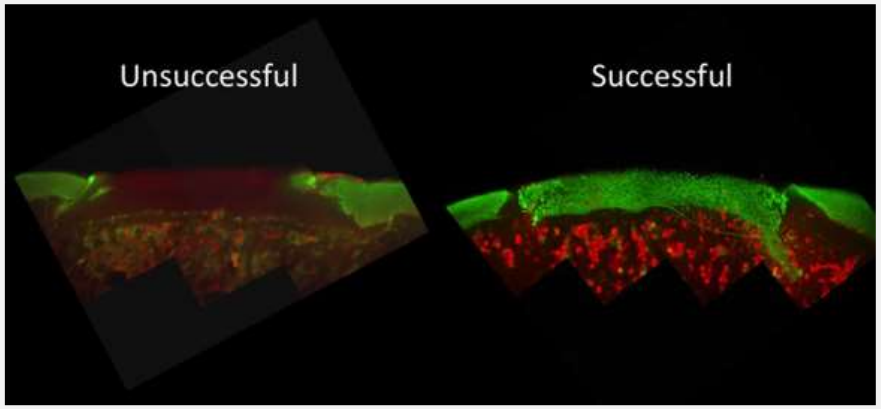


Figure 2. Live-dead images showing the range in chondrocyte viability seen in grafts at time of implantation: (A) 23% chondrocyte viability, (B) 71% chondrocyte viability, (C) 99% chondrocyte viability (calcein acetoxymethyl ester/Sytox blue stain; original magnification ×4).



OCA Preservation Duration	6-Month Outcome	Chondrocyte Viability, %
28 days	Successful	89.9 ± 9.6
	Unsuccessful	57.2 ± 11.6
60 days	Successful	82.9 ± 9.4
	Unsuccessful	33.8 ± 19.9

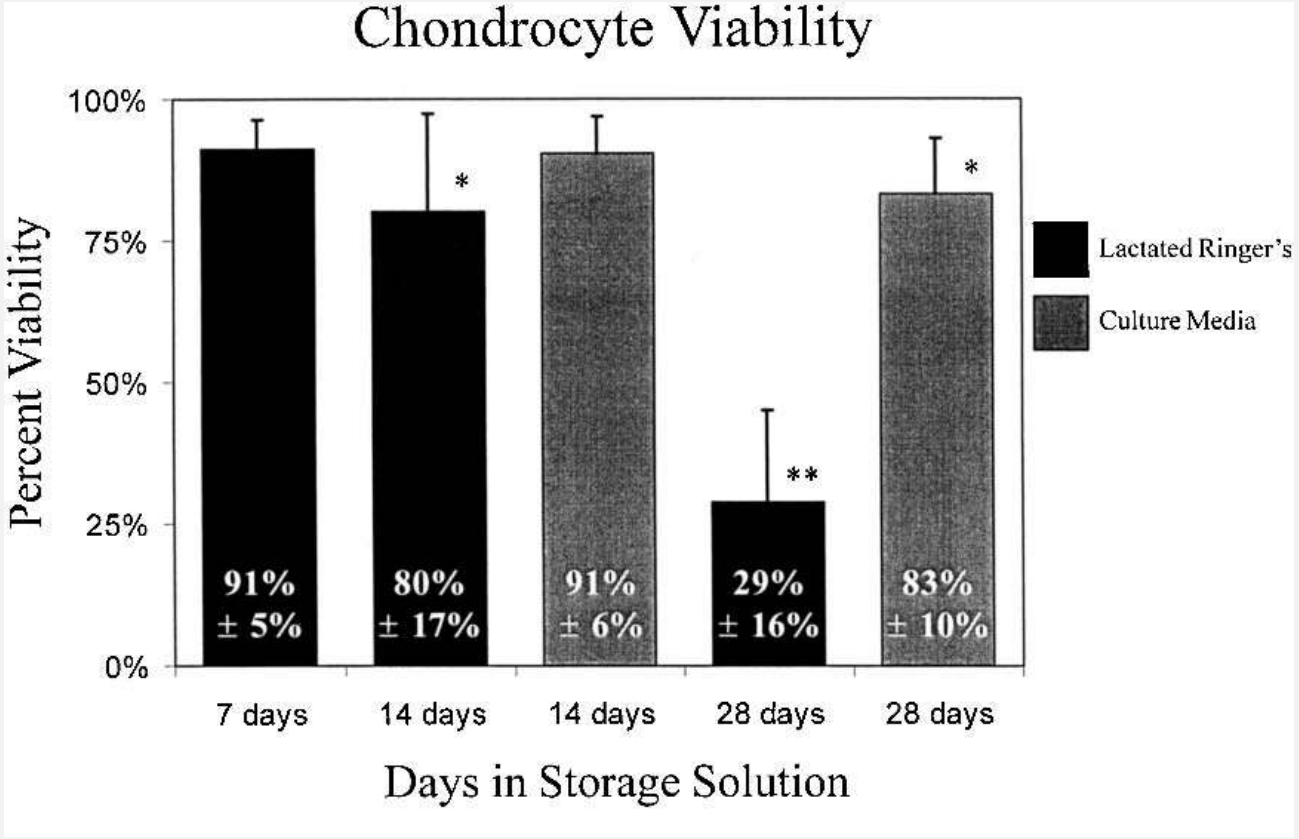
Results: Chondrocyte viability ranged from 23% to 99% at the time of implantation. All successful grafts had >70% chondrocyte viability at the time of implantation, and no graft with chondrocyte viability <70% was associated with a successful outcome.

