DIU « Infection ostéoarticulaire » - Séminaire de Lyon du mardi 6 et mercredi 7 décembre 2022

Innovation dans l'antibiothérapie locale

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Président du Comité Scientifique des CRIOAc 2017-2022











Antibiotiques locaux

Quand le chirurgien orthopédiste « joue » à l'infectiologue



Antibiotiques locaux

IOA = infection locale

Légitime de vouloir agir localement



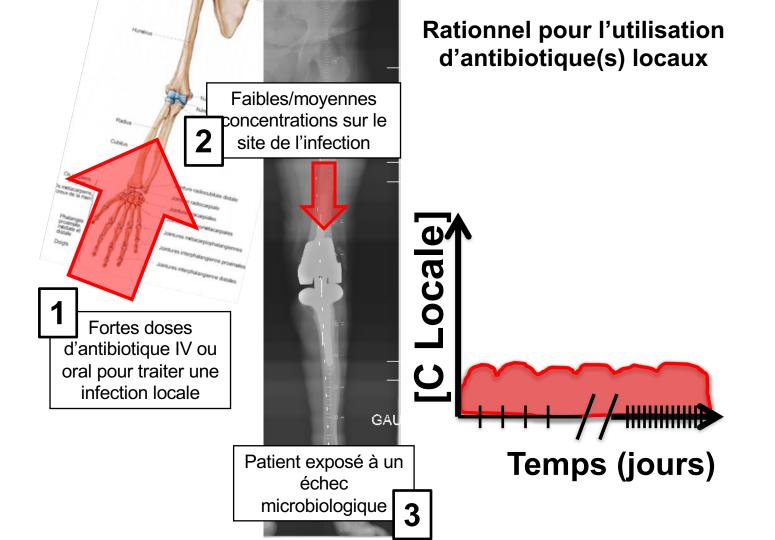
- Billes de gentamicine
- Chirurgie non optimal
- Faible relargage local
- Sans antibiothérapie systémique

