

# Oral and Dental Status of Patients Taking Biologic Agents

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## INTRODUCTION

Biologic agents are drugs used to manage autoimmune diseases, inflammatory conditions, infectious diseases, and cancers. Biologic agents are used in the field of oral medicine to treat conditions such as Sjogren's syndrome, pemphigus vulgaris, and mucous membrane pemphigoid and across medicine for an expanding set of indications.<sup>1,2</sup> However, there exists some documentation of adverse effects affecting the oral cavity and oropharynx associated with these use of these drugs.<sup>3</sup>

While some early literature has reported on use of these drugs in treating oral disease and on the assessment of healing during treatment across realms of health care, no data has evaluated dental status of these patients.<sup>4,5,6</sup> We conducted a retrospective cohort study in which existing charts of Penn Dental Medicine patients on biologic agents were reviewed to evaluate the presence of oral lesions, caries, and periodontal disease in these patients.

## METHODS

Electronic records of patients treated at Penn Dental Medicine from July 2017 through July 2022 were collected for analysis, including all adult patients who were 18-90 years of age taking a TNF antagonist, B or T cell inhibitor, and interleukin inhibitor. These categories were investigated as they are the most widespread biologic agents and within the category agents were likely to be employed for long-term treatment. Patients will be selected on the basis of medication list.

Data obtained regarding oral lesions included presence, diagnosis, description, and treatment administered (if present). Data obtained regarding caries status included number of fillings per year, DMFT score, diagnoses, and restorative procedures performed during treatment. Data obtained regarding periodontal status included diagnosis, probing depth, number of deep pockets (>4mm), and periodontal treatment (such as number of scaling and root planning (SRP) treatments). Data was also obtained regarding other treatments such as number of root fillings and extractions.

## RESULTS

Between July 1, 2017 and July 1, 2022, 255 patients taking 24 different biologic agents were treated at Penn Dental Medicine (Figure 1). Adalimumab was the most commonly employed biologic agent followed by etanercept and infliximab. Overall, TNF-alpha inhibitors were the most common class (Figure 2). Patients on biologic agents were born between 1934 and 1998 and the cohort was comprised of 153 females, 97 males, and 1 transgender patient (Table 1). Patient number showed a slight increasing trend over the years studied (Figure 3).

