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In vitro assessment of isopropanol leakage from antiseptic barrier caps into commonly used needleless connectors

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Supplementary data

Table S1. Overall difference test (ANOVA) for isopropanol leakage after 24h or 7 days of experiment.

ANOVA summary	Day 1	Day 7
F	12,12	36,16
P value	<0,0001	<0,0001
P value summary	****	****
Significant diff. among means (P < 0.05)?	Yes	Yes
R square	0,8483	0,9435

Table S2. Test of differences (ANOVA) with Tukey's multiple comparison test performed after 24h of experiment

Tukey's multiple comparisons test	Mean Diff,	95,00% CI of diff,	Significant?	Summary	Adjusted P Value
MaxPlus vs. NanoClave	2,206	-0,7996 to 5,211	No	ns	0,3229
MaxPlus vs. MicroClave	1,548	-1,457 to 4,553	No	ns	0,7962
MaxPlus vs. Didactic	-2,051	-5,056 to 0,9542	No	ns	0,4254
MaxPlus vs. CareSite	3,492	0,4865 to 6,497	Yes	*	0,0128
MaxPlus vs. Safeflow	2,650	-0,3556 to 5,655	No	ns	0,1236
MaxPlus vs. Q-Syte	-2,792	-5,797 to 0,2132	No	ns	0,0870
MaxPlus vs. BD Max 0	0,3070	-2,698 to 3,312	No	ns	>0,9999
MaxPlus vs. Smartsite	2,828	-0,1776 to 5,833	No	ns	0,0795
MaxPlus vs. Bionector	3,558	0,5526 to 6,563	Yes	*	0,0106
MaxPlus vs. Vadsite	2,994	-0,01127 to 5,999	No	ns	0,0515
MaxPlus vs. Autoflush	2,327	-0,6786 to 5,332	No	ns	0,2543
MaxPlus vs. Neutraclar	0,7810	-2,224 to 3,786	No	ns	0,9987
NanoClave vs. MicroClave	-0,6574	-3,663 to 2,348	No	ns	0,9998
NanoClave vs. Didactic	-4,257	-7,262 to -1,251	Yes	**	0,0013
NanoClave vs. CareSite	1,286	-1,719 to 4,291	No	ns	0,9283
NanoClave vs. Safeflow	0,4440	-2,561 to 3,449	No	ns	>0,9999
NanoClave vs. Q-Syte	-4,998	-8,003 to -1,992	Yes	***	0,0001
NanoClave vs. BD Max 0	-1,899	-4,904 to 1,107	No	ns	0,5384
NanoClave vs. Smartsite	0,6220	-2,383 to 3,627	No	ns	0,9999
NanoClave vs. Bionector	1,352	-1,653 to 4,357	No	ns	0,9023
NanoClave vs. Vadsite	0,7883	-2,217 to 3,794	No	ns	0,9986
NanoClave vs. Autoflush	0,1210	-2,884 to 3,126	No	ns	>0,9999
NanoClave vs. Neutraclar	-1,425	-4,430 to 1,581	No	ns	0,8680
MicroClave vs. Didactic	-3,599	-6,605 to -0,5940	Yes	**	0,0094
MicroClave vs. CareSite	1,944	-1,062 to 4,949	No	ns	0,5043
MicroClave vs. Safeflow	1,101	-1,904 to 4,107	No	ns	0,9756
MicroClave vs. Q-Syte	-4,340	-7,346 to -1,335	Yes	**	0,0010
MicroClave vs. BD Max 0	-1,241	-4,247 to 1,764	No	ns	0,9431
MicroClave vs. Smartsite	1,279	-1,726 to 4,285	No	ns	0,9307
MicroClave vs. Bionector	2,010	-0,9956 to 5,015	No	ns	0,4552
MicroClave vs. Vadsite	1,446	-1,560 to 4,451	No	ns	0,8569
MicroClave vs. Autoflush	0,7784	-2,227 to 3,784	No	ns	0,9987
MicroClave vs. Neutraclar	-0,7673	-3,773 to 2,238	No	ns	0,9989
Didactic vs. CareSite	5,543	2,538 to 8,548	Yes	****	<0,0001
Didactic vs. Safeflow	4,701	1,695 to 7,706	Yes	***	0,0003
Didactic vs. Q-Syte	-0,7410	-3,746 to 2,264	No	ns	0,9992
Didactic vs. BD Max 0	2,358	-0,6472 to 5,363	No	ns	0,2383
Didactic vs. Smartsite	4,879	1,873 to 7,884	Yes	***	0,0002
Didactic vs. Bionector	5,609	2,604 to 8,614	Yes	****	<0,0001
Didactic vs. Vadsite	5,045	2,040 to 8,050	Yes	***	0,0001
Didactic vs. Autoflush	4,378	1,372 to 7,383	Yes	***	0,0009
Didactic vs. Neutraclar	2,832	-0,1732 to 5,837	No	ns	0,0786
CareSite vs. Safeflow	-0,8421	-3,847 to 2,163	No	ns	0,9974
CareSite vs. Q-Syte	-6,284	-9,289 to -3,279	Yes	****	<0,0001
CareSite vs. BD Max 0	-3,185	-6,190 to -0,1796	Yes	*	0,0307
CareSite vs. Smartsite	-0,6641	-3,669 to 2,341	No	ns	0,9997
CareSite vs. Bionector	0,06607	-2,939 to 3,071	No	ns	>0,9999
CareSite vs. Vadsite	-0,4978	-3,503 to 2,507	No	ns	>0,9999
CareSite vs. Autoflush	-1,165	-4,170 to 1,840	No	ns	0,9632