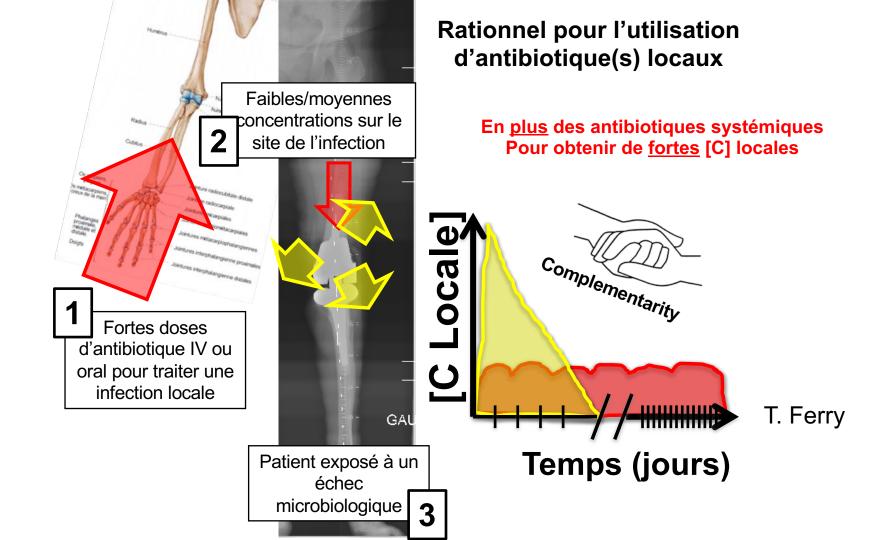




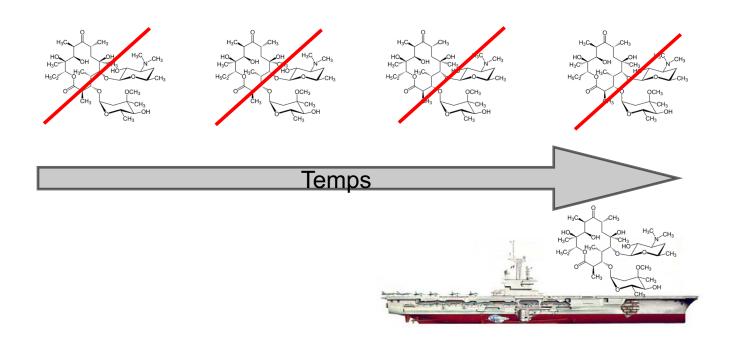


Acquisition de résistance





Durée de vie des antibiotiques







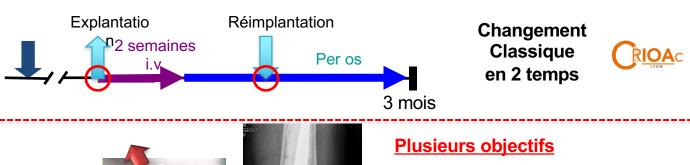




Ciment PMMA

PMMA: polyméthyl mthacrylate

Stratégie médico-chirurgicale au cours des infections de PTG



Ciments aux antibiotiques



Spacer articulé

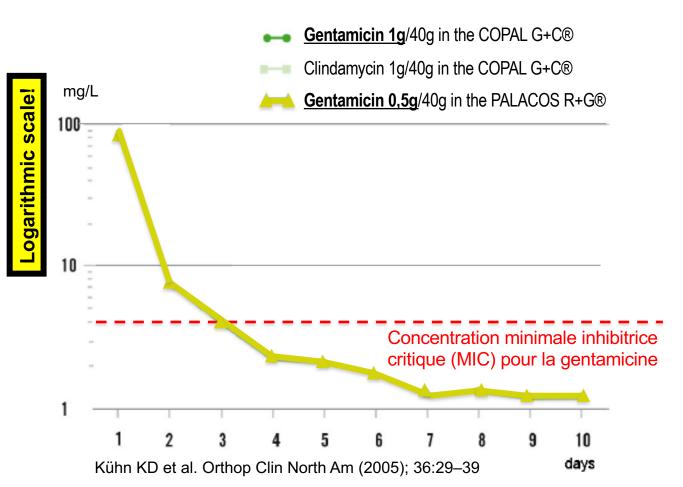
Pour traiter l'infection

Pour prévenir la surinfection

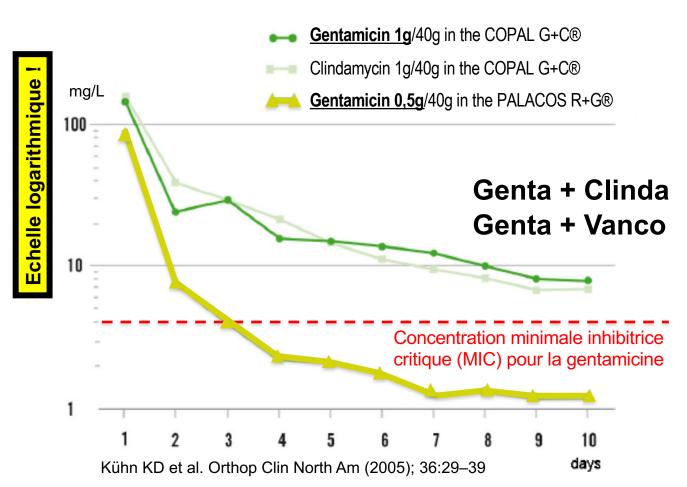
Pour faciliter la rééducation

Ciment utilisé pour la réimplantation Pour traiter l'infection Pour prévenir la surinfection Pour fixer la prothèse

Concentrations locales



Concentrations locales







Antibiotics in Bone Cements Used for Prosthesis Fixation: An Efficient Way to Prevent Staphylococcus aureus and Staphylococcus epidermidis Prosthetic Joint Infection

OPEN ACCESS

Edited by:

Marco Cassone, University of Michigan, United States

Reviewed by:

Diling Chen, Guangdong Academy of Science, China Andréa Cara¹, Mathilde Ballet^{1,2}, Claire Hemery¹, Tristan Ferry^{1,3,4,5}, Frédéric Laurent^{1,2,3,5} and Jérôme Josse^{1,3,5*}

