Research Article Review:

"Autoimmune Diseases and Oral Health: 30-Year Follow-Up of a Swedish Cohort"

NYCCT Dental Hygiene

Lamia Ahmed

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"Autoimmune Diseases and Oral Health: 30-Year Follow-Up of a Swedish Cohort"

Summary of the Article:

This 30-year follow up of a Swedish Cohort study was conducted to find a link between poor oral health hygiene and the incidence of autoimmune diseases. Subjects were selected in 1985, and then followed up again in 2015. Oral infections, such as gum disease or periodontitis up-regulate a number of systemic inflammatory reactions that play in a role in the development of systemic diseases such as diabetes, cardiovascular diseases and even cancer. In this study, 1676 subjects from Stockholm, Sweden were randomly selected and observed.

The results showed that the subjects who had autoimmune diseases, which were 50 people from the sample of 1676, did have higher plaque index scores, which is indicative of poor oral hygiene, and due to this factor were more likely to develop autoimmune diseases in 30 years. Although this study did have it's limitations, and lots of health and behavioral characteristics were not available to the researchers, this study examines something very important. The sample size for this study was also ethnically homogenous and the results cannot be applied to generalized populations, it is an important study that should be taken into consideration when dealing with our patients, as it highlights the reasons why the plaque index score could be higher for someone who has an autoimmune disease as opposed to someone who does not.

Article Information:

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2. Written by: Anna Julkunen, Anna Maria Heikkinen, Birgitta Soder, et al.
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Study Analysis:

1. **Study Type:** The study in this article is a retrospective longitudinal 30 year cohort study of Swedish adults, from the year 1985 to the year 2015. Overall, 1,676 subjects between the ages of 30-40 years, were randomly selected, and their Calculus Index, Gingival Index, Plague index and periodontal pocket depth were observed, and followed up in 30 years.

2. **Study Purpose:** As per the authors, this study was conducted to see if there could be a link between poor oral health and autoimmune diseases. Periodontitis is already known to be associated with many systemic conditions such as Rheumatoid Arthritis and Diabetes, as well as cardiovascular disease and even cancer. On this basis, the authors wanted to investigate if a similar incidence can be found between poor oral health and if that could lead to or contribute to autoimmune diseases. There are many contributing and risk factors to autoimmune diseases, such as genetics, age, gender, hormones and reproductive status. Both Periodontitis and autoimmune diseases are known to be multifactorial, as well as both are a response to bacterial, viral or microbial infection, so the hypothesis of the authors are that poor oral health can affect the incidence of autoimmune diseases.

3. **Experimental Design:**
A. For this study, there was no control group. A cohort of 1676 individuals ultimately became the subjects of this study. Initially, 3273 individuals were invited to be a part of this study. The only requirements were that they were residents of Stockholm and were born between 1945 and 1954. Of all the individuals who were asked, ultimately 1676 responded and wanted to take part in the study. This group of 1676 subjects, was further divded into two groups, group of individuals with autoimmune diseases (1626), and individuals with autoimmune diseases (50).

B. This study was conducted over 30 year period between 1985 and 2015.

C. The subjects hospital and open health care admissions (World Health Organization ICD 9 and 10 codes) were recorded from the Swedish national health registers. All subjects were required to fill out a questionnaire which asked for information such as gender, work status, and health behaviors (smoking/non smoking). A clinical examination observed and recorded the subjects' plaque index, gingival index, calculus index, probing depths equal to and greater than 5mm, and number of missing teeth. Further information regarding autoimmune related diseases were used and obtained from the Center of Epidemiology of the Swedish National Board of Health and Welfare. Socioeconomic data was also used, obtained from the National Statistics Center.

D. The data collected during this research was analyzed statistically. The following factors were considered statistically significant: sex, smoking status (current smoker/former smoker/non-smoker), snuff use, working status, periodontal pocket depths, missing teeth, and median values of plaque index scores, calculus index scores and gingival index scores. The subjects' oral health and background variables were statistically analyzed and compared to each other

E. P-Values less than 0.05 were considered statistically significant.

4. **Results:**
Statistical analyses were carried out by the SPSS Base 15.0 Statistical Software Package (SPSS Inc.,Chicago, IL, USA). Comparisons were made by cross-tabulation, chi-square test, and binary logistic regression.

The subjects were separated into two groups: patients with autoimmune disease (N = 50) and patients with no autoimmune diseases (N = 1626) autoimmune disease. Sex distribution and smoking and snuff use did not have any affect on the results of the study. . Oral health data showed no difference between groups in the number of periodontal pockets or missing teeth. Patients who had autoimmune diseases and also ≥5 mm periodontal pockets were diagnosed with Type 1 Diabetes (3 patients), rheumatic diseases (4 patients), Henoch-Schönlein purpura (1 patient), and colitis ulcerosa (1 patient).

