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Prediction of Long-Term Oral Health in a Dutch Military Population

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Objectives To develop a prediction model for substantial deterioration of oral health defined as tooth loss (either ≥1 or ≥2), alveolar bone loss (either ≥1 or ≥2) and a combination of tooth loss and alveolar bone loss using long-term clinical data from a selection of the Dutch military population.

Methods Dental records with data and radiographs available over a period >20 years from patients serving in the Dutch Military were selected resulting in 198 patient files (192 male; 6 female, year of birth between 1958 and 1973; observation time 29-42 years). Bitewing radiographs were assessed for caries activity (CA) and alveolar bone loss (BL) by 2 experienced clinicians. CA was determined as lesions progressing into dentin. BL was determined by assessing sites with ≥ 6mm BL in PM region. 13 predictors were selected: year of birth, sex, military rank, general health (ASA), Diabetes Mellitus type 2, number of medications, smoking, sum CA-score, sum BL-score, maximum BL-score, D-T, M-T, F-T. Data were analyzed using a LASSO technique to select the main predictors. ROC-curves with corresponding AUC-values were calculated corrected for optimism by 500 fold bootstrapping for defined outcome measures.

Results Predicting ≥1 BL resulted in AUC 0.775 with predictors: year of birth, sex, rank, number of medication, smoking, caries activity, sum BL, maximum BL-score, D-T, and F-T. Predicting ≥2 BL resulted in AUC 0.788 with predictors: rank, smoking, sum BL, maximum BL-score, and F-T. Predicting ≥1 BL and ≥ 1 missing teeth resulted in AUC 0.784 with predictors: year of birth, rank, smoking, sum BL, maximum BL-score, M-T, and F-T. Tooth loss was not predictable in our model.

Conclusions Our model shows a reasonable ability to predict alveolar bone loss > 6mm, also when combined with tooth loss.