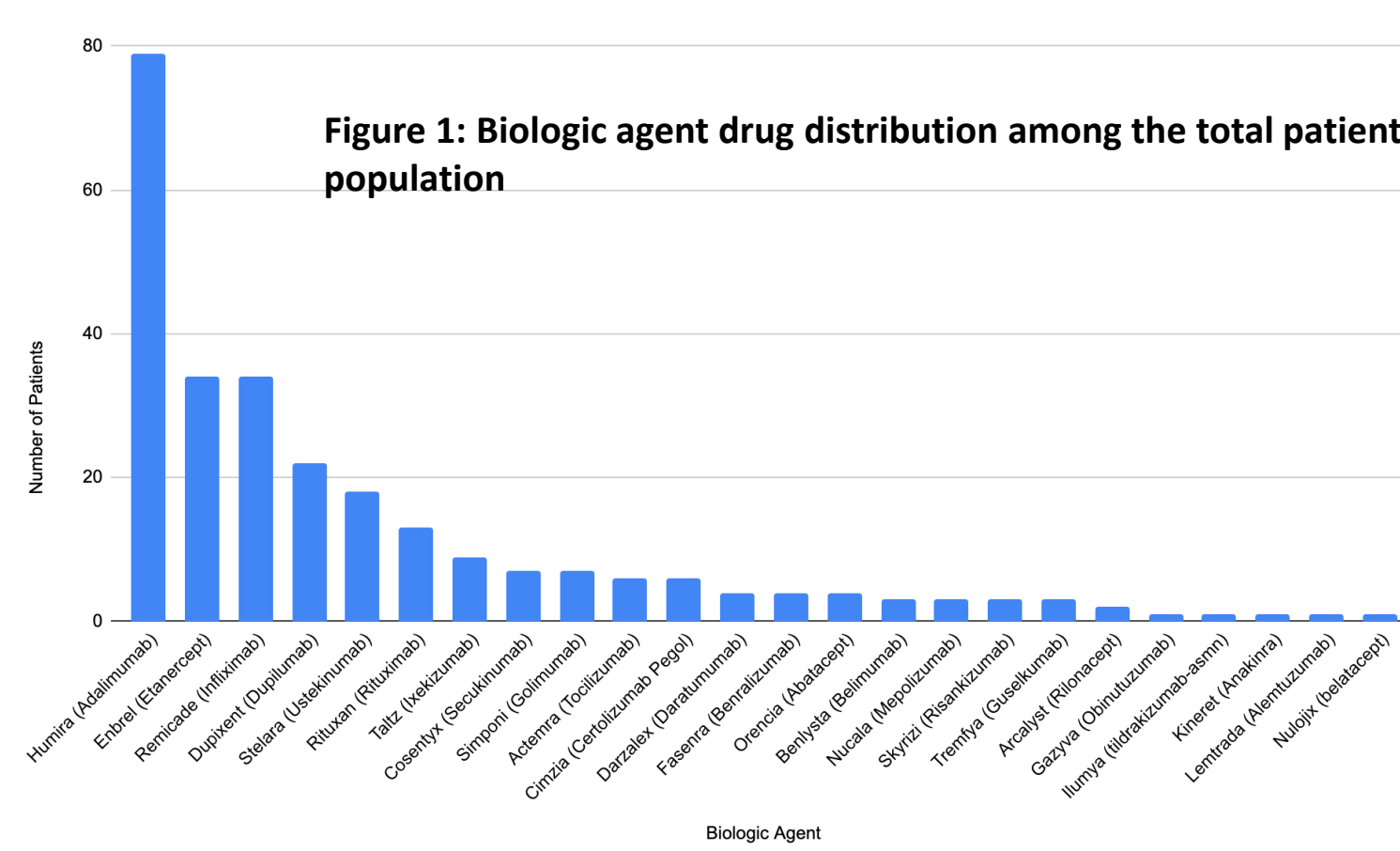


Figure 1: Biologic agent drug distribution among the total patient population

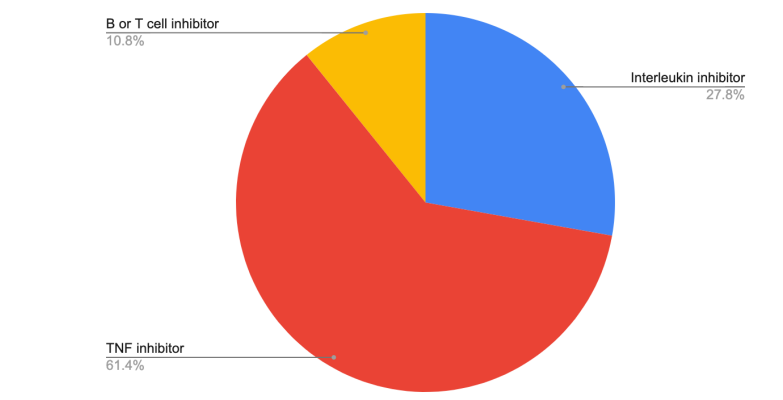


Figure 2: Classes of biologic agent represented

Age	
Year of Birth (mean +/- standard dev)	1968 +/- 16
Range	1934-1998
Sex	
Female	153
Male	97
Transgender/Unknown	1
Race	
Unreported	130
Black or African American	53
White	53
Other	6
Native Hawaiian or Other Pacific Islander	6
Asian	4