CONSERVACIÓN DE LOS INJERTOS OSTEOCONDRALES

The Effects of Storage on Fresh Human Osteochondral Allografts

Scott T. Ball, MD, David Amiel, PhD,* Seth K. Williams, MD,* William Tontz, MD,* Albert C. Chen, PhD,† Robert L. Sah, MD, ScD,† and William D. Bugbee, MD**

Clin Orthop • Number 418, January 2004



Lactated Ringer-based storage solutions are equally well suited for the storage of fresh osteochondral allografts as cell culture medium-based storage solutions

Afif Harb[1], Alexander von Horn[1], Kornelia Gocalek, Luisa Marilena Schäck, Jan Clausen, Christian Krettek, Sandra Noack, Claudia Neunaber*

Trauma Department, Hannover Medical School, Carl-Neuberg-Strasse 1, 30625 Hannover, Germany

Injury, Int. J. Care Injured 48 (2017) 1302–1308

In conclusion, our study shows that Ringer Lactate-based storage solutions are equally suitable for the storage of osteochondral grafts as DMEM-based storage solutions in respect to chondrocyte survival rates and matrix quality. Furthermore, we confirm that both the composition and the temperature of storage solutions have an impact on the survival rate of chondrocytes within the stored allografts; in the present study set-up, storage at 4 °C displayed a better chondrocyte survival rate than storage at 37 °C.

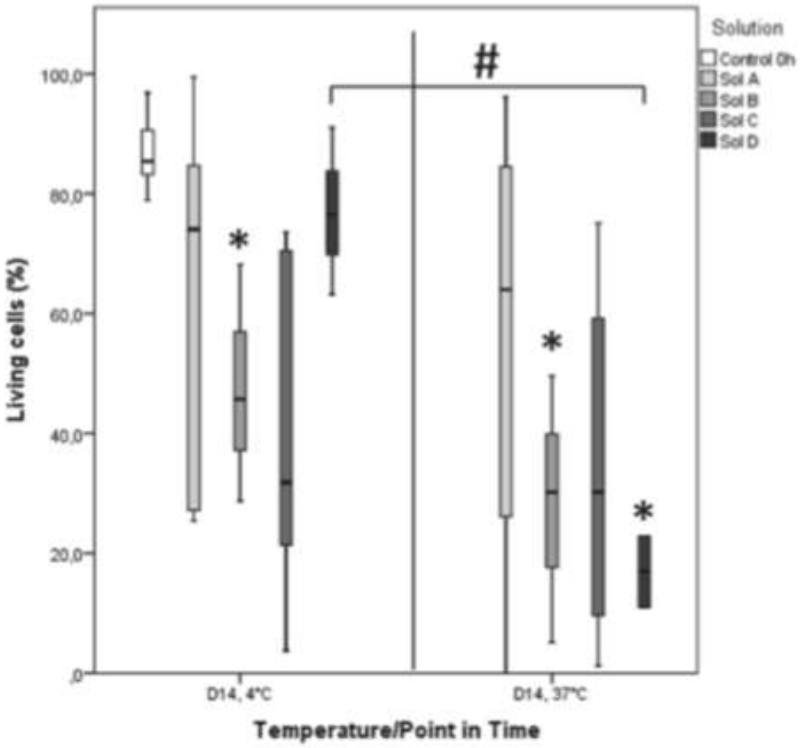


Fig 1. Box-plot displaying average percentage of living chondrocytes relative to total chondrocyte count. Displayed are the results for all groups at day 14 of storage for both 4 °C and 37 °C storage temperature. Statistically significant differences between the control and an experimental group are marked by an asterisk ($p < 0.05$). Statistically significant differences between two experimental groups are marked by a hashtag ($p < 0.05$).

