

Investigating Clinical Correlations of Dental Implant Failures and Patient Related Factors

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Introduction

➤ Implant success depends on various biological and physical factors like biomechanics, quality and quantity of bone, loading conditions and more, but it also greatly depends on patient habits.

➤ Patient related factors like medication use, anxiety and stress levels, smoking and tobacco use, nutrition and diet, systemic health conditions all come in play when evaluating implant efficacy.

➤ Implant failure can be due to excess cement residues used in cement-retained restorations that can interfere with healing process and additionally favor plaque accumulation and eventually progress to peri-implant diseases.

➤ In existing research, the detrimental effects of excess cements as well as challenges posed by peri-implantitis have been independently criticized when evaluating implant failure.

➤ The existing literature fails to address the potential correlation between submucosal cement, peri-implantitis, and implant failure, which is a notable gap in research that needs to be investigated.

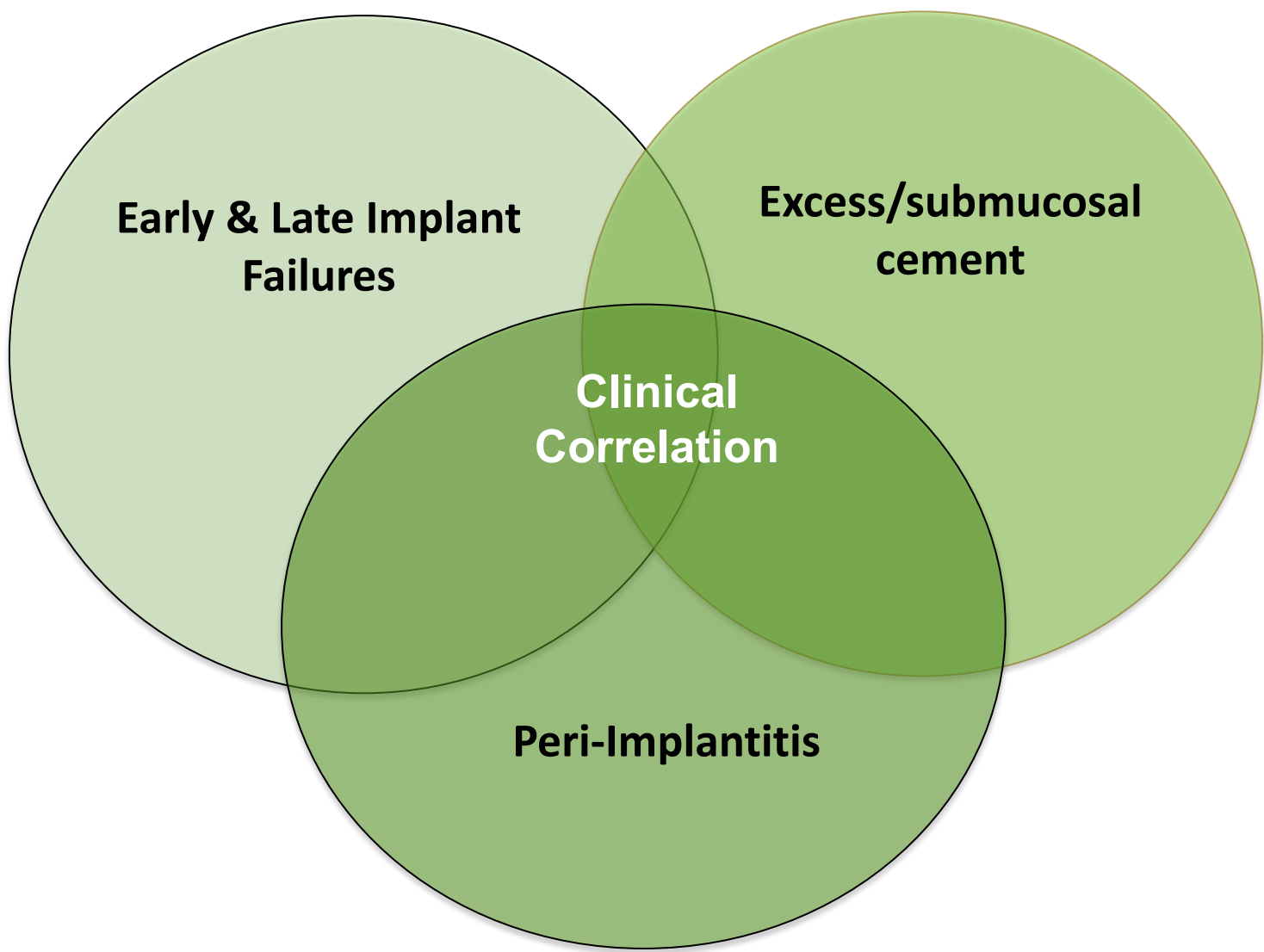


Fig 1: This diagram illustrates the objective of seeking a clinical correlation between early and late dental implant failures, excess cement, and peri-implantitis.

