

Longitudinal *in vivo* micro-CT-based approach allows spatio-temporal characterization of fracture healing patterns and assessment of biomaterials in mouse femur defect models

Esther Wehrle¹, Duncan C Tourolle né Betts¹, Gisela A Kuhn¹, Erica Floreani¹, Malavika H Nambiar¹, Bryant J Schroeder¹, Sandra Hofmann^{1,2}, Ralph Müller¹

¹ Institute for Biomechanics, ETH Zurich, Zurich, Switzerland, ² Department of Biomedical Engineering and Institute for Complex Molecular Systems, Eindhoven University of Technology, The Netherlands.

Corresponding author:

Ralph Müller, PhD

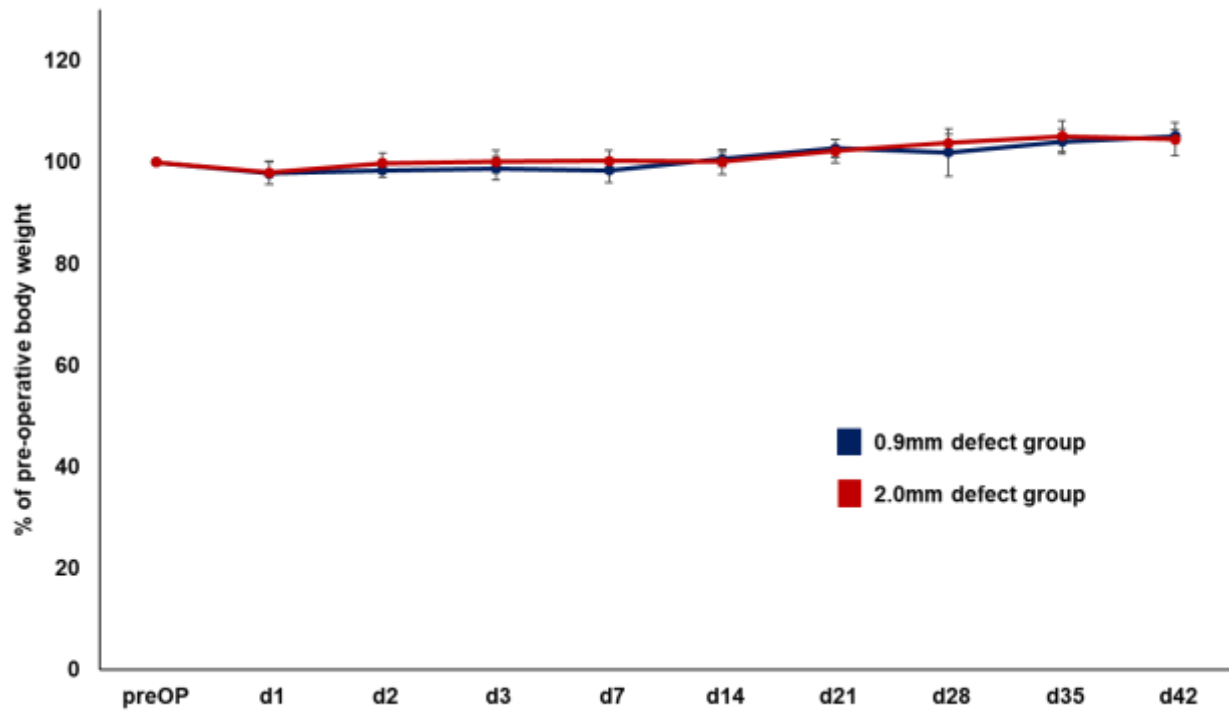
Institute for Biomechanics

ETH Zurich

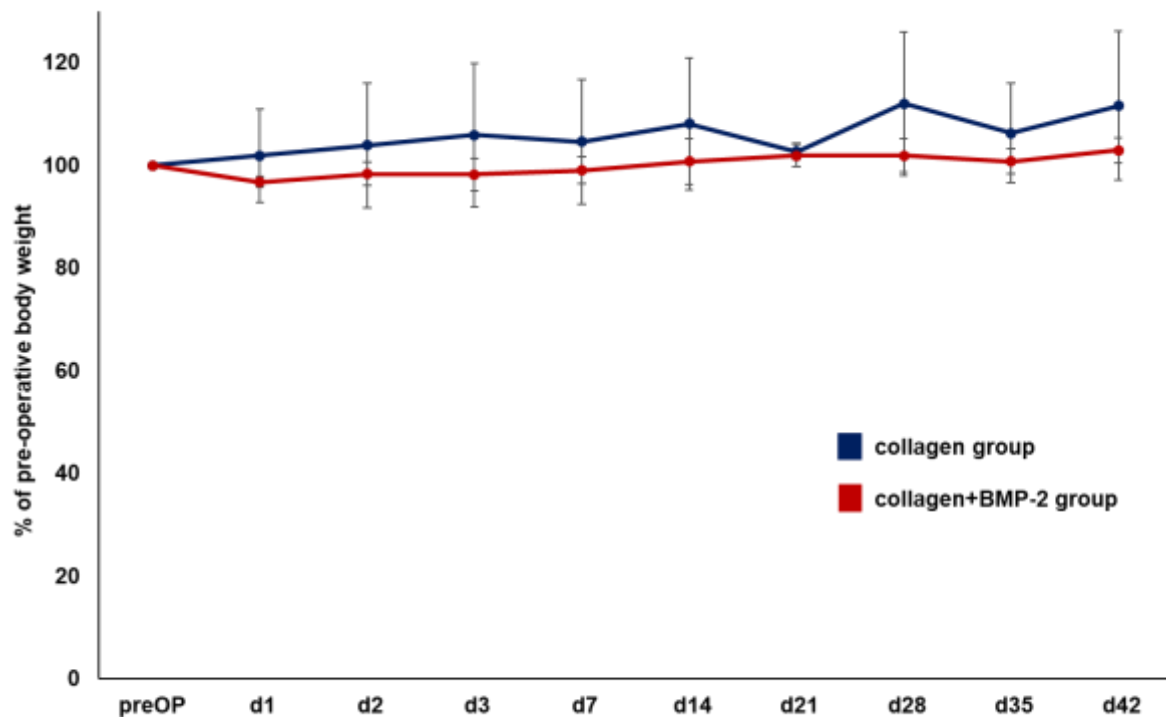
Leopold-Ruzicka-Weg 4

8093 Zurich, Switzerland

Email: ram@ethz.ch



Supplementary Fig. S1. *In vivo* monitoring of body weight of the mice from the 0.9mm defect group (n=8) and the 2.0mm defect group (n=10) measured pre-operatively (preOP), on postoperative days 1-3 and weekly from day 7 to day 42. The postoperative values were related to the preoperative data.



