

Supplementary Materials

Performance Assessment of Acrylate Metal Complex (AMC) and Conventional Consolidants for Fragile Bone Artefacts

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Table S1. Color difference test results.

Test group	ΔL	Δa	Δb	ΔE	Mean ΔE value
AMC	0.198	0.326	0.974	1.046	1.25
	1.212	0.128	0.386	1.28	
	0.404	0.316	1.252	1.353	
	0.722	0.312	1.062	1.322	
	0.216	0.458	1.13	1.238	
	1.384	0.24	0.45	1.47	
Remmers 300	1.032	0.666	0.696	1.412	0.95
	0.602	0.242	0.092	0.655	
	0.598	0.14	0.016	0.614	
	0.564	0.162	0.092	0.594	
	0.964	0.368	0.546	1.167	
	0.864	0.31	0.686	1.146	
B72	0.934	0.182	1.034	1.405	1.05
	0.402	0.258	0.782	0.916	
	0.222	0.224	0.53	0.617	

Table S2. Color difference test results.

Test group	Mass before reinforcement(g)	Mass after reinforcement (g)	Volume of applied reinforcing agent(ml)	Penetrated amount of reinforcing agent (g)	Penetration rate(%)	Average penetration rate(%)
AMC	10.042	10.358	2.5	0.316	3.1%	3%
	10.57	10.908	2.5	0.338	3.2%	
	10.99	11.343	2.5	0.353	3.2%	
Remmers 300	10.349	10.514	2.5	0.165	1.6%	1.59%
	10.587	10.763	2.5	0.176	1.7%	
	10.401	10.559	2.5	0.158	1.5%	
	10.306	10.43	2.5	0.124	1.2%	
B72	10.768	10.918	2.5	0.15	1.4%	1%
	10.933	11.097	2.5	0.164	1.5%	

Table S3. Compactness test results.

Test group	Unreinforced(Km/s)	Mean(Km/s)	Reinforced(Km/s)	Mean(Km/s)
AMC	0.65	0.506	1.04	0.91
	0.52		1.01	
	0.42		0.99	
	0.42		0.8	
	0.42		0.71	
Remmers 300	0.31	0.342	0.34	0.408
	0.4		0.62	
	0.29		0.31	
	0.36		0.39	
	0.35		0.38	
B72	0.37	0.36	0.34	0.426
	0.4		0.4	
	0.28		0.45	
	0.32		0.37	
	0.43		0.57	

Table S4. Flexural strength test results.

Test group	Item	1	2	3	4	5	Mean(MPa)
AMC	Maximum load(N)	155	164	163	143	158	1.924
	Thickness(mm)	5.59	5.44	5.56	5.54	5.5	
	Flexural strength(MPa)	1.86	2.07	1.98	1.75	1.96	
Remmers 300	Maximum load(N)	104	104	98	124	126	1.37
	Thickness(mm)	5.41	5.45	5.54	5.74	5.42	
	Flexural strength(MPa)	1.33	1.31	1.2	1.41	1.6	
B72	Maximum load(N)	108	84	118	110	80	1.274
	Thickness(mm)	5.4	5.17	5.42	5.57	5.6	
	Flexural strength(MPa)	1.39	1.18	1.51	1.33	0.96	
Unreinforced	Maximum load(N)	75	72	76	81	73	0.986
	Thickness(mm)	5.37	5.43	5.54	5.21	5.34	
	Flexural strength(MPa)	0.98	0.92	0.93	1.12	0.95	

Table S5. Surface hardness test results.

Test group	Hardness before reinforced (HL)	Mean (HL)	Hardness after reinforced (HL)	Mean (HL)	Hardness improvement rate(%)
AMC	588	590.4	619	635.8	7.70
	585		697		
	602		624		
	584		610		
	593		629		
	560		571		
Remmers 300	576	569.4	580	576	1.12
	557		562		
	581		587		
	573		580		
	578		599		
	592		605		
B72	564	575.6	570	589.4	2.40
	558		573		
	586		600		

Table S6. Mass loss rate test results.

