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Mikkelsen, Karin Bundgaard; Sørensen, Erik Elgaard; Ripadal, Nils Krister Olof; Christensen, Ann-Eva; Schönheyder, Henrik Carl

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Challenging the six-hour recommendation for reprocessing sterilisable medical equipment

Karin BUNDGAARD, RN, MScN, PHD, Clinical Nursing Research Unit & Clinic for Neuro-, Head- and Orthopaedic diseases, Aalborg University Hospital, Denmark

Erik Elgaard SØRENSEN, RN, MScN, PhD, Head of Research, Professor, Clinical Nursing Research Unit, Aalborg University Hospital & Department of Clinical Medicine, Aalborg University, Denmark

Krister RIPADAL, RN, MScPH, Head Nurse, Sterile Centre, Clinic for Diagnostics, Aalborg University Hospital, Denmark

Ann-Eva CHRISTENSEN, Biostatistician, Unit of Epidemiology and Biostatistics, Aalborg University Hospital, Denmark

Henrik Carl SCHØNHEYDER, MD, Senior Hospital Physician, Professor, Department of Clinical Microbiology, Aalborg University Hospital, Denmark

Background

At present, the reprocessing of sterilisable medical equipment is recommended to be initiated no later than six hours after completion of surgery, to ensure that the quality of the instrument does not deteriorate. A literature search showed a lack of evidence for the consequences that may occur if medical personnel deviate from the standard six-hour sterilisation protocol.

Aim

This study challenges the six-hour recommendation for reprocessing sterilisable medical equipment. We investigate whether an increase in residual protein content is present proportional to holding time before reprocessing is initiated, and whether an increase in corrosion is present on surgical scissors proportional to holding time before reprocessing is initiated.

Method

Residual protein was identified on surgical instruments contaminated with human blood after different holding times and before washes using the o-phthalaldehyde (OPA) method. Corrosion was identified on surgical scissors contaminated with human blood after different holding times and before reprocessing using light stereomicroscopy and scanning electron microscopy (SEM).

Results

Protein residues ranged between 14.0 µg and 51.9 µg and thus below the accepted threshold of 100 µg per instrument surface.

Corrosion was identified on 22 of 30 scissors. Corrosion was identified as areas with red-coloured deposits and lighter discoloration corresponding to 0.05% of the surface. Pitting corrosion was identified on four out of 30 scissors.