Table 1: Demographics of total patient population

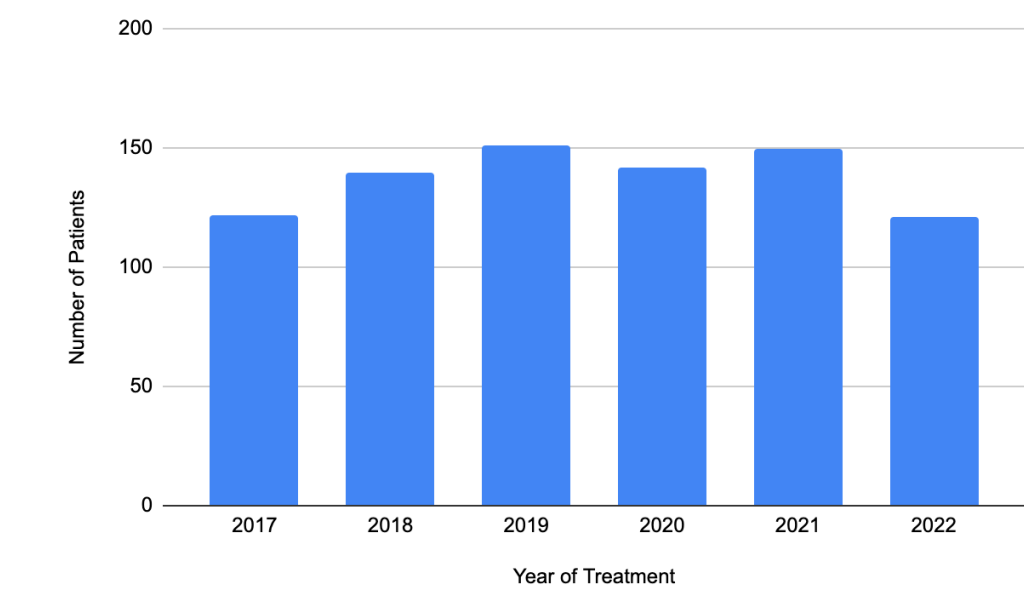


Figure 3: Number of patients treated per year, showing a flat to upward trend. Note that 2020 included 3 months of emergency treatment only and 2017 and 2022 each included only 6 months of data.

