Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i3.5213

THE DIFFERENCE IN GINGIVAL INDEX BETWEEN LEFT-HANDED AND RIGHT-HANDED PATIENTS BEFORE AND AFTER PERIODONTAL SCALING

Dr Ujala Mushtaque[1*], Dr Rumaisa Tariq[2], Dr Aisha Naveed[3], Dr Bashair Rangoonwala[4], Dr Adeela Saif[5], Dr Hadiqa Fatima[6]

[1*]Assistant Professor, Head of Department, Periodontology, Jinnah Medical and Dental College, Karachi, Pakistan Email: drujala@hotmail.com
[2]Lecturer, Department of Periodontology, Jinnah Medical and Dental College, Karachi, Pakistan Email: rumaisatariq@gmail.com
[3]Lecturer, Department of Periodontology, Jinnah Medical and Dental College, Karachi, Pakistan Email: aisha_naveed19@hotmail.com
[4]Dental Surgeon, Jinnah Medical and Dental College, Karachi, Pakistan Email: bashair.97@hotmail.com
[5]Dental Surgeon, Jinnah Medical and Dental College, Karachi, Pakistan Email: doctor.adeela@gmail.com
[6]Dental Surgeon, Jinnah Medical and Dental College, Karachi, Pakistan Email: mn95@hotmail.co.uk

***Corresponding Author:** Dr Ujala Mushtaque
*Assistant Professor, Head of Department, Periodontology, Jinnah Medical and Dental College, Karachi, Pakistan Email: drujala@hotmail.com

Abstract

Objective

Patients' motivation and self-care are essential for professional periodontal therapy, as it is effective for removing bacterial plaque from tooth surfaces. The primary goal of the research was to determine how the gingival indices of left- and right-handed patients differ before and after periodontal scaling.

Methods

A cross-sectional study with one hundred patients who were referred to the Department of Periodontology at Jinnah Medical and Dental College, Karachi, Pakistan was conducted. Two main types of patients were selected one who used their left hand and the other who used their right hand. Pocket depths, mean gingival and plaque indices were recorded along with gingival diseases.

Results

In the study of the right hand, patients with gingival disorders were found to be significantly higher. These findings suggest a possible link between handedness and gingival issues. The findings emphasize the importance of enhancing gingival health by implementing specific interventions to improve oral hygiene habits and reduce the risk of periodontal disease.

Conclusion

The findings showed that the ideal gingival health is compatible with left-handed individuals as they have better oral hygiene. Dentists can prevent the harmful consequences of using only one hand (right or left) by encouraging their patients to use both hands while performing oral hygiene procedures.

Keywords
Gingival Index, Left- or right-handedness, Oral Hygiene, Periodontal Index, Periodontal treatment, Scaling

INTRODUCTION

The high incidence rates and significant socioeconomic impact of periodontal disease on society have made this disease an important public health concern (1). Periodontal disease development and progression are thought to be influenced by dental plaque. The dental plaque biofilm that is collected from oral surfaces is made up of a diverse range of organisms. The accumulation of dental plaque, which is associated with periodontitis, is a chronic inflammatory disease characterized by the gradual degradation of the tissues supporting teeth, including the periodontal ligament and alveolar bone (2). Plaque buildup on the gingival margin causes gingival inflammation, which has the potential to persist over time. Gingival redness, and bleeding upon probing are the hallmarks of an inflammatory disorder known as gingivitis; there is no discernible loss of alveolar bone or tooth-supporting structures. If properly treated, gingivitis is reversible and does not cause permanent damage. But if ignored, it can develop into periodontitis, which can destroy alveolar bone and ultimately result in tooth loss (3). The disease is caused by a complicated web of dynamic interactions between harmful host immune responses, particularly bacterial infections, and environmental variables (4). Periodontal pathogens are necessary but not alone responsible for the development of disease in the absence of a susceptible host, bacterial plaque continues to be the main cause for the beginning of periodontal disease. Over 11% of adults suffer from severe periodontitis, which also has systemic inflammatory effects and is a primary cause of tooth loss that impairs speech, nutrition, quality of life, and self-esteem. Other factors influencing the disease progression include genetics, smoking, and hormonal imbalances. Insulin, as a hormone, plays a critical role in the maintenance of periodontal tissue integrity (5). Bacteria's ability to breach the host-epithelial barrier, protected by gingival crevicular fluid (GCF) flow and various antimicrobial peptides, plays a crucial role in determining the severity of periodontal damage (6).