Test group	Dry-wet cycling		Mass loss rate (%)	Ultraviolet aging		Mass loss rate (%)
	Quality before aging (g)	Quality after aging (g)		Quality before aging (g)	Quality after aging (g)	
AMC	10.2	9.9	1.96%	10.2	10.1	0.40
	9.9	9.8		10	10	
	10	9.8		10.2	10.2	
	10.4	10		9.9	9.9	
	10	10		10.4	10.3	
Remmers 300	10.3	10.3	1.18%	10.2	10.1	0.40
	10.5	10.2		10.6	10.6	
	10.3	10.3		10.5	10.4	
	10.1	9.9		10.4	10.4	
	10.3	10.2		10.1	10.1	
B72	10.1	9.8	1.58%	10.2	10.1	0.60
	10.6	10.4		10.1	10.1	
	10.1	9.9		10.1	10.1	
	9.2	9.2		10.5	10.4	
	10.2	10.1		10.2	10.1	

Table S7. Flexural strength test results after Dry–wet cycling.

Test group	Item	1	2	3	4	5	Mean(MPa)
AMC	Maximum load(N)	136	134	124	136	120	1.65
	Thickness(mm)	5.49	5.66	5.32	5.35	5.37	
	Flexural strength(MPa)	1.69	1.57	1.64	1.78	1.56	
Remmers 300	Maximum load(N)	94	122	86	112	109	1.31
	Thickness(mm)	5.46	5.44	5.33	5.67	5.49	
	Flexural strength(MPa)	1.18	1.55	1.14	1.31	1.36	
B72	Maximum load(N)	98	72	74	94	94	1.11
	Thickness(mm)	5.68	5.55	5.42	5.08	5.42	
	Flexural strength(MPa)	1.14	0.88	0.94	1.37	1.2	

Table S8. Flexural strength test results after Ultraviolet aging.

Test group	Item	1	2	3	4	5	Mean(MPa)
AMC	Maximum load(N)	122	126	138	116	128	1.54
	Thickness(mm)	5.47	5.54	5.83	5.32	5.55	
	Flexural strength(MPa)	1.52	1.54	1.52	1.54	1.56	
Remmers 300	Maximum load(N)	122	92	100	98	66	1.21
	Thickness(mm)	5.35	5.44	5.49	5.48	5.55	
	Flexural strength(MPa)	1.6	1.17	1.24	1.22	0.8	
B72	Maximum load(N)	112	84	86	138	78	1.21
	Thickness(mm)	5.51	5.75	5.66	5.42	5.53	
	Flexural strength(MPa)	1.38	0.95	1	1.76	0.96	

Table S9. Color difference test results after Dry-wet cycling.

Test group	Before aging			After aging			ΔE
	L	a	b	L	a	b	
AMC	92.32	0.79	7.26	86.49	0.61	5.82	5.93
	92.32	0.78	7.25	86.5	0.56	6.28	
	92.32	0.79	7.25	86.5	0.58	6.28	
	92.32	0.78	7.25	86.49	0.59	6.27	
	92.32	0.8	7.24	86.49	0.58	6.28	
Remmers 300	90.55	0.2	9.36	86.45	0.73	4.69	6.11
	90.56	0.21	9.35	86.48	0.72	4.69	
	90.55	0.22	9.35	86.46	0.73	4.69	
	90.58	0.21	9.33	86.44	0.72	4.68	
	90.57	0.18	9.34	86.48	0.71	4.69	
B72	92.55	0.04	7.7	86.58	0.62	6.29	6.18
	92.55	0.04	7.69	86.56	0.61	6.29	
	92.55	0.04	7.69	86.58	0.59	6.31	
	92.55	0.03	7.7	86.57	0.58	6.3	
	92.54	0.04	9.69	86.57	0.59	6.3	