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Oral health in a cohort of individuals on a plant-based diet: a pilot study

DEN 1200 Section 2B

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## **Summary of the article**

M. Mazur, S. Bietolini, D. Bellardini, et al. conducted a cohort study to analyze the oral health of adults who had been following a plant-based diet for a least 24 months. The study took place in Italy over a period of 6 months and was published in *La Clinica terapeutica* in the March-April 2020 edition (<https://pubmed.ncbi.nlm.nih.gov/32141486/> doi: 10.7417/CT.2020.2204).

77 participants took part in the study which consisted in 2 phases. The first phase consisted in two questionnaires in which information of the participants was gathered such as eating habits and their oral health. The second phase consisted of an oral exam on 20 patients out of the 77 who took the questionnaires. Gingival recession was noted in all participants, bleeding on probing on half of the participants, and plaque on 70% of the participants. Based on the statistics of these findings only a correlation between consumption of fruits during lunch and an increase protection against caries was noted.

The authors concluded that the small number of participants played a big factor in the limitations of their findings. They also mentioned that the lack of a control group could have also caused less data to be gathered. The authors aim to learn more about the relationship between the oral health and plant-based diets.

## **Article Information**

The title of the article is “Oral health in a cohort of individuals on a plant-based diet: a pilot study” by M. Mazur, S. Bietolini, D. Bellardini, et al.. The article was published on *La Clinica terapeutica* on the March-April 2020 edition (<https://www.clinicaterapeutica.it/ojs/index.php/1/article/view/48>). Article link was also published in pubmed (<https://pubmed.ncbi.nlm.nih.gov/32141486/>). The DOI of the article is 10.7417/CT.2020.2204. The author did not list any conflict of interest.

## **Study analysis:**

### **Type of study**

The study type conducted was a cohort study. The study was conducted in Italy and began in September 2015. The study was done over a period of 6 months.

### **Study purpose**

The authors stated that “there is little available data on oral health in individuals consuming a plant-based diet” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). The authors conducted this study to “investigate the general and clinical oral health status of a cohort of adults who had been following a plant-based diet for a minimum of 24 months” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). The information known before the study about plant-based diets and the overall health was positive. Plant-based diets have been linked with “longer life expectancy compared to other diets” and “clinical and epidemiological studies conducted over the past 30 years show that the choice of plant-based diet is associated with a lower body mass index, lower rates of death from ischemic heart disease, lower serum cholesterol and a lower incidence of high blood pressure, diabetes mellitus type II and cancer (prostate and colon)” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). Plant-based diets go against “most dietetic recommendations widely found in the literature” but a recent paper published by the Academy of Nutrition and Dietetics said that plant-based diets “are appropriate throughout the entire life cycle, providing that they are appropriately planned” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). Dietary habits have been linked to “white spot lesions (incipient enamel demineralization), dental erosion, erosive tooth wear and abrasion” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). A clinical study comparing a sample of 15 subjects following a plant-based diet with 15 who served as a control showed that there was “a higher prevalence of white spot lesions on buccal surfaces” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). The author’s aim was to expand the research about the relationship there is between plant-based diets and the oral health.

### **Experimental design**

The authors decided to use a sample greater than or equal to 70 participants with no control group. However, in their discussion they did compare the results in this study with the results of the Italian population in previous studies. A total of 77 adults whose ages ranged from 21-67 were “recruited mainly through social networks in Central and North Italy” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). 35 of the participants were male and 42 were female. The participants selected must have been following a plant-based diet for a minimum of 24 months and must not have any “relevant medical conditions” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020).

The study was conducted over a period of 6 months and was divided in 2 phases. In the first phase 2 questionnaires were taken by all 77 participants. The first questionnaire's aim was to "investigate risk areas of oral disease" (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). The measures taken were age, weight, oral hygiene habits, types of food intakes, alcohol consumption, if they smoked, oral health issues, dental sensitivity (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). The second questionnaire was given "to investigate the Oral Health Related Quality of Life (OHRQoL) and identify problems, unfavorable oral conditions and dysfunctions that could possibly affect the patient's quality of life, well-being, and self-esteem" (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). There was also a second phase where a clinical examination was conducted on 20 of the 77 who took the questionnaire, by a team of dentist and dental hygienist. Each patient had their oral cavity evaluated and data was collected. The measures taken in phase 2 were plaque score, calculus detection, gingival recession, bleeding on probing, enamel hypomineralization, dentine hypersensitivity, erosive tooth wear, and caries activity.

The researchers analyzed their findings statistically. They compared nutritional habits with "other variates" such as "caries, recession, erosive tooth wear, abrasion..." and only the ones with significant correlations were analyzed further (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020).

The researchers were calibrated in the second phase of the study when an oral exam was conducted on the 20 participants. A "team of dentist/ hygienist at 1<sup>st</sup> Observation Unit of Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome" were the ones conducting the oral examinations (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020).