The treatment and prevention of periodontal disorders both depend on the removal of bacteria from the tooth surface. Plaque removal from tooth surfaces that was effective requires a combination of expert care and the specific attention and motivation of each patient. Since dental and periodontal problems are usually connected to the oral hygiene performance of individuals, tooth brushing was crucial. Tooth brushing was always considered the simplest and most efficient way to meet oral hygiene requirements for the removal of bacterial plaque from tooth surfaces (7). It was emphasized that brushing method, frequency, duration, applied power, experience, and knowledge regarding good oral hygiene create great differences in the removal of plaque from the surface (8).

Among the personal characteristics that contribute to various cognitive and pragmatic capacities, such as the ability to follow oral hygiene recommendations, was handedness. It seems that individuals who were right- or left-handed vary in their capacity to brush and remove plaque from different areas of the mouth (9). The tendency to use one's dominant hand, sometimes referred to as handedness, to accomplish tasks more quickly and accurately (10). However, the dominant hand was more challenging when it comes to handedness. Some individuals may have a rare ability that enables them to use both hands equally. They should be seen as exceptions, however. Most people were usually either left- or right-handed (11). Several studies have explored the effects of brushing variables on dental and oral hygiene (12). However, little research has been done on the connection between hand preference and understanding of correct brushing techniques and oral hygiene. Additionally, there was a need to identify the group of individuals who sustain a good gingival index and oral hygiene after receiving scaling and education on proper brushing techniques. According to research conducted so far, left-handed individuals generally exhibit better oral hygiene practices. However, no local study has been carried out in Pakistan yet. This research aims to examine the oral health status of patients before and after scaling procedures in both left- and right-handed individuals.

OBJECTIVE

To assess the difference in gingival index between left-handed and right-handed patients before and after periodontal scaling.

MATERIAL AND METHODS

A Cross-sectional study was conducted in the periodontics department of Jinnah Medical and Dental College, Karachi, Pakistan among 100 patients. Patients were placed into two groups: Those who used their left hand and those who used their right hand. The inclusion criteria of the study were Left-handed and right-handed individuals belonging to the age group (18-25) and the exclusion criteria included patients with systematic disease, teenagers, infants, and old aged people.

The patients were clinically evaluated and provided with a questionnaire to divide them into their respective groups Gingival index was recorded and scaling was performed. Almost every clinical evaluation was carried out for one week and three months. Pocket depths, mean gingival and plaque indices were recorded along with gingival diseases, smoking patterns, and frequency of brushing among the patients.

Inflammation in the areas was assessed using a gingival score (scale: 0 = none to 3 = severe), and dental plaque accumulation was measured using a dental plaque score (scale: 0 = none to 3 = numerous) (13,14). A periodontal pocket probe (WHO probe, Paul Leibinger GmbH, Tuttlingen, Germany) was employed for evaluation.

The gingival and dental plaque indices for each patient were calculated as the average scores of all teeth, based on the means of the four regional gingival and dental plaque scores for each tooth.

Measurements were taken around each tooth to determine the pocket depth, which was the distance between the base of the pocket and the gingival margin. The average depth for each patient was then calculated. In individuals with healthy gums, periodontal pockets typically range from 2 to 3 mm and result from the deterioration of the underlying periodontal tissues (13).

The SPSS software version was utilized for data analysis. The mean and other descriptive statistics for each measured variable were computed. Chi-Square was employed to assess statistical variances between the different groups.

RESULTS

According to the study findings total of 43.2% of males belonged to right-handed and 46.6% belonged to left-handed. Similarly, 54.8% of females belonged to right-handed and 51.4% belonged to left-handed as shown in Table I.