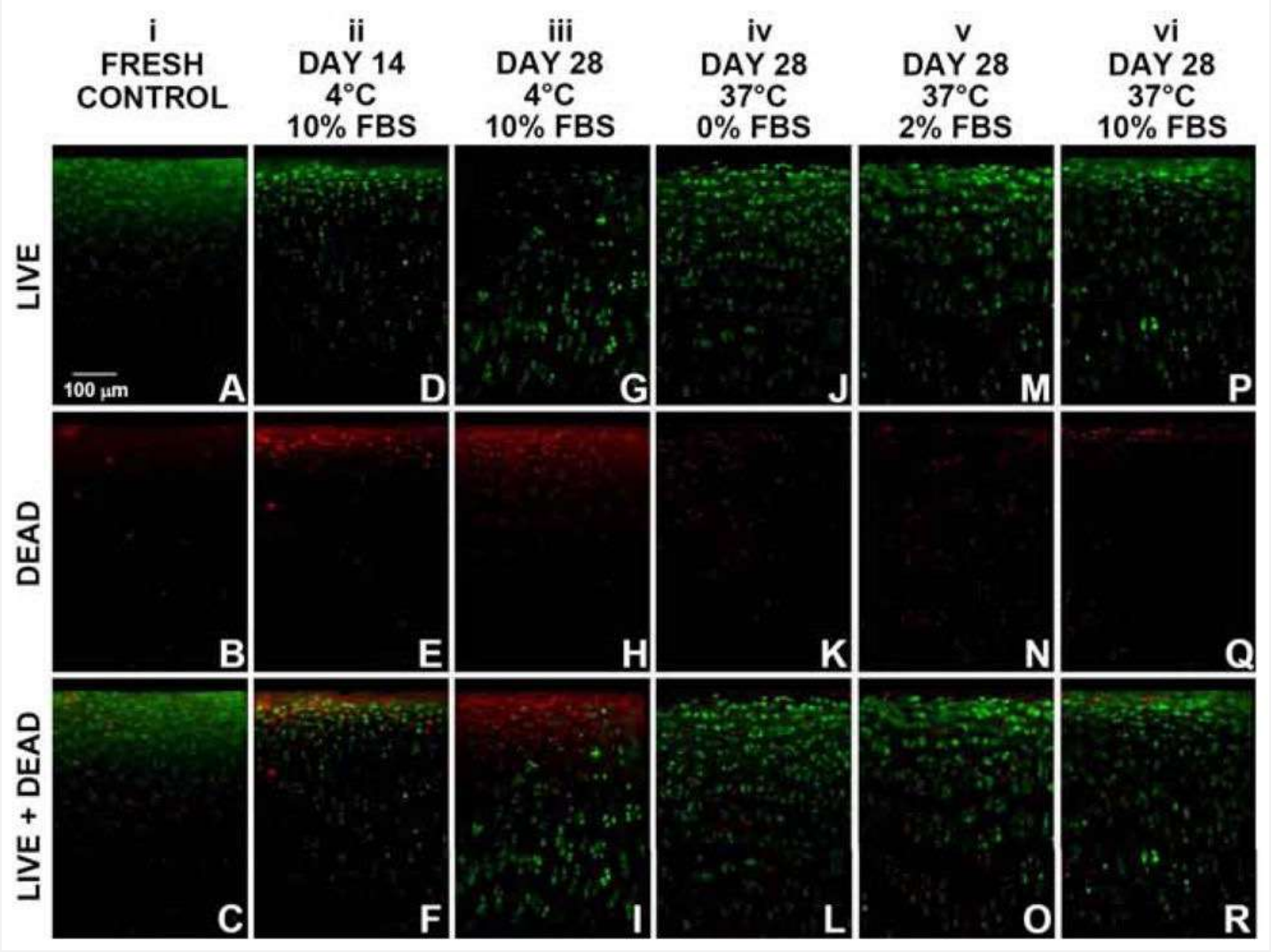
Conclusion: LR based solutions that contain only substances that are approved in Germany may be just as efficient for storing grafts as the USA DMEM-based solution gold standard. Moreover, in the present experiment storage of osteochondral allografts at 4 °C was superior to storage at 37 °C.