Twenty-three patients (46%) with autoimmune disease as well as 720 patients (44%) without autoimmune disease had missing teeth ($p = 0.885$). The number of missing teeth per person varied: 1–6 among the autoimmune disease patients, 1–28 among patients with no autoimmune disease, respectively.

The presence of autoimmune disease associated with higher plaque index score (crude odds ratio (OR) = 2.00, 95% confidence interval (CI) = 1.09–3.70, $p = 0.016$). When adjusted by gender and use of snuff the result remained the same (adjusted OR = 2.30, 95% CI = 1.17–4.56, $p = 0.016$). No statistical significant difference was found in gingival index scores of patients with and without autoimmune disease diagnosis. Calculus index scores did not either differ between the groups.

An interesting trend was found among the subjects with autoimmune disease being less active in work/working than those with no autoimmune disease diagnosis

5. **Conclusions:**
Based on the results and the data, the authors conclude that a higher plaque index score appeared to have some affect on the development of autoimmune diseases with the 30 years that they were observing. They also concluded that subjects with autoimmune diseases were most likely to miss work, or not work due to their condition.

High plaque index scores reflect poor oral health hygiene at home, and the plaque index scores for subjects with autoimmune disease were significantly higher in than their counterparts (subjects without any autoimmune diseases). This could be due to a couple of factors. Rheumatic patients might have an issue with dexterity (arthritis or paint in joints) that could prevent them from brushing or flossing properly. Another factor could be that most anti-inflammatory medications, and medications prescribed to help manage autoimmune diseases could have oral side effects that can effect plaque index scores. However, there was not a record kept or maintained on any of the medications being taken by the subjects.

There were limitations of the this study however. To begin with, the sample of subjects were ethnically homogenous. This study may say a lot about Swedish people, however it can not be applied to other generalized populations. Other limitations were the limited information on health and behavioral habits, such as how frequently the subjects were brushing. An extended medical and family history was not taken into account when getting information on the subjects, especially the group of subjects who had autoimmune diseases. Since there are many factors that can contribute to autoimmune disease, most importantly there is a genetic factor. It was not noted

whether the subjects had anyone in their family who also suffered from autoimmune diseases.

Considering these limitations, the argument that poor oral health will lead to some autoimmune diseases was only speculation.

6. **Impression**

This article peaked my interest I was diagnosed with sarcoidosis, an autoimmune disease, in December of 2020. Sarcoidosis is a disease where the autoimmune response is to attack the lymphatic system, the lungs, the skin or the eyes. Granulomas form where the immune system causes damage. I had many granulomas in my chest, in my lymph nodes surrounding my lungs and heart. Currently I'm on anti-inflammatory medications, which causes xerostomia, along with a weakened immune system. As we know, xerostomia can lead to a play ground from the microbes in your mouth and optimal for calculus formation, and a weakened immune system is just the opportunity that pathogenic microbes need to effect your periodontal tissues.

I think it's important for me as a future dental hygienist to be aware of this, because these are all factors that can lead to poor oral health hygiene or care at home. Certain autoimmune diseases can even lead to dexterity problems that can lead to improper or difficulty brushing and flossing (as was described regarding subjects with rheumatoid arthritis in this study).

As dental hygienists we have an obligation to teach our patients the best way to take care of their oral health, and some patients need specialized care and recommendations. A patient who is having issues with dexterity due to rheumatoid arthritis should be recommended to use an electric tooth brush, which does most of the work for the user, and does not require the user to manually brush in order to effectively clean.

It's also important to educate patients, especially those who are taking anti-inflammatory medications. It's important to educate patients about their medications and how it can cause xerostomia. In a case where my patients is experiencing xerostomia, I would recommend them a dentrifice that is SLS free, and recommend that they drink more water on a daily basis. The SLS free toothpaste should help with not further drying out the oral environment. If those recommendations don't help, then we can explore mouth rinses that are specially formulated for people with dry mouths.

7. **Reference**

Julkunen A, Heikkinen AM, Söder B, Söder PÖ, Toppila-Salmi S, Meurman JH. Autoimmune Diseases and Oral Health: 30-Year Follow-Up of a Swedish Cohort. Dent J (Basel). 2017 Dec 22;6(1):1. doi: 10.3390/dj6010001. PMID: 29563402; PMCID: PMC5872203.