Table I-Demographic characteristics of left and right hands individuals

Variables	Right-Handed	Left-Handed	Total
Age	30 (18-25)	22 (18-25)	31.5 (18-25)
Male **Female**	41 (43.2%) 52 (54.8%)	9 (46.6%) 10 (51.4%)	51 (43.8%) 63 (54.2%)
Frequency of Brushing **Rare** **Once** **Twice**	 18 (19%) 39 (41%) 38 (40%)	 1 (4.8%) 12 (57.1%) 8 (38.1%)	 19 (16.4%) 51 (44%) 46 (39.6%)
Pattern of smoking **Never smokers** **Heavy smokers**	 68 (71.6%) 27 (28.4%)	 17 (80.9%) 4 (19.1%)	 85 (73.3%) 31 (26.7%)

Table II-Comparison between the groups of gingival, plaque indices, and pocket depths

Variables	Right-Handed	Left-Handed	p-value
Gingival Index	1.31	0.51	<0.01*
Plaque Index	1.60	1.05	<0.05*
Pocket Depth	1.91	1.95	>0.05

Table III- Comparison of periodontal diseases between the groups

Type of Disease of Periodontium	Right-handed	Left-handed	Total
Gingival Disease	54 (56.9%)	16 (80%)	71 (61.1%)
Periodontal Disease	39 (41.1%)	3 (18%)	43 (36.15)

DISCUSSION

Maintaining proper oral hygiene was crucial for maintaining dental and oral health, and it was typically closely linked to gingivitis, periodontitis, and dental caries (9). In this era, there was ample evidence linking dental plaque to the start of periodontal disorders. It was difficult to attribute the diseases of periodontium to the effect of local harmful elements because various factors affect an individual's periodontal disease severity and extent, including host responsibility and variations in dental microbiota (15). It was claimed that dental hygiene practices impact periodontal disease. Hand preference and manipulation were linked to genetics, neuromuscular structure, and cerebral function (16). Patients who use their left hand were more skilled than those who use their right in artistic disciplines like music and sketching. They were also superior at maintaining dental hygiene (17,18). The results of the study revealed that left-handed patients proved to have better oral hygiene, periodontal, and gingival indices than the patients with right-handed which was similar to the study conducted by Tezel et al., which also revealed that left-handed individuals tend to maintain better oral hygiene, resulting in reduced bad breath (19). According to several studies, left-handed people typically have superior periodontal, gingival, and oral hygiene than right-handed people. According to a study conducted by Ozden et al., left-handed individuals had superior oral hygiene as well as higher PI and GI indices than right-handed individuals. Left-handed people tend to have superior oral hygiene, which is consistent with optimal gingival health and may be related to their unimpaired neuromuscular abilities (20). Hence all patients should be given appropriate oral health instructions to have healthy oral health. The study's single-center design along with the small sample size were its main drawbacks. The oral cavity being a vital organ of the body shouldn't be overlooked at any stage of life. In addition to other related aspects, a specialized oral management plan should be followed to address oral health difficulties.

CONCLUSION

The study has concluded that left-handed individuals have better gingival health and oral hygiene. Still, additional neurologic testing must be done to validate the findings. Hence the use of both hands should be promoted while applying oral hygiene treatments, to prevent the harmful consequences of using only one hand.

REFERENCES

1. Tonetti MS, Eickholz P, Loos BG, Papapanou P, Van Der Velden U, Armitage G, Bouchard P, Deinzer R, Dietrich T, Hughes F, Kocher T. Principles in the prevention of periodontal diseases: consensus report of group 1 of the 11th European Workshop on Periodontology on effective prevention of periodontal and peri-implant diseases. Journal of Clinical Periodontology. 2015 Apr;42:S5-11. http://doi:10.1111/jcpe.12368. PMID: 25639948.
2. Papapanou PN, Sanz M, Buduneli N, Dietrich T, Feres M, Fine DH, Flemmig TF, Garcia R, Giannobile WV, Graziani F, Greenwell H. Periodontitis: Consensus report of workgroup 2 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. Journal of Periodontology. 2018 Jun;89:S173-82. http://doi:10.1002/JPER.17-0721.