## **Results**

Based on phase one's first questionnaire the researchers were able to find that the mean of years the 77 participants have been on a plant-based diet averaged to around 4 years. Average daily food and drink intake was 3 times a day. 41.55% of participants stated losing weight after starting a plant-based diet and average weight loss was 6.84 kg. Around 15% of participants said to be smoking tobacco, questionnaire results showed that on average they smoked for 11 years "with an average consumption of 7 cigarettes per day." 5.2% of participants stated having gastroesophageal reflux. 11.7% "reported a previous or current long period of drug intake" (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). 6.5% of participants reported having a food

allergy. 62.3% of participants stated eating fruit for breakfast. 44.15% of participants stated never having consumed beer or wine while 55.84% they did sometimes. 84.41% stated never having consumed spirits while 15.58% said they do sometimes. 74.02% of participants have never consumed carbonated drinks while 25.79% of participants said they do sometimes. 80.51% answered that they never consumed sugared drinks while 19.48% of participants stated they did sometimes. Regarding their oral health, based on the responses on the questionnaires, the average times the participants brushed their teeth was 2 times a day. The last visit to the dentist by the participants averaged to around 13 months and the last oral hygiene appointment the participants had averaged to around 19 months. Since starting the plant-based diet 7.8% of participants stated presence of apthosis. 10.4% of participants said they had gingival irritation, 26.0% of participants stated that their gums would bleed when they brushed their teeth. 3.9% of participants said they had heat sensitivity while 23.4% said they felt cold sensitivity. 14.3% of participants stated they had bruxism, 5.2% stated to have periodontitis, 44.2% reported they had caries, 16.9% said they had dental extractions, 36.4% said they had dental fillings, 7.8% said they had dental implants (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). The second questionnaire, Italian version of Oral Health Impact Profile-14 or IOHIP-14, “respondents answered “never and almost never” in a percentage ranging from 87% to 100%. Only with respect to pain did 41% of participants answered sometimes” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020).

Phase 2 of the study was an intraoral exam conducted on 20 participants, of the 77, who had completed the questionnaires in phase 1. 70% of the 20 participants “showed visible dental plaque”, 50% of participants had calculus, and 55% had bleeding on probing, all had some recession, “a mean of DMFT index of 4.95 was found with D=6%, F=88%, and M=5%...”, 15% of participants showed enamel vestibular hypomineralization, “erosive tooth wear was found in 3 subjects (15%) with a BEWE score of 1...”, 49% of participants had dentine sensitivity (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020).

Based on the statistics of the data there was one significant finding. The research article states, “The multiple regression analysis revealed that only one variable, fresh fruit consumption at lunch ( $p < 0.05$ ), had a protective effect against caries. The probability of developing no caries was 81.25% in subjects who consumed fresh fruit at lunch and 49.18% in subjects who did not” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020).

## **Conclusions**

The authors concluded that “individuals on a plant-based diet have good overall oral health conditions and exhibit good self-care” which is “in agreement with the behavior of these subjects towards an overall healthy lifestyle” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). They compared the results of the participants in this study with that of the Italian population, based on previous studies. For example, “50% of the subjects reported one dental visit in the last three years” while in the Italian population “29.2%... reported one visit in the last three years” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). The authors stated that there was “no correlation... between caries, recession, erosive tooth wear, abrasion hypersensitivity, periodontitis and the lifestyle habits of the population following a plant-based diet ( $P < 0.05$ ), except for the fresh fruit consumption during daytime variate” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). Referring to the gingival recession present in all participants they concluded that it could be due to many factors such as incorrect brushing technique or harsh materials. Their findings contribute to the further understating of the subject because dietary habits have been linked to the oral health. We can see through this study that there was correlation between consumption of fruits during lunch and protection against caries, but the main takeaway was the participants awareness of having to visit their dentist and dental hygienist. Knowing the lifestyle of a patient who follows a plant-based diet informs us on their point of view of self-care which includes oral care.

The authors mentioned that there was a “lack of a control group”, and the number of participants was limited, “making the conclusions difficult to generalize” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). For the next studies they propose having a larger group of participants that follow a plant-based diet and “a well-structured control group” (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020). The authors propose what should be studied next is the incidences of oral conditions and enamel defects in children with vegan pregnancies and vegan nutrition in the first five years of their life (M. Mazur, S. Bietolini, D. Bellardini, et al., 2020).

## **Your impression**

The study conducted by these researchers, in my opinion, is very important because as dental hygienist we learn that many foods can affect the teeth, like staining. I think learning about dietary habits that are popular nowadays is key to understanding our patients. Learning about their overall care allows us to understand how important they view oral care. It also allows

us to recommend products that may fit into their lifestyle. While this study was not able to show much difference between the oral health of a person following a plant-based diet compared to the general Italian population I think it opened the gate to further studies. Personally, I would like to see a study with participants who try out a plant-based diet for a period and then go back to their usual dietary habits. I would like to compare their oral health during these two time periods and see if there are any changes.

It was interesting to learn the correlation that existed between the consumption of fruits at lunch with an increase of protection against caries. I think it is important to learn how different types of diets and foods influence the patient's oral health. This could be key towards recommending patients to avoid certain foods or encourage them to consume others that we know could benefit them.

### **Works Cited**

Mazur, M., Bietolini, S., Bellardini, D., Lussi, A., Corridore, D., Maruotti, A., Ottolenghi, L., Vozza, I., & Guerra, F. (2020). Oral health in a cohort of individuals on a plant-based diet: a pilot study. *La Clinica terapeutica*, *171*(2), e142–e148.  
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