Risk Indicators Associated with the Prevalence of Peri-Implantitis: A 25-Year Retrospective Cross-Sectional Study with Cox Regression Modeling

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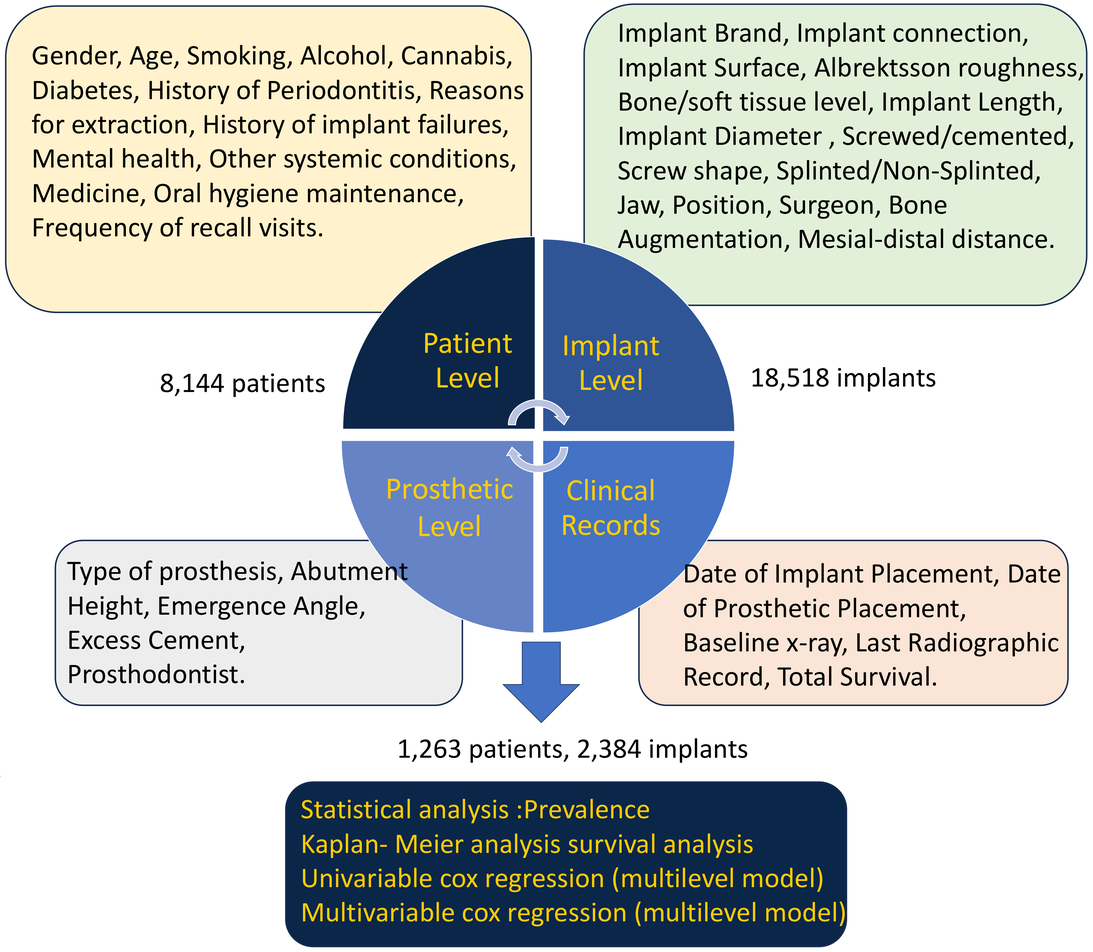
Background

Understanding risk indicators for peri-implant diseases is essential for prevention, current evidence regarding their impact remains inconclusive. The reported prevalence of peri-implantitis varies widely across regions, populations, and study designs.

Aim

This study aimed to identify patient, implant, provider, and restorative factors associated with peri-implantitis by employing regression modeling in a long-term retrospective.



Methods

- A retrospective cross-sectional analysis was conducted among subjects receiving dental implants between 2012 and 2023 (25 years), including only implants with at least one year of functional loading.
- Exclusion criteria:
  - No radiograph after implant surgery
  - No radiograph or clinical note after restoration 1 or more than 1 year
  - No record of the implant's information (diameter and length), which is used for reference in the calibration
- Diagnosis Periodontitis with staging and grading
- Diagnosis Peri-implantitis
- X-ray measurement
- Statistical analysis