CHONDROCYTE VIABILITY IS HIGHER AFTER PROLONGED STORAGE AT 37°C THAN AT 4°C FOR OSTEOCHONDRAL GRAFTS

Andrea L. Pallante, M.S.[†], **Won C. Bae, Ph.D.**[+], **Albert C. Chen, Ph.D.**[†], **Simon Görtz, M.D.**[‡], **William D. Bugbee, M.D.**[‡,#], and **Robert L. Sah, M.D., Sc.D.**[†,*]

Am J Sports Med. 2009 November ; 37(Suppl 1): 24S–32S.

Los injertos osteocondrales se obtuvieron de cabezas humerales de cabra, se transportaron en tampón fosfato (PBS)+antibióticos (penicilina, estreptomicina y fungizona: PSF) y se conservaron en EMEM con aditivos: acido ascórbico, L-glutamina y PSF.



ANTIBIÓTICOS

Antibioticos							
Si	6						
	Amikacina						SI
	Cotrimoxazol	SI	SI	SI			SI
	Estreptomicina				SI	SI	SI
	Vancomicina	SI	SI	SI			SI
	Voriconazol						SI
	Anfotericina B	SI	SI		SI	SI	
	Osteomicina						
	Otros	Tobramicina	Tobramicina	Tobramicina	Penicilina	Penicilina	
No	2						

CONTROL MICROBIOLÓGICO

Toma de muestra para microbiología								
Hisopo en quirófano	SI	SI		SI	SI	SI	SI	SI
Fragmento en quirófano			SI					
Liquido de lavado en quirófano							SI	
Liquido de transporte		SI		SI	SI	SI	SI	SI
Medio de mantenimiento tras recambio			SI	SI	SI	SI	SI	
Medio de mantenimiento pre-distribución			SI		SI	SI	SI	
Medio tras 5 dias del procesamiento								SI
Hisopo/medio tras 3 días con Antibiótico		SI						

ACTITUD ANTE CONTROL MICROBIOLÓGICO POSITIVO

Positivo tras obtención	
Descartar la pieza	3
Procesar la pieza	3
Descartar/Procesar en función del microorganismo	1
NS/NC	1

Positivo tras procesamiento	
Descartar la pieza	4
Procesar la pieza	0
Descartar/Procesar en función del microorganismo	3 (Comensal piel, saprofito, coagulasa negativo)
NS/NC	1

RESPUESTA INMUNE TRAS INJERTO OSTEOCONDRAL

- Los injertos no se seleccionan en ni función de HLA ni de ABO
- La porción ósea es inmunogénica (proteínas óseas, médula ósea)
- El 50% de los injertos desarrollan anticuerpos anti-HLA
- Se correlacionó con alteraciones en la interfaz injerto-huésped en los estudios de resonancia magnética.
- Se desconoce la relevancia clínica de este hallazgo

PULSE LAVAGE

Pulse Lavage Fails to Significantly Reduce Bone Marrow Content in Osteochondral Allografts

A Histological and DNA Quantification Study

Luiz Felipe Ambra,* MD, PhD, Laura de Girolamo,[yz] PhD, and Andreas H. Gomoll,[§] MD

The American Journal of Sports Medicine
1–6
DOI: 10.1177/0363546519864716

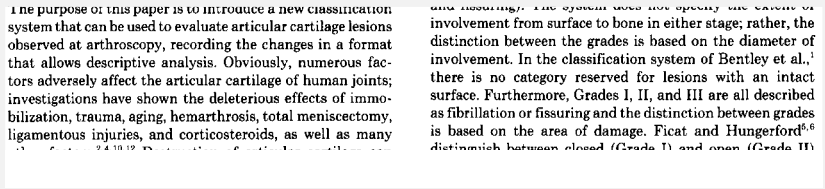
CONCLUSIONES

Edad	<45 años
Tiempo transporte	1-4 horas
Tiempo procesamiento	12-24 horas
Contenedor	Bote
Liquido conservación	Medio cultivo/Ringer L.
Suplemento con suero	No
Temperatura	4°C
Recambio de medio	Variable