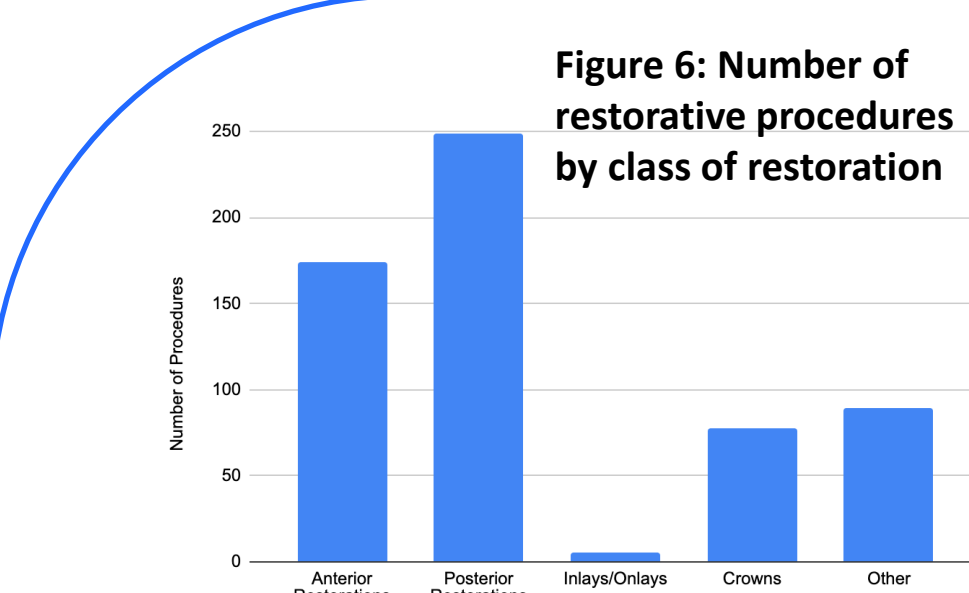


Figure 6: Number of restorative procedures by class of restoration

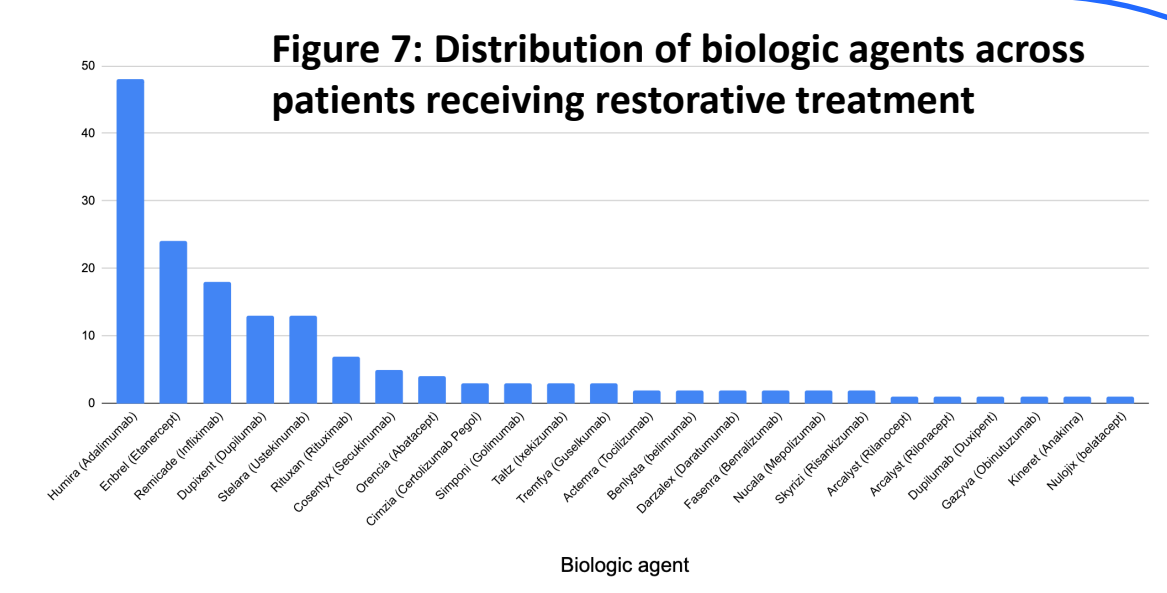


Figure 7: Distribution of biologic agents across patients receiving restorative treatment

	Anterior Restoration	Posterior Restoration	Inlay/Onlay	Crowns	Other	Total # of Restorative Procedures Completed Each Year:
2017	22	3	0	7	12	= 44
2018	35	51	2	11	17	= 116
2019	27	61	0	13	16	= 117
2020	28	35	0	20	16	= 99
2021	39	58	0	17	21	= 38
2022	23	41	3	10	7	= 84

Table 2: Most common class of restorative procedures per year with two most common classes highlighted in yellow for each year 2017-2022

There were a total of 595 restorative procedures completed on 153 patients between 2017 and 2022, which comprised primarily posterior direct restorations (249, 42%, Figure 6). There were also 174 anterior restorations, 5 inlays/onlays, 78 crowns, and 89 other restorative procedures completed.

Anterior and posterior restorations were the most common procedures (Table 2). The one exception to this is the year 2017, where the top 2 restorative procedures were anterior restorations and other restorative procedures.

Patients who underwent restorative treatment were taking a variety of biologic agents. The most popular biologic agents taken by restorative patients were adalimumab, followed by etanercept, and infliximab (Figure 7). Of the 153 patients who had restorative treatment, 92 were treated with TNF inhibitors, 43 were taking interleukin inhibitors, and 17 were taking B and T cell inhibitors.