➤ This study aims to evaluate various patient related and external factors to establish clinical correlations between excess cement and peri-implantitis and its effect on early and late dental implant failures.

Methodology

➤ Data from a local dental office in Dallas was collected for about 93 dental implants coming from 80 patients with failed dental implants between 2012 and 2021 (IRB-22-440). The data collected was “de-identified” to protect the patient’s privacy of health information.

Methodology cont.

➤ For data collection, the inclusion criteria was that patient must have one or more failing dental implant(s) that are planned to be removed/already removed from any time frame between 1 to 10 years. Patients taking medications that affect bone quality were excluded from the study.

➤ Information collected from each patient included: Date of implant extraction, Gender, Date of Birth, Age, Medications, Medical history, Past surgeries, History of diabetes, History or periodontal disease, History of smoking, Tooth number, Cement/Screw retained, Number of years implant was in function, Clinical/radiographic findings.

Results and Discussion

Age vs. Years Implanted

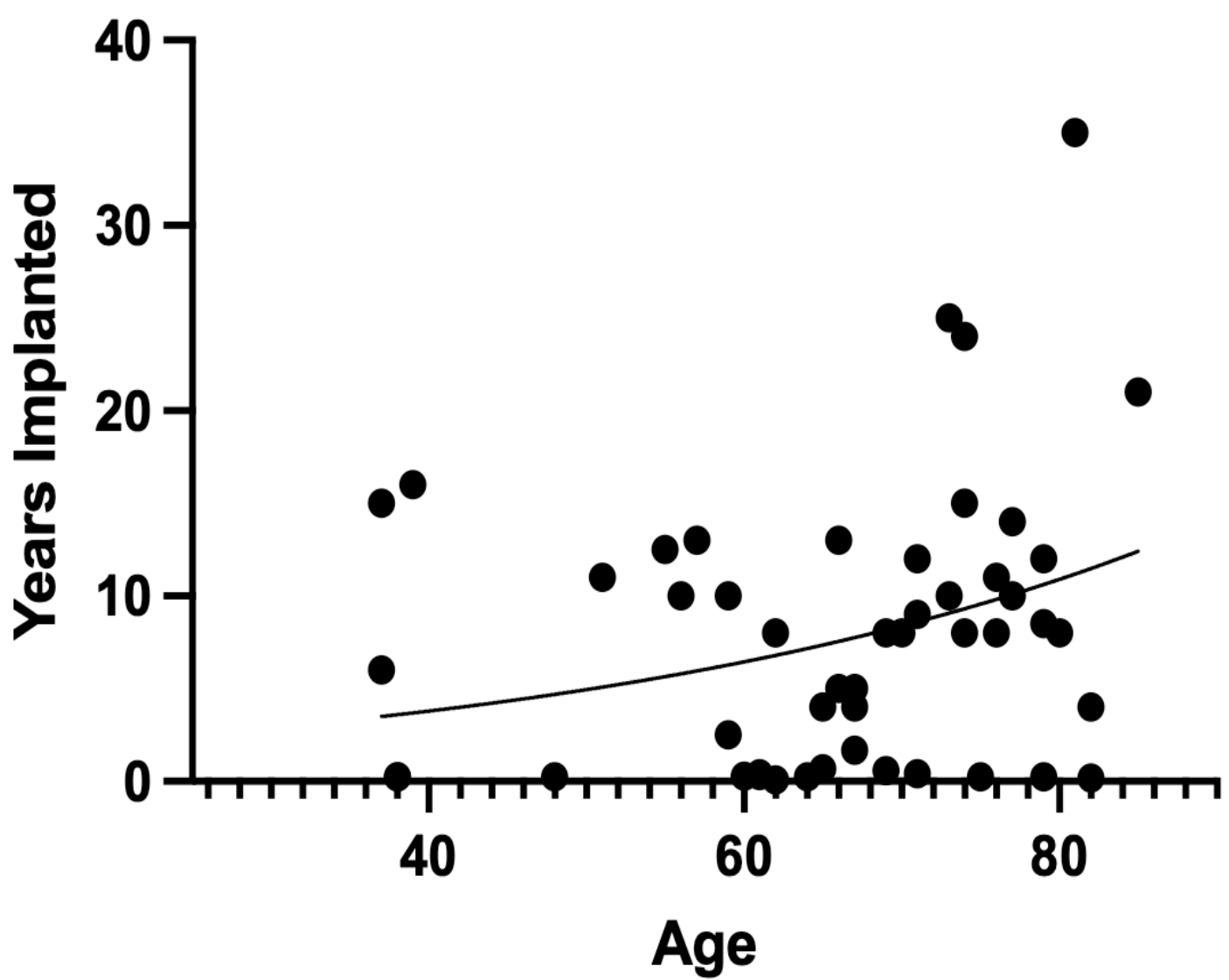


Fig 2: Distribution of age vs. number of years the implant was in function

Diabetes vs. Years Implanted

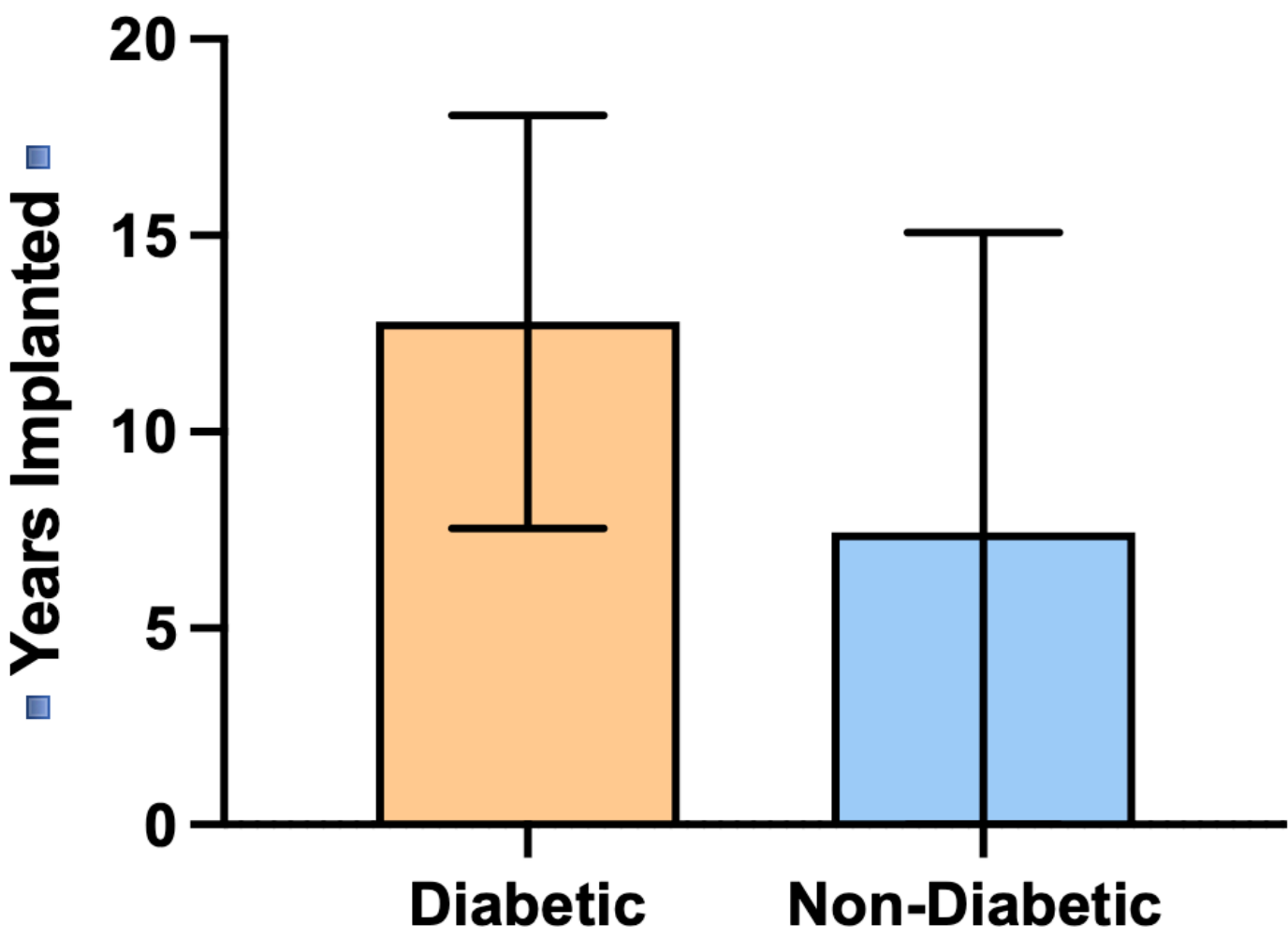


Fig 3: Graphs comparing diabetic and non-diabetic patients vs. number of years the implant was in function

Smoking vs. Years Implanted

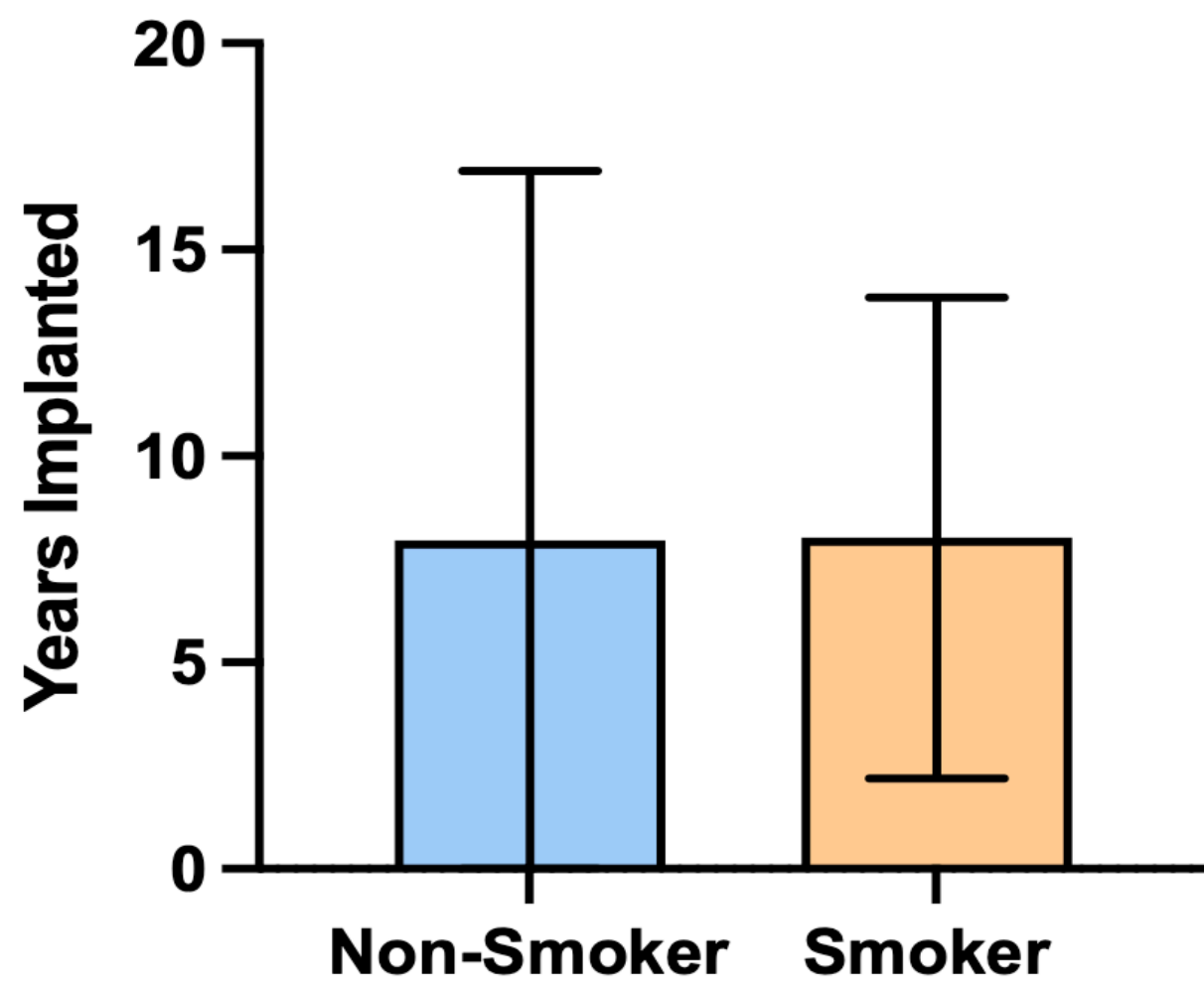


Fig 4: Graphs depicting smoking status of a patient vs. number of years the implant was in function