CareSite vs. Neutraclear	-2,711	-5,716 to 0,2944	No	ns	0,1065
Safeflow vs. Q-Syte	-5,442	-8,447 to -2,436	Yes	****	<0,0001
Safeflow vs. BD Max 0	-2,343	-5,348 to 0,6626	No	ns	0,2460
Safeflow vs. Smartsite	0,1780	-2,827 to 3,183	No	ns	>0,9999
Safeflow vs. Bionector	0,9082	-2,097 to 3,913	No	ns	0,9949
Safeflow vs. Vadsite	0,3443	-2,661 to 3,350	No	ns	>0,9999
Safeflow vs. Autoflush	-0,3230	-3,328 to 2,682	No	ns	>0,9999
Safeflow vs. Neutraclear	-1,869	-4,874 to 1,137	No	ns	0,5615
Q-Syte vs. BD Max 0	3,099	0,09376 to 6,104	Yes	*	0,0388
Q-Syte vs. Smartsite	5,620	2,614 to 8,625	Yes	****	<0,0001
Q-Syte vs. Bionector	6,350	3,345 to 9,355	Yes	****	<0,0001
Q-Syte vs. Vadsite	5,786	2,781 to 8,791	Yes	****	<0,0001
Q-Syte vs. Autoflush	5,119	2,113 to 8,124	Yes	****	<0,0001
Q-Syte vs. Neutraclear	3,573	0,5678 to 6,578	Yes	*	0,0101
BD Max 0 vs. Smartsite	2,521	-0,4846 to 5,526	No	ns	0,1671
BD Max 0 vs. Bionector	3,251	0,2456 to 6,256	Yes	*	0,0255
BD Max 0 vs. Vadsite	2,687	-0,3182 to 5,692	No	ns	0,1129
BD Max 0 vs. Autoflush	2,020	-0,9856 to 5,025	No	ns	0,4479
BD Max 0 vs. Neutraclear	0,4740	-2,531 to 3,479	No	ns	>0,9999
Smartsite vs. Bionector	0,7302	-2,275 to 3,735	No	ns	0,9993
Smartsite vs. Vadsite	0,1663	-2,839 to 3,172	No	ns	>0,9999
Smartsite vs. Autoflush	-0,5010	-3,506 to 2,504	No	ns	>0,9999
Smartsite vs. Neutraclear	-2,047	-5,052 to 0,9586	No	ns	0,4285
Bionector vs. Vadsite	-0,5639	-3,569 to 2,441	No	ns	>0,9999
Bionector vs. Autoflush	-1,231	-4,236 to 1,774	No	ns	0,9461
Bionector vs. Neutraclear	-2,777	-5,782 to 0,2284	No	ns	0,0904
Vadsite vs. Autoflush	-0,6673	-3,673 to 2,338	No	ns	0,9997
Vadsite vs. Neutraclear	-2,213	-5,218 to 0,7922	No	ns	0,3184
Autoflush vs. Neutraclear	-1,546	-4,551 to 1,460	No	ns	0,7978