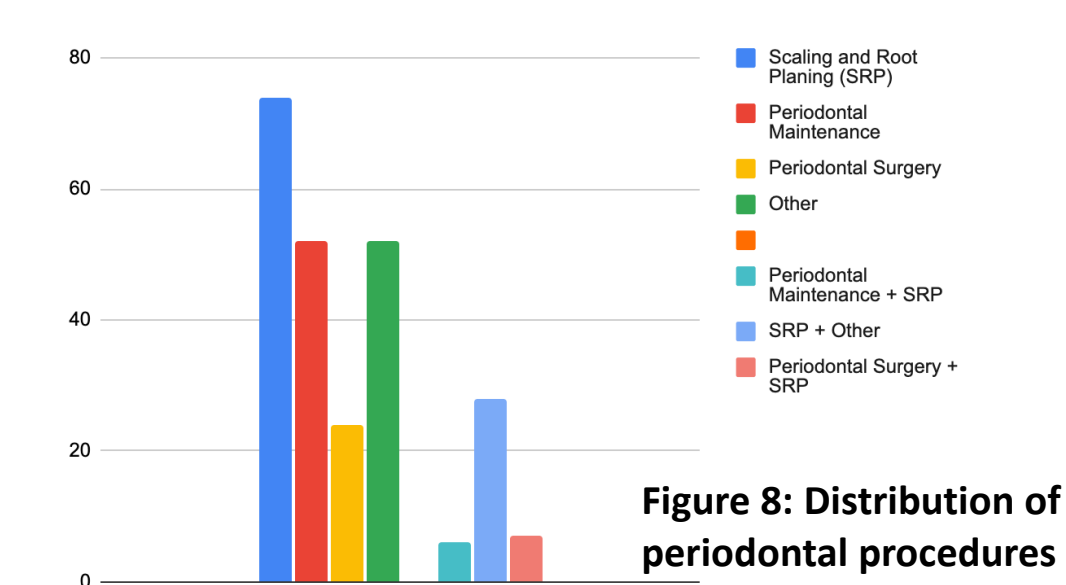


Figure 8: Distribution of periodontal procedures

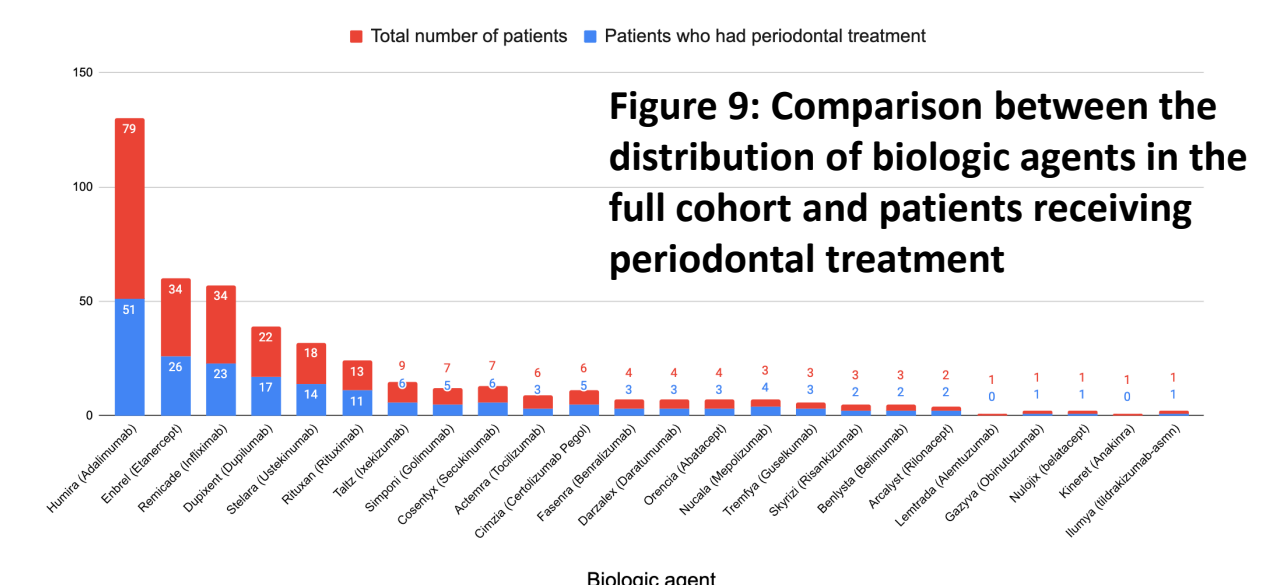


Figure 9: Comparison between the distribution of biologic agents in the full cohort and patients receiving periodontal treatment

A total of 180 patients had periodontal treatment. Scaling and root planning (SRP) was the most common type of procedure (Figure 8). The next most common periodontal procedure was a periodontal maintenance appointment, followed by other periodontal procedure. The "other" category consisted among other things of bone grafts, implant placements, palliative treatments. The fewest patients had both periodontal maintenance and SRP. Figure 9 demonstrates the frequency of periodontal treatment in patients taking biologics compared to the overall cohort. Nearly every biologic represented in our cohort had some number of patients who underwent periodontal treatment except for alemtumumab and anakinra.

## SUBGROUP DEMOGRAPHICS

There were a total of 155 patients who underwent restorative treatment. Of these restorative patients, there was an average birth year of 1976, 85 were female, 69 were male, and 1 patient was transgender. In terms of racial background, 35 were White, 25 were Black or African American, 2 were Hawaiian or Pacific Islander, 1 was Asian, and 91 were unreported or "other" race.