Gender vs. Years Implanted

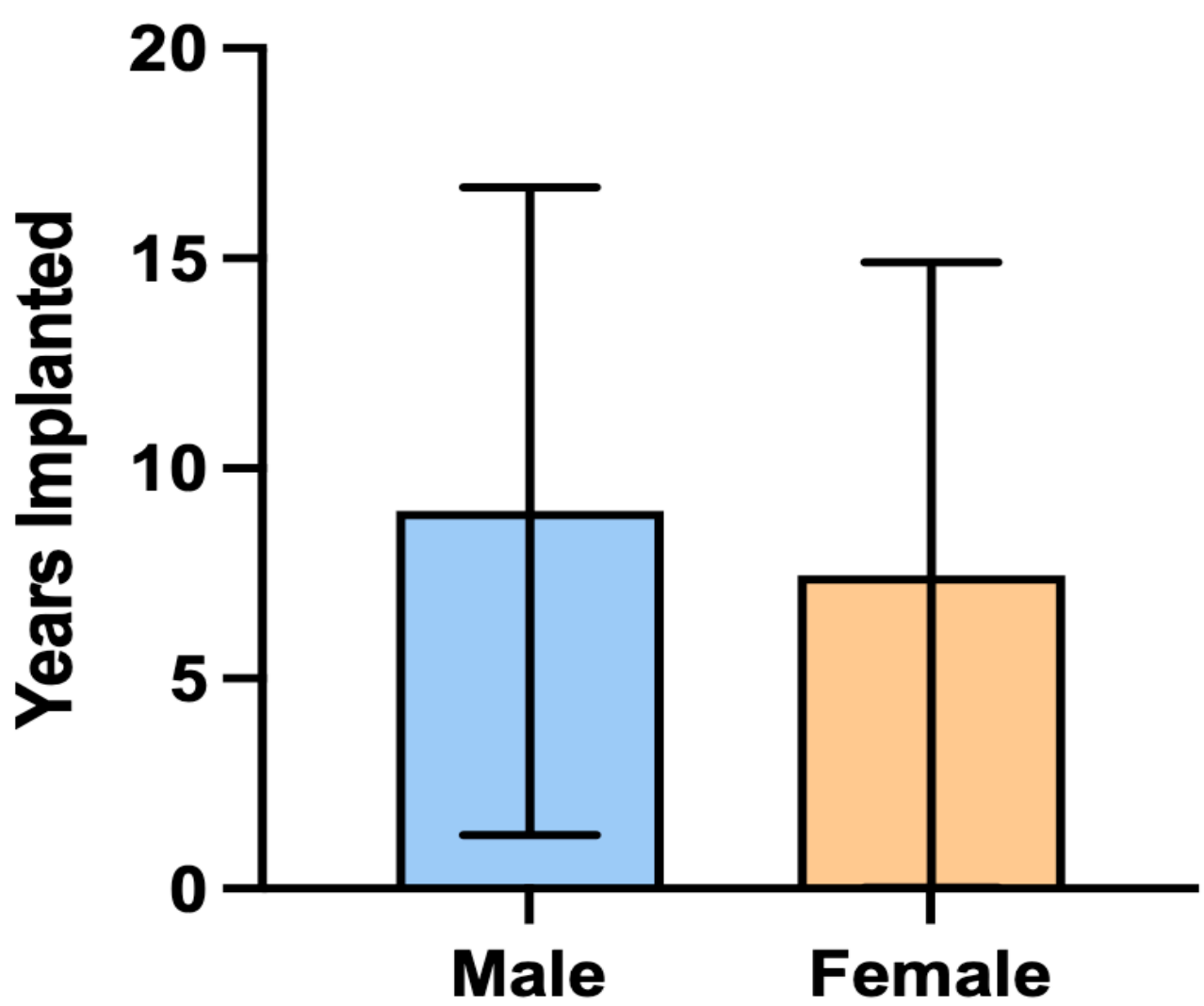


Fig 5: Graphs depicting gender vs. number of years the implant was in function