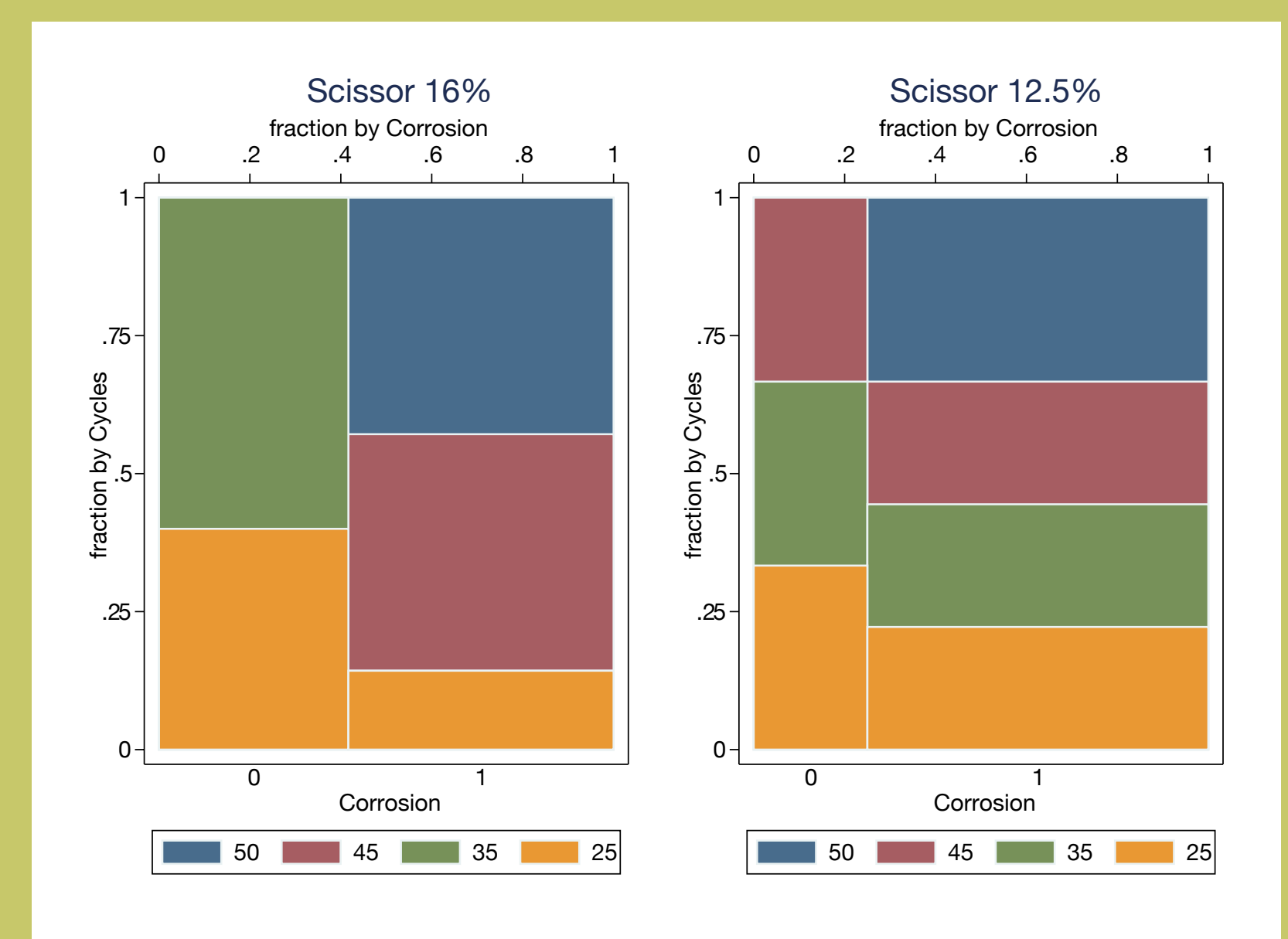
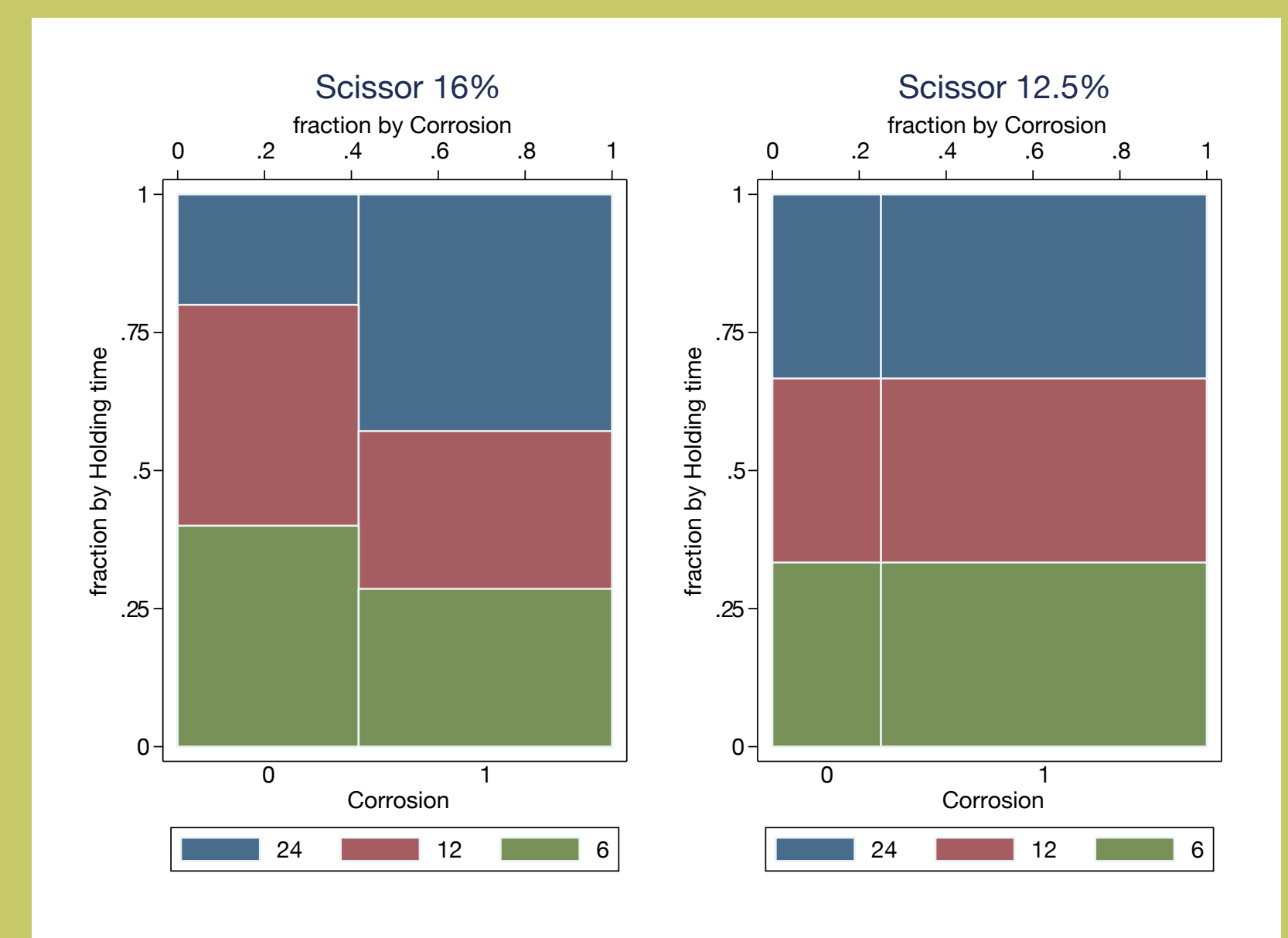
Table 1: Protein residues

