

Vascular Injury of Immature Epiphyses Impair Stem Cell Engraftment in Cartilage Defects: Investigations in a Large Animal Model

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SUPPLEMENTARY TABLES

Supplementary Table S1. MOCART 2.0 Knee Score: Cartilage Repair Tissue Assessment: Grading and Point Scale¹

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

MOCART: Magnetic Resonance Observation of Cartilage Repair Tissue

Supplementary Table S2. ICRS macroscopic evaluation of cartilage repair²

	Points
1 Degree of defect repair	
1 In level with surrounding cartilage	4
2 75% repair of defect depth	3
3 50% repair of defect depth	2
4 25% repair of defect depth	1
5 0% repair of defect depth	0
2 Integration to border zone	
1 Complete integration with surrounding cartilage	4
2 Demarcating border < 1 mm	3
3 3/4th of graft integrated, 1/4th with a notable border > 1 mm width	2
4 1/2 of graft integrated with surrounding cartilage, 1/2 with a notable border > 1 mm	1
5 From no contact to 1/4th of graft integrated with surrounding cartilage	0
3 Macroscopic appearance	
1 Intact smooth surface	4
2 Fibrillated surface	3
3 Small, scattered fissures or cracs	2
4 Several, small or few but large fissures	1
5 Total degeneration of the grafted area	0
4 Overall repair assessment	
1 Grade I: normal	12
2 Grade II: nearly normal	11-8
3 Grade III: abnormal	7-4
4 Grade IV: severely abnormal	3-1

ICRS: International Cartilage Repair Society

Supplementary Table S3. Pineda score³

		Points
1	Filling of defect	
1	125%	1
2	100%	0
3	75%	1
4	50%	2
5	25%	3
6	0%	4
2	Reconstitution of osteochondral junction	
1	Yes	0
2	Almost	1
3	Not close	2
3	Matrix staining	
1	Intact smooth surface	0
2	Reduced staining	1
3	Significantly reduced staining	2
4	Faint staining	3
5	No stain	4
4	Cell morphology	
1	Normal	0
2	Mostly hyaline and fibrocartilage	1
3	Mostly fibrocartilage	2
4	Some fibrocartilage but mostly nonchondrocytic cells	3
5	Nonchondrocytic cells only	4

Supplementary Table S4. Wakitani score⁴

		Points
1	Cell morphology	
1	Hyaline cartilage	0
2	Mostly hyaline cartilage	1
3	Mostly fibrocartilage	2
4	Mostly noncartilage	3
5	Noncartilage only	4
2	Matrix staining (metachromasia)	
1	Normal (compared to host)	0
2	Slightly reduced	1
3	Significantly reduced	2
4	No metachromatic stain	3
3	Surface regularity	
1	Smooth (>3/4*)	0
2	Moderate (1/2 < < 3/4*)	1
3	Irregular (1/4 < < 1/2*)	2
4	Severely irregular (1/4 <*)	3
4	Thickness of cartilage	
1	> 2/3**	0
2	1/3 < < 2/3**	1
3	<1/3**	2
5	Integration of donor to host adjacent cartilage	
1	Both edges integrated	0
2	One edge integrated	1
3	Both edges not integrated	2

*Total smooth area of reparative cartilage compared to the whole area of the cartilage defect.

**Average thickness of reparative cartilage compared with that of the surrounding cartilage.

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