Type of Restoration vs. Years Implanted

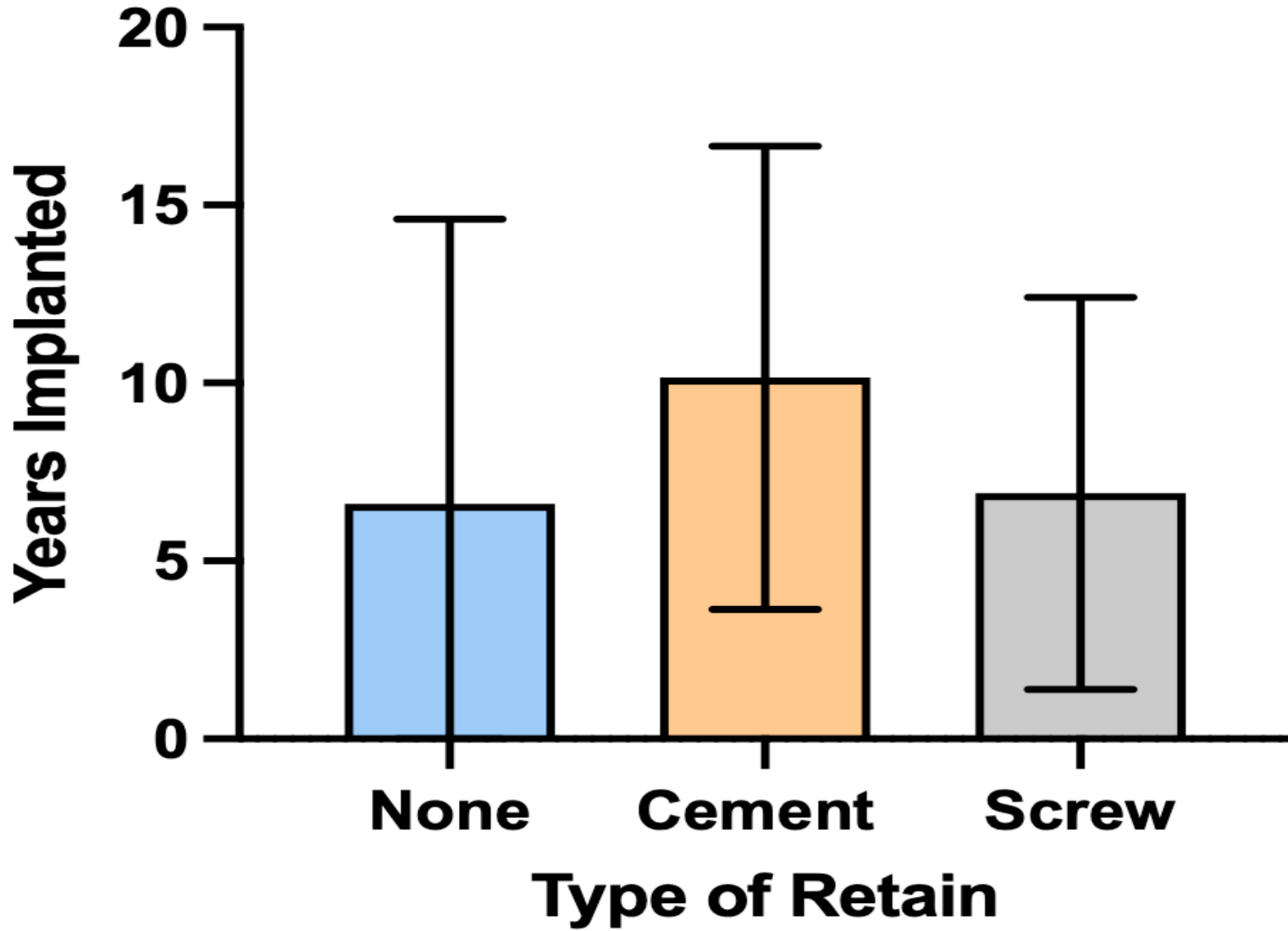


Fig 6: Graphs depicting type of restoration vs. number of years the implant was in function

