APPLICATIONS OF MULTIVARIATE SURVIVAL ANALYSIS TO DENTAL RESEARCH

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Data structures comprised of time-to-event, within-subject clustered outcomes are common in patient-oriented dental research, e.g. caries data are recorded from multiple teeth or even multiple surfaces per tooth from each patient. Analytical methodologies for multiple observations per patient present challenging and frequently encountered issues in dental research. Most routinely used statistical analysis procedures require the common assumption that all observations are independent. In the presence of clustered observations, these procedures are usually not directly applicable. For making valid statistical inferences, more sophisticated tools are needed in order to take within cluster outcome correlations into account. The application of sophisticated survival analysis methods in patient-oriented dental research has been limited.

The purpose of this abstract is to discuss applications of methodological advances in Cox proportional hazards models to dental research. Applications of these methods will be discussed using either the marginal approach or the frailty approach to account for clustered time-toevent outcomes measurements within the same subject. Extensions of the Cox proportional hazards model to the generalized linear transformation models will also be discussed. The specific analytic issues addressed are generalizable to almost any patient-oriented dental research as many studies having multiple correlated outcome observations per patient, e.g. caries, periodontal disease, temporomandibular joint disorders, impacted teeth, dental implants, and maxillofacial trauma research.