PMID: 29926951.
3. AlGhamdi AS, Almarghlani AA, Alyafi RA, Kayal RA, Al-Zahrani MS. Gingival health and oral hygiene practices among high school children in Saudi Arabia. Annals of Saudi Medicine. 2020 Mar;40(2):126-35.
4. Jepsen S, Caton JG, Albandar JM, Bissada NF, Bouchard P, Cortellini P, Demirel K, de Sanctis M, Ercoli C, Fan J, Geurs NC. Periodontal manifestations of systemic diseases and developmental and acquired conditions: Consensus report of workgroup 3 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. Journal of Clinical Periodontology. 2018 Jun;45:S219-29. http://doi:10.1111/jcpe.12951. PMID: 29926500.
5. Mehrotra N, Singh S. Periodontitis. PMID: 31082170
6. Curtis MA, Diaz PI, Van Dyke TE. The role of the microbiota in periodontal disease. Periodontology 2000. 2020 Jun;83(1):14-25. http://doi:10.1111/prd.12296. PMID: 32385883.
7. Iba B, Adamu VE. Tooth brushing: An effective oral hygiene measure. Orapuh Journal. 2021 Jul 31;2(2):e811-.
8. Rudak O, Andruškienė J. IMPORTANCE OF INDIVIDUAL ORAL HYGIENE IN ORAL HEALTH MAINTENANCE: SCIENTIFIC LITERATURE REVIEW. Professional Studies: Theory & Practice/Profesines Studijos: Teorija ir Praktika. 2019 Jan 1(20).
9. Mokhtari S, Sanati I, Babaki FA, Alamdari S, Tavana N. Investigating the effect of handedness on the dental caries pattern, gingival index, and plaque index in 6–10 years old children. Nigerian Journal of Clinical Practice. 2020 Apr 1;23(4):545-9. http://doi:10.4103/njcp.njcp_600_19. PMID: 32246663.
10. Idenya PM, Gichangi P, Ogeng'o J. Directional asymmetry in handedness and hand efficiency. Anatomy Journal of Africa. 2020 Sep 22;9(2):1848-56.
11. Arora A, Saiya P. Effect of handedness in professional dentists. Journal of Dental & Allied Sciences. 2018;7(1).
12. Kumar S, Tadakamadla J, Johnson NW. Effect of toothbrushing frequency on incidence and increment of dental caries: a systematic review and meta-analysis. Journal of dental research. 2016 Oct;95(11):1230-6. http://doi:10.1177/0022034516655315. Epub 2016 Jun 22. PMID: 27334438.
13. Mishra PS, Marawar PP, Mishra SS. A cross-sectional, clinical study to evaluate mobility of teeth during pregnancy using periotest. Indian Journal of Dental Research. 2017 Jan 1;28(1):10-5. http://doi:10.4103/ijdr.IJDR_8_16. PMID: 28393811.
14. Shrestha R, Pradhan S, Baral G. Prevalence of Gingivitis in Second Trimester of Pregnancy. PMID: 37042370.
15. Kinane DF, Stathopoulou PG, Papapanou PN. Periodontal diseases. Nature reviews Disease primers. 2017 Jun 22;3(1):1-4. http://doi:10.1038/nrdp.2017.38. PMID: 28805207.
16. Muñoz-Carrillo JL, Hernández-Reyes VE, García-Huerta OE, Chávez-Ruvalcaba F, Chávez-Ruvalcaba MI, Chávez-Ruvalcaba KM, Díaz-Alfaro L. Pathogenesis of periodontal disease. InPeriodontal disease-diagnostic and adjunctive non-surgical considerations 2019 Jun 6. IntechOpen.
17. ÖZKURT KAYAHAN Z, BARUT G, BAL B. Scanning Time of a Digital Impression Technique: A Comparison Between Left-and Right-Handedness. Turkiye Klinikleri Journal of Dental Sciences. 2021 May 1;27(2).
18. Asenova I. Brain lateralization and developmental disorders: A new approach to unified research. Routledge; 2018 Jan 9. http://doi:10.1080/1357650X.2018.1483941. Epub ahead of print. PMID: 29874155.
19. Tezel A, Orbak R, Çanakçi V. The effect of right or left-handedness on oral hygiene. International journal of neuroscience. 2001 Jan 1;109(1-2):1-9. http://doi:10.3109/00207450108986521. PMID: 11699335.
20. Ozden FO, Ongoz F, Gunduz K, Avsever H. Comparison of the oral hygiene status and gingival

health between left-and right-handed individuals. Journal of Experimental and Integrative Medicine. 2011 Jul 1;1(3):197-200.