¹ Centre International de Recherche en Infectiologie, CIRI, Inserm U1111, CNRS UMR5308, ENS de Lyon, UCBL1, Lyon, France, ² Laboratoire de Bactériologie, Institut des Agents Infectieux, Hôpital de la Croix-Rousse, Hospices Civils de Lyon, Lyon, France, ³ Université Claude Bernard Lyon 1, Lyon, France, ⁴ Service de Maladies Infectieuses, Hôpital de la Croix-Rousse, Hospices Civils de Lyon, Lyon, France, ⁵ Centre Interrégional de Référence des Infections Ostéo-Articulaires complexes (CRIOAc Lyon), Hospices Civils de Lyon, Lyon, France





Economic Study of 2-Stage Exchange in Patients With Knee or Hip Prosthetic Joint Infection Managed in a Referral Center in France: Time to Use Innovative(s) Intervention(s) at the Time of Reimplantation to Reduce the Risk of Superinfection

OPEN ACCESS

Edited by:

Monica Catarina Botelho. Instituto Nacional de Saúde Doutor Ricardo Jorge (INSA), Portugal

Reviewed by:

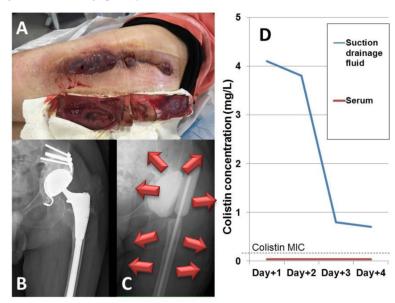
Carlo Luca Romano'.

Hassan Serrier 1*, Christell Julien 2, Cécile Batailler 3,4,5, Eugénie Mabrut 3, Corinne Brochier⁶, Sylvie Thevenon⁶, Marianne Maynard-Muet⁶, Agnes Henry⁷, Sébastien Lustig^{3,4,5}, Laure Huot¹, Tristan Ferry^{3,5,8,9} and the Lyon BJI Study group

Images in...

Gentamicin—vancomycin—colistin local antibiotherapy in a cement spacer in a 54-year-old haemophilic patient with relapsing plurimicrobial severe prosthetic joint infection

Tristan Ferry, ^{1,2,3,4} Romain Desmarchelier, ⁵ Sophie Magréault, ^{6,7} Florent Valour, ^{1,2,3,4} on behalf of the Lyon BJI Study group

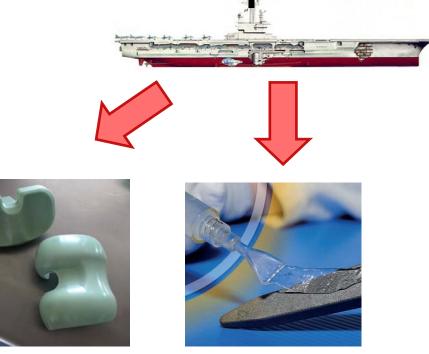








Ciment PMMA

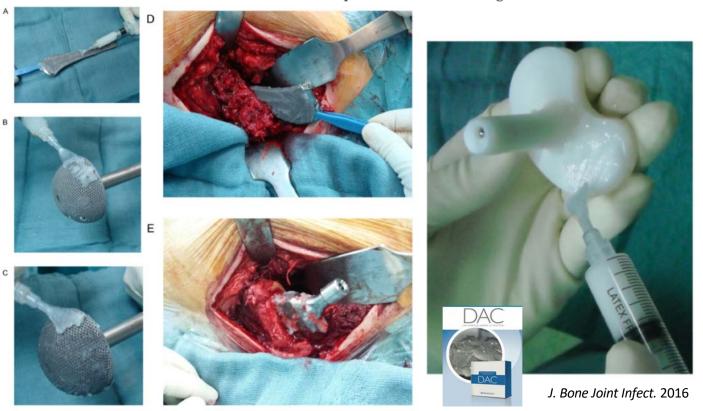


Ciment PMMA

Hydrogel

Does an Antibiotic-Loaded Hydrogel Coating Reduce Early Post-Surgical Infection After Joint Arthroplasty?

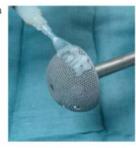
Carlo Luca Romanò^{1⊠}, Kostantinos Malizos², Nicola Capuano³, Riccardo Mezzoprete⁴, Michele D'Arienzo⁵, Catherine Van Der Straeten^{6,7}, Sara Scarponi¹ and Lorenzo Drago^{8,9}



Early Post-Sur

Carlo Luca Romanò^{1⊠}, Ko D'Arienzo⁵, Catherine Van







Does an Antibiotic-Loaded Hydrogel Coating Reduce Treated % throplasty?

