Incidence of Periodontitis Progression for Patients with the Lapse in Maintenance Therapy Secondary to the COVID-19 Pandemic


Introduction

According to the American Academy of Periodontology (AAP), periodontal disease is a chronic inflammatory disease that affects gum tissue and bone supporting teeth. If left untreated, periodontal disease can lead to tooth and bone loss, clinical attachment loss, and increased pocket depths. Periodontal maintenance therapy is a program of regular visits aimed at maintaining the homeostasis of periodontal tissues after completion of active periodontal treatment. The purpose of a rigorous maintenance schedule is to allow time for tissues to heal after initial therapy, followed by appropriate support to preserve the treatment outcomes without relapse to a diseased state. Although these intervals are set more frequently so that patients can reduce the progression of their disease, studies have shown that 84% of patients do not follow their regular maintenance schedules after active therapy. The COVID pandemic has had a profound impact on the health care system, including the dental industry. In March of 2020, when the pandemic first became widespread in the United States, dental practices were forced to shut down. With this shut down, hundreds of thousands of people no longer had access to routine dental care, including patients who had an established dental home at the ECU SoDM. The ECU SoDM transitioned to strictly Emergency care in mid-March of 2020. Periodontitis is a common, oral inflammatory condition affecting approximately half of U.S. adults. Observational studies indicate that periodontitis can be effectively managed with compliance to professional maintenance therapy. A recent systematic review and meta-analysis found that only 25% of periodontitis patients in Maintenance exhibit periodontitis progression over 5-10 years. The objectives of this study were to examine the effect of the COVID-19 pandemic on periodontitis patients and their scheduled maintenance within an academic practice-based network (PBN); and to measure the incidence of periodontitis progression that occurred over the pandemic and closure of the PBN.

Methods

This retrospective, cohort study utilized de-identified electronic health record (EHR) data from a PBN involving nine clinical sites. For inclusion, patients needed to have completed two periodontal maintenance visits ([D910], one prior to the pandemic closure (September 2019 - March 2020), and one after clinic reopening (May-December 2020). Patients also needed to have full mouth periodontal charting at the two maintenance visits. For the statistical analysis, mean changes in CAL were calculated along with the incidence of CAL loss according to defined thresholds.

- **Inclusion Criteria**:
  - Adult patients of record, ages 18 years and older
  - Completed two periodontal maintenance visits ([D910]
  - One visit prior to the pandemic closure (September 2019 - March 2020)
  - Second visit after clinic reopening (May – December 2020)
  - Full-mouth periodontal charting at the two maintenance visits

**Figure 1. Etiology and pathogenesis of periodontitis**

**Figure 2. ECU SoDM academic practice-based network (PBN) including Ross Hall and eight Community Service Learning Centers sited in rural NC counties.**

**Table 1.** Number and percent of participants with mean CAL loss or gain over the pandemic. T-testing indicated no statistical differences between the groups for mean CAL changes (p=0.045).

**Table 2.** Number and percent of participants with periodontitis progression or CAL loss per case definitions at one or more sites.

**Results**

1,573 periodontitis maintenance patients met inclusion criteria for the analysis. Of these, 924 patients (58.7%) exhibited a mean loss of CAL (0.3 mm, SD 0.3); and 649 patients (41.3%) exhibited a mean gain of CAL (0.3 mm, SD 0.3) over the two maintenance visits. These mean CAL changes were not statistically significant (p>0.05). Meanwhile, 442 (28.1%), 334 (21.2%) and 262 (16.7%) patients exhibited CAL loss of ≥3 mm at ≥1 site, ≥2 sites, and ≥3 sites, respectively. 257 (16.3%), 140 (8.9%), and 82 (5.2%) patients exhibited CAL loss of ≥4 mm, at ≥1 site, ≥2 sites, and ≥3 sites, respectively.

**Figure 3.** Inclusion criteria, identification of study population, and stratification of cases versus non-cases based on periodontitis progression definitions.

**Discussion**

CAL is the preferred method of measuring the severity of periodontitis because it can represent the cumulative perio disease of the patient. CAL is the distance from the CEJ to the base of the pocket. The CEJ is a fixed point on the tooth, thus making CAL the most important factor in determining prognosis of the tooth. With this study, we were observing the effect on missed periodontal maintenance appointments during the COVID-19 pandemic. We recognize that the COVID-19 pandemic has affected patients in numerous ways, including but not limited to financial hardships, loss of insurance, and fear of personal safety.

Based on the results of this study, we cannot conclude that there is a statistically significant change in mean CAL in patients in periodontal maintenance at ECU SoDM during the COVID pandemic. Of the patients who had increases in mean CAL, when comparing the amount of increase and the number of sites that had increases, the most patients had changes of greater than or equal to 2 mm at 1 or more sites. We recognize that there are limitations to our study such as random student error and patients seeking dental care elsewhere, but further study of changes regarding dental and overall health during the pandemic is warranted.

**Conclusions**

Both provider and patient are accountable for the long-term supportive periodontal care. The COVID-19 forced lockdown hindered this commitment. Preventing patients from coming in for their established 3-6 month interval prevents patients from receiving continued risk assessment, behavior motivation, personalized oral hygiene coaching, professional mechanical plaque removal, and targeted subgingival debridement appropriate for each patient (Rosling et al., 2001).

Acknowledgements

The investigators acknowledge the faculty, students, residents, and staff at the ECU SoDM who contributed the clinical data for this analysis and for their dedication to patient care during the COVID-19 pandemic.

References