Table S3. Test of differences (ANOVA) with Tukey's multiple comparison test performed after 7 day of experiment

Tukey's multiple comparisons test	Mean Diff,	95,00% CI of diff,	Significant?	Summary	Adjusted P Value
MaxPlus vs. NanoClave	0,7081	-5,299 to 6,715	No	ns	>0,9999
MaxPlus vs. MicroClave	0,8437	-5,163 to 6,850	No	ns	>0,9999
MaxPlus vs. Didactic	-7,695	-13,70 to -1,689	Yes	**	0,0045
MaxPlus vs. CareSite	7,069	1,062 to 13,08	Yes	*	0,0112
MaxPlus vs. Safeflow	1,048	-4,959 to 7,055	No	ns	>0,9999
MaxPlus vs. Q-Syte	-19,56	-25,57 to -13,56	Yes	****	<0,0001
MaxPlus vs. BD Max 0	-0,7843	-6,791 to 5,222	No	ns	>0,9999
MaxPlus vs. Smartsite	-1,491	-7,498 to 4,516	No	ns	0,9992
MaxPlus vs. Bionector	5,413	-0,5936 to 11,42	No	ns	0,1072
MaxPlus vs. Vadsite	1,910	-4,097 to 7,917	No	ns	0,9921
MaxPlus vs. Autoflush	5,516	-0,4903 to 11,52	No	ns	0,0943
MaxPlus vs. Neutraclar	-6,865	-12,87 to -0,8586	Yes	*	0,0151
NanoClave vs. MicroClave	0,1357	-5,871 to 6,142	No	ns	>0,9999
NanoClave vs. Didactic	-8,403	-14,41 to -2,397	Yes	**	0,0015
NanoClave vs. CareSite	6,361	0,3543 to 12,37	Yes	*	0,0309
NanoClave vs. Safeflow	0,3400	-5,667 to 6,347	No	ns	>0,9999
NanoClave vs. Q-Syte	-20,27	-26,28 to -14,27	Yes	****	<0,0001
NanoClave vs. BD Max 0	-1,492	-7,499 to 4,514	No	ns	0,9992
NanoClave vs. Smartsite	-2,199	-8,206 to 3,808	No	ns	0,9758
NanoClave vs. Bionector	4,705	-1,302 to 10,71	No	ns	0,2403
NanoClave vs. Vadsite	1,202	-4,805 to 7,209	No	ns	>0,9999
NanoClave vs. Autoflush	4,808	-1,198 to 10,82	No	ns	0,2154
NanoClave vs. Neutraclar	-7,573	-13,58 to -1,567	Yes	**	0,0053
MicroClave vs. Didactic	-8,539	-14,55 to -2,532	Yes	**	0,0012
MicroClave vs. CareSite	6,225	0,2186 to 12,23	Yes	*	0,0372
MicroClave vs. Safeflow	0,2043	-5,802 to 6,211	No	ns	>0,9999
MicroClave vs. Q-Syte	-20,41	-26,41 to -14,40	Yes	****	<0,0001
MicroClave vs. BD Max 0	-1,628	-7,635 to 4,379	No	ns	0,9981
MicroClave vs. Smartsite	-2,335	-8,341 to 3,672	No	ns	0,9625
MicroClave vs. Bionector	4,569	-1,437 to 10,58	No	ns	0,2761
MicroClave vs. Vadsite	1,066	-4,940 to 7,073	No	ns	>0,9999
MicroClave vs. Autoflush	4,673	-1,334 to 10,68	No	ns	0,2485
MicroClave vs. Neutraclar	-7,709	-13,72 to -1,702	Yes	**	0,0044
Didactic vs. CareSite	14,76	8,758 to 20,77	Yes	****	<0,0001
Didactic vs. Safeflow	8,743	2,737 to 14,75	Yes	***	0,0009
Didactic vs. Q-Syte	-11,87	-17,88 to -5,862	Yes	****	<0,0001
Didactic vs. BD Max 0	6,911	0,9043 to 12,92	Yes	*	0,0141
Didactic vs. Smartsite	6,204	0,1976 to 12,21	Yes	*	0,0383
Didactic vs. Bionector	13,11	7,102 to 19,12	Yes	****	<0,0001
Didactic vs. Vadsite	9,605	3,599 to 15,61	Yes	***	0,0002
Didactic vs. Autoflush	13,21	7,205 to 19,22	Yes	****	<0,0001
Didactic vs. Neutraclar	0,8300	-5,177 to 6,837	No	ns	>0,9999
CareSite vs. Safeflow	-6,021	-12,03 to -0,01430	Yes	*	0,0491
CareSite vs. Q-Syte	-26,63	-32,64 to -20,63	Yes	****	<0,0001
CareSite vs. BD Max 0	-7,853	-13,86 to -1,847	Yes	**	0,0035
CareSite vs. Smartsite	-8,560	-14,57 to -2,553	Yes	**	0,0012
CareSite vs. Bionector	-1,656	-7,663 to 4,351	No	ns	0,9977
CareSite vs. Vadsite	-5,159	-11,17 to 0,8477	No	ns	0,1453