Joint	Hip	153	80.9
	Knee	36	19.0
Type of surgery	Primary	135	71.8

C		Knee	36	19.0
1	Type of surgery	Primary	135	71.8
	\$6.0590 08	Revision	54	28.2
	Systemic prophylaxis	Cefazolin	69	48.2
	400	Cefazolin +	29	20.3
		Glycopeptides		
		Cefazolin +	46	38.3
ALC: U		Vancomicin		
Contract v		Vancomycin +	45	31.5
NAME OF TAXABLE PARTY.		Meropenem		
	DAC volume (mL)	Mean ± SD	8.3 ± 2.7	
	5.0	Min - Max	5 - 10	
	DAC + vancomycin		100	52.9
	5%			
	DAC + gentamicin		70	37.0
	3.2%			
2000	DAC + vancomycin		15	7.9
Annual Property	2% + meropenem 2%			
	Other associations		4	2.1

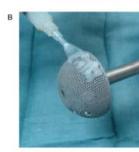


ete⁴, Michele

Does an Antibiotic-Loaded Hydrogel Coating Reduce Early Post-Sul Joint Hip 153 80.9 hroplasty?

Carlo Luca Romanò^{1⊠}, Ko D'Arienzo⁵, Catherine Vai







joint	TIIP	100	00.7
	Knee	36	19.0
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Glycopeptides

	Cefazolin +	46	38.3
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DAC volume (mL)	Mean ± SD	8.3 ± 2.7	
	Min - Max	5 - 10	
DAC + vancomycin		100	52.9
5%	1		
DAC + gentamicin	1	70	37.0
3.2%			
DAC + vancomycin	J	15	7.9
2% + meropenem 2%	/		

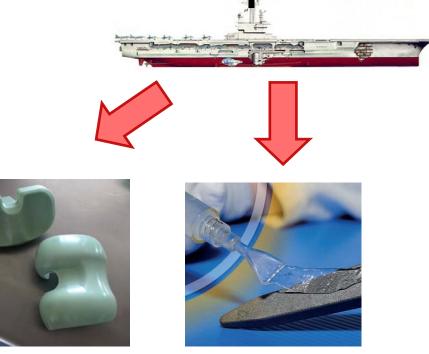
Other associations

throplasty?



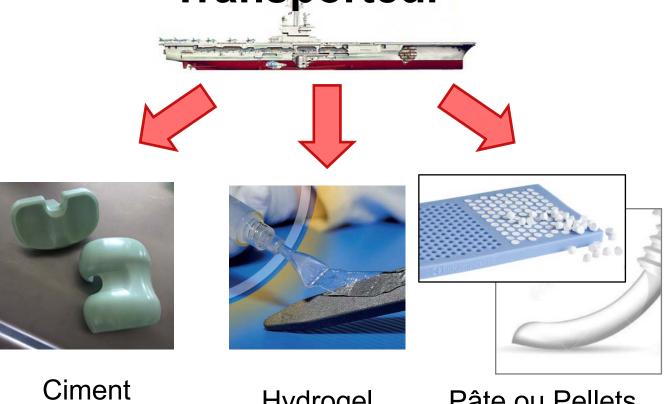
J. Bone Joint Infect. 2016

2.1



Ciment PMMA

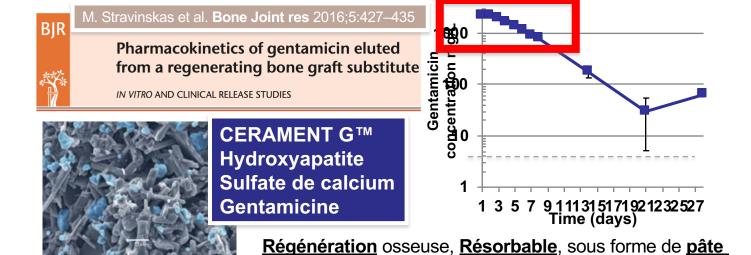
Hydrogel



PMMA

Hydrogel

Pâte ou Pellets



■ GENERAL ORTHOPAEDICS

Single-stage treatment of chronic osteomyelitis with a new absorbable, gentamicin-loaded, calcium sulphate/hydroxyapatite biocomposite

A PROSPECTIVE SERIES OF 100 CASES

Mac Nally M. et al.