Of the 180 patients who received periodontal treatment while being treated with a biologic agent, the average year of birth was 1968. There were 107 females and 73 males. There were 101 patients unreported race, 30 Black or African American, 34 White, 4 other, 5 Native Hawaiian or other Pacific Islander, and 4 Asian patients.

DMFT was collected for each patient. On average, patients had 1.61 decayed teeth, 4.76 missing teeth and 6.75 filled teeth.

Fourteen patients (5.5%) were classified as "emergency" treatment as defined as first and last treatment dates within one month of each other. Three of these fourteen received extraction treatment. Eleven of the fourteen patients (78%) were on TNF inhibitors which is greater than the approximately 60% of the total patient population on TNF inhibitors. Three patients were being treated for Rheumatoid Arthritis, two for Crohn's disease, two for Psoriatic arthritis. Eight of the fourteen (57%) were female which is similar to the ratio of females in the total patient population (152/255 = 60%). 100 patients had tooth extraction treatment with an average of 3.54 teeth extracted. Of these patients, 62 were female and 38 were male. This patient population had a higher average number of missing teeth of 7.75 teeth relative to the total population average of 4.76. Approximately half of the total number of patients on interleukin inhibitors received extraction treatment compared to approximately one third of patients who were on TNF and B Cell inhibitors (Figure 4).