CareSite vs. Autoflush	-1,553	-7,559 to 4,454	No	ns	0,9988
CareSite vs. Neutraclear	-13,93	-19,94 to -7,928	Yes	****	<0,0001
Safeflow vs. Q-Syte	-20,61	-26,62 to -14,61	Yes	****	<0,0001
Safeflow vs. BD Max 0	-1,832	-7,839 to 4,174	No	ns	0,9945
Safeflow vs. Smartsite	-2,539	-8,546 to 3,468	No	ns	0,9338
Safeflow vs. Bionector	4,365	-1,642 to 10,37	No	ns	0,3364
Safeflow vs. Vadsite	0,8620	-5,145 to 6,869	No	ns	>0,9999
Safeflow vs. Autoflush	4,468	-1,538 to 10,48	No	ns	0,3049
Safeflow vs. Neutraclear	-7,913	-13,92 to -1,907	Yes	**	0,0032
Q-Syte vs. BD Max 0	18,78	12,77 to 24,79	Yes	****	<0,0001
Q-Syte vs. Smartsite	18,07	12,07 to 24,08	Yes	****	<0,0001
Q-Syte vs. Bionector	24,98	18,97 to 30,98	Yes	****	<0,0001
Q-Syte vs. Vadsite	21,47	15,47 to 27,48	Yes	****	<0,0001
Q-Syte vs. Autoflush	25,08	19,07 to 31,09	Yes	****	<0,0001
Q-Syte vs. Neutraclear	12,70	6,692 to 18,71	Yes	****	<0,0001
BD Max 0 vs. Smartsite	-0,7067	-6,713 to 5,300	No	ns	>0,9999
BD Max 0 vs. Bionector	6,197	0,1906 to 12,20	Yes	*	0,0386
BD Max 0 vs. Vadsite	2,694	-3,312 to 8,701	No	ns	0,9041
BD Max 0 vs. Autoflush	6,301	0,2940 to 12,31	Yes	*	0,0335
BD Max 0 vs. Neutraclear	-6,081	-12,09 to -0,07430	Yes	*	0,0453
Smartsite vs. Bionector	6,904	0,8973 to 12,91	Yes	*	0,0143
Smartsite vs. Vadsite	3,401	-2,606 to 9,408	No	ns	0,6892
Smartsite vs. Autoflush	7,007	1,001 to 13,01	Yes	*	0,0123
Smartsite vs. Neutraclear	-5,374	-11,38 to 0,6324	No	ns	0,1124
Bionector vs. Vadsite	-3,503	-9,510 to 2,504	No	ns	0,6507
Bionector vs. Autoflush	0,1033	-5,903 to 6,110	No	ns	>0,9999
Bionector vs. Neutraclear	-12,28	-18,29 to -6,272	Yes	****	<0,0001
Vadsite vs. Autoflush	3,606	-2,400 to 9,613	No	ns	0,6111
Vadsite vs. Neutraclear	-8,775	-14,78 to -2,769	Yes	***	0,0009
Autoflush vs. Neutraclear	-12,38	-18,39 to -6,375	Yes	****	<0,0001