Oxford Bone infection unit



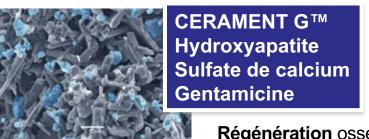


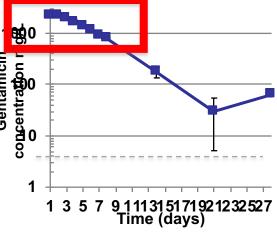
Bone Joint J 2016;98-B:1289-96.

M. Stravinskas et al. Bone Joint res 2016;5:427–435

Pharmacokinetics of gentamicin eluted from a regenerating bone graft substitute

IN VITRO AND CLINICAL RELEASE STUDIES





Régénération osseuse, Résorbable, sous forme de pâte

■ GENERAL ORTHOPAEDICS

Single-stage treatment of chronic osteomyelitis with a new absorbable, gentamicin-loaded, calcium sulphate/hydroxyapatite biocomposite

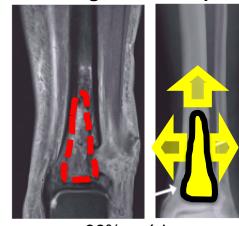
A PROSPECTIVE SERIES OF 100 CASES

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Oxford Bone infection unit

Bone Joint J 2016;98-B:1289-96.

Chirurgie en 1 temps

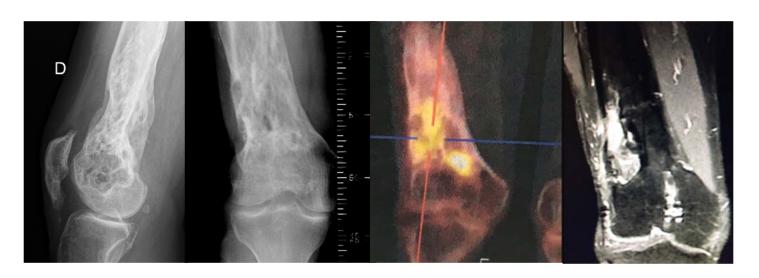


96% guérison

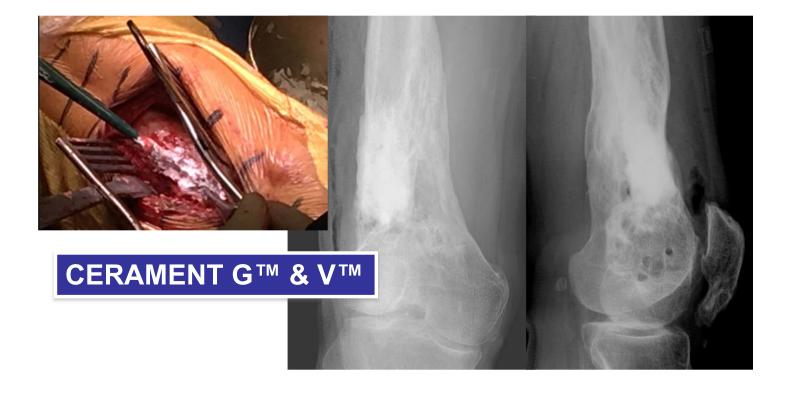
Homme de 62 ans. Fracture ouverte fémur distal il y a 20 ans, infection à *Pseudomonas*. Douleurs chroniques **mécaniques** sur arthrose handicapante. **CRP négative**, scintigraphie positive.

Indication de PTG

Séquelles d'ostéomyélite ? Ostéomyélite chronique ?



PTG de 1^{ère} intention? PTG de résection?