Supplementary Fig. S2. *In vivo* monitoring of body weight of the mice from the collagen group (n=8) and the collagen+BMP-2 group (n=8) measured pre-operatively (preOP), on postoperative days 1-3 and weekly from day 7 to day 42. The postoperative values were related to the preoperative data.

Supplementary Table S1. Study design (female 20 week-old C57BL/6J mice)

Experiment	Group	Group size	Size of femur defect	Biomaterial application	<i>In vivo</i> micro-CT measurements	Registration of micro-CT scans #	Histology
1	0.9mm	n=11	0.9mm (n=10)	-	d0, week 1-6 (n=10)	week 1-6 to week 0-5 (n=10)	week 6 (n=2)
	2.0mm	n=8	2.0mm (n=8)	-	d0, week 1-6 (n=8)	week 1-6 to week 0-5 (n=7)	week 6 (n=2)
2	collagen	n=8	2mm (n=8)	collagen	d0, week 5+6 (n=8)	week 1-6 to week 0-5 (n=8)	week 6 (n=1)
	collagen +BMP-2	n=8	2mm (n=8)	collagen +BMP-2	d0, week 5+6 (n=8)	week 1-6 to week 0-5 (n=8)	week 6 (n=1)

micro-CT scan taken at timepoint x registered to micro-CT scan taken at timepoint x-1

Supplementary Video 1. Visualisation of the defect healing process and the VOIs involved for a representative animal from the 0.9mm defect group and the 2.0mm defect group.

Supplementary Video 2. Visualisation of the defect healing process and the VOIs involved for a representative animal from the collagen group and the collagen+BMP-2 group).