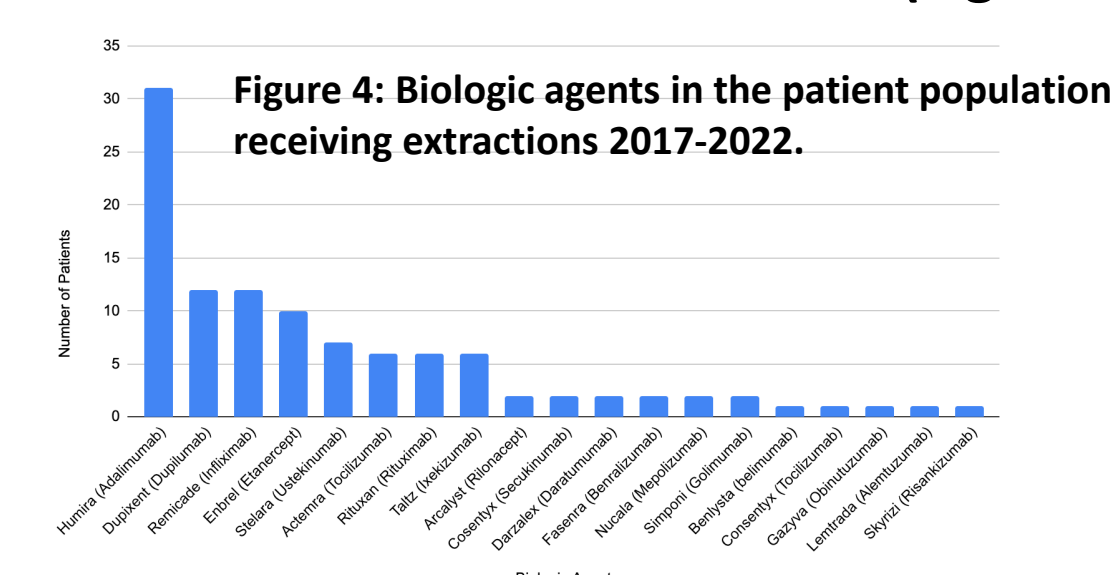


Figure 4: Biologic agents in the patient population receiving extractions 2017-2022.

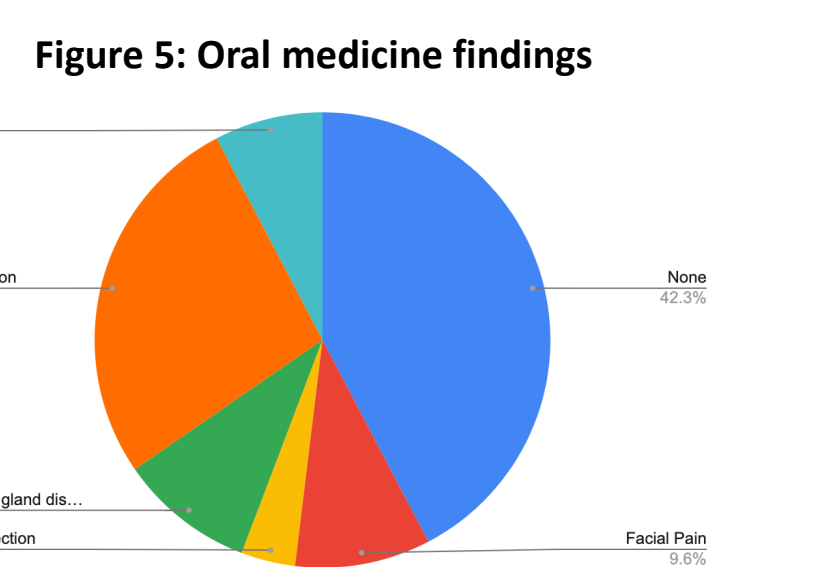


Figure 5: Oral medicine findings

53 patients in our population had oral medicine consultations. The most common oral medicine finding was an oral lesion (Figure 5) and the most common diagnosis was mucositis. Of these patients, 32 were female and 19 were male and the most common biologic agent was adalimumab, followed by infliximab, and etanercept.

## CONCLUSIONS

This study presents the first assessment of dental status in patients treated with biologic agents of three classes encompassing therapy for a variety of autoimmune, inflammatory, and malignant disorders and begins to characterize the impacts of these agents on patients taking them and presenting for dental treatment.

All eligible patients on biologic agents as well as specific populations were assessed for potential impacts on dental status. The emergency, extraction and oral medicine patient populations had no remarkable differences in treatment frequency or outcome from the total patient population. More evidence is required to understand whether complications overall or of particular types are expected in these patients.

When looking at the patients who underwent restorative treatment, there were no notable findings compared to expected rates in patients not taking biologic agents. Anterior and posterior restorations were the most common procedures completed on restorative patients taking biologic agents.

Of the patients that underwent periodontal treatment, rates of periodontal disease and treatment were similar to those found in the overall population. However, it can be noted that nearly all the patients on biologics had some form of periodontal treatment during care.

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