Antibióticos	Si
Control microbiológico	
Hisopo	Si
Liquido transporte	Si
Medio tras recambio	Si
Medio pre-distribución	Si
Control microbiológico	
Tras obtención	Procesar
Tras procesamiento	Descartar

Gracias por la atención

CLASIFICACION DEL CARTÍLAGO ARTICULAR



The purpose of this paper is to introduce a new classification system that can be used to evaluate articular cartilage lesions observed at arthroscopy, recording the changes in a format that allows descriptive analysis. Obviously, numerous factors adversely affect the articular cartilage of human joints; investigations have shown the deleterious effects of immobilization, trauma, aging, hemarthrosis, total meniscectomy, ligamentous injuries, and corticosteroids, as well as many

involvement from surface to bone in either stage; rather, the distinction between the grades is based on the diameter of involvement. In the classification system of Bentley et al.,[1] there is no category reserved for lesions with an intact surface. Furthermore, Grades I, II, and III are all described as fibrillation or fissuring and the distinction between grades is based on the area of damage. Ficat and Hungerford[5,6]

		c. posterior ⅓
3. Bone exposed	A. Bone surface intact	Lateral femoral condyle
	B. Bone surface cavitation	a. anterior ⅓
		b. middle ⅓
		c. posterior ⅓
		Medial tibial condyle
		a. anterior ⅓
		b. middle ⅓
		c. posterior ⅓
		Lateral tibial condyle
		a. anterior ⅓
		b. middle ⅓
		c. posterior ⅓

system makes no allowance for a lesion without surface changes. Insall's system is problematic because the specifications for Grade II (fissuring) and Grade III (fibrillation) are somewhat qualitative and may or may not be applied similarly by observers. Although Goodfellow et al.[7] differentiates between surface degeneration and basilar degeneration, the terms fasciculation I, blister, and fasciculation II, under the general category of basilar degeneration, can cause some confusion. Most other authors seem to use the term fasciculation when referring to disruption of an intact surface.

a specific size range (diameter) in centimeters to a particular grade lesion.

Anatomical location of the lesion

Classification systems of articular cartilage damage have dealt primarily with lesions of the patella. However, there is a wide difference of opinion concerning the most common location (Table 1). Outerbridge[11] observed that degeneration

¿QUÉ DICE LA BIBLIOGRAFIA?

Tras la obtención y el tratamiento antibiótico (24 h) los injertos se almacenan en solución Ringer lactato o en medio de cultivo, a 4°C.

Se ha descrito una importante caída en la viabilidad de los condrocitos tras 28 días de almacenamiento.

A los 14 días, el medio de cultivo muestra mejor viabilidad que Ringer-lactato (91% vs. 81%) que se acentúa a los 28 días (83% vs. 29%).

Algunos estudios recientes muestran que los injertos conservados a 37°C muestran una mejor viabilidad de los condrocitos y una menos viabilidad ósea, que puede disminuir la inmunogenicidad.

CONCLUSIONES

Edad	<45 años
Tiempo transporte	1-4 horas
Tiempo procesamiento	12-24 horas
Contenedor	Bote
Liquido conservación	Medio cultivo/Ringer L.
Suplemento con suero	No
Temperatura	4ºC
Recambio de medio	Variable

Antibióticos	Si
Control microbiológico	
Hisopo	Si
Liquido transporte	Si
Medio tras recambio	Si
Medio pre-distribución	Si
Control microbiológico	
Tras obtención	Procesar
Tras procesamiento	Descartar

CONCLUSIONES

Edad	<45 años
Tiempo transporte	1-4 horas
Tiempo procesamiento	12-24 horas
Contenedor	Bote
Liquido conservación	Medio cultivo/Ringer L.
Suplemento con suero	No
Temperatura	4°C
Recambio de medio	Variable

Antibióticos	Si
Control microbiológico	
Hisopo	Si
Liquido transporte	Si
Medio tras recambio	Si
Medio pre-distribución	Si
Control microbiológico	
Tras obtención	Procesar
Tras procesamiento	Descartar