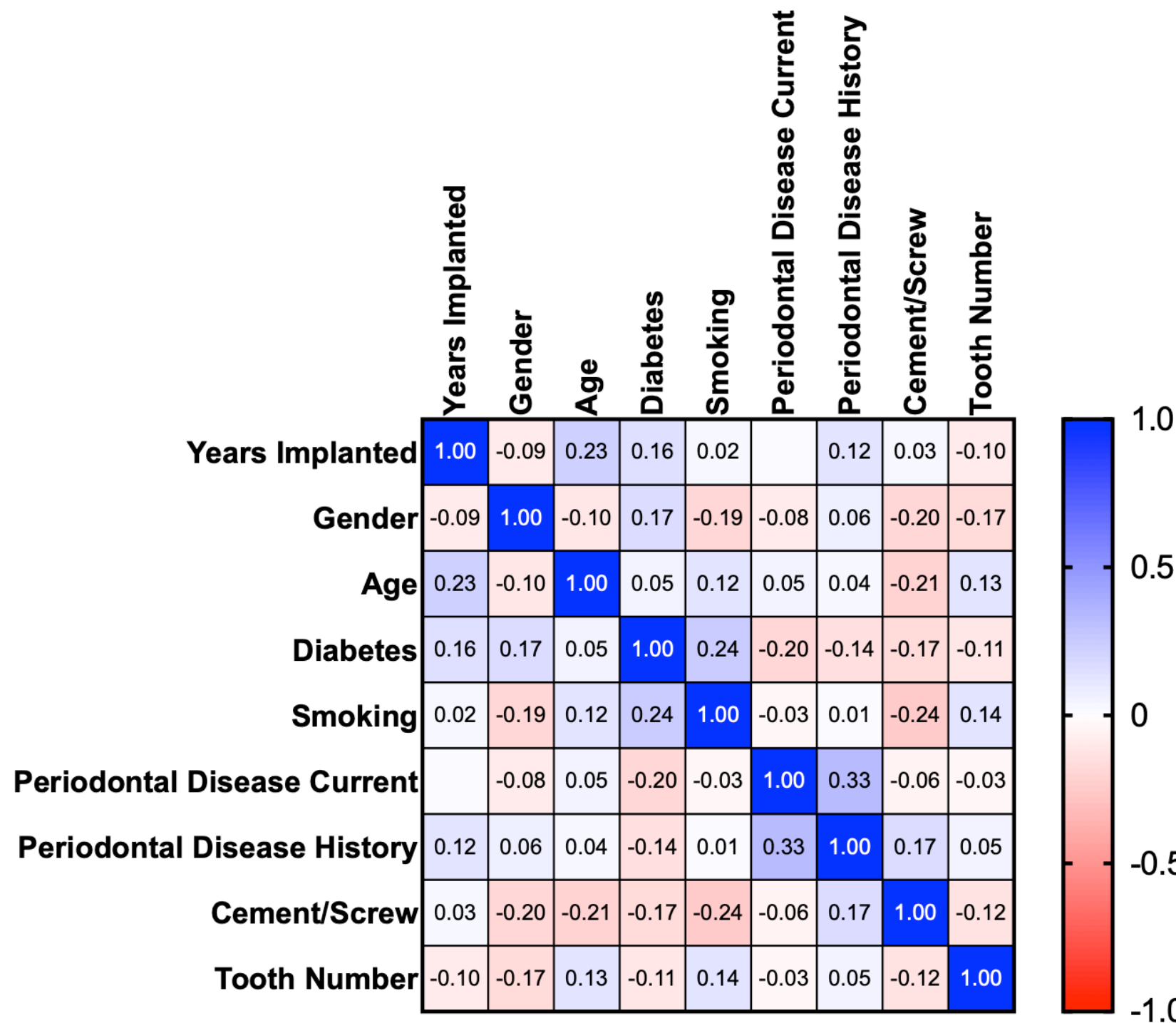


Fig 7: Pearson's Correlation matrix showing relationship between various patient factors

Conclusion

➤ Upon data analysis, it was observed that implants failed within first 10 years for age range of 60-80 years.

➤ A reverse trend was noticed for non-diabetic patients with implants lasting for about ~15 years while for diabetic patients the implants were in function for longer.

➤ Smoking habits showed no significant impact on the longevity of dental implants, while the implants exhibited a slightly longer lifespan in males compared to females.

➤ When comparing different type of restorations, cement-retained implants lasted longer than the screw-retained but there were a few implants which were left unidentified from either of the restoration type.

➤ Pearson's correlation chart revealed a weak positive relation was observed between age and number of years the implant was in function.

Future Works

In collaboration with Dr. Tang, Associate Professor in Mathematics Department at UTD, we plan to try two possible models to associate patient factors and implant failures: logistic regression and cox regression in survival analysis.

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