Treatment	Protein µg/puncture cannulae	Protein µg/scissors	Protein µg/knife shafts
Positive Control*	>500 (794)***	>1000 (2720)***	>1000 (2200)***
	>500 (1010)***	>1000 (2730)***	>1000 (2290)***
Negative control**	12,7	41,4	36,6
	16,0	43,5	37,3
0 hours holding time	14,3	39,2	35,0
	15,0	35,2	35,2
3 hours holding time	14,8	35,0	33,4
	16,2	36,3	33,1
6 hours holding time	18,5	50,4	33,0
	20,4	40,0	35,5
9 hours holding time	25,9	38,2	35,9
	14,0	35,1	33,5
12 hours holding time	15,6	34,6	33,6
	15,3	33,7	33,0
24 hours holding time	13,8	37,7	32,4
	50,9	35,4	31,7
36 hours holding time	14,3	34,5	31,0

*Positive controls - instruments that were contaminated but not washed.

**Negative controls - instruments that were not contaminated but washed.

*** The signals for positive controls were out of range for the standard series. The values in the parentheses were found by extrapolation of the linear function for the standard series.



Conclusion

No association was identified between residual protein and holding time as well as between incidence of corrosion and holding time. The study thereby challenges the relevance of upholding the recommendation of a maximum wait of six hours before reprocessing. The findings will potentially have an impact on the organisation of reprocessing of surgical instruments in Denmark and Internationally.