P. aeruginosa en culture!3 mois d'antibiotiques systémiques



Plus aucune douleur à 6 mois



Fletcher et al., Journal of Medical Microbiology 2022;71:001517 DOI 10.1099/jmm.0.001517



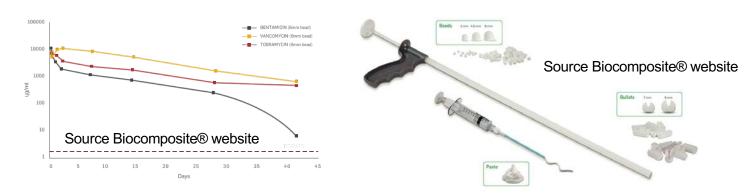
3 ACCESS

In vitro efficacy of antibiotic loaded calcium sulfate beads (Stimulan Rapid Cure) against polymicrobial communities and individual bacterial strains derived from diabetic foot infections

Julie Fletcher^{1,*}, Rob Porter², Zoe Boulton³, Laura Brown³, Bridget Knight⁴, Lidia Romanczuk⁴, Sean Aiken⁵, Craig Delury⁵ and Stephen Michell^{1,*}

gentamicin liquid (6ml)





Vancomycin (powder) 1000mg and gentamicin (liquid) 240mg DO NOT USE MIXING SOLUTION



liquid to syringe

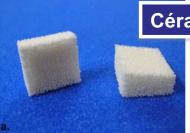
Porous Alumina Ceramic as a vector for local antibiotic delivery



Eric DENES¹, François BERTIN², Guislaine BARRIERE¹, Evelyne POLI¹, Guillaume LEVEQUE¹, Christian WOLOCH³

1 I.Ceram, Limoges, France 2 Thoracic Surgery, Dupuytren Teaching Hospital, Limoges, France 3 Pharmacology laboratory, Dupuytren Teaching Hospital, Limoges, France





Céramique d'alumine poreuse

Ostéomyélite chronique

Large utilisation dans les situations non septiques

Colonisation par les ostéoblastes

Excellentes propriétés mécaniques

Non résorbable, prévoir la fabrication en amont, délai

Sternum

Céramique d'alumine poreuse
+ Gentamicine





Congrès des CRIOAc 2017, Tours



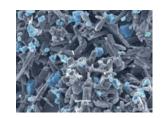
Antibiothérapie locale





- Nombreux <u>« transporteurs »</u>
- Combinaisons d'antibiotiques (souvent G+V)
- Fortes doses, exposition prolongée
- Importance des <u>RCP CRIOAc</u> pour déterminer la meilleurs stratégie médico-chirurgicale
- Et choisir <u>ensemble</u> <u>& @ & l'antibiothérapie locale!</u>
- Nécessité d'une <u>évaluation clinique</u> pour prouver la valeur ajoutée, et pouvoir revendiquer un remboursement











Lyon BJI Study group



Coordinator: Tristan Ferry

Infectious Diseases Specialists – Tristan Ferry, Florent Valour, Thomas Perpoint, Florence Ader, Sandrine Roux, Agathe Becker, Claire Triffault-Fillit, Anne Conrad, Cécile Pouderoux, Pierre Chauvelot, Paul Chabert, Johanna Lippman, Evelyne Braun

Surgeons – Sébastien Lustig, Elvire Servien, Cécile Batailler, Stanislas Gunst, Axel Schmidt, Elliot Sappey-Marinier, Quentin Ode, Michel-Henry Fessy, Anthony Viste, Jean-Luc Besse, Philippe Chaudier, Lucie Louboutin, Adrien Van Haecke, Marcelle Mercier, Vincent Belgaid, Aram Gazarian, Arnaud Walch, Antoine Bertani, Frédéric Rongieras, Sébastien Martres, Franck Trouillet, Cédric Barrey, Ali Mojallal, Sophie Brosset, Camille Hanriat, Hélène Person, Samuel Prive, Philippe Céruse, Carine Fuchsmann, Arnaud Gleizal;

Anesthesiologists – Frédéric Aubrun, Mikhail Dziadzko, Caroline Macabéo, Dana Patrascu;

Microbiologists – Frederic Laurent, Laetitia Beraud, Tiphaine Roussel-Gaillard, Céline Dupieux, Camille Kolenda, Jérôme Josse;

Imaging – Fabien Craighero, Loic Boussel, Jean-Baptiste Pialat, Isabelle Morelec;

PK/PD specialists – Michel Tod, Marie-Claude Gagnieu, Sylvain Goutelle;

Clinical research assistant and database manager – Eugénie Mabrut









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