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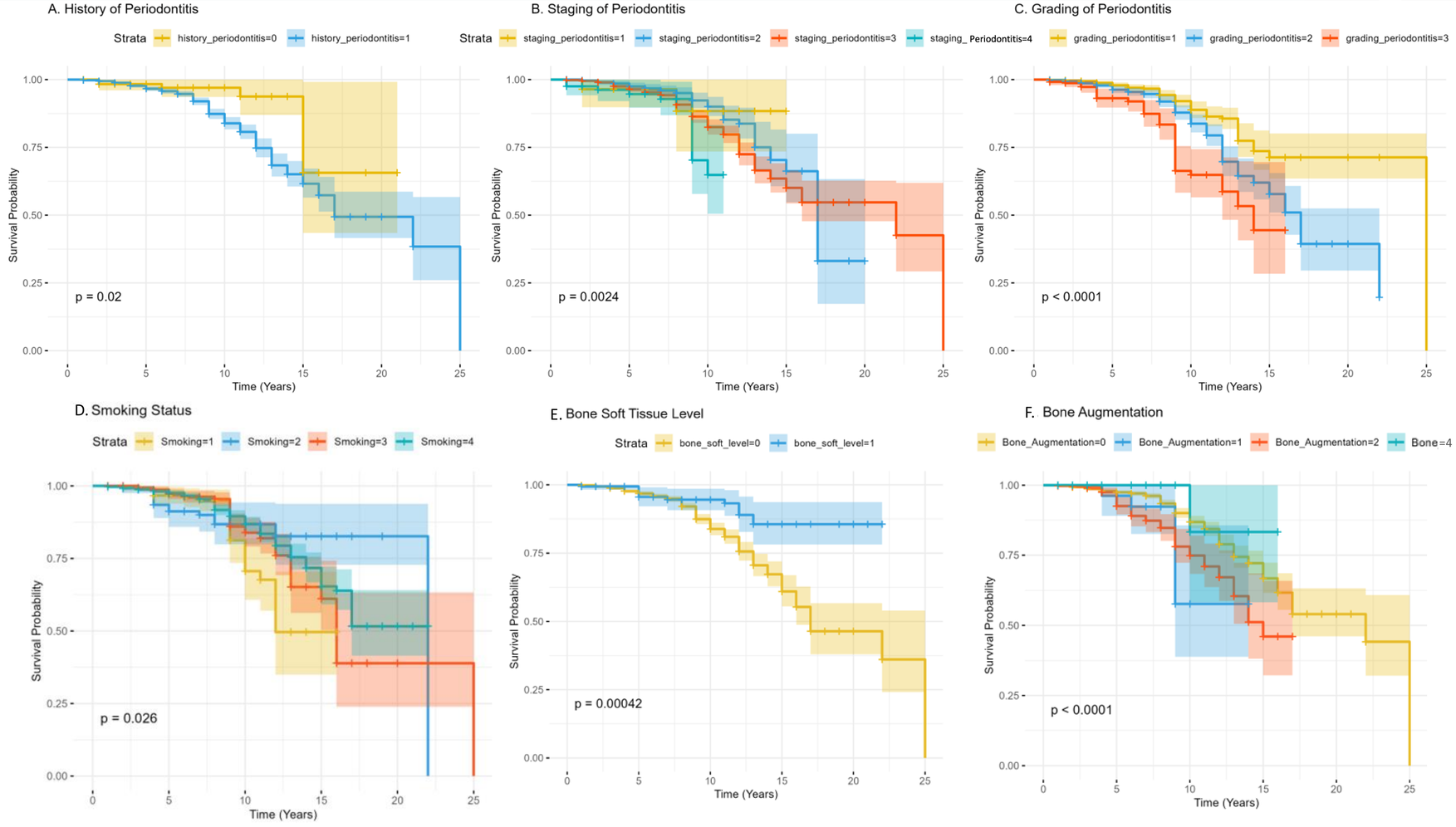
Results

Prevalence analysis:
Peri-implantitis was 13.46% at the implant level and 11.87% at the patient level.
The cumulative peri-implantitis-free rates were 99% at 1 year, 96.77% at 5 years, and 84.86% at 10 years post-implantation.

Kaplan-Meier analysis survival analysis:
Among patient-level factors, a history of periodontitis, including disease staging and grading, as well as smoking history, was significantly associated with peri-implantitis. Implant-level factors including implant placement level (bone-level vs tissue-level), bone augmentation at the time of implant placement, provider experience, and prosthesis design also showed significant associations.



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Results

In univariable Cox regression analysis, the risk of peri-implantitis was higher for connected crowns compared to single crowns (HR = 3.45, 95% CI: 1.57–7.58, p = 0.002), while longer implant length reduced the risk (HR = 0.81, 95% CI: 0.71–0.93, p = 0.002). Tissue level implants, compared to bone level implants, conferred protection (HR = 0.23, 95% CI: 0.08–0.69, p = 0.009).

Conclusion

Peri-implantitis risk is multifactorial, with patient periodontal status, prosthesis type, implant length, tissue levels, and provider experience all contributing to disease occurrence. Expert surgical technique and improved oral hygiene practices were protective against peri-implant disease. Comprehensive patient evaluation and individually tailored surgical and maintenance protocols are crucial to minimize peri-implantitis